


The Value Sieve: A Decision System for Complex Environments

By


John Christopher Corbett
B.Sc., University of Victoria, 1978
M.P.A., University of Victoria, 1994


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We accept this dissertation as conforming
to the required standard


Dr. Jim ~~Cutt~~, Supervisor (School of Public Administration)


Professor Denis ~~Protti~~, Supervisor (School of Health Information Science)


Dr. Rod Dobell, Member (School of Public Administration)


Dr. Roger ~~Davidson~~, Outside Member (Department of Mathematics and Statistics)


Dr. Tom ~~Rosenal~~, Outside Member (University of Calgary Medical School)


Dr. Tom ~~Shoyama~~, External Examiner

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University of Victoria

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Supervisors: Dr. Jim Cutt and Professor Denis Protti


ABSTRACT


The Value Sieve is a framework for making resource allocation decisions in complex environments. The theory and research methodologies employed in its development are founded in the social sciences. Given the social psychological nature of organizational problems, an open systems approach is taken. This approach requires that the target system be considered in the context of its operating environment and that the design includes the ways in which each subsystem interacts with others through inputs and outputs. This approach is intended to avoid the problems created when analysts treat organizations as closed systems and so invest their efforts in determining a detailed internal structure without considering the external environmental forces and the "natural" features demonstrated by open systems. The Value Sieve is an optimization methodology and gets its name from the perspective that optimization in a complex environment requires accountable decision-makers to accept that there will be a series of tradeoffs that are ultimately determined by which outputs and outcomes they value most. This decision framework assists decision-makers in distilling their choices to achieve maximum expected utility for the scarce resources available for allocation. The framework is particularly useful where choices must be made among alternatives with incommensurable output or outcome performance measures. The Value Sieve framework is developed theoretically and conceptually in the first half of the thesis. In the second half, the framework is applied to a set of complex decisions in health and childcare in the public sector and human services in the private non-profit sector.


Dr. Jim Cutt, Supervisor (School of Public Administration)


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Dr. Rod Dobell, Member (School of Public Administration)


Dr. Roger Davidson, Outside Member (Department of Mathematics and Statistics)


Dr. Tom Rosenal, Outside Member (University of Calgary Medical School)



Dr. Tom Shoyama, External Examiner

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Dedication

For Katherine and no other.

Chapter 1: Introduction to the Value Sieve

"What ails the truth is that it is mainly uncomfortable, and often dull. The human mind seeks something more amusing, and more caressing."

H. L. Mencken

"The stoical scheme of supplying our wants by lopping off our desires, is like cutting off our feet when we want shoes."

Jonathan Swift

Preamble

In 1992 I became aware of the problems associated with resource allocation in the health care sector. The Seaton Commission (Seaton, Evans, Ford, Fyke, Sinclair, Webber, 1991) had reported their findings and indicated that the level of care in the BC was just fine, the level of spending was just fine, but that spending could be adjusted to improve efficiency. Those liberated funds could then be directed to issues of health promotion and disease prevention.

The theme of this and other government commissioned studies set about a desire to restructure the system of the delivery of services in the province. The theme became known as "closer to home" and its general goal was to decentralize many of the functions of the Ministry of Health out to independent not-for-profit agencies that are now considered Regional Health Authorities. (At that time these were known as Regional Health Boards or RHBs and Community Health Councils or CHCs)

The Provincial government reacted with all speed to develop and implement a Regional Governance model. One step in this process was the appointment by the government of first Board members for each regional health board¹. Tom

¹ At the time it was expected that elections for Board members would follow in coming years after the boards were established and stabilized by the first group of appointed directors.

Shoyama², a Professor of Public Administration at the University of Victoria and member of the Board of Directors of the local hospital was seconded to the Capital Health Board³, Board of Directors. Professor Shoyama was asked to Chair the finance committee of the CHB and in this way I became involved as Professor Shoyama's graduate student.

The Health Authorities Act, which lay the foundation for the restructuring through the use of the RHBs, envisioned that a majority of the Board of Directors positions would be elected and not appointed in the future. Further, the Act indicated that health professionals, administrators, and union representatives were not to be members of the Board of Directors. Thus a first concern was how to ensure that these individual board members were placed within an information context to deal with the gravity of the circumstances, know the severe consequences of the resource allocation decisions they might make but still facilitate decision making. The Health Authorities Act required transparency of process and so a second part of the problem was to identify the means wherein the board could communicate its beliefs and values to the health professionals, the government and the population.

Open process was believed to be an essential element to protect the integrity of the decision making process and ensure the trust of the population. There was a deep concern underlying the effort to move the decision making to an elected board that political or special interests could deeply damage the quality of the health system. It was clear that an RHB with a budget (in the case of the CHB 450,000,000 1993 dollars) to control all health spending within a geographic space would be a prize for any interest group or coalition of interest groups.

The second and third concerns were cost compression and movement of resources. In practice this can be thought of as "How will it be possible to identify savings in one program/area and move those savings to another program/area?" This would require that the resource allocation method allow the movement of

² Professor Shoyama was the supervisor for my Master's Thesis in Public Administration and we were looking for a good problem as a focus for my thesis paper. We both agreed this was a good problem.

³ The Capital Health Board (CHB) is now known as the Capital Health Region (CHR).

resources to better structure the region at a time when all managers were aware of the significant pressure to achieve cost reduction. This must be placed within the context of knowing that the budget within the CHB was seen to be approximately 10 to 15 percent higher than the provincial resource allocation model suggested as a fair proportion of the provincial health resources. Consequently it would be expected that funding levels in the CHB would be held constant (in practical terms this would be perceived as budget cutting) while other regions received increases⁴. There would be a psychology of hardship in the organization. As a side issue this would suggest that seasoned personnel might be attracted to new areas where spending was increasing and induce some problems in acquiring seasoned personnel in established (constrained) programs.

The fourth concern was the variability in information being used by the various health providers to justify their efforts and the poor information infrastructure that existed within the Ministry of Health and consequently the CHB. It was not clear what was known and what was speculation. Reports and documentation implied much data was available and useful in informing decisions. However, a deeper review of the available data did not support the argument that there was an informed system of service in place. If this was the case then the CHB could not know what it was inheriting from the Ministry of Health and as a consequence could not know what was working well or not working well.

The fifth concern was how to develop a systemic motivation to encourage new ideas and new efforts to provide better health to the population. This is a broader way of framing how many saw the issue that was to ensure that the system could adapt to meet new needs as the demographics of the area changed over time. While one specter in the CHB was the number of seniors it could also be the case that new immigration inflows could adjust the population composition. The point was not the actual demographics but the notion of adjustment and optimization.

This was a wonderful, rich family of problems that required both academic and practical skills and knowledge. The result of this effort led to the Value Sieve, and

⁴ This was a fundamental underpinning to the Ministry of Health provincial resource allocation plan which called for the use of a population based, determinants of health model to "equitably fund" the RHAs of the province.

a Masters Degree focused upon the issues of resource allocation in a generic RHB. This was followed by a consulting contract⁵ to develop the resource allocation methodology to be applied in the Capital Health Region by the CHB.

At that time my concerns were:

- The assumption that the available data provided a strong basis for informed decision making.
- The notion of restructuring such a large system without an understanding of the true current state of affairs increased the opportunities for moral hazard and deference to political solution making.
- Putting large organizations into a mix with smaller organizations would result in the consumption of the smaller agencies and the reallocation of their resources to the goals and purposes of the larger enterprises. I.e. the civil service response to decentralizing the Ministry of Health to get it closer to the people was coupled with the notion of centralizing all the regional agencies.
- The rejection of business models and perspectives because this was health care and we need to be cooperative. This was reinforced by the consistent view by many that a single regional monopoly would be the best/most effective/most efficient organizational structure even though they could argue immediately about why monopolies in the private sector were bad.
- The models of cooperation and decision making being discussed ignored the evidence of the health economics literature, the health literature, and the problems of decision making under conditions of uncertainty, organizational behavior and open system theory.

The result of these efforts was to ask the question: “ what is the most appropriate decision support system for this environment?” At that time I proposed that a monopsony⁶ be created which was simply a purchase and audit office. Its function

⁵ Winning the contract required successfully competing in an open RFP by the Capital Health Board.

⁶ See glossary for definition.

would be to use its monopsonistic power to acquire health related products and services for the population. The goal was to create a simpler business relationship with service providers and beneficiaries of services. By not providing services, the CHB would be capable of minimizing its internal defensive mechanisms and be more capable of seeing the system of services and the allocation of resources as its responsibility. Further, it would mean that the current service providers would not be restructured into states that were not known/understood.

In continuing to develop the Value Sieve and preparing an implementation strategy for the CHB I spoke to hundreds of managers, reviewed hundreds of service agreements, examined the reliability of thousands of data sets, and spoke to hundreds of experts during a six month period. What was clear in many of the discussions with administrators was their ability to make their points based upon general arguments and the poverty of data that was used to support the argument. In many cases a good administrator could argue within whatever context you placed them for whatever service they felt they were providing.

The Capital Health Board approved implementation of the Value Sieve as the regional resource allocation methodology. The implementation plan included leaving the existing separate health organizations as separate organizations until some evidence was available that integration of the various enterprises offered some economic or health advantage to the population. The Board was replaced for political reasons in the next month and all efforts of the new administration were directed towards the government forced merging of the larger independent corporate structures of the region⁷ into a single, even larger corporate structure. The CHB model of health monopsony was exchanged for the CHR model of the health monopoly.

The work of applying the Value Sieve supported the need to continue to establish the theoretical underpinnings of systemic decision framework and information architecture for use in complex environments. At the same time, much needed to

⁷ This regional reorganization has now been attempted twice, once in 1994 and once in 1999. Current changes at the administrative level of the CHR suggest another change in 2001. At this time there is no evidence to support the administrative prescription of reorganization has improved the health of the population.

be done to understand the practical conditions and constraints upon decision-makers. This would need to be given due consideration in order to develop a truly appropriate, workable resource allocation decision support system that could be supported by principals, agents and clients in the field. This Ph.D. dissertation represents that effort.

1.0 Introduction

"For every complex problem there is a simple solution. And it is wrong."

H.L. Mencken

"It is much easier to be critical than to be correct."

Benjamin Disraeli

The complexity of organizational activity is becoming revealed through the development and improvement of information and decision science. To some extent this is because we are becoming an economy based knowledge intensive activities. To do our jobs we must know more in order to make better judgements about the details of each task. However, it is also the case that complexity is being driven by the realization that essential relationships for the success of an organization's product or service must reach beyond the boundaries of individual firms. Success requires the boundaries to be more permeable to communication of information in order to encourage "selective cooperation" among organizations. Information is now frequently identified as the single most important commodity managed by an organization.

Key to the application of information science is the recognition that there are substantive behavioral aspects of how humans incorporate information and make decisions in individual and group settings. There are individual differences in the answers we receive from the simplest questions about the same observable, measurable, identical conditions. Is the glass half full, half-empty, or twice as big as it needs to be? To what extent do our decision systems require that all parties frame the data in the same way to arrive at a decision?

From a practical perspective how can we develop an information system that can manage individual differences in such a way as to reveal both agreement and disagreement? With agreed decisions understood it is possible to direct limited resources to the areas where additional knowledge might be usefully acquired to

resolve consequential disagreements and so avoid the problems of Lilliput⁸ and Blefuscu.

The economics of information is an essential knowledge base in understanding the development of sustainable information systems. An unwavering view of information economics is that every business is an information business and no business is possible to optimize without the benefit of information. For example, 33% of the \$350 billion spent on Health Care in the United States consists of capturing, storing, processing and retrieving information. By this measure health care is a larger information industry than the "information industry" (Boston Consulting Group, 1996).

The complexity of the decision making by health professionals is vast. There is great difficulty in an average individual, without the training, reasonably being able to question an expert and determine the extent that the answer is a fiction or a fact. I.e. the extent that decision making is composed of bias is a practical problem for resource allocation. How would a non-doctor test for the truth and avoid being mistreated? Moral hazard existed in the possibility that experts would represent their wants expressed as needs. Given health is primarily composed of experts (from the lay perspective) how would a reasonable control methodology be developed which minimized moral hazard, organization and budget slack?

What mechanism would work if experts agreed 100% of the time and what method would work if experts only agreed 70% of the time? Further what would happen if agreement among experts did not always result in the correct answer? I.e. how often could it be expected that experts would agree and also be correct? We know that the number must be less than "70%". In expert systems development a similar problem exists in that there is a need to develop the knowledge base using a single expert. (Corbett, 1987). The consequence of this is that you test the system against the expert and if you choose your expert poorly you may have significant problems with acceptance.

⁸ In Gulliver's Travels Jonathan Swift wrote of the case of two kingdoms, Lilliput and Blefuscu, at war over whether the small or larger end of a boiled egg was the correct end to eat from.

While the purpose of this paper does not require me to develop an extensive review of the literature in this regard, general findings support the less than perfect view. Thus one of several problems that must be confronted is – what do we anticipate to be the level and types of error in the system? What mechanisms would allow these errors to be trapped and what mechanisms are likely to be most cost effective?

1.1 The Research Problem

The Value Sieve⁹ (Corbett, 1994) research and development began in 1992 with the goal of developing a resource allocation framework for a publicly controlled, not-for-profit, regional health organization¹⁰ in British Columbia, Canada. In its initial framing the question was “how does a regional health monopsony, supervised by a board specifically selected for their lack of vested interest in a health profession or union affiliation, allocate resources to optimize the health of the population of the region?” While the applied research has continued to focus upon the problem of resource allocation in health and social service organizations, the scope and generalizability of the work has evolved. Health and social service organizations are now seen as a particularly difficult subset of a class of administrative and information system optimization^{11,12} problems, which in general might be distinguished most simply as problems of optimization in complex environments.

In health and social service terms the task of this research is to develop a practical, resource allocation decision-making framework to optimize the individual efforts

⁹ In the initial work I called the methodology a Decision Support System for the Allocation of Resources. (DSSAR) and the specific technique the Corbett Sieve and not the Value Sieve.

¹⁰ For readers unfamiliar with the Canadian health care system this might best be considered an HMO with a monopoly for a geographic space holding approximately 400,000 individuals. The budget of approximately \$450,000,000 (1992 CDN) is provided to the organization by a provincial Ministry of Health . While there were approximately 150 service providers receiving contracts the majority of the funds (90%) were going to 15 organizations.

¹¹ Optimization is the collective process of determining a set of conditions required to achieve the best result from a given situation. (Beveridge, and Schetchter, 1970)

¹² From the systems engineering perspective, optimization is decision making and is identified as a taking of choices from sets of options in order to obtain the most desired outcomes. (Hazelrigg, 1996) "

of persons and groups such that the maximum health of the population is achieved within the resources available, today and in the future. In business terms the task of this research is to develop a practical framework which optimizes the mission of the firm, through the selection and coordination of priority activities, as determined by the accountable decision-maker(s). Given that private firms must in many cases reach beyond their boundaries to establish cooperative relationships with other independent entities, the technique must permit, at the discretion of the decision-makers, the exchange of information to permit the optimization of activities which benefit those participants. Examples of this might include licensing agreements, the development of industry groups that negotiate standards, or agreements associated with just in time production.

In all settings, resources are scarce and accountable decision-makers wish to optimize their return on investment. This is also known as getting value for money and the usage of this phrase identifies an important element in this work. Value is subjective and rooted within the culture, motivations and context of the individual decision-maker(s) involved. Consequently value for money can be a "wicked problem" for which there is no clearly correct technical answer (McNaught, 1991). The optimization process in such an environment will be grounded within the values and motivations of the individuals and groups involved their knowledge and experience, the information available, culture, resources and the mechanism(s) used in decision making.

In most cases a wicked problem is seen to comprise features such as:

- an evolving problem statement which incorporates a family of interlocking issues;
- multiple stakeholders;
- incommensurable measures;
- uncertainty and risk in decision making;
- solutions which don't converge but instead diverge to recruit additional issues and parties; and

- resource limitations which include money, knowledge, time, attention and political will.

A final technical solution to a wicked problem is unlikely to be discovered. However like all optimization problems the solution is improved through the movement from a low state of utility to a higher state of utility until the final goal is reached. In this way decisions are most appropriately considered the best equilibria available at the time, given the objective function, given what we know, and the available resources. Simon (1981) called this approach satisficing which underscored the believe that if there was no final solution the best an accountable decision-maker could do was try to improve over the current state, the next time the opportunity arose.

1.2 The Research

The Value Sieve is a decision framework for application in the field. The theory and research methodologies employed in its development are founded in social science. Accepting the social psychological nature of organizational problems an open systems approach is taken. This approach¹³ requires that the target system is considered within the context of its operating environment and that the design considers the ways each subsystem will react with others through provision of inputs and outputs. This approach is intended to avoid the problems many individuals create when they mistake their organizations as closed systems and so invest their efforts in determining a detailed internal structure without considering the external environmental forces and the "natural" features which open systems demonstrate.

The primary rules for the designs of an effective system are:

- understand the goal(s)
- ensure the system is self correcting to optimize with respect to the goal

¹³A more fulsome discussion of the basic characteristics of an "open system" is included in the Glossary of this document.

- ensure the elements of the system can communicate so the entire system is self correcting and goal directed
- preserve parsimony

The Value Sieve is an optimization methodology for use in complex environments. It gets its name from the notion that optimization in a complex environment requires the accountable decision-maker(s) to accept that there will be a series of tradeoffs which are ultimately determined by which outputs and outcomes the accountable decision-maker values most. The Value Sieve is a decision framework that assists the decision-maker(s) in distilling their choices to result in the maximum expected utility for the resources they have to allocate.

The theme of the research is to address the problem faced by all decision-makers in complex environments (open systems) who wish to optimize: how to make decisions which improve their activity's/program's/organization's performance in concert with the performance of other decision-maker's activities/programs/organizations. In an open system one decision-maker's key business relationships may include other decision-makers that are within the boundaries of the home organization and beyond the boundaries of the home organization. i.e., the environment.

Optimization in an open system requires:

- a decision framework capable of managing a high number and variety of activities and ongoing change;
- a mental model¹⁴ for the decision framework which is simple and can replace the existing mental models of the current decision frameworks in place;
- aligning the motivation(s) of the participants;
- collecting information regarding the performance of the various activities within the system of relationships and ensuring feedback;

- negotiating protocols for communication and other system wide behaviors;
- dispute resolution and negotiation mechanisms;
- a hierarchy of objective functions which are being optimized and
- a method for collecting and prioritizing the objective functions of the decision-makers within the system.

1.3 The Basic Value Sieve Decision System

The Value Sieve is a program prioritization system which guides a decision-maker in choosing among alternative programs in order to maximize an objective function for which he/she is accountable. Optimization is based upon the decision-maker's estimate of the expected utility of each program's contribution towards the objective function in relation to resources required.

Given the measures for each program are not commensurable, the value (the expected utility and resource requirements) of each program is compared and prioritized relative to the value of the alternatives. The result is an ordinal scaling based upon the values and working context (knowledge, professional preferences, priorities, choices available, and resources available) of the decision-maker(s). The decision-maker's ordinal scaling (called a Kernel) represents their highest expected utility for a given total resource budget in relation to a specified objective function.

Through the controlled distribution of each decision-maker's Kernel information and objective function, the Value Sieve system supports the coordination of the decision-maker's choices within a complex environment. It achieves this by directing each decision-maker's attention to the choices and priorities selected by other decision-makers within the context of their respective objective functions.

The relationship between Kernels and objective functions within the Value Sieve system permits meaningful information and budgetary roll-up. Roll-ups can be

¹⁴ The term mental model is used to represent a less formal, perhaps entirely unique, heuristic employed by a decision-maker. Mental model is intended to

based upon any grouping or hierarchy of objective functions and can include, programs, departments, organizations and industries. From a resource allocation perspective this allows an opportunity for an existing budget to be optimized or a new budget to be estimated based upon what the decision-makers believe must be accomplished.

1.4 The Organization of The Dissertation

Decision making in a complex environment is intrinsically complex. One challenge of this interdisciplinary dissertation has been to craft a logic stream that allows the reader to have a working framework established within which more detailed information can be organized so that the testing of the various components of the Value Sieve in applied settings comes together in a meaningful way.

To accomplish this the paper has been broken into seven additional chapters. Chapter Two uses a single perspective, the incommensurability of measures, as a theme to explain the general nature and use of the Value Sieve. The purpose of this is to provide a general framework for the following chapters. Chapter Three provides a review of the economic and psychological elements associated with decision making by individuals and groups. Its purpose is to identify the evidence associated with human decision making and the problems which must be overcome by any decision making framework. Chapter Four is a detailed explanation and review of the Value Sieve decision making framework. Chapter Five is the action research from four independent trials of the Value Sieve and the conclusions associated with these trials. Chapter Six is an overview of the complexity of the regional health environment and is intended to provide an understanding of the complex forces at play within the health and social service industries. Chapter Seven is a summary of model conceptual elements and the preferred conceptual model for implementing the Value Sieve. Chapter Eight is a summary and speculation chapter which discusses the Value Sieve and additional insights gained as a result of the research.

stress that these models may be less explicit than a conceptual model, which in my view requires a more rigorous explanation.

Chapter Two: The Value Sieve: Accountable Choices Among Incommensurable Programs

*"For in much wisdom is much vexation,
and those who increase knowledge increase sorrow."*

Ecclesiastes 1:18

"Nothing is impossible for the person who doesn't have to do it himself."

Weiler's Law

2.0 Purpose

The purpose of this chapter is to provide an orientation to the Value Sieve which is sufficiently robust that the technical discussions and technical appendices, which follow, can be more easily integrated. The rationale takes a single critical problem, commensurability, and uses this focus to provide a consistent reference point in order to describe the Values Sieve. The framework is then applied within a hypothetical application.

2.1 Introduction

The development and utilization of commensurable¹⁵ measurement scales is driven by the desire of decision-makers to compare apples with apples. Comparable measures serve the need to understand the resources required to achieve an output or an outcome and hence value for money. Commensurability rests at the heart of efficiency and effectiveness measures and ensures that discussion regarding different approaches to achieve the same outcome can be accomplished in a technical and unemotional assessment which utilizes the full benefit of a rational, objective approach. When such a scale is available an

¹⁵ From Euclid's Elements Book X Definitions: Those magnitudes are said to be *commensurable* which are measured by the same measure, and those *incommensurable* which cannot have any common measure.

Example: Two magnitudes A and B of the same kind are *commensurable* if there is another magnitude C of the same kind such that both are multiples of C , that is, there are numbers m and n such that $mC = A$ and $nC = B$. If they're not commensurable, then they're *incommensurable*. See Glossary for more detail.

accountable decision-maker (agent) may use the scale to select from among the available alternatives and to defend their choice to their supervisor(s) (principal).

However, in practice decision-makers are often faced with incommensurable measures and are still required to make choices to optimize the expected utility created by their allocation of scarce resources. The Value Sieve (Corbett 1994, 1995) is a resource allocation methodology developed to assist managers and administrators of organizations who must make choices using incommensurable, apples versus oranges, measures (Corbett in press). Further the Value Sieve creates both procedural¹⁶ and consequential¹⁷ accountabilities to better manage the problems which are associated with decision making under conditions of complexity, risk, ambiguity and ignorance.

2.1.2 The Problems of Non - Commensurability

At its core, commensurability encompasses traditional measurement validity and reliability concerns. Validity issues ask if the variable measured is indeed a reasonable representation of the dimension of interest within the applied setting. Reliability asks if the measure of a variable can be taken consistently. While validity and reliability are most commonly associated with experimental procedures they must also be considered within the context of quasi-experimental procedures and program evaluation¹⁸.

The rigor of experimental process is often unobtainable within an applied setting. This fact will surely frustrate those individuals who wish to ensure their programs are fully supported by experimentally validated outcome measures. However, this difficulty should not be used to support the argument that measurement is too difficult to use in organizations. Given the organization has a purpose, there must be an information system which provides the essential feedback to the decision-makers and indicates the organization is (or is not) moving in the prescribed

¹⁶ Procedural accountability – the individual is accountable for ensuring the required, precise administrative steps are followed.

¹⁷ Consequential accountability – the individual is responsible for the output/outcome (consequences) of what takes place.

direction. Without such an information system there can be no meaningful, purposeful action. While an information (feedback) system is a requirement for the goal directed action of an organization, highly detailed measurement systems may not be.

For example: Organization "A" teaches children to swim and measures their swimming proficiency with a general test. The test indicates success or failure on a number of variables and results in an overall pass or fail for each swimmer. While more detailed and stringent tests and testing conditions are possible, the general test meets the Organization "A" administrative/management requirements. Organization "B" also teaches children to swim and tests the children's ability to meet specified competencies in a similar but not identical method to Organization "A". Both Organization "A" and Organization "B" publish a list of children they have "taught to swim". Questions raised by the example include the following.

- Given differences in measurement between Organization "A" and Organization "B" is the measurement "children taught to swim" commensurable?
- To what extent should the organizations invest scarce resources to ensure that their measures of swimming competencies are commensurable?
- Under what circumstance can we envision the organizations individually or collectively investing in measurement improvements?
- What prevents any measurement system of "taught to swim" developed today from being refined to a more descriptive and specific representation in the future?
- How should accountability be allocated in relation to choice of measurement?

¹⁸ While pure experimental approaches are not always possible, an organized approach to the evaluation of current practice and the acquisition of supporting knowledge is always appropriate.

The purpose of the example is to suggest that while the desire to develop perfection¹⁹ in measurement is laudable, the conditions necessary for measurement perfection are not necessarily cost effective or certain to improve decision making. Further, the notion of commensurability is in many cases an arbitrary agreement about the level of detail/differentiation required by the decision-maker. The compass of the information can only be determined when the purpose(s) of the decision-maker(s) is/are made clear. Therefore in the applied settings of organizations, our challenge is to develop decision systems which: utilize the information available; simplify arguments where appropriate; avoid measurement dysfunction; point to practical improvements in the activities of the organization (this can include measurement improvements); identify those activities which together maximize the outcomes of the organization given the resources available to the organization are limited; and ensure that those accountable for various aspects of performance understand and accept their accountability.

2.1.3 Multiple Measures and Non Commensurability

For most decision-makers the desire to create a single commensurable measure with which to compare possible actions/programs is very great. The benefit of a valid and reliable measure is that the measurements themselves, when reported on the scale provide the decision-maker with a defensible, de-facto course of action. Under this condition the accountable decision-maker is protected from error by the measurement system.

In most cases applied program measurement will include more than one variable of interest and as a consequence multivariate techniques will be required to develop an equation which predicts a single commensurate²⁰ dependent variable. Without the proper use of multivariate techniques great caution is required when decision-makers decide to "prescribe a procedure" to aggregate the measures of

¹⁹ Measurement perfection would be valid and reliable measurement commensurability which can remain valid and reliable within and between applied settings.

²⁰ Of the same size, extent, or duration as another.

individual variables²¹. This is because, without testing, it is impossible to know whether the model created by combining variables provides anything more than a veil of rigor.

For example²², a not-for-profit, federated funding organization allocates resources to a number of community agencies. Board members of the funding agency have selected seven variables, which they believe represent important indicators of a program's contribution to the community. Each of the 10 decision-makers chooses a number on a ten point scale assigned to each variable A through G. The decision-makers now add up all the points for each program and fund programs based upon the highest overall scores. When questioned the decision-makers indicate that they had used a mathematical scoring scheme to combine the various influences in order to make the decision making fair. They used mathematics to make sure the scoring was impartial. At the minimum this requires that each score and each variable is combined on a scale which is commensurable.

In these circumstances it is better to provide the quantitative and qualitative information to the decision-makers without the addition of a questionable "unifying" numerical strategy. Therefore while clarity in accountability relationships requires that multiple performance measures be used and focused through a program logic, great care must be associated with the assumptions incorporated into the mechanisms of the optimization processes used for a given budget (Cutt in press). Thus decision-makers are still faced with choices using incommensurable strategic outcomes, e.g. juvenile crime rates and quality of care for the elderly.

The consequence of this is that the decision making process must facilitate decision making using current incommensurable information and must accept that

²¹ Frequently, these are known as Score Cards or the use of a Balanced Score Card technique. Great skill is required to demonstrate the utility of these techniques beyond the face valid arguments. In the wrong hands, they can open the door to bias; wishful thinking and other well documented psychological human characteristics. Psychological characteristics are developed later in this document.

²² A more detailed account of this type of problem can be found in a review of the resource allocation process by Corbett in 1998.

the objective function²³ will be measured subjectively in terms of expected utility for the resources available. In other words, expected utility will be based upon the values/assessment of the decision-maker(s).

2.1.4 Decision Making Versus Problem Solving

It should be recognized that when confronted with a choice many individual decision-makers begin to direct their attention to solving the problem that is the subject of the choice instead of making a decision. Whatever the reason for this, it is important to realize that decision-makers confronted with difficult choices will tend to procrastinate and seek measurement tools which will assist them in deciding what to do. This is a problem if the decision making process is time sensitive and/or the problem is too complex to resolve.

2.1.5 Hierarchy, Specialization, Supervision and Measurement Dysfunction

Organizations develop hierarchies to better manage the variety of specialized activities which take place within and between themselves and organizations beyond their boundaries. The result of specialization is differentiation of the processes within the organization and consequently the utilization and development of specialized knowledge. A consequence of this specialization is that a principal does not necessarily understand the measures or the justifications used by an agent. In these circumstances the desire to aggregate information to develop a commensurable measure, which can be used by the principal, e.g., an external funder, for decision making, may result in the loss of essential information needed for decision making by the agent.

The goal of commensurability is to ease the difficulty of decision making by establishing appropriate metrics. However, if the goal of commensurability is poorly managed it can result in principals reducing the significance of all of the information required by the agent alone to only the information required by the principal. The disparity of information between the principal and the agent is a

²³ A function associated with an optimization problem which determines how good is a solution. (Atallah, 1999).

central theme of measurement dysfunction²⁴. This is an important issue in relation to accountability because it suggests that a failure to understand the information relationship between principal and agent and their respective decision making responsibilities can result in perverse/unintended organization outcomes. An accountable decision-maker must accept the distinction between control based upon the power of their office, and control based upon the power of information or knowledge.

2.1.6 Politics, Facts and Judgement

When selecting a course of action a decision-maker should be capable of substantiating their choices in such a way as to make distinctions between decisions based upon information (measures) and decisions made based upon power of position (judgement). In practice we know that decisions based upon multiple measures will likely require the use of judgement by the decision-maker and hence it will be value based. In other words the information provided is interpreted by the decision-maker(s) and they use their personal understanding of the circumstances and their best judgement to determine a best course of action. The use of personal insight and judgement is necessary in multiple variable and incommensurable decision making and this fact places a special burden for accountability upon the decision-maker.

The special burden requires the justification of one choice versus another without the benefit of a clear measure that represents "better" from all possible perspectives. In this regard there is very little difference between technical judgement²⁵ and personal politics. Either require the decision-maker to use a personal heuristic or value based reckoning to result in a choice. The values of others, may be quite different than the values of the accountable decision-

²⁴ Errors in decision making made due to an inadequate understanding of the relationship between the data available and the data necessary to adequately model the situation.

²⁵ The distinction between technical judgement and personal politics is intended to point out that it is very difficult to determine the extent that a decision-maker has made a judgement based upon self interest at the cost of the best interest of the program or organization. Indeed, it is the impossibility of knowing the thoughts of an individual that makes the need for measurement of results imperative for the feedback of information and consequent control of a program and an organization.

maker(s) and as a consequence it is probable that debate about the elements of the heuristic will result in engaging in problem solving²⁶ behavior instead of decision making.

However, the notion of judgement and related individual differences in technical judgement is taken to the extreme within the notion of pure politics. Pure politics can be argued as the use of position and power to make choices that prioritize personal ambition and directly or indirectly provide personal benefit²⁷. This frustrates the stated goal of using the available resources to maximize expected utility for the specified objective function. The negative use of pure politics is using the power of position to spend the expected utility intended for the stated objective function on an alternative, undisclosed objective function. For example, a decision-maker chooses an option preferred by an important board member or senior manager (even though the decision-maker knows the choice will have negative consequences for the enterprise) in order to curry favour. This bias may also result from fear of consequences from higher authority.²⁸

²⁶ There is a distinction between problem solving and decision making. Decision-making is the actual process (mechanics and elements) of choosing between available alternatives. Problem solving is the direction of energy into the actual work associated with one or more of the choices.

²⁷ To be clear, pure politics in the absence of information is the best decision tool available. However, in order to ensure this "freedom to choose" is not abused, some effort must be extended to ensure against bias induced by motivations of a more personal nature. A more extreme example of managing pure politics is The Whistleblower Bill of Rights recommended by the Commission on Research Integrity. See Appendix A.

²⁸ The U.S. Merit Systems Protection Board, 1993 focused on a broad range of misconduct by government employees and went well beyond perceptions of the propensity to report and feelings of vulnerability. It collected information from over 13,000 government employees to examine the extent of exposure to misconduct, the extent to which those exposed reported the misconduct, the reasons why some did not report, and what happened to those who did. Key findings from this study included the following:

- * Eighteen percent of those surveyed reported personal awareness of misconduct;
- * Half of those who knew of misconduct had reported it (up from 30 percent in a 1983 survey);
- * Of those who did not report the misconduct, 60 percent believed that reporting it would have no impact and 33 percent did not report because they feared retaliation;
- Thirty-seven percent of those who reported the misconduct reported subsequent threats or retaliation; and

Figure 2.1 shows technical certainty on the Y-axis and Judgement required on the X-axis. Technical certainty is highest when there is a single objective measure of outcome, which is accepted by all participants. As more measures are used the problem becomes less technically certain as the relationship between the measures and the outcomes becomes more complex. Judgement required is highest when personal values and heuristics must be used to make decisions and lowest when empirically based decision making is possible. The dotted line on the graph shows the concept of commensurability. Commensurability is highest when there is an agreed single measure with technical certainty that supports an empirically based judgement for decision making. At the other end of commensurability is the point where many measures of quantitative and qualitative information require the decision-maker to use personal heuristics and values to determine the preferred choice. This is because even though some of the measures used to compare one program with another may be the same (commensurable) the full description of the outputs and outcomes generated by the program are not. Therefore, even though the independent variables used to describe the resources required to produce the output and outcomes may be the same (commensurable) it is unlikely that they will be identical quantities (commensurate).

Figure 2.1 shows an X on the graph of commensurability because in applied settings most choices are based upon the evaluation of multiple quantitative and qualitative measures for which there is no technically certain method of choosing and so requires the decision-maker to use personal values in arriving at a conclusion. When technical certainty is high the decision-maker will rely more upon empirically based judgement than personal values. However, it must be acknowledged that the decisions that require no personal values or heuristics from

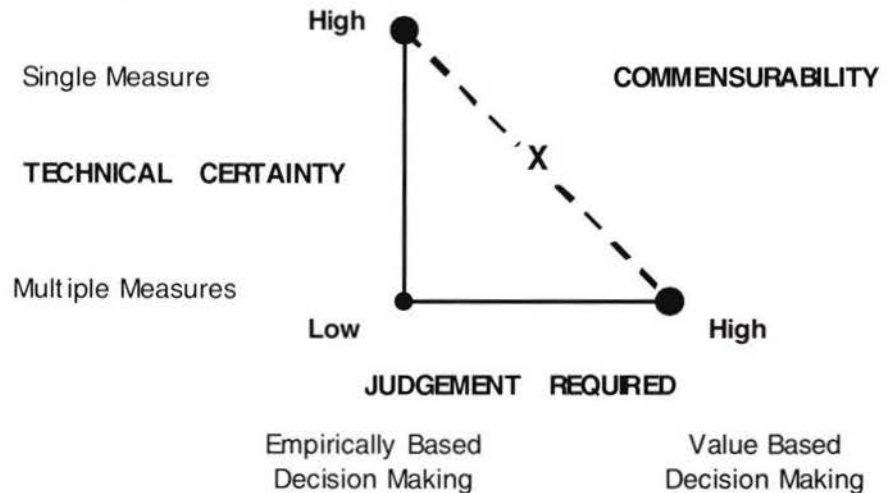
* Nearly half of all those who reported threats or retaliation believed that they experienced each of the following: shunning by coworkers or managers (49 percent); verbal harassment or intimidation (47 percent); and poor performance appraisals (47 percent).

This quote taken from "Consequences of Whistleblowing for the Whistleblower in Misconduct in Science Cases, Final Report Submitted to: Lawrence Rhoades, Ph.D., Director Division of Policy and Education, Office of Research Integrity, Contract No. 282-92-0045, October 30, 1995 ". More detail of this report is available in Appendix A

the decision-maker occur at only a single point on the graph. These decisions are so clearly supported by technical information it is unlikely that the decision-maker would realize that they had made a decision at all. This being the case, the accountable decision-maker in an applied setting will most frequently expend their energies in comparing and then choosing among alternatives which require the use of personal values to balance incommensurable measures of alternative actions.

Individual differences are likely, given the required use of individual heuristics. The outcome of this will be that multiple decision-makers should be expected to have their interpretations vary around a mean. This does not suggest the difference will be insignificant among a small group of decision-makers that may represent broad differences of opinion and personal heuristics. Therefore it should be expected that disagreements will most frequently take place when technical information is low and judgement is high; when there is discrepancy in the knowledge required to utilize the information available; and when pure politics and power are used to direct resources to create personal benefit in the face of better options.

Figure 2.1: Commensurability – the relationship between technical certainty and judgement required



2.2 The Value Sieve - Decision Making Among Incommensurable Actions

2.2.1 Overview

The Value Sieve is a "choice"²⁹ prioritization process which results in a decision-maker choosing among alternative programs in order to maximize an objective function for which they are accountable. Optimization is based upon the decision-maker's estimate of the expected utility of each program's contribution towards the objective function in relation to resources required. This ratio of expected utility to resources required is defined in figure 2.2 as Value for Money (VfM)³⁰.

Figure 2.2: Value for money (VfM)

$$\text{Value For Money (VfM)} = \frac{\text{Expected Utility}}{\text{Resources Required}} = \frac{\text{Anticipated Outputs \& Outcomes}}{\text{Resources Required}}$$

Given the measures for each program are not commensurable the expected utility of one program versus another is determined through direct comparison of the available choices by the decision-maker. The result is an ordinal scaling³¹ based upon the VfM of each of the choices available to the decision-maker. The ordinal scaling of the VfM of the choices provides the highest expected utility for a given total resource budget. From a resource allocation perspective this allows an opportunity for an existing budget to be optimized based upon VfM or a new budget to be estimated based upon what the decision-makers believe must be accomplished.

²⁹ A choice may be a program, an activity, an action, a project, or any other identifiable alternative use of controlled resources. This paper will attempt to stay with the language of alternative programs.

³⁰ In the literature, Value for Money (Lerlerc, Moynagh, Boisclair, & Hanson 1996) is variously defined using different measures of value from productivity to outcomes. In this dissertation, I will distinguish a specific definition of Value for Money from all others by using the abbreviation VfM.

³¹ Ordinal scaling is the worst case under the circumstances and depending upon the measures used, higher orders of measurement are possible.

The heart of the Value Sieve methodology is the systematic use of information within a consistent³² accountability structure. This is essential for the coordination of information feedback so that the programs of the organization can be adjusted to better meet their individual and collective organizational goals and objectives. The Value Sieve maintains the following fundamentals regarding the accountability of a decision-maker.

A decision-maker:

- identifies the goals and objectives they are accountable for and how those goals and objectives are nested within the overall goals and objectives of the organization;
- is responsible for ensuring that in selecting their actions intended to reach their goals and objectives, as many choices are available/ considered as possible;
- is responsible for making choices among the available alternatives;
- is responsible for using the best information available;
- is responsible for understanding the impact of their choices which constrain the ability of other decision-makers; and
- is required to convey as much information about their choices as possible.

Therefore the Value Sieve starts with the notion that decision-makers must be able to list or inventory their options available. This is most realistically done by specifying actions that can be taken or programs that can be implemented.

2.2.2 The Purpose of Information

The purpose of information is to reduce uncertainty. Thus, the process of obtaining information can be interpreted as an attempt to reduce the number of choices available which could be the correct answer to a question. One way of

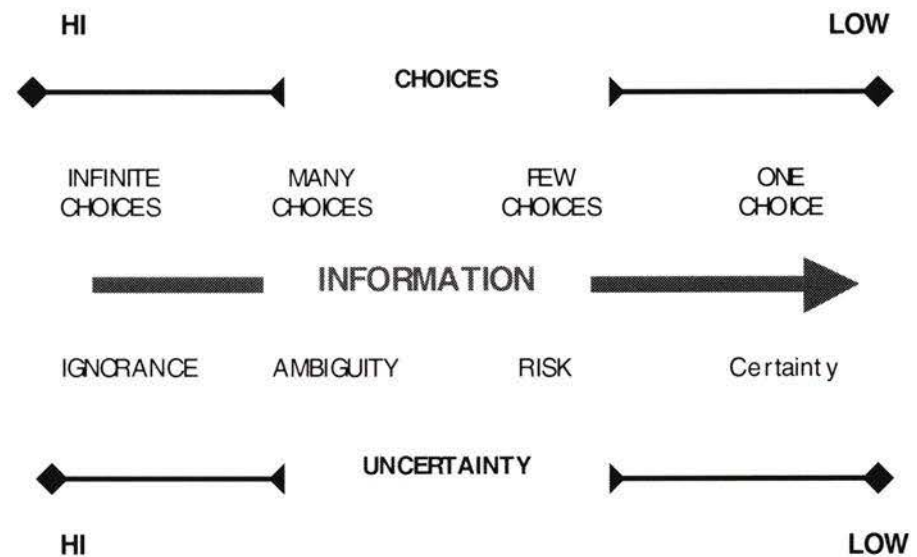
³² Consistent is believed to include the requirement that the accountable decision-makers are "known" by all the participants.

measuring information is to consider the change in the number of choices available. These perspectives are shown in figure 2.3.

In this regard there are two things that are desired from any measurement strategy:

- Can the information eliminate or reduce my uncertainty about the choices available?
- Can the information help someone else eliminate or reduce their uncertainty about their choices available?

Figure 2.3: Information judgement and uncertainty



Therefore, data and measures collected which do not reduce a decision-maker's uncertainty among their choices, are not information. Similarly, if the decision-maker is constrained to a set of choices and does not have the power to recruit new choices, then data and measures which do not relate to the available choices are not information to that decision-maker.

2.2.3 An Inventory of Choices

Information is used to reduce uncertainty about choices. Consequently, the Value Sieve requires that decision-makers identify their choices before they begin to determine their best course of action. This inventory of possibilities allows the decision-maker and their personnel (or other interested parties) to identify possible actions and the resources required to carry out the actions. Further, each

action plan will include the specification of appropriate information that can demonstrate outputs and outcomes. Options may or may not rely upon relationships with other programs or organizations and some choices which are technically possible will not be eliminated from possible action because they do not conform to fixed organizational constraints.

2.2.4 The Importance of A Priori Program Statements

Cognitive psychology and experimental economics have been very useful in the demonstration of the impact of human bias in the forecasting, interpretation and explanation of data. The results suggest that creating a program and explaining what will occur should be managed very much like the experimental process of describing an experimental model and then testing it. Accordingly a demonstration of understanding the dynamics of a program must be based upon the ability to predict correctly the resource requirements, the outputs and outcomes before they come to pass. This is particularly important since the Value Sieve uses both resources required, and outputs and outcomes, in the decision-maker's determination of any program's VFM.

It follows that measurement systems are not objectives in themselves but are means by which decision-makers receive feedback which can be used to better direct their efforts and resources they control. The central significance within experimental procedure is not the fact that there is measurement but the fact that the decision-maker/ researcher must state, a priori, the question and how the question will be answered using some kind of repeatable observation and measurement system.

The a priori statement for a program must provide the means by which an individual can demonstrate, test and improve a program. Further, through the open provision of the a priori program statement, including resources required, objectives, testing plan, data measures and decision process, others may participate in the improvement of the program or the rejection of the program in favor of another. An improvement to the program may include showing that the program does not explain all the facts in an appropriate way or that there are unforeseen consequences which occur but have not been taken into consideration by the decision-maker.

2.2.5 Utility and Objective Functions

It is expected that incommensurable measures will be interpreted by a decision-maker within the context of an objective function. In social services an example of an objective function could be a set of objectives designed to reduce juvenile violence. Thus each available alternative program addressing juvenile violence could be considered within the context of its ability, in new or complementary ways, to contribute to the reduction in juvenile violence. The integrated measure (in the mind of the decision-maker) is the VfM of an alternative in addressing the objective function.

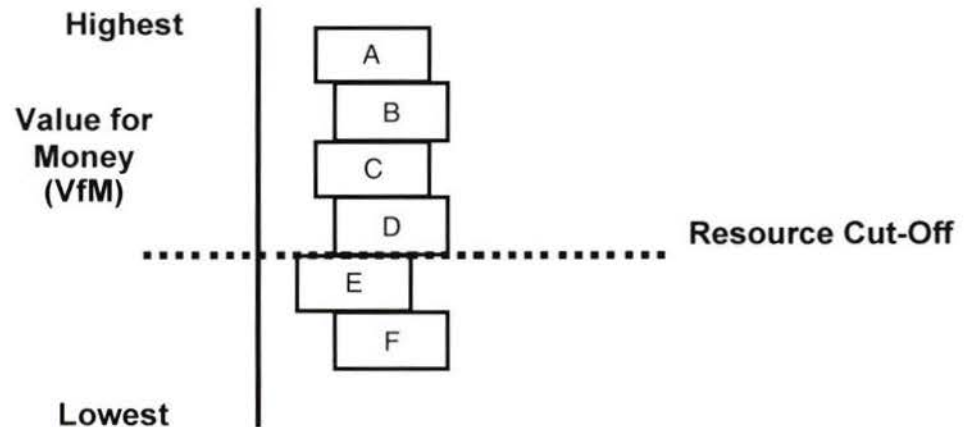
If only a single program alternative was available then it would, by virtue of being the only choice, be the best choice available and would thus have the highest VfM measure of the objective function³³. If two program alternatives were available and the organization could afford only one, then the program that offered the highest VfM for the objective function, from the perspective of the decision-maker, would be the program selected. The pattern should be clear that through the use of comparison of one program's VfM for the objective function with another a series of programs could be compared which would demonstrate an ordinal measurement system of the VfM of the available choices for the objective function of interest.

A cheese sandwich with a given resource cost given to a young person would rank higher in expected utility for the objective function of youth hunger than would a cheese sandwich given to a senior citizen. The expected utility of the same item can be different when considering it in relation to the objective function of interest. Thus a program's expected utility for an objective function can only be determined when it is placed within the context of the available alternative programs and the total resources available which can be applied to the objective function by the decision-maker. When an organization has the resources to fund one or more programs towards the goal of an objective function, the collection of

³³ An entertaining question from this would be " is it possible that the reason government creates service monopolies is because they prefer to avoid demonstrating the values embedded in their choices at senior levels by loading all of the difficult value choices into the single organization which they can say "does it all"?

programs which maximize the VfM for the objective function will be chosen. This is shown in Figure 2.4.

Figure 2.4: Value for money ranking demonstrating optimized expected utility of a basket of programs within the context of a specific objective function and resources available



From open systems theory an organization can be considered a “human and machine” based information processing system. Knowledge is located within the organization as families of procedures and heuristics which incorporate the detailed instructions of how the materials imported from the environment are to be processed to ensure their export from the organization with the greatest assurance of the continuous flow of future materials into the organization. I.e. organizations are collected cycles of events and processes that must function well enough to continue their own perpetuation. Hierarchies may be considered to have an advantage when the knowledge they have captured and embedded in their policies and procedures reduces the burden of information processing. This is done through systematization³⁴. In other words the economic advantage of hierarchy over market occurs when the hierarchy can process information faster because it has already reduced thinking to reflex or semi automatic processing. It can achieve this by establishing standards for inputs and outputs based upon linked/fixed patterns of behavior incorporated into a complex series of activities that requires more matching of patterns than of problem solving. I.e. organizations

³⁴ Systematization reduces “decision load” on the individuals and the organization. This note is here to remember the notion of decision load as a measure of the knowledge intensity of an activity and its ability to be “standardized”. I.e. a function with high decision load may be inherently complex and as a consequence less likely to conform to standardization attempts.

expend energy to reduce the choices available for decision-makers, and in so doing make the processes more efficient. The market determines the effectiveness of the organization by comparing its outputs with others that are available. Thus an organization can only be seen as effective when its outputs compete/compare favorably with those desired by the environment/market place. Thus in complex environments the hierarchical organization will only have an advantage when its ability to transform inputs into desirable outputs can be codified to reduce the time and expense of information processing. This advantage must be significant in cost or quality or the competing knowledge workers will create individual practices or smaller, less expensive hierarchies which will more efficiently and effectively meet the desired variety found in the market place. Traditional industry used the restricted availability of capital as the mechanism to control competition and so encourage "large enterprises" which could produce standardized products. The strategy of standardization was to collect and consolidate experience into organizational embedded processes and procedures. In effect the capital equipment (machines) retained the knowledge of the organization and were the fixed platforms where new knowledge was discovered and embedded. The creation of knowledge workers has created a new pressure to control production through the use of intellectual capital (knowledge capital). In this situation the new knowledge is captured and encoded within the individuals executing the tasks. As a consequence the knowledge worker retains ownership of the new knowledge which may be difficult for the organization to systematize and download into the machinery of processes controlled and owned as property by the organization. The specialization of knowledge and the difficulty to "capture it" through its encoding into objects has made the task of coordination in complex organizations more difficult. In many cases errors have occurred and continue to occur because the managers and administrators of the organizations have failed to fully appreciate the change in power that knowledge workers have brought into the mix. These elements of production have greater freedom and as a consequence of scarcity will require different conditions of employment than have been acceptable in the past. Further, in order to maximize the benefit which can be generated by knowledge workers organizations will be required to accept that control of a knowledge worker (who has more information than the manager) may require a rethink about decision making practices within an organization.

An organization can be imagined as a hierarchy of objective functions, lower level objective functions being "nested" within higher level objective functions. More senior decision-makers are accountable for the specification and coordination of more junior decision-makers objective functions. The Value Sieve ensures that each "nested" objective function is optimized by the accountable decision-maker. Decisions which adjust the maximization of VfM of a single nested objective function in relation to a superincumbent objective function are made through the choices of a superior decision-maker who is responsible for maximizing VfM by balancing a collection of nested objective functions within the superincumbent objective function; i.e. when junior managers report to a senior manager, the senior manager is responsible for balancing and coordinating the actions/choices of the junior managers such that the VfM produced by their combined efforts is maximized for the senior manager's objective function. The obligation of junior managers is to make choices that maximize the VfM of their own objective function. The obligation of the senior decision-maker is to ensure that combined VfM is maximized and the expected utility producing efforts of the junior managers are coordinated. In this way programs and their specific objective functions can be combined/ "rolled up"³⁵ to create well-organized aggregates which correspond to the programs and objective functions of decision-makers who are senior in the hierarchy of the organization. Rolling up the set of individual paired choice comparisons among programs into an aggregate provides optimization at the aggregate or organizational level. The series of paired comparisons choices involves the decision-maker's judgement about ranked contribution to VfM, where the concept of VfM involves assigning a common currency to both incommensurable outcomes and commensurable but incommensurate resources. In aggregate this provides for the maximization of expected utility for a total given budget.

VfM can be maximized by each decision-maker for their objective function. From the equation in Figure 2.2 it can be seen that VfM can be increased in one of two ways. The first is by holding the outputs and outcomes and therefore expected

³⁵ Rolled up is a common phrase used in management accounting that suggests that each layer in an organization's financial and business activities can be consolidated without distorting the underlying detail.

utility constant and trying to reduce the resources required achieving those outputs and outcomes. The second is by holding the resources constant and then raising the outcomes and outputs. Conversely, a loss of VfM should result when the delivered outputs and outcomes are lower than originally estimated or the resources required are higher than the original estimates. It follows that a decision-maker cannot compare programs and maximize VfM for an objective function until the "best available"³⁶ information is provided for each of the choices that will be included in the decision making process.

The ability to determine the VfM of an object or of a program in relation to an objective function is inherent in all people. However, the estimate of VfM is not necessarily the same among all people and should therefore be expected to reflect individual differences.

Moving resources from one activity to another results in an improvement in VfM when there is a net increase in expected utility produced by the redirection of resources. VfM is determined through the medium of a specified program's relationship with alternative programs and an objective function. Value is a relative term which means the choice with the most VfM. An objective function in and of itself does not have expected utility. Consequently, investing resources to determine the optimal objective function is only useful when there are sufficient degrees of freedom to redirect resources to programs that can produce VfM for the new objective function. Further, the redirection is only appropriate if the new expected utility being created is greater than the expected utility being lost.

VfM is estimated by the a priori provision of information. VfM is determined by what was delivered. Accountability requires decision-makers to explain the difference between what was estimated and what was delivered and to adjust their future decision making accordingly. This is basic requirement for any contract

³⁶ Best available is not intended to suggest that extraordinary efforts be employed to collect new or better information. As a start, it simply requires the program managers and staff provide the data they currently use for decision making. This will include a clear statement of what they believe they accomplish with the resources they are provided.

where a representation to deliver goods and services binds the agreement to a price to paid for those goods and services.

2.2.6 Focusing on Actions and Not Theory

While the Value Sieve can be applied to any sort of decision process, its great strength is in application environments. It has been specifically designed and tested in applied settings where choices must be made using the available incomplete information within short periods of time. These conditions are not conducive to extended philosophical discourse. Consequently the process focuses attention on actions that can be accomplished that have an impact upon the objective function. This approach accepts that a number of decision-makers may agree to a course of action as being the best available even though they are each agreeing for different reasons. In other words individuals participating in the decision making process may assign a choice a high level of VfM for very different reasons.

For example - a city lot is declared by the city council as green space. Council members may feel this is the correct thing to do for a variety of reasons. Some members might value green space for environmental reasons while other may value green space because it increases property values in the adjoining area.

The central notion is that when individual differences of VfM do not affect the over all choice to proceed, it is immaterial that all participants agree with the choice for identical reasons. Where differences of opinion become important are when the VfM estimates made by different members of a decision making body result in disagreement about whether the action should be taken or not. I.e. one group see the action as having high VfM and so wish to fund the program while another group see the action as having low VfM and do not wish to fund the program.

In practice the prioritization based upon the perceived VfM tends to show that in general there is much agreement among participants about programs and that disagreement tends to take place at the margins where the differences in VfM are low; because these programs are competing for resources around the cut off they can stimulate important discussion.

2.2.7 Combining Individual Differences

Individual differences assume that more than a single individual has a formal voice in the decision making process. A benevolent dictator, no matter how carefully he or she listens, still makes the final decision. In this case and in many administrative positions, administrators and managers have no requirement to take into consideration differences of opinion. They have been designated as accountable and as a consequence the organization has trust in their decision.

In situations where groups of individuals are involved in developing a decision, the Value Sieve uses a preferential voting mechanism to combine perspectives on decision-making panels. There are different kinds of voting procedures that can be used, however these technical arguments are best left to more detailed explanation of the voting and the Value Sieve.

2.2.8 Coordinating Within and Between Boundaries in Complex Systems

The ordinal scale of program VFM is an extremely informative record of the thinking of the decision-maker. The comparisons allow other to understand the priorities of the decision-maker in a much more comprehensive way than simply knowing the objective function. In looking at the relative utilities the ordinal measure can provide evidence of weighting of preferences within a budget envelope. Further, it lets other specialized areas understand the impact of changes in perceived VFM within a specialized group.

In the case of non-profit organizations the revealed prioritization of actions may be extremely important to ensure that continued collaborative action is possible.

For example - an outreach program for youth is going to cut back on its swimming recreation time for street juveniles. This will impact the health of street youth because the swim program has been used as a method of ensuring the youth take a shower before they enter the pool and has been an opportunity for providing unobtrusive counseling for health and safety concerns as well as keep a reasonable estimate of numbers of street youth. The result will be an increase in demand for services at a local drop in center.

A program that was the last funded within an organization's budget knows that it is most likely to be eliminated if it cannot improve its performance. A program

which was the first not funded program knows that in the next funding cycle it needs to demonstrate greater VfM than the last program funded.

2.3 Hypothetical application of The Value Sieve Process

2.3.1 Value Sieve Summary

The Value Sieve is a decision process that maximizes the expected utility that can be produced by an organization for a specified collection of resources. The process requires decision-makers to specify their objective function(s) and within the context of that objective function compare the available program alternatives. The VfM of each possible alternative program is assessed using a paired comparisons approach that ultimately creates a priority list of the alternative programs. The prioritized list shows the maximum contribution towards the objective function that can be achieved given different levels of resource. I.e. the least VfM is provided by the last program funded within the specified objective function.

Organizations with multiple objective functions can optimize the overall expected utility by moving resources from one prioritized list of programs within one objective function to another prioritized list of programs for an alternative objective function. In so doing, decision-makers are using the Kaldor³⁷ criterion to shift resources from one objective function to a different one. By extension this suggests that there may be a prioritization of objective functions for the overall organization.

The Value Sieve requires the following steps:

- the identification of the decision-maker(s)
- the identification of the objective function;
- the identification of the general level of resources that will be available;

³⁷ Kaldor criterion - A change is an improvement if the people who gain from the change evaluate their gains at a higher dollar figure than the dollar figure the losers attach to their losses.

- an inventory³⁸ of programs/activities which may be used to address the objective function, (this process can be as open or closed as required);
- invitation to provide addition information regarding any program within the inventory, (this process can be as open or closed as required);
- prioritization of the programs comparing the VfM of one program versus the VfM of another program in relation to the objective function;
- voting procedure if there is more than a single accountable decision-maker and
- "publication" of the prioritization of the programs in the inventory, (distribution can be as open or closed as required).

The Value Sieve is designed to be customized to meet the needs of the specific organization. In preparing the following example some assumptions and simplifications have been made to focus attention on the overall form and function of the methodology.

2.3.2 Community Aid Society (CAS) - A Value Sieve Hypothetical Application

The Community Aid³⁹ Society (CAS) is a regional, charitable organization that promotes and collects charitable donations from the citizens of a geographic region and then directs them back into the communities of the region. The donations are provided to various CAS member organizations that provide charitable services to the people of the region. CAS conforms to the model of a Federated Funding Organization (FFO).

³⁸ An inventory includes the available information about the program. This would include resource costs, processes used, outputs and outcomes. In some cases it may also include supply availability and estimated demand for service. A sample inventory document is included in Appendix C- The Basic Value Sieve Inventory

³⁹ Community Aid Society (CAS) is the name chosen for the hypothetical organization because to my knowledge there is no organization which represents itself with this name.

On an annual⁴⁰ basis the member organizations provide their requests for funding to the CAS and in turn the CAS determines which service programs it should fund. For the purposes of this hypothetical example I will assume that there are 60 funding requests, within 3 categories of program. Category A - Youth Services, Category B - Seniors Services, and Category C - Family Services. Further I will assume that these programs request approximately \$3,000,000 per year, which is based upon the average of the charitable donations which are raised each year. Each year there is no guarantee that \$3,000,000 will be raised and consequently some care must be taken to manage the expectations of the charitable agencies regarding continuity of funding. I.e. organizations that receive support from CAS have no guarantee of program funding continuity.

The mission of the CAS is to improve the well being of the community through the provision of services to at risk elements of the population. The general at risk elements of the population have been identified by the CAS as, Youth, Seniors and Families. The divisional structure of the Society reflects these focuses and consequently the objective of each of the divisions is to direct the resources each division receives to maximize the well being of their target population within the community. Each service program funded by a CAS division is regarded as providing the best value for money from among the service choices available.

The selection of the specific primary objective function is reviewed at the beginning of every third resource allocation cycle. The three-year review of primary objective functions was chosen over a one-year review process to manage the expenditures of time and effort associated with a proper review. It was also determined that the three-year period provides stability for both CAS and the service provision organizations. The selection of the specific primary objective functions is usually done by board members and the senior staff through a combination of public discourse and needs survey. A significant benefit of this process is that it encourages CAS to communicate with the service providers, key organizations and members of the community.

⁴⁰ The Value Sieve need not be used on an annual basis. One of the original design intentions of the fully documented process was to reduce the costs associated with resource allocation by increasing the time between allocations. In those cases, the design recommends contract provisions for 3 to 5 years.

The result of the process is an objective function: a prioritized (not weighted) list of primary objectives that are intended to guide the VfM estimates of the various programs by the accountable decision-makers. The CAS generated the following objective function.

- Priority One - to reduce the number of families living below the designated poverty line.
- Priority Two - to improve the health and independence of emancipated youth that live in poverty.
- Priority Three - to enable programs which aid youth in becoming economically self-sufficient.
- Priority Four - to improve the independence of the elderly within the community.
- Priority Five - to increase volunteerism in the community.
- Priority Six - to restore and fortify families in distress.

This ranking of the component objectives in the objective function which articulates the over arching mission "community aid" is an important communication tool to the community, the decision-makers and the service providers. It represents a predisposition for actions that are consistent with the CAS priorities.

CAS uses the Value Sieve process as both an optimization and as an accountability device. Optimization occurs through the selection of the highest VfM programs that address the objective function. Accountability occurs by ensuring that the process is open, and participants document their deliberations/decisions.

In consideration of its accountabilities CAS must ensure that:

- the donors feel that CAS is the most appropriate mechanism to provide the maximum benefit to the target populations within the community. i.e. CAS spends the funds wisely,

- the individuals within the target population who are receiving services get the quantity and quality of services which have been paid for by CAS,
- the available resources address the most important needs of the target population(s),
- the service providers believe that the allocation process is fair and works to ensure that the most useful services are provided to the target populations,
- a reasonable strategy is employed to determine the needs of the specific target populations within the community,
- the resources provided to service organizations to acquire services are based upon fair pricing policies,
- there is consequence for service providers failing to provide the quantity and quality of services contracted and the outcomes predicted,
- the community believes the allocation process is responsive to the needs of the community, the target populations and the organizations which provide the services, and
- the process is stable and establishes a base of trust in the process by service providing organizations.

2.3.2.1 Resources Available

In this hypothetical it will be assumed that there are 60 proposals for services requesting funds totaling \$3,153,000. However, fundraising this year has not been as successful as expected and there are only \$2,800,000 available. Therefore there is a funding shortfall of \$353,000. A shortfall can be managed in a number of ways but in this case the CAS board has determined that each division must demonstrate the impact of a reduction of the full \$353,000. While it is unlikely that the Board would manage the shortfall by reducing a single division it is not unreasonable to believe that such an open approach would demonstrate that the Board is willing to review hard choices in order to ensure the health of the remaining service programs.

The details of 60 different service requests is not necessary for the example however it is useful to provide some sense of the services under consideration and the ability of the sieve process to assist in making choices. Please note these service descriptions are hypothetical examples and are not intended to provide service-related insights.

2.3.2.2 Sample Services

2.3.2.2.1 Hypothetical Youth Services Projects

- YS3 - (\$14,000) - Criminal Records checks for youth service workers.
- YS9 - (\$140,000) - Swimming Safety Service - the service maintains a community pool and provides opportunity for swimming instruction. Services are directed to young people age 3 to 15. The program trains 1,100 children to swim each year.
- YS14 - (\$201,000) - Youth Accommodation Building - the service allows homeless youth up to 90 days accommodations while they find alternative safe housing. Expenses include cleaning, plumbing, maintenance, yard work, room setups and capital improvements.
- YS20 - (\$98,000) - Street Outreach Service - the service provides a social worker and vehicle to drive to various youth collecting locations in the city to ensure the young people are aware of community health and social safety net programs. The social worker provides food and basic medical and hygiene supplies.
- YS25 - (\$4,000) - Financial Hardship Offset - the service provides required fees for children of low-income families to participate in school events and enrichment activities.

2.3.2.2.2 Hypothetical Senior's Services Projects

- SS4 - (\$96,000) - Seniors Yoga for Cardiac Patients, the program provides an opportunity for seniors with cardiac health issues to congregate at a local recreation center and participate in a safe exercise regimen.

- SS6 - (\$38,000) - Meals Delivery, the program works with another project to provide hot meals to senior citizens in their homes. This program covers the cost of gas and automobile depreciation for volunteer drivers. These volunteers deliver approximately 200 meals each night of the year.
- SS12 - (\$56,000) - Outreach for elders in abusive relationships. The counseling service provides education, counseling and referrals.
- SS16 - (\$15,000) - Membership Fees - provides fees to low income seniors so that they may participate in enrichment and community activities.
- SS21 - (\$181,000) - Seniors Group Counseling program for management of depression. The service provides multiple workshops, group and individual counseling opportunity for seniors who are experiencing depression.

2.3.2.2.3 Hypothetical Family Services Projects

- FS3 - (\$28,000) - Preschool program for young single parents and their children. The program provides well-structured social and educational opportunities for the children and an opportunity for young single parents to establish healthy relationships with their children and promote social networks for themselves.
- FS6 - (\$80,000) - Alcohol and Drug Counseling provides individuals and group counseling to individuals and families of individuals with drug and/or alcohol dependency issues.
- FS9 - (\$160,000) - Supported Independent Living. The goal is to provide skills to young parents (17 to 24) who are living on income assistance. The goal is to aid in finding safe affordable housing and provide skills and supports to find training and employment.

2.3.3 The Organization of Decision Making

The organization of the resource allocation process requires that the CAS establish several mechanisms that will direct the resource allocation process. First

CAS must have a clear mission statement for itself as an organization. This mission statement is a stable expression of the organization's vision. Second, the organization must create any specific goals and objectives for the business cycle it is in. As a community organization it may note that a specific issue is an increasing problem in the community and as a consequence it may direct the attention of service providers towards this issue by indicating that in this business cycle there is a desire to fund service programs which direct attention/energy to that issue. Illustrative issues could include literacy, inter-generation harmony, hunger, or violence.

Table 2.1: Value Sieve – Proposals Organized by Division and Unique Identifier

<u>Youth Project Proposals</u>		<u>Seniors Project Proposals</u>		<u>Family Project Proposals</u>	
<u>ID#</u>	<u>Cost</u>	<u>ID#</u>	<u>Cost</u>	<u>ID#</u>	<u>Cost</u>
YS1	113,000	SS1	240,000	FS1	4,000
YS2	44,000	SS2	65,000	FS2	18,000
YS3	14,000	SS3	17,000	FS3	28,000
YS4	18,000	SS4	96,000	FS4	8,000
YS5	175,000	SS5	31,000	FS5	36,000
YS6	75,000	SS6	38,000	FS6	80,000
YS7	25,000	SS7	51,000	FS7	10,000
YS8	6,000	SS8	12,000	FS8	6,000
YS9	140,000	SS9	8,000	FS9	160,000
YS10	33,000	SS10	39,000	FS10	2,000
YS11	58,000	SS11	24,000	Sub Total	\$ 352,000
YS12	64,000	SS12	56,000		
YS13	35,000	SS13	33,000		
YS14	201,000	SS14	68,000		
YS15	12,000	SS15	79,000		
YS16	28,000	SS16	15,000		
YS17	60,000	SS17	28,000		
YS18	19,000	SS18	90,000		
YS19	22,000	SS19	32,000		
YS20	98,000	SS20	5,000		
YS21	105,000	SS21	181,000		
YS22	37,000	SS22	28,000		
YS23	20,000	Sub Total	\$ 1,236,000		
YS24	10,000				
YS25	4,000				
YS26	110,000				
YS27	29,000				
YS28	10,000				
Sub Total	\$ 1,565,000				

The determination of the focus for the business cycle could be considered the objective function of the organization for the business cycle. Within that organizational objective function each funded program will be prioritized. In the case of CAS, the divisional structure encourages the development of a secondary objective function which directs the attention of resource allocators to their specific target population (for example youth) within the context of the overall objective function. (for example literacy)

Each of the divisions of CAS (youth, seniors and families) has a coordinator that receives requests for funding and confirms that they are complete. Service proposals must specify which division they are requesting to compete within. There are no limits to the number of proposals that can be submitted by a service provider and there is no constraint on a service provider who wishes to propose services to different divisions. Service providers which address more than one target population must demonstrate the costs associated with each target population/division.

There are a variety of different approaches which can be used in determining the specific decision making process. This includes several strategies for proposal verification that may be carried out in the decision making process. This example is based upon an organization making choices which are intended to benefit target members of the community who frequently, for a variety of reasons, have no voice of their own. The first requires that service providers requesting resources completely document their proposal and are satisfied that it fully and accurately represents the proposed program. This includes costs, deliverables and the mechanism(s) (empirical and or theoretical) through which the deliverables are produced.

For example:

YS20 - (\$98,000) - Street Outreach Service - the service provides a social worker and vehicle to drive to various youth collecting locations in the city to ensure the young people are aware of community health and social safety net programs. The social worker provides food, basic medical, and hygiene supplies.

The project expects to provide services for 30 to 50 youth per evening of operation. The program is expected to operate 6 PM to 2 AM, Wednesday through Sunday, 48 weeks per year. We expect to provide services 9,600 times during the year. (40 youth average per night, 5 nights per week, 48 weeks per year results in 9,600 contacts) This amounts to \$10.20 per contact.

These are new programs and there is little empirical evidence of the extent of the impact upon street youth and the community. However, it is our expectation that there are multiple positive circumstances which will occur as a result of this program. These include:

- a reduction in youth related street crime in the downtown core areas where street youth congregate;
- a reduction in street youth numbers because those who can be assisted will be referred to an existing support agency;
- a reduction in young deaths due to exposure or extreme poverty;
- an increase in the ability to manage and monitor the street youth population for individual health concerns;
- an increase in the ability to manage and monitor the street youth population for public health concerns, (for example sexual transmitted disease);
- an opportunity to establish and maintain a dialogue with street youth so that issues and or alternative approaches can be identified which will improve the quality of life for all within the community.

There are concerns that such projects may encourage youth that live at home to move onto the street and/or youth from other regions and communities to move here to live on the street. We do not expect this to be the case and have found no evidence in the limited literature of such occurrences. It is however, a consistent concern raised in newspapers by critics in areas where such projects have been undertaken.

Initially we intend to collect the number of contacts made and the type of services received during each contact. In addition discussions are taking place with other service providers and municipal officials to determine our ability to develop new or use existing indicators which would test our above mentioned project expectations. The project will work to identify these additional and appropriate measures within 90 days of being funded.

2.3.4 Resource Allocation Process - CAS

2.3.4.1 Level One - Membership

A first step in the resource allocation process is when individual organizations self select to apply and successfully become a member of CAS. The membership in CAS specifically defines the requirement for cooperative action with the CAS. Further, membership provides competitive, collaborative, and cooperative opportunities between member organizations.

2.3.4.2 Level Two - Division Application

A member organization can apply to as many of the divisions as they wish with as many different programs as they wish. However, only completed proposals are accepted.

As a part of its transparency philosophy, the CAS has chosen to allow the requests for funding to be reviewed by any interested party. All parties may provide specific salient written feedback regarding any individual project proposal. A copy of the feedback is provided back to the originating organization. The originating organization may adjust, or clarify the proposal in response to the feedback at its own discretion. Feedback is retained by CAS and is provided to the proposal reviews along with the final project funding application.

Table 2.1 shows the project unique identification numbers, the requested funds for each project and the division within which it is competing for funding.

2.3.4.3 Level Three - Divisional Application Review

The CAS believes that the expertise of the service provider members must be used to assist in the selection of projects to fund. Consequently, the representatives for each of the members of each division are used to create the division's resource

allocation jury. This decision to use service providers in the review process is often challenged by observers however; it forms an important element in the accountability system used by CAS. Instead of working to determine who else in the community has the expertise to know what can or can't be done and the appropriate cost and outcome relationships for non-profit organizations, CAS requires its members to police themselves through a transparent review and prioritization of their own service proposals.

Table 2.2: Value Sieve – Youth Proposals Sorted by Individual Raters

<u>Youth Proposal ID</u>	<u>Request</u>	<u>Sort</u>	<u>Rater ID</u>								<u>Sum</u>
			A	B	C	D	E	F	G	H	
YS3	14,000	Low	1	1	1	1	1	1	1	1	8
YS9	140,000	Low	1	1	1	1	1	1	1	1	8
YS14	201,000	Low	1	1	1	1	1	1	1	1	8
YS20	98,000	Low	1	1	1	1	1	1	1	1	8
YS25	4,000	Low	1	1	1	1	1	1	1	1	8
YS18	19,000	Med.	1	1	1	1	1	1	2	1	9
YS10	33,000	Med.	1	1	1	1	1	1	2	2	10
YS12	64,000	Med.	1	2	1	1	2	1	1	1	10
YS24	10,000	Med.	1	2	1	1	2	1	2	1	11
YS15	12,000	Med.	2	2	2	2	2	2	1	2	15
YS16	28,000	Med.	2	2	2	2	2	2	1	2	15
YS19	22,000	Med.	2	2	2	2	1	2	2	2	15
YS23	20,000	Med.	2	1	2	2	1	2	2	3	15
YS2	44,000	Med.	2	2	2	2	2	2	2	2	16
YS8	6,000	Med.	2	2	2	2	2	2	2	2	16
YS27	29,000	Med.	2	2	2	2	2	2	2	2	16
YS6	75,000	Med.	2	1	2	2	2	3	2	3	17
YS11	58,000	Med.	3	2	3	3	3	2	1	1	18
YS22	37,000	Med.	2	3	2	2	2	2	3	2	18
YS1	113,000	Med.	2	2	3	2	2	2	2	3	18
YS13	35,000	Med.	3	3	2	3	3	3	3	2	22
YS7	25,000	Med.	3	3	3	3	3	3	3	2	23
YS4	18,000	High	3	3	3	3	3	3	3	3	24
YS5	175,000	High	3	3	3	3	3	3	3	3	24
YS17	60,000	High	3	3	3	3	3	3	3	3	24
YS21	105,000	High	3	3	3	3	3	3	3	3	24
YS26	110,000	High	3	3	3	3	3	3	3	3	24
YS28	10,000	High	3	3	3	3	3	3	3	3	24
<i>Sub Total</i>	<i>\$ 1,565,000</i>										

In the case of the youth project proposals there are 28 organizations proposing 28 projects. These members participate in the selection of 7 of their members to

carryout the sort. The youth decision-making group is composed of 8 persons 1 from each of the organizations and the division manager.

Each individual member carries out a series of paired comparisons to generate a personal sort on the projects. The sort generates three equal groups of projects categorized as high priority, medium priority and low priority. In the Youth division case there are 28 proposals and consequently each rater is requested to select 9 high (signified by the number 3), 9 low (signified by the number 1) and 10 medium proposals (signified by the number 2). The individual prioritizations are then collected from each member and then aggregated to show how each ranked the proposals. The example of the first prioritization is shown in Table 2.2. In this example it should be noted that the rankers uniformly agreed on 5 low ranked, 3 medium ranked and 6 high ranked proposals. Clearly the number of perfect agreements will vary, however experience to date would suggest that agreement occurs more frequently than was originally expected.

Looking at the medium ranked proposals it should be noted that the various individuals did vary on these rankings and this is to be expected. By using the individual rankings a complete aggregated first prioritization will allow all raters to understand where the various proposals stand and this provides an opportunity for discussion on a proposal by proposal basis to listen to each member identify any unique elements they felt were important in their ranking or how others ranked a specific proposal.

In the example, Table 2.3 shows there was sufficient agreement within the Youth Division to unanimously identify 5 low proposals which in total requested \$457,000. The Seniors Division also unanimously identified 5 low ranking proposals that totaled \$386,000. The Family Division unanimously identified 3 low ranking proposals totaling \$268,000. In order for the Family Division to meet the requirement of delivering the full shortfall all of the service proposals will need to be ranked to total \$352,000.

The next level of the Value Sieve requires the same divisional raters to prioritize the lowest ranking proposals in order to meet the targeted budget requirements. In the cases of the Youth and the Seniors proposals this meant prioritizing the proposals that had already been unanimously agreed as the lowest ranking. In the

case of the Family Division this meant ranking the entire collection of Family proposals.

Table 2.3: Value Sieve Prioritization Results by Division by Proposal

<u>Youth Project Proposals</u>			<u>Seniors Project Proposals</u>			<u>Family Project Proposals</u>		
ID#	Cost	SORT	ID#	Cost	SORT	ID#	Cost	SORT
YS3	14,000	Low	SS4	96,000	Low	FS3	28,000	Low
YS9	140,000	Low	SS6	38,000	Low	FS6	80,000	Low
YS14	201,000	Low	SS12	56,000	Low	FS9	160,000	Low
YS20	98,000	Low	SS16	15,000	Low	FS1	4,000	Med.
YS25	4,000	Low	SS21	181,000	Low	FS4	8,000	Med.
YS1	113,000	Med.	SS3	17,000	Med.	FS7	10,000	Med.
YS2	44,000	Med.	SS5	31,000	Med.	FS8	6,000	Med.
YS6	75,000	Med.	SS7	51,000	Med.	FS10	2,000	Med.
YS7	25,000	Med.	SS8	12,000	Med.	FS2	18,000	High
YS8	6,000	Med.	SS9	8,000	Med.	FS5	36,000	High
YS10	33,000	Med.	SS11	24,000	Med.	Sub Total	352,000	
YS11	58,000	Med.	SS13	33,000	Med.			
YS12	64,000	Med.	SS14	68,000	Med.			
YS13	35,000	Med.	SS15	79,000	Med.			
YS15	12,000	Med.	SS17	28,000	Med.			
YS16	28,000	Med.	SS19	32,000	Med.			
YS18	19,000	Med.	SS22	28,000	Med.			
YS19	22,000	Med.	SS1	240,000	High			
YS22	37,000	Med.	SS2	65,000	High			
YS23	20,000	Med.	SS10	39,000	High			
YS24	10,000	Med.	SS18	90,000	High			
YS27	29,000	Med.	SS20	5,000	High			
YS4	18,000	High	Sub Total	\$ 1,236,000				
YS5	175,000	High						
YS17	60,000	High						
YS21	105,000	High						
YS26	110,000	High						
YS28	10,000	High						
Sub Total	\$ 1,565,000							

This ranking is done by starting with the low rated proposals only and individually ranking them using paired comparisons. At this level an additional prioritization or a preference voting method is used which results in an individual ranking of proposals 1 through N. In table 2.4 a simple ranking of 1 through 5 is demonstrated.

Table 2.4: Value Sieve Youth Division Ranking

<i>Youth Proposals</i>		<i>Rater</i>								<i>Score</i>	<i>Rank</i>
<i>ID</i>	<i>Cost</i>	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>E</i>	<i>F</i>	<i>G</i>	<i>H</i>		
YS3	14,000	1	1	1	1	2	1	1	1	9	1
YS9	140,000	4	4	4	5	4	4	4	4	33	4
YS14	201,000	2	2	5	2	1	2	2	2	18	2
YS20	98,000	3	5	3	3	3	3	3	3	26	3
YS25	4,000	5	3	2	4	5	5	5	5	34	5

The combination of each raters ordinal rank by program yields a total score which translates into a proposal specific ordinal level ranking by the division decision-makers. The combined results of such a process are shown in Table 2.5.

Table 2.5: Value Sieve Individual Division Lowest Priority Rankings

<i>Youth Proposals</i>			<i>Seniors Proposals</i>			<i>Family Proposals</i>		
<i>ID</i>	<i>Cost</i>	<i>Rank</i>	<i>ID</i>	<i>Cost</i>	<i>Rank</i>	<i>ID</i>	<i>Cost</i>	<i>Rank</i>
YS3	14,000	1	SS4	96,000	2	FS3	28,000	10
YS9	140,000	4	SS6	38,000	5	FS6	80,000	8
YS14	201,000	2	SS12	56,000	3	FS9	160,000	9
YS20	98,000	3	SS16	15,000	4	FS1	4,000	7
YS25	4,000	5	SS21	181,000	1	FS4	8,000	6
<i>Sub Total</i>	<i>457,000</i>		<i>Sub Total</i>	<i>386,000</i>		FS7	10,000	3
						FS8	6,000	4
						FS10	2,000	5
						FS2	18,000	2
						FS5	36,000	1
						<i>Sub Total</i>	<i>352,000</i>	

The divisions have now completed their responsibility by providing an ordinal level ranking of their divisional proposals. These divisional recommendations are provided to the board level decision-makers of CAS. The CAS executive decision-making group must now prioritize between proposals between divisions in such a way that the budget constraints are met. It should be noted that the executive has access to the full proposals listed and the ranking results of each of the divisions. The executive have the power to ignore the recommendations of each of the divisions if they see fit. While it is anticipated that the executive decision committee will in most cases follow the recommendations of the divisions, the executive have the oversight responsibility to ensure that they are

satisfied with the process and appropriateness of the divisional Value Sieve ranking.

Table 2.6: Value Sieve Combined Priority Sort

<i>Between Division Programs and Rankings</i>		
<i>ID</i>	<i>Cost</i>	<i>Sort</i>
YS20	98,000	Low
YS25	4,000	Low
FS3	28,000	Low
FS6	80,000	Low
FS9	160,000	Low
FS1	4,000	Med.
FS4	8,000	Med.
FS7	10,000	Med.
FS8	6,000	Med.
FS10	2,000	Med.
FS2	18,000	Med.
FS5	36,000	Med.
SS4	96,000	Med.
SS6	38,000	Med.
SS12	56,000	Med.
SS16	15,000	Hi
SS21	181,000	Hi
YS3	14,000	Hi
YS9	140,000	Hi
YS14	201,000	Hi
<i>Sub total</i>	<i>1,195,000</i>	

The executive repeats the Value Sieve procedure that was used by the divisions. In this context the task may be seen as more challenging because the proposals that must be ranked are less likely to be comparable. Individual raters are requested to sort the 20 proposals towards an outcome of 7 low rank, 6 medium rank and 7 high rank. In Table 2.6 the results of the individual low, medium and high sort is shown. The raters unanimously agreed on 5 low and 5 high ranked proposals with 10 medium ranked proposals containing mixed results. The low sort proposals total \$370,000. While it is possible to argue that the sorting process could end now, it is important to identify the specific ranking of these low rated proposals so that those operating within this domain understand the rater's perspectives of what is valued by the CAS. Consequently the low and medium proposals will be ranked to provide an ordinal level ranking of each of these

proposals. Implicit in this ranking is that if additional resources became available or if a further reduction of resources were to occur these lower ranking proposals would be the beneficiaries or the losers respectively.

In providing ordinal level ranking to the low and medium proposals the Community Aid Society is prioritizing the spending of \$644,000. These dollars support the projects that provide services that are the least valuable of the services provided by funded proposals of the CAS. The notion of least valuable is clearly a relative term and is not intended to suggest that those proposals if funded would not accomplish worthy outcomes. What it does indicate is that the "community VfM" of these services is ranked lower than that of other services.

Table 2.7: Value Sieve Final Ranking

<u>ID</u>	<u>Cost</u>	<u>Rank</u>	<u>Cost</u>
YS20	98,000	15	98,000
FS3	28,000	14	28,000
FS9	160,000	13	160,000
FS6	80,000	12	80,000
YS25	4,000	11	
FS1	4,000	10	
FS4	8,000	9	
FS10	2,000	8	
FS8	6,000	7	
FS7	10,000	6	
FS2	18,000	5	
FS5	36,000	4	
SS4	96,000	3	
SS6	38,000	2	
SS12	56,000	1	
<i>Sub total</i>	<i>644,000</i>	<i>Sub Total</i>	<i>366,000</i>

The Value Sieve procedure has prioritized all proposals within each division and has prioritized the lowest ranked proposals across the Society. This results in a clear message from CAS to the community, the target population and service providers about what the Society believes are programs which provide, from the resources available the most effective and efficient uses of the resources to better the target population. It focuses the arguments and discussion regarding service proposals on those proposals that are operating or will be operating at the margin.

A careful review of the ranking, shown in Table 2.7, demonstrates that regardless of what is said by the CAS decision-makers at the executive level, the Family proposals do not rate highly. With all 10 family proposals operating in the bottom 12 of all 60 proposals reviewed it should be clear that the family division service providers are either not performing well enough, or not proposing services which are seen to have relative value, or family services are not a high priority for the CAS when compared to their other service divisions.

Thus the value of the ranking is that it allows those organizations offering proposals which are operating on the margins to understand this and determine if this information can be used in a constructive way. For example it may be the case that a proposing organization must find a method to reduce the costs associated with the outcomes/outputs in order to improve its ranking. I.e. its VfM. Or it may be the case that the CAS no longer wishes to offer funding to proposals which offset the responsibility of an existing government proposal(s). I.e. the CAS does not want to become the financial support to programs/projects that are the legal responsibility of the government. Or it may be that the proposal addresses a problem so vast that the CAS does not feel it has the resources or the proposal making agencies the knowledge or skills necessary to address such problems.

Whatever the reason, several extremely important elements are communicated as a result of the Value Sieve methodology.

The transparent sort and following ranking process clearly demonstrates the ranking of proposals and shows which proposals were valued over others. An individual decision-maker is unable to indicate values of one kind and not support those values in their decision-making prioritizations. This is not to say that there will not be obfuscation at the margins with individuals potentially presenting the most politically acceptable explanations for their prioritizations.

2.4 Technical Summary

The Value Sieve establishes a stable and consistent model/methodology for decision making within an organization. The model can be applied to any type of organization that wishes to ensure its decision-makers are accountable. The methodology does not constrain the application of judgement or personal insight

to any decision but it does require that the decision-maker demonstrate the information used and solutions considered. It does this by requiring the decision-maker to identify the choices that were considered and to make evident the relative VfM of each for the objective function. This simple act establishes the bridge between technical and political accountability by making both the technical and judgement components of decision making transparent. It accepts that both technical and political communities within an enterprise may have preferences which cause them to "spend VfM " rightly meant for the specified objective function. Through the Value Sieve process it is possible to know if there was insufficient effort spent in developing alternatives, whether alternatives were based upon bad technical knowledge, or whether some other consideration must have been involved in the judgement associated with the prioritization of the available choices.

While the methodology cannot look into someone's mind and know the reason for their choices it is possible for a supervising individual or board member or member of the public to note a disparity in the VfM judgement(s) of a decision-maker and take corrective actions. Consequently, accountability flows in the appropriate directions in order to minimize poor judgement of both technical and political natures. This feedback establishes a foundation for ongoing efforts to improve individual and overall expected utility produced by the organization within a specified level of resource. This is enhanced and coordinated through the "roll up" which assists an organization in creating a stable model of decision making which is designed to accept changes in technical knowledge and social preferences over time.

2.5 Conclusion

The Value Sieve was developed to work in an environment which is almost entirely populated by well meaning and industrious individuals working hard to do the right thing⁴¹. It accepts that judgement and incommensurable measures will be present for the vast majority of decisions made, today and in the foreseeable

⁴¹ Note however that the processes of the Value Sieve are not limited to the operation of decision-making systems which are only operated by individuals who do the right thing.

future. It supports a decision-maker in using judgement to interpret the best available information and goes far in the way of ensuring procedural and consequential accountability. These accountabilities provide the opportunity for decision-makers, working in good faith, to adjust their actions to improve performance given new knowledge or a changing environment.

Further, the Value Sieve as a technique communicates the values of the decision-makers to the rest of their organization through the selection of actions. This selection provides insight into the underlying values of the decision-maker and their objective functions.

By specifying the methodology and techniques of an accountable decision-maker the Value Sieve creates a simple and unifying understanding of the purpose of management and the foundation for an organization to maximize the expected utility it produces for a specified objective function for a given budget.

An expansion of Value Sieve framework is provided in Chapter 4 after an overview of the underlying theoretical and experimental elements.

Chapter Three: Technical Underpinnings

"There is nothing quite so practical as good theory and nothing so good for theory-making as direct involvement with practice."

Nevitt Sanford

3.0 Overview of Technical Underpinnings of the Value Sieve⁴²

The technical underpinnings of the Value Sieve are complex and are difficult to explain concisely. This is not because the Value Sieve as a tool is complicated but because the method is elegant in its simplicity of managing many complex variables and their influences. Each influence is balanced and this multi-part balance is difficult to express in simple terms. This short overview is intended to convey a basic overview of the variables and their relationships. These ideas are developed more completely in technical appendix B which is included for those interested in more detailed technical information. The summary, which follows this introduction, assumes a basic understanding of the technical information found within appendix B

In Canada and other industrialized countries the funding allocated to the health and social services sectors is under scrutiny. The primary considerations focus upon the obligation of government to facilitate the health and welfare of their citizens and to minimize or eliminate gaps in the social safety net for special populations and the resources required to meet the needs of the population. Examples of special populations include: the mentally ill; children; and the poor. Given that terms such as, "disadvantaged", "poor", and "healthy" are all relative,

⁴² This technical chapter accepts that the readers are from a variety of disciplines and consequently will have varying degrees of knowledge as it relates to the technical topics. For this reason this technical section is perhaps a little more wordy than would be expected in a dissertation where all participants share common concepts and vocabulary. Brief supporting notions have been placed in the footers and additional materials have been placed into a technical glossary to provide further technical clarification as required. These resources are supported further by Appendix B.

it should be clear that these issues within a population can never be fully resolved. Consequently resources will always be scarce when trying to remedy these issues.

Governments through the establishment of laws and regulations determine the obligations of the citizens and the government in meeting the needs of the population. These laws and regulations limit the strategies that may be employed by citizens to meet their individual needs. Further, the laws and regulations determine/constrain the strategies which will be employed by both public and private entities to meet the needs of the citizens. Citizens, the government and the private sector collectively determine what will be made available to meet the needs of the population, including the requirements of the social safety net.

Value for money is a central concern directly or indirectly, for all parties participating in the health and social safety system of any country. It is within the context of value for money that all industrial countries endeavor to determine the appropriate mixture of individual, public and private resourcing to meet these needs of the population. Resourcing is usually determined through a combination of historic precedent, political philosophy, economic capacity and social expectations. The amount of resource committed by any one participating party is to some extent dependent upon the options available, the actions taken and the resources contributed by the other parties.

To understand the consequences of these different mixtures of resourcing, a model⁴³ of service is required which predicts the consequences of different mixtures of resource from the participating parties. Given the differences that exist between economic theory⁴⁴ and management practice, information must be gathered over time to determine how the model and practice might be adjusted to improve the health and social system.

⁴³ All regulation can be considered to include a model of the system which is being regulated. If this were not the case then the consequences of the regulation could not be predicted. This is not to suggest that the models included within regulations are always correct, indeed the frequency of perverse consequences suggests that frequently the models used to guide regulation are less than perfect.

⁴⁴ There is an old joke about the economist who saw something working in practice and wondered whether it would work in theory.

That there is a distinction between economic theory and management practice can be most clearly demonstrated when the traditional rational economic actor model used by many economists and managers is challenged in the laboratory⁴⁵. What the theoretical model predicts about optimum decision making is not supported in the laboratory findings. Thus while we would prefer there to be a single model which predicts behavior we must accept that there are two models which must be understood: the model of what is best to do in theory, and the private (mental) model which guides a decision-maker in practice. The consequence of this finding is that there may be random or systematic breaks between what is theoretically possible and what can practically be achieved. These discrepant errors in judgement under conditions of ambiguity or uncertainty may be difficult for even well trained persons to avoid. To what extent can these errors be minimized and to what extent are these errors underlying significant losses of efficiency or effectiveness?

Different academic disciplines bring different perspectives to bear on this issue. The challenge of building a framework for decision making is the need to develop a process which can support the diversity of academic findings and still provide a practical capability for administrators and managers to make decisions which portend improvement.

In welfare economics, the determination of value for money depends upon the values of the decision-maker(s). Each available option provides a measure of VfM to the decision-maker. Considering the choices available, decision-makers apply their values to select that choice which maximizes their VfM. When a basket of choices may be selected, decision-makers optimize their expected utility⁴⁶ by selecting those choices that combine to create the greatest overall expected utility. The values of the decision-maker(s) used to gauge expected utility are thus central to the Pareto optimization⁴⁷ of choices and thus the maximization of expected

⁴⁵ Field observations from many social scientists (Herb Simon to Thomas Davenport) have also identified the failure of the rational actor model.

⁴⁶ I am using expected utility here as an example of a model of decision-maker motivation and optimization. Utility theory, Expected Utility Theory, Prospect Theory etc. all have problems being supported in the laboratory.

⁴⁷ Pareto optimization defined in glossary.

utility and VfM. However, values by definition are individual and so individual differences must be expected.

In principal agent theory⁴⁸ the principal provides instruction to the agent to carry out specific actions. In order to protect his⁴⁹ interests the principal supervises the agent to ensure that the actions were carried out in a satisfactory manner. Moral hazard is a situation in which an agent has an incentive⁵⁰ to use the resources of the principal in such a way as to increase her personal benefit at a cost to the principal. In some cases the cost may be obvious⁵¹ while in others it may be difficult to detect. Difficulty in detection may be due to a lack of technical knowledge on the part of the principal, an incomplete or ambiguous agent activity monitoring system, or a lack of personal incentive for the principal. The extent of the investment a principal is willing to make in a monitoring system is based upon the transaction cost economics. These costs include the cost of developing, implementing and maintaining the monitoring system and its ability to eliminate the real and perceived costs associated with opportunism/moral hazard.

Principals using inadequate measurement systems for monitoring can through the use of the specific or inherent agent motivations⁵² induce perverse consequences. Measurement dysfunction caused by a monitoring system can cause the agent to change essential work place behaviors. The result is the measurements (variables) of the monitoring system distort (through the incentive system) the necessary actions of the agent, but due to the design flaws the distortion is not detected by the monitoring system. In some circumstances the tasks and knowledge required

⁴⁸ Principal/agent defined in glossary.

⁴⁹ In this paper, for simplicity, I will adopt the male as principal and agent as female.

⁵⁰ Care must be taken at this point to ensure that the difference between incentive and motivation is remembered. While an economist would argue that financial incentive is necessary to direct the energies of an agent, it is clear to a psychologist that motivation induced by other than financial incentive is possible. Indeed, it is the case that in some circumstances a financial incentive may result in an agent being motivated to take a money-losing alternative.

⁵¹ It may even be encouraged as an informal perk of the job.

⁵² It should be noted that in economics incentives are considered to be of a financial nature only and a subset of motivations. Financial incentives provide no guarantee that the agent will not call upon other internal motivations (morals, ethics, professional pride, and love) to direct their behavior.

by the agent to complete a task conspire with the cost to “properly”⁵³ monitor the task so that principals must rely on trust and negative incentives to agents for breach of trust.

Measurement systems that are linked intentionally or not to incentive/motivation systems may induce unintended consequences by changing the behaviors of layers⁵⁴ of principals and agents and consequently their organizations. Bounded rationality is another view of measurement dysfunction in that it frames the working context of principals and agents such that they do not consider the impact of their actions on other principals and agents or their efforts within the same or complementary organizations. The concept of bounded rationality would explain why managers working within the same organization and supporting the overall organizational goal(s) can create unintended consequences which make their fellow manager’s tasks more costly or difficult.

To minimize the dysfunction which results from bounded rationality information must be made available from each bounded unit so that coordination is possible. Coordination is the Pareto optimization of multiple programs under the aegis of an accountable decision making principal. There are only two methods available for the coordination of the allocation of resources, a market or a hierarchy⁵⁵. Hierarchies are more costly mechanisms than markets to allocate resources. This is because of the level of energy/control which is required to maintain the hierarchy and the possibility for less than optimal decision making due to bounded rationality and measurement dysfunction. Hierarchies can only exist within a specific entity and ultimately these entities public or private must compete within a market to acquire resources⁵⁶. This competition is always won by the entities (programs) which can offer the greatest VfM to the purchasing/allocating decision-maker(s). Accountable principals use the existing information and their

⁵³ “Properly” requires a monitoring system which does not induce measurement dysfunction.

⁵⁴ Layers of principals and agents refers to the notion that within a multi tiered hierarchy the agent of one principal may also be a principal to an agent lower in the hierarchy.

⁵⁵ (Williamson 1975) compares these as two alternatives. However, these may be seen as the opposing ends of a spectrum as some (Ouchi 1980) believe that entities demonstrate a mixture of the two strategies.

⁵⁶ In open systems theory resources are considered negative entropy.

values⁵⁷ to determine the relative **VfM** of their available choices and allocate resources accordingly.

For each decision-maker the expected utility/outcomes from choices are constrained by the variety of choices available. Hierarchies incorporate knowledge into policies and procedures so that principals may reduce the variety of choices available to agents and in so doing manage (streamline) the complexity of the task of determining the expected utility of each possible choice or the Pareto optimal basket of choices. These guidelines provided by principals to agents presuppose that the senior levels of the organization have a greater understanding of the organization, its mission and the individual tasks which interact to meet the objectives of the mission than do the agents of the organization. This is a traditional top down perspective based upon organizational command and control models such as machine bureaucracies. However, in complex environments where many difficult to monitor transactions are taking place and/or specialized knowledge is required by the agent, the volume, variety and variability of the information being managed by the agent increases the probability that any measurement system will be incomplete. When incomplete measurement systems are linked to formal or informal agent incentive systems the opportunities for management error due to erroneous levels of certainty increase the possibility that principals will generate decisions and directives which will result in unforeseen, unintended, perverse consequences⁵⁸.

⁵⁷ The decision-maker would be applying the roles, norms, and values of the position and organization except in such cases where moral hazard is at play such as conditions of ambiguity or uncertainty or measurement dysfunction.

⁵⁸ In these circumstances, the benefit of a market is the speed with which feedback can be received from the buyers/intended buyers, to identify errors in judgement and decision making. The client is ultimate arbiter of what they value and what they do not. Enterprises such as the Canadian health system do not necessarily have the benefit of independent, informed feedback because the buyers of the services are also the providers of the services. This makes it more difficult to identify and resolve errors in judgement under conditions of uncertainty.

As an example, knowledge intensive⁵⁹ enterprises operate in complex environments and carry out different complex tasks at unique levels within the organization's hierarchy. The result is that the formal and informal information systems operating within complex organizations cannot conform to a traditional top down information model. In other words the leadership in a traditional machine bureaucracy would expect to have more information at the top than each individual production unit would have at the bottom. Thus administrators from the top of the organization would be capable of providing sufficient and reasonable instructions downwards through the hierarchy to successfully direct the activities of persons working in the lower reaches of the enterprise. However, in knowledge intensive enterprises this ability to direct from the top is tempered because the complexity of activities taking place at different levels within the enterprise cannot be easily summarized without loss of essential information. The consequence is that organizational leaders can have only partial understanding of the various activities taking place within the organization. Communication from the top of the organization to provide direction is much more challenging in that the use of the summary "supervisory" information vocabulary may not provide sufficient clarity or detail to be interpreted at the varying operational levels without ambiguity or uncertainty. Consequently, information systems constructed to convey an encapsulated representation of the "basic status"⁶⁰ of different programs may very adequately inform senior decision-makers about the status of programs within their organization. However, when those basic status monitoring information systems are used as performance measurement (motivational) systems they interact with the individual incentives of the agents within the organization.

⁵⁹ I am using the term knowledge intensive instead of knowledge based to avoid the variety of assumptions that are characterized by the literature on what a knowledge-based enterprise is. In this case, I simply want to reinforce the notion that the expertise necessary to carry out the individual activities of the enterprise requires specialized knowledge which is not easily accessible to the senior executive of the organization. Consequently, a knowledge intensive enterprise would include a broad spectrum of organizations which require specialized knowledge to operate successfully.

The deficiencies and gaps of the information system which are not particularly dangerous when used to understand status become increased uncertainties when they are used to provide feedback related to performance.

Data becomes information to the extent that it can reduce uncertainty regarding the choices available to a decision-maker. Information is measured by the degree that it reduces uncertainty among the choices. Data which does not reduce uncertainty is not useful. Since the categories must be specified by an observer, the uncertainty of a system may be different as seen by different observers. Consequently a principal and an agent may look at the same information and have different levels of uncertainty. For example, individuals with specialized knowledge are trained to identify greater degrees of differentiation within their specialization and to develop subtle categorizations and so it is reasonable to expect specialists to see important distinctions where those with different specialized training do not. Therefore it is essential to understand the information requirements of the decision-maker and the uncertainty that must be addressed to aid in their decision making.

The distinct categories contained within specialized knowledge makes it possible for one untrained person to consider the measures of different variables to be commensurable while those with specialized knowledge to realize the measures are not commensurable. It is possible for identical information to be provided to two individuals who experience different levels of reduction in uncertainty. Then it follows that information systems designers must determine whose decision making they are intending to affect in order to select those variables and determine which measures will provide the most appropriate reductions in uncertainty. What model of knowledge and decision making and production does the entity have? In the information systems literature this can be considered what

⁶⁰ An encapsulated representation or basic status report is intended to suggest that a summary report designed to minimize dysfunction be used to provide an understanding of the performance of the program. This is intended to make clear that the information needed by senior personnel for decision making would be included in these program information capsules but not be limited to these capsules. There are many other sources of information which the senior personnel would wish to have, to improve their decision making.

is the information culture of the organization and what information behaviors do the various participating work units have.

The selection of the information required in a knowledge intensive organization must be determined by those who are accountable for the delivery of the consequences of the expenditure of resources by the entity. This suggests that while the senior administrator⁶¹ must have information to aid in the development and maintenance of the organization and ensure that elements of the organization are performing well, the managers at various levels within the knowledge based organization must have potentially different information in order to optimize the consequences of the work they are accountable for.

Thus the participants in the construction of the information system must understand that the purpose of data is to reduce uncertainty of decision-makers and that the individual differences due to specialization, complexity of the working relationships with other entities and manager responsibility may mean that work units have different requirements. Further, the development of variable subsets which are used by agents managing a work unit to inform principals about the status of a working unit are not the only variables that must be manipulated in order to produce a satisfactory working unit outcome. To avoid measurement dysfunction the principal/administrator must be cautious about using status related information interchangeably with performance measurement information. The subtleties of this distinction can be very difficult given the current desire to believe that information is an inherently good thing and does not lead to dysfunction.

The Value Sieve takes the point of view that optimization is the goal of all principals and that in executing that optimization the agent agrees to apply their skills to use resources to provide the product, output, outcome agreed to. Further, that any agreement about the specification of the product, service, output or outcome made by a principal contracting to a more knowledgeable agent

⁶¹ When referring to a person in an organization I will use terminology which relates to a management position in the hierarchy. This is to distinguish from the pure theoretical relationship between principal and agent that can only represent the hierarchical relationship between two individuals. Thus if a principal is referred to then it is the direct supervisor of the agent.

cannot/will not be sufficiently detailed to avoid measurement dysfunction. In agreements between entities the failure to deliver a product or service according to the spirit of the specification causes the purchaser to discontinue the relationship and look to others to provide the product or service. This freedom to choose an alternative (substitute good) causes entities providing products and services to resolve differences in order to maintain a long term cooperative and mutually beneficial relationship. The specification becomes a stepping stone to a trust relationship where greater "contextually relevant" information is exchanged between the principal and agent to ensure the letter and spirit of the specification is well understood by both parties in the relationship. In the long run, trust is the least expensive method of managing complex relationships. Unilateral specifications and monitoring strategies developed by principals for performance measurement purposes is expected to result in the loss of trust between agent and principal and generate perverse/unintended consequences through moral hazard and measurement dysfunction. This will be particularly true in knowledge enterprises where the specification includes details or constraints of the knowledge/intellectual process(es) to be used instead of the performance characteristics of the deliverable. In some cases principals contract with agents on a best efforts basis because there is insufficient willingness of the part of the agent to provide guarantees beyond those associated with their professional training and competence within their chosen profession. In these circumstances proof of competency, trust in professional integrity, and monitoring the status outputs with the option of choosing an alternative agent is the best a principal can do. In cases where choosing an alternative is difficult, disincentive schemes must be developed to ensure that the identification of breach of trust carries serious consequences.

For example: In taking your medical case to a cardiac specialist you cannot expect to receive a guarantee of regaining perfect health after treatment. You can expect to be guaranteed best efforts and practice which is free of errors. However, it is difficult for an individual patient to have sufficient knowledge to expect that they can first identify flaws in the service provided and second correctly distinguish between flaws which were the consequence of foreseeable errors versus unforeseeable complications. To protect the trust professional regulatory agencies

are created to police the practice of professionals in order to protect the public and the profession from inadequate professional behavior/practice. In extreme cases professionals may have their professional designation cancelled through removal as a member in good standing of the regulatory agency. The difficulty in this public protection strategy is that clients/citizens are required to identify cases of poor practice which can then be investigated by the regulatory agency. This is made more difficult in Canada because in Canada the professional regulatory agencies for physicians do not require physicians who make mistakes to advise their clients of these mistakes. I.e. not advising a client of a mistake is not seen as a breach in professional practice. Given this circumstance serious penalties must be created to inflict severe consequences upon doctors whom have errors detected in their practice and who did not advise their clients. If this is not the case, public trust can only be maintained while there is ignorance of the true nature of their protection. From an uncertainty reduction/information system perspective, the information consequences of this state of affairs points to very high cost measurement validation systems if trust is to be forfeit in the relationship with these professionals.

Thus trust has worth and is required in complex and knowledge intensive enterprises where it is not cost effective for the principal to specify and monitor all aspects of the needed service or product on an ongoing basis. Conversely the loss of trust has a cost and increases the difficulty in specifying and monitoring performance in order to minimize perverse consequences. There is a benefit cost which must be calculated in order to determine the best course of action in balancing trust, working environments, incentive systems, feedback systems, and information systems.

The design, development, implementation and maintenance of information systems for knowledge based organizations operating within complex environments is extremely challenging. It is made more difficult when the enterprise is not a green start⁶² and so the design and implementation must be carried out within the additional constraints of the current information

environment, established policies and procedures, formal and informal agreements and legacy relationships.

The Value Sieve is intended to work in complex, knowledge intensive environments attempting to maximize value for money. The Value Sieve is an optimization methodology which uses the activity of resource allocation to prioritize incommensurable programs based upon the values of the consequentially accountable decision-maker. The Value Sieve establishes an information foundation within a program an enterprise and within any bounded system of entities working towards a common interest (objective function⁶³).

For example in the field of social services an example of an objective function could be "reducing juvenile violence". Thus each available alternative program addressing juvenile violence could be considered within the context of its ability to, in new or complementary ways, to contribute to the reduction in juvenile violence. The integrated measure (in the mind of the decision-maker) being the **VFM** of an alternative program in addressing the objective function.

The Value Sieve employs the fundamental basis of experimental and quasi-experimental learning. This incorporates:

- a statement of the process or procedure including materials/resources required;
- an a priori statement of what is expected to be achieved;
- a measurement strategy to confirm the extent that it has been achieved; and
- a review and evaluation period to revise the program and consequently the next plan of action based upon what has been learned.

The health and social services provided within any industrialized country compose a complex system of knowledge intensive services separated by arbitrary

⁶² This is the norm rather than the exception in most industries. It is particularly true in health and social service organizations in Canada because they are government funded and consequently rarely die to be reborn with a clean slate.

⁶³ Definition and example is included in the glossary under the heading Utility and Objective Functions

boundaries. Funding is divided among public, private and not-for-profit entities who in the preponderance of cases invoice a party other than the person served. It has been determined by numerous studies that the cost of healthcare in Canada is escalating and is in need of control. There is a desire to restructure the healthcare system within Canada to make it more efficient and effective. It has been argued that in order to accomplish this new service delivery structures must be employed and information systems developed. The Value Sieve was developed as a resource allocation process within the context of the regionalization of the health care system in BC, Canada. The design of the Value Sieve was carried out to include the issues associated with the development of regional health administrative and information systems, and the high probability that the development of the regional resource allocation process would need to evolve in cooperation with the organizational, administrative and information systems in place.

There are a number of technical elements which stand out as they relate to the design of a resource allocation process. They have been broken into three sections in appendix B and attempt to move from basic concepts through management techniques and finally to health system specifics. In some cases the placement of an idea is clearly judgmental however, the sequence should ease the burden of moving through so much information.

From the research findings the best evidence for the design of a resource allocation process for health and social service organizations emerges. The summary and conclusions of these findings are as follows.

3.1 Summary, Conclusions and Technical Recommendations

"Ninety-four percent of university professors think they are better at their jobs than their colleagues. Twenty-five percent of college students believe they are in the top 1% in terms of their ability to get along with others. Seventy percent of college students think they are above average in leadership ability. Only two percent think they are below average."

Thomas Gilovich *How We Know What Isn't So*

3.1.1 Design Considerations for Decision Making in Organizations

In considering the criteria that should be used to guide the development of a decision making infrastructure for a large complex/heterogeneous⁶⁴ organization several points must be emphasized. This is best done under key conceptual headings.

3.1.1.1 Economic Models of Behavior

- Firms do not perform as suggested by the economic theory of the firm. Complex human systems do not select the highest value Nash equilibrium. This is frequently the result of an inability of the decision-makers to coordinate their actions. Sub optimal action coordination is not easily resolved without two-way communication along with an open verification process of actions of the participants.
- The use of principal agent theory to assist in the alignment of the vested interests of the “owner” with the staff is not supported by the organization decision literature. The consequence of this is that alignment strategies focusing upon money or other motivators may result in distortions of the actions of the principal and agent.⁶⁵
- Humans are not rational as described by traditional economic theory. The decision making is made difficult due to complexity, uncertainty, and risk. People will direct their attention to problem solving instead of decision making if they are given the chance.

3.1.1.2 Management Models of Organization

- The volume of decisions, and the need to have specialized skills and knowledge to make those decisions, requires the decentralizing of decision making. The movement of decision making downwards in the hierarchy

⁶⁴ Health organizations like Regional Health Authority provide a variety of specialized individuals to meet the diverse needs of the clients. Consequently, this diversity makes the operations diverse which increases the difficulty in establishing single simple patterns and policies. This is the opposite of a homogeneous organization that has a number of individuals doing essentially the same work.

⁶⁵ The section in this dissertation on measure dysfunction develops the issues associated with principal agent theory.

requires that decision-makers be provided with sufficient flexibility to use their judgement. The provision of flexibility for judgement requires that the organization be exposed to having decision-makers choose what is best for themselves and not the organization. Given this, the alignment of the interests of all the parties must be considered, and will likely require a system of interlocking trust based agreements.

- The utilization of contracts to define an organization will not work at the level of detail required to have complete control. Studies indicate that most organizations do not have the level of detail specified in their contracts necessary to clearly ensure that a party, acting in bad faith could not take advantage of the situation.⁶⁶ (Jacobs 1992). Contracts must be used to develop and firmly state objective deliverables and specifications. An attempt to use contracting language to specify methodologies will likely result in waste and contractual disputes.
- Healthy organizational systems enjoy a dynamic tension between the idealized vision of the organization which will exist within the top levels of management and the grittier perspective at the bottom. The decision system needs to keep the perspective of both ends of the enterprise in balance.

3.1.1.3 Organizational/Human Systems

- Human systems cannot be engineered as easily as mechanical systems and human related systems problems can rarely be resolved with only technological solutions.
- Population health as defined within the context of the determinants of health, is an open system. Therefore, in many cases corrections made in one area will result in problems being identified in another. Frameworks must be

⁶⁶ Jane Jacobs, *Systems of Survival* makes the point that business organizations use contracts to frame the nature of the business relationship but use the specter of repeated business and reputation to reinforce business fare trading. She also notes that fair-trading is not a part of lexicon of government workers. This suggests that government organizations may not be well equipped to use contracts to coordinate their actions with other parties.

established to map in general the systems in operations (Davenport 1997). These notions are part of the information ecology of the system under study.

- Smaller teams are more likely to have better coordination and therefore produce fewer sub-optimal decisions. Further, small groups working successfully will find it easier to include small numbers of new individuals without this causing reduction in performance.
- Human problems are rarely resolved by technical systems (Fischhoff and Johnson 1997). This includes the implementation of technology and technology based services. Problems that are identified with technology will often have humans at their core. For example, information overload.

3.1.1.4 Decision Making and Uncertainty

- The organization must accept that many of the decisions made involve risk and uncertainty and as a consequence the organization must not direct its energies and decisions as though at some time in the future all these problems will be resolved or become predictable and controllable. A failure to acknowledge that some of an organization's systems operate because of unofficial intelligence and scrounging for resources may result in these informal systems being dropped when changes or restructuring takes place.
- Decision-makers will have bounded rationality. Therefore, communication is an essential tool that will assist in a variety of ways to minimize errors. Communication should include a priori documentation so that judgement errors (for example hindsight and or confidence bias) do not cloud the parties understanding and ability to work constructively.
- Organizations must resist simple philosophies which suggest that people are programmable or that focusing on a single dimension can solve multi dimension decision problems. For example the notion that "quality is free" (Crosby, 1979) suggest that quality takes no time, utilizes no additional resources, and that errors can be eliminated given sufficient industry on the part of the decision-maker.

- Focused teams of homogenous individuals will lose the ability to generate divergent opinions and perspectives. Therefore, decision systems should be able to be accessed by others who are not part of the team so that additional variety of options can be suggested and narrow less than optimal views can be challenged.

3.1.1.5 Quality Control when The Product is Knowledge Based

- Experts will disagree. I.e. an agreement of 100% is likely to be rare. There are in general terms four levels of agreement. 1) Aided decision-makers, including weather forecasters, astronomers and insurance analysts, using sophisticated computing tools and models tend to agree 70% to 95% of the time. 2) Competent decision-makers such as chess masters, grain inspectors and livestock judges who use rules agree 50% to 60% of the time. 3) Restricted decision-makers including clinical psychologists, parole officers, and student admission officers agree about 40% of the time. Finally, 4) quasi-random decision-makers such as stock brokers and polygraph readers enjoy very little agreement. Many decision making experts such as nurses, physicians and most researchers work at each of these four agreement levels depending upon their task (Azar, 1999).
- Experts will make mistakes. A Harvard medical study indicates that approximately 4% of patients are the victims of medical system errors. Of these 25% were mistakes resulting from incorrect judgement. 14% of these medical systems errors result in the death of the client (Troyen, A. & Brennan et al., 1991). In Australia, it was estimated that approximately 16% of admissions result in an adverse event which results in 14,000 preventable death per year (Cordner, 1995).
- Data by itself does not demonstrate/provide an inherent quality control mechanism. Finding the errors in data can be so expensive that it is not economic to use the data. Using data which has unknown validity and/or reliability in decision making is an action which requires extreme care and extensive documentation regarding the assumptions involved.

3.1.1.6 Model Development and Implementation

- The broader and most important question is how systems are conceptualized.
- You need to find out where people are before you can take them where you want them to be.

3.1.2 Decision System Recommendations

Introduction

The notion of the Value Sieve resource allocation process is to build a platform for current and future decision making which allows a stable “mental model” of resource allocation (Corbett 1993). While the model is stable, the nature of it “a quasi market” assists individuals within the organization to address their individual and collective optimization activities within the context of scarce resources and an obligation to both clients and staff.

The Value Sieve addresses the complex organizational requirements in health through:

- the constructive identification of boundaries between programs and organizations;
- the a priori documentation of predictions and interpretive guides; and
- the development of cooperative plans and services which meet the combined needs (Nash Equilibrium) of the programs and organizations.

Cooperation is developed through improved coordination that results from more direct and action verifiable communication. To achieve this, the following “guidelines” are proposed.

3.1.2.1 Value Sieve Guideline One: A Decision System

Health is an open system composed of humans serving the needs of humans. The system must be designed to work using the strengths and accepting weaknesses of humans. Where possible “prosthetics” should be designed and implemented to relieve those human weakness. In the allocation of resources, the Value Sieve directs the attention of all parties to the choices that must be made and so minimizes the innate human desire to convert decision making into problem

solving. The Value Sieve brings to a Region a working context and an overall conceptualization that will assist the various and disjoint parts in working together.

3.1.2.2 Value Sieve Guideline Two: Contingency Theory

While statistically a particular population has a health problem, funding will not be based upon the size of that population but on the ability of a particular organization/community to address that population successfully. This means that while other Regions may have expertise and while best practice may tell us what should be achievable, our own verifiable numbers will identify if a different investment in the public/population health which has a higher probability of achieving more, should be made. This call for competition among the Region's health providers allows us to acknowledge that when we are spending health dollars all population health services are substitute goods.

3.1.2.3 Value Sieve Guideline Three: Use the Evidence of Behavior

Humans are not rational actors, the theory of the firm is not true, and that principal agent theory cannot be used to align the interests of workers. These experimental findings must cause us to revisit many of the working assumptions that have been developed for our organizations and the decisions we make. Seeking the most efficient Nash Equilibrium⁶⁷ for the organization while accepting the decision-makers will be using bounded rationality⁶⁸ for the majority of their actions and basing these final judgements is an impossible process⁶⁹.

3.1.2.4 Value Sieve Guideline Four: A Quasi Market

The use of hierarchy to control and direct the actions of the individuals working within health does not benefit from a more extensive hierarchy. The volume of decisions that must be made will force decentralization of decision making to specialized groups. This is based upon the fact that these decisions must be made using the expertise of the individuals and teams that provide the service to the

⁶⁷ Nash's, Nash Equilibrium (Nobel Prize) - please note that there are other theories around such as Axlerod's Landscape theory.

⁶⁸ Simon's, Bounded Rationality. (Nobel Prize)

⁶⁹ Arrow's, Impossibility theory. (Nobel Prize)

client. Given the variety of specialization that must be coordinated, a more efficient form of organization is a quasi market. This movement away from traditional hierarchy is providing the flat organizational structures which individuals and organizations are trying to develop. Given the requirement of decentralization of decision making and the desire to reduce the costs of middle management there is but a single choice for a structure that will meet these requirements. A market or more precisely a variation of a market called a quasi market.

3.1.2.5 Value Sieve Guideline Five: Attention Allocation

The quasi market must follow from the decentralization of decision making. As funding is reduced and middle managers are required to do more with less, they will need to move decisions either upwards or downwards within the hierarchy. Assuming, that senior decision-makers will begin to find their limit in making difficult choices related to specialization that they do not understand, many of the decisions will either not be made or will be directed downwards in the hierarchy. Middle managers, overloaded with decisions will either, not make the decisions of they will move them downwards in the hierarchy to the service delivery teams and their personnel. This action, over time, should result in the further migration of middle managers to senior executive roles or back into direct service delivery functions. The volume of decisions can only grow and the specialization needed to make these decisions will also grow. The reduction of middle management requires a quasi market as the only method available to manage the decision making load efficiently and effectively.

3.1.2.6 Value Sieve Guideline Six: Good Fences Make Good Neighbors

Organizations wish to control their externalities and this is usually done by consuming external organizations under the belief that when these former externalities are consumed they will be predictable and controllable. Regional health organizations will first attempt to consume the other organizations around them that have an impact upon population health. This will take place through a direct integration of smaller organizations and non-profits. It will also take place through the withdrawal of government funding from those independent community organizations. The problem with this slow consumption and

integration is the reduction of variety in the perspectives of the possible solutions, the increased rigidity that comes from a traditional hierarchy and the increased cost for services. The increase in costs results from the unionization⁷⁰ of working teams who have traditionally operated at a lower cost and with lower management overhead than traditional government paid health workers. To minimize the damage that can be done through the acquisition and direct control of resources, a regional health organization must develop methods to work cooperatively with other health related organizations and recognize that the desire to consume these organizations will in the long run result in a lesser ability to meet the needs of the population.

3.1.2.7 Value Sieve Guideline Seven: Understand the Equilibrium

Given the majority of health and social programs are already established a centerpiece of any resource allocation process must be its acceptance of the current working models inside each organization. This includes the need to acknowledge that these “in place” models have been built over many years and have quite rightly, been given structural/procedural/policy support. All assumptions regarding the current operating status must assume that all policies and procedures have been implemented with the best of intentions. In the initial stages it is unreasonable to assume that organization slack and/or budget slack will be easily identified and resolved. The current organization should be accepted as satisfied.

The current system must be understood in order to support a change to a new equilibrium remembering that a poorly considered shift could result in an organization being in a worse, not better situation as a consequence of poorly executed change to the existing equilibrium. This will require the procedures establish an ability to identify relationships with the environment or other programs within the organization that will potentially produce unintended consequences.

⁷⁰ Private conversation with senior members of the Ministry of Health and Ministry for Children and Families.

3.1.2.8 Value Sieve Guideline Eight: An Accountable Process to Prioritize Choices

Management by exception recommends that supervisors establish procedures that direct their attention to those things which are not working as expected. In this context, those things that are working well are left alone to continue as planned. A manager directs their attention, which is a limited resource, to those activities that may benefit from the attention. The manager will be expected to determine the best way to “fix” the problem. This does not always mean the problem can be solved easily and it may be the case that the most appropriate solution is to reduce or eliminate the activity, or the people carrying out the activity

The market place and medical triage⁷¹ have much in common. Both mechanism acknowledge the scarcity of resources and the essential need to maximize benefits by eliminating investment into those entities for which there is a low probability of success. Although from time to time they are proved wrong through the heroic efforts of others, the discipline of scarcity continues to be applied. This discipline focuses our attention on an essential fact, the direction of scarce resources into entities which do not or cannot survive eliminates the ability to direct resources to those that can survive but will not if their resource needs are not met.

While a market implies that there are but two categories, winners and losers, there are in reality many categories, which are to some extent arbitrary and therefore communicate gradations of concern instead of hard specifics. Both the market and triage recognize the essential elements of expert judgement under conditions of uncertainty and complexity and both are aware of the painful consequences of their judgements. There are three basic categories: those who will definitely receive resources, those who definitely will not receive resources, and those who must be prioritized to receive resources based upon the best judgement of the probable outcome. Making these resource allocation decisions requires five ambient factors.

Five factors are:

⁷¹ The sorting out and classification of patients or casualties to determine priority of need and proper place of treatment. The online medical dictionary <http://www.graylab.ac.uk>

- understanding the resources available – (what have we got) – this requires that the quantity, quality, ownership and control of resources available are understood
- understanding the demand for resources – what can we do – this requires that the entities which require resources announce themselves and that the decision structure ensures that all opportunities requiring resources are understood
- understanding what can be done with different resources – what can be accomplished – the decision-maker must have sufficient breadth and depth of knowledge to know, outside the current constraint of time and resources, what can be accomplished with resources and different combinations of resources
- what is the consequence of time in decision making – what is the cost of inaction – the impact of time must be understood to fully develop a plan of action. This may be based upon the actual shelf life of resources, the utilization rate of resources by others, the critical nature of the entity receiving the resources and whether other essential resources that will be required in the future will be available. The decision making context is critical and requires that decision-makers make the distinction between what they should do now versus what should be done to collect additional information for future decision making.
- understanding what can be accomplished when the available resources are applied to the current demands and opportunities in a timely manner. – what have we got to do -

In both the market and in triage the best outcomes are produced by individuals who understand the probabilities of what can be accomplished and are capable of making the difficult choices that ultimately maximize the benefits and minimize the losses.

3.1.2.9 Value Sieve Guideline Nine: Rejuvenation through Incremental Change

Experts use the available knowledge to direct their scarce resources into those activities, which they believe, possess the highest return. In this situation,

feedback can be incomplete because the alternatives remain unfunded and so the process may tend to result in self-fulfilling prophecies. The market solves this problem through the introduction of new, high-risk organizations that specialize in the innovative exploitation of market niches. There is a high failure rate of these new and innovative participants and so high levels of reward are required to motivate and coordinate the involvement of new participants. In many cases, successful new participants are acquired by larger stable organizations that find it easier to renew themselves through the acquisition of already successful concepts than internally innovating. Cherry picking successful concepts is less expensive than building the infrastructure and going through the high proportion of failures that are required to develop successful concepts.

For example, most would argue that Microsoft Corporation is an extremely innovative company. Critics of Microsoft would argue that its greatest strength has been its ability to acquire innovative software/companies and then to exploit its market knowledge/position to maximize a profitable return on the acquired intellectual content. The relationship between larger stable organizations and smaller entrepreneurial enterprises creates a laboratory/ecology where new variety is created, tested, and then rewarded.

However, this does not take place in environments where organizations enjoy monopoly power. Stability and standardization are the hallmarks of profitability in the monopoly. This is why governments establish regulations to protect competition and minimize the number of monopolies and the extent that they may use their power against the better interests of the population.

While this is true when government views the dangers of monopoly in the private sector, this view is not reflected upon itself and the public sector. Protected not-for-profit monopolies tend to acquire the intellectual benefits created by smaller not-for-profit organizations however there is no reward to the smaller agency and there is no protection for the clients of the not-for-profit agency whose services are migrated to the larger enterprise. Government and not-for-profit monopolies tend to prevent new parties from exploiting under served niches and because there is no reward associated with the risk and effort invested by innovation new entities new approaches are not reinforced.

The best example of this can be seen in contrasting the USA and British not-for-profit sector. The USA has established an infrastructure that assumes that resource givers are the best people to decide who is doing good work in the not-for-profit sector. In the British system, there is a bias to believe that government can best decide the appropriate parties to receive support. The consequence is an increasing investment in not-for-profit organizations in the USA and dropping level of contribution in Britain.

3.1.2.10 Value Sieve Guideline Ten: A System to Trap Perverse Consequences

The metaphor which keeps coming to mind to convey this situation is the Tsunami warning system established (proposed) for the West Coast of Canada. The system contains a large number of independent and intelligent buoys that will transmit a signal to a satellite or a ground station when certain physical changes take place at its location out at sea. These small independent devices each monitor a very small sample of the physical world and attend to a very small number of variables to detect reason for alarm. The detection system does not understand the world it monitors, and depending upon the costs associated with false positives or false negatives, may be expected to call out for the provision of greater intelligence to assess the circumstances. This approach to detection may be improved in the future as patterns (knowledge) in the complex behaviors in the ocean and atmosphere and associated with Tsunamis can be detected earlier and more reliably.

From an organization systems perspective the metaphor would ask how a distributed system of perverse consequence detectors could be established at the lowest possible cost. This is particularly important in cases where there is no usable, complete, valid, reliable, coordinating information system within the organization. Further, in the case of determinants of health where many of the organizations and systems they operate within are necessarily bounded to enable management. In this complex open systems environment strategies must be developed which will facilitate the early identification of adverse effects/perverse consequences and the possible benefits available from cooperative action.

A perverse consequence trapping system must be aligned to work with the incentives inherent within the system.

3.1.2.11 Value Sieve Guideline Eleven: Focus on Decision Making Not Problem Solving

The essential distinction in this work is the goal to develop a decision framework for complex organizations. It does not presuppose that there is insufficient information within the organization. It does presuppose that much of the difficulty in complex organizations is related to communication, coordination, and mechanisms of accountability.

In this regard the resource allocation framework should be capable of separating the decision making process associated with investing resources into activities from the problem solving processes addressed by the activities themselves. Consequently, it is suspected that a significant aspect of the design requires that the models of the operators and the organization can be adjusted with little interest in changing the equilibrium of the current information, workload, and the working relationships.

The first goal is a model shift that provides new understanding and a model of competition and cooperation, which establishes a “a level playing field through an explicit statement of the rules of the game”. To establish a simple model of resource allocation which can be reinforced easily by the organization and from which the variety and expertise of the organizational participants may flow. Ideally, the new mental model will replace many competing dysfunctional models of behavior.

The second goal is a shift in mental models made “in place” i.e. without the organization trying to make a change in anything other than the model it uses for its resource allocation decision process. This is intended to minimize the risk associated with a change in organizational equilibrium.

3.1.2.12 Value Sieve Guideline Twelve: The System Must Be Inexpensive To Implement and Maintain

The organizations prepared to consider a change in behavior have most frequently come to this conclusion through the route of financial failure. Something is wrong, most often money is short. In the private sector, an investment in restructuring is most often required too prevent a takeover or bankruptcy. In a

government or not-for-profit setting, the organizations are often not capable⁷² of financing a large capital expenditure⁷³ in an attempt to fix what is wrong. Nor in the government case is the fear of bankruptcy or takeover a realistic concern. This inability for the organization to come to a catastrophic end results in a powerlessness to motivate participants whose livelihoods come from the system. Further, the organization is unable to improve alignment and coordination using additional incentives due to the structure of funding and the associated agreements.

A reorganization plan, which speaks to the need for dollars that are unavailable, is an act of witlessness. Consequently, the budget can afford only incremental change. This is fortunate because incremental change is the most effective way to avoid regression towards the second best. The resource allocation mechanism must focus upon the constructive use of incremental change.

Therefore, if capital is not available and incentives cannot be created then we are left with a need to use other motivation, which we know exists. Motivation must be created and encouraged towards the program goals. In so doing the identification of budget slack/organizational slack must be directed through a "fair process" to improve the goals of the program and/or organization in such a way as to preserve and protect the motivation of the participants within the programs.

In separating the behaviors of decision making from problem solving, we sow the seeds of inexpensive organization reformation through a change in mental models. While rare, epiphanies are inexpensive.

⁷² This notion of capable should be seen as stating the organization rules will not permit it and or the organization cannot provide the necessary return in exchange for the risk, or the organization is risk averse and would not conceive of the notion to start with.

⁷³ Most recently this calls for information systems. A computer system which will tell us what to do. An automated decision making system which can take responsibility for the current state of affairs. These are expensive, and usually require an investment of an average of \$15,000,000 (US) This of course represents approximately 5% of the budget of a \$500,000,000 (CDN) health authority.

3.1.2.13 Value Sieve Guideline Thirteen: Stop Reorganizing

"We trained hard . . . but it seemed that every time we were beginning to form up into teams we would be reorganized. . . . I was to learn later in life that we tend to meet any new situation by reorganizing; and a wonderful method it can be for creating the illusion of progress while producing confusion, inefficiency, and demoralization."

Petronius Arbiter, 210 B.C.

Chapter Four: The Value Sieve Framework

"Never tell people how to do things. Tell them what you want them to achieve and they will surprise you with their ingenuity."

George S. Patton

"It is not true, as a good many industrial psychologists assert, that human nature resists change. On the contrary, no being in heaven or earth is greedier for new things. But there are conditions for man's readiness for change. The change must appear rational to him; man always presents to himself as rational even his most irrational, most erratic changes. It must appear an improvement. And it must not be so rapid or so great as to obliterate the psychological landmarks which make a man feel at home; his understanding of his work, his relations to his fellow-workers, his concepts of skill, prestige and social standing in certain jobs and so forth."

Peter Drucker

4.0 The Overview

Chapter Two provided a simple overview of the Value Sieve and was intended to orient the reader to the Value Sieve concepts and procedures so that the technical materials could be understood within the context of resource allocation under conditions of uncertainty. Once this simple representation of the Value Sieve procedure has been considered, its utility within larger and more complex environments can be developed. This is best considered in the light of procedures that manage the additional elements associated with open systems, market forces, and management activities incorporated within complex systems. These include:

- the complexity of the organization, its relationship to other organizations and their relationship to the environment;
- when the decision-maker allocating the resource wishes to overcome the problems of boundedness and take into consideration the effect of his/her choices upon other decision-maker's objective functions both within the boundary of the organization outside the boundary of the organization;

- when proxy decision-makers replace traditional market decision making procedures, and
- when financial incentives and performance measurement cannot be relied upon to coordinate the motivations of the various participants within the organization.
- when program failure cannot be predicted a priori

The Value Sieve establishes a foundation of procedural and consequential accountability which supports both the decision-makers and the organization in achieving its goals and objectives. The process is founded upon the belief that organizations are social structures and consequently will operate as open systems. As open systems there will be ongoing differentiation. This is consistent with the growth of knowledge based industries and the findings that line personnel currently must have greater expertise and knowledge.

When markets do not function, choices are fraught with uncertainty, measurement strategies cannot meet the requirements of commensurability and resources are scarce, then the Value Sieve can be seen as a framework for conflict⁷⁴ resolution. The Value Sieve is a designed series of interlocking procedures which utilizes conflict between parties to achieve the preferred goals of the system.

4.01 The Purpose of the Value Sieve

In complex organizations, many programs are in operation. These individual programs require the management of knowledge and uncertainty. Given the majority of choices will not benefit from commensurable measurement, the values of the individual decision-maker(s) will need to be articulated/revealed in the process. To coordinate the efforts of individual programs to the maximum benefit of the controlling organization requires information management strategies and decision frameworks which aid the accountable decision-makers in balancing the interests of many parties. This of course requires decision-makers to use techniques that acknowledge the uncertainty, and tries to harness its strengths.

⁷⁴ Conflict is the result of being required to choose between alternatives.

A resource allocation decision making framework for complex organizations, must be able to address the uncertainties associated with: information volume and quality; knowledge; coordination; and culture; in multi-program, multi-organizational efforts in complex environments. Examples of these might include: research and development activities in drug companies, the development of a large software program/project, the administration of a hospital, an international aid program/project, an automobile manufacturer, a regional health authority, a business consortium, a community health program/project, a grocery store, a multimedia technology company, the international space station program/project, NATO, or the European Economic Union.

All of the examples represent multiple programs coming together and in need of resources to accomplish their goals. The scarcity of resource (time, money, talent, and materials) is the enemy of each participant. In these matters, there is no difference between for profit and not-for-profit organizations. However, the information management issues, the lack of risk reward compensation, the broader more accepted use of values in justification, the more clearly arbitrary bounded nature of programs, the culture of secrecy towards failure, and the separation of beneficiaries from donors make the complexity and coordination of decision making more difficult in the not-for-profit industry than the for profit industry.

For this reason alone a not-for-profit⁷⁵ context for the Value Sieve will be described in fuller detail than the for profit sector.

The purpose of the Value Sieve decision framework is to assist the participants in complex enterprises to identify and manage information to support the accountable decision-maker(s) in using their available resources wisely. It permits an organization to perform cost effectively resource allocation decisions in a timely, appropriate, and defensible manner. This decision framework requires the ready inspection of constraints, motivations, measurements, values, models, assumptions, and corporate culture influences on human behavior so that

⁷⁵ The use of Not-for-profit in this paper is primarily focused upon the provision of determinants of health services and includes registered charities, committees, government, and quasi-governmental organizations. This aggregation will be referred to as the not-for-profit sector.

coordination and alignment of intent and accomplishment of objective function(s) is possible. For organizational survival, the achievement of objective functions must be linked through performance measurement and negative feedback⁷⁶ to a resulting flow of sufficient volumes of negative entropy⁷⁷.

The Value Sieve is based upon the central premise that an accountable decision-maker is to allocate the use of available resources in order to create the maximum expected utility towards the objective function(s) of his/her responsibility. This purpose is second only to the objective function(s) of more senior accountable decision-makers of the entity. Each accountable decision-maker is responsible for documenting the assumptions, and measures associated with the choices that were made so that negative feedback to the accountable decision-maker is possible. It is assumed that negative feedback from the environment is essential for the development and maintenance of necessary negative entropy⁷⁸.

4.1 Introduction

A decision is an irrevocable allocation of resources. Consequently the Value Sieve considers the decision making process cardinal to resource allocation. As might be expected the issues of information and decision making under conditions of uncertainty become pivotal elements of the Value Sieve framework along with the expected issues of scarcity and value for money.

⁷⁶ Negative feedback is an information process. The information is provided from the evaluation of the outputs of a process back to the operators of the process that creates the outputs. Negative feedback is an essential information process which enables a consumer to communicate and inform a program and so enable the accountable decision-maker to "adjust or adapt" the program and its outputs to increase the satisfaction of the consumer.

⁷⁷ In open systems theory negative entropy is the energy which is returned to a target system from the environment in exchange for target systems outputs into the environment. This negative entropy is commensurate with the "value" of the outputs put into the environment by the target system. In this way, an energy cycle exists between the environment and each system operating within the environment.

⁷⁸ In a for profit organization, negative feedback and negative entropy are linked because both come from the same source, the buyer of the product or service. In a not-for-profit entity, negative entropy and negative feedback may come from different sources, the benefactor, and the beneficiary. Consequently, many of the problems of not-for-profit decision making are associated with the management of these two streams of information.

This Chapter is written to define the Value Sieve as a decision tool to be operated when under the attendant condition of scarce resource. Since most organizational decisions are associated with scarce resources, it is a reasonable view that “resource allocation” and “decision making under conditions of scarce resource” are identical statements. Thus, it is possible to see the former chapter’s preoccupation with decision making under conditions of uncertainty and the use of mental models to optimize the utility of the information available. In keeping with the overall health information science and public administration context of this dissertation, health and social programs will continued to be used as the primary examples whenever appropriate.

All organizations operate as open systems (Katz and Kahn 1966). Their boundaries are permeable to a variety of interactions with entities⁷⁹ that are outside their formal “legal reality⁸⁰”. Entities exist in an open system through the process of acquiring negative entropy. Given there is at any time a finite amount of negative entropy organizations must master the processes that acquire negative entropy, maintain its flow, and where possible increase its volume. Negative entropy creates the necessary stability for an entity to survive. Consequently, we may safely assume that while all organizations accept that resources are limited they would prefer more to less.

The human mind can imagine all manner of desirable outcomes if resources were available. The portrayal of these acts of imagination in planning documents is often used to attract resources. However, often the results of implementing a plan falls short and consequently the necessary resources may flow elsewhere. An important concept that is often forgotten by entity/program managers is that money does not, in the global scheme of things, disappear. It only leaves one entity/program to reappear in another entity/program that in turn is provided the opportunity to establish a cyclic relationship between its outputs and consequential inputs, including negative entropy. Resource allocation is thus a

⁷⁹ An entity is used in accounting to identify any individual, proprietorship, partnership, or organization, whether for profit or not-for-profit.

⁸⁰ Organizations must conform to legal definitions which impose the notion of specific legal boundaries to the organization. These boundaries define “our responsibilities” from “their responsibilities” which are those responsibilities of other organizations.

decision which results in the flow of resources to an entity which in turn must produce an output which results in sufficient inputs including negative entropy to continue. In this way, the resources within an organization may be moved/redirected to maximize the benefits associated with the purposeful management of the organization.

4.1.1 A Market

While resource scarcity is a constant for organizations, it may not be assumed that organizations and the programs within them are operating efficiently or effectively. These concepts are relative terms and consequently place a burden upon the market mechanisms to determine through competitive processes the value of the outputs of the entity. Once value has been identified then ongoing efforts to improve the efficiency and effectiveness of production occur. The rate of change in efficiency or effectiveness is accelerated when other producers/competitors are present who may work to increase their share of the market place. The buyers/clients within the market place ultimately determine the value of the outputs of different entities.

A market system permits individuals with differing values, interests and desires to use a common currency (most often cash) to acquire those services and products which maximize their personal expected utility. While the price received by the entity may be the same to all buyers, the VfM of the item to the buyer may vary dramatically. The issue of price is often confused with the issue of values because they are both variables in determining whether sufficient numbers of buyers will exchange their negative entropy for the product or service offered by the entity. The issue of the value of the output is of interest to the entity only in so far as it results in an exchange of negative entropy that permits the entity to continue.

While a market model is often used to express the dynamics of for profit business, it is frequently seen as an inappropriate model in the not-for-profit sector. This is unfortunate because a market model can provide significant guidance in the development of information systems which improve the capacity of not-for-profit organizations to meet their specified purpose and in developing improved systems of management and delivery which direct our scarce resources to more efficient and effective products and services which users value most.

Before proceeding it is essential to know that a perfectly competitive market as used in an economics model rarely exists. This is because the assumptions required are not often found. This does not suggest that economic models are not informative. However, it does require that the assumptions of models be specified before an economic model is adopted for application in an applied setting. For example a perfectly competitive market requires: (Mansfield, 1979)

- the product of any one seller is identical to the product of every other seller
- every buyer or seller in a market is so small as to be unable to influence a product's price
- resources are very mobile, in that they may be shifted from one use to another very readily
- all parties have perfect knowledge of the relevant economic and technological data. This includes the past, present and future.

In applied settings, the imperfections may be associated with incomplete information and/or uneven distribution of resources. Further, these imperfections are exploited to the benefit of the exploiter but only in so far as the disparate distribution of information, and resources is supported by producing something valued by the buyers in the market place. In this manner, the complexity and individual differences of human motivation may provide a much better insight to the value of outputs and outcomes than the traditional simplistic model of financial incentive alone. For example regardless of the price/quality/availability, many refused to purchase South African wine during apartheid. In the market, buyers did not value the product.

As has been explained in the prior chapter there are two fundamental mechanisms for resource allocation/decision making coordination, a market, and a hierarchy. The Value Sieve mechanism is an attempt to establish a framework for resource allocation decision making which allows an organization or an industry or a humanitarian purpose to establish methods for the control, coordination and alignment of actions/activities/programs/organizations in a purposeful way. The Value Sieve is not an "ethical framework" which is intended to direct the user to a

specified “ethical conclusion”. It is assumed that, for the most part, all parties competing for resources would identify themselves as operating ethically and as the ‘white hats’ in the contest for scarce resources⁸¹. The ethics of the decision-maker⁸² will influence the value of the choices available and therefore, ethics are inherently included within the Value Sieve framework as are religious, political and cultural predisposition.

The Value Sieve is a resource allocation decision framework that serves all parties involved in resource allocation decision-making by remaining neutral. It is intended to be a tool that can be relied upon to serve the accountable decision-maker regardless of their purpose.

4.1.2 For Profit and Not-for-profit

As has been made clear the decision-maker’s values determine the expected utility⁸³ of a product or service. The VfM of a product or service assigned by a decision-maker is clearly influenced by individual values in addition to the nature of the work, circumstances, degree of uncertainty and corporate culture.

Therefore, the values that are applied by a decision-maker in a work setting need not reflect their personal values.

4.1.2.1 For Profit Organizations

Values in organizations do align the activities of the participants. In for profit settings the alignment is aided by the common commensurable theme of money, or more clearly return of investment. In this setting, the basic rules of business are made clear. Negative entropy comes from clients, investors, and bankers. To keep investors they need to see a return on their investment within a reasonable period

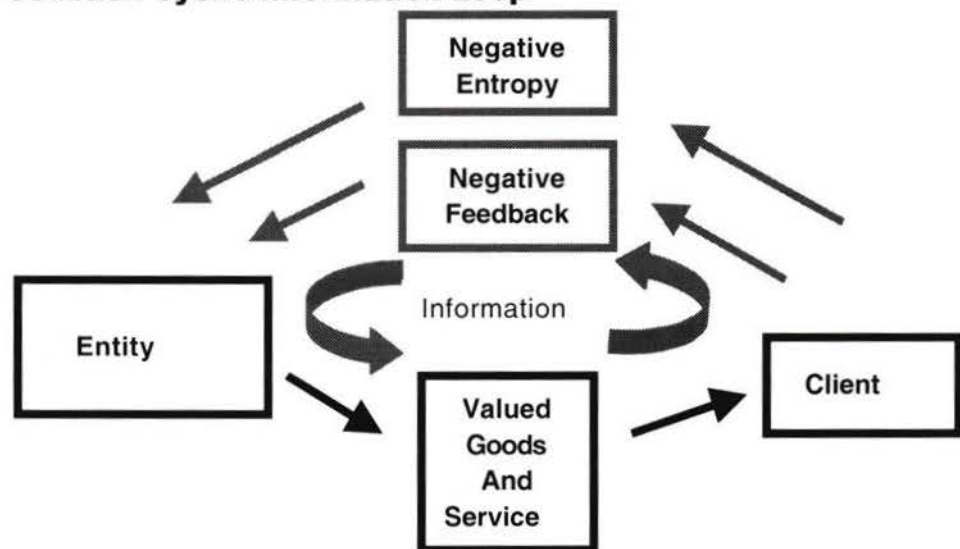
⁸¹ I believe this in the same way that I believe opposing armies believe that God is on their side and that the loser will be portrayed as unethical by the books written by the winner.

⁸² In cases, where there is more than one accountable decision-maker the Value Sieve provides a procedure whereby a final decision is made. These issues will be addressed further along in this chapter.

⁸³ I am using the term expected utility as a general indication that personal expected value is intimately involved in determining the utility of a product or service. However, this is not to suggest that Expected Utility Theory is the chosen theoretical underpinning of the work. It is simply more convenient that discussing utility from the perspective of Prospect Theory etc.

of time or they will withdraw from further participation. Shareholders provide resources based upon a promise from the company regarding the future. It is important that this transaction between company and investor not be confused with the transactions that take place on the stock market. The stock market manages the buying and selling of shares between individuals and does not “directly” benefit the company on a day to day basis. The second relationship to acquire negative entropy is with a bank. The bank provides short present injections of negative entropy in exchange for a payment plus negative entropy in the future. Ongoing stable streams of negative entropy must come from the market place where buyers value the service or product sufficiently to exchange negative entropy for the expected utility of the good or service. These relationships and attendant obligations tend to be clear to parties and are enforced by business practices, codes of conduct and civil law.

Figure 4.1: For Profit Entity Negative Entropy and Negative Feedback Cyclic Information Loop



Thus, a for profit organization uses the resources put at risk by shareholders to produce and sell a product or service in the market place. The market place is composed of individual buyers and uses a common currency of money to value a product or service compared to alternatives. The organization uses the output of a product to achieve the desirable outcome of sales, which return resources (negative entropy) to the organization. (Figure 4.1) These resources are then used to produce more product or service, stabilize, and where possible grow the organization and return a reward to the shareholders for the risk they incurred. A

for profit organization which fails to produce a product or service that attracts buyers within a market will use this negative feedback to adjust its product or service in a goal seeking process to identify and adapt its efforts in order to find a group of buyers who wish to purchase what they produce.

A large organization may produce multiple products which are managed and coordinated. Some products will be on the rise while other products are on the decline. It is expected that, within reason, the organization will manage resources. In this notion, it suggests that the organization has sufficient intelligence to understand where resources should go in order to generate present and future negative entropy. As no organization enjoys perfect success the financially successful programs support the research, development, and testing of new products and the costs associated with failed efforts. The organization manufactures negative entropy through its relationships with its customers. Given successful generation of negative entropy, the management of the organization may minimize the interference by the shareholders and rent the negative entropy of the banks in order to expand its operation. These efforts and the relationship among the various activities within the programs of the enterprise are complex and most decisions are fraught with uncertainty. However, they have the common currency of return on investment and profit and loss statements to ensure that operations are in general working as well as the competition.

Those who wish to believe that business people have no established rules of conduct would be well served to read Jane Jacobs' book "Systems of Survival". In this work Jacobs advances her perspective that there are dramatically different values and cultures between government and business organizations. In her work many may be surprised by the compelling arguments that suggest business people are obliged to be honest and fair in their dealings because their reputations must encourage many others to buy their wares while government people are not so constrained and may be more likely to establish patterns of self protection and secrecy. This notion is supported by Axelrod's (1984) work in game theory where it is suggested that cooperation evolves most frequently when decision-makers anticipate a long-term relationship and so the most appropriate behavior to encourage repeated transactions is cooperation. This is also the simplest approach to manage the uncertainty of transactions and minimize the information burden

associated with decision making. Thus, trust becomes a conventional business practice for parties wishing to maintain long-term relationships and to minimize the information issues/uncertainty reduction associated with a transaction⁸⁴. Organizations wishing to promote their reputation (hence stability) as trustworthy establish policies which reinforce their trustworthiness to their clients. For example, a no questions asked returns policy is used in many consumer goods stores.

The different values of individuals identified by Jacobs suggest that different mental models may exist in government personnel and be reinforced by the organizational culture. This may create very different values and priorities than are expected to be demonstrated by the mental models of business personnel and organizations. Significant in this notion of different values and mental models is the underlying issue of information and its relationship to uncertainty reduction. If mental models are different then it is possible that information strategies will be developed which conform to the assumptions of the primary mental models and organization culture and as a consequence will be/must be different than the information systems of business.

To build a decision framework and information system which supports resource allocation in the business and the public sector requires that we direct our attention first to the most difficult and complex environment and then determine the Value Sieve's ability to be used in the simpler environments. For this reason, the health and social sectors were chosen as the domain for development. There is no more difficult or complex environment within which to develop and test a resource allocation, decision-making framework. The full complexity of the environment will be made clear in Chapter Six in an overview of the health environment.

⁸⁴ This is not intended to suggest that only trust is involved in maintaining business relationships. Certainly contractual bonds are used to support the honesty of the parties to the transaction. However, it is important to realize that the variety of methods which can be used to "wiggle out" of an agreement cause many business people to spend less on lawyers and risk on the side of honesty between business associates.

4.1.2.2 Not-for-profit Organizations

A not-for-profit organization in general, has donors who give resources to the entity based upon what the entity states it will do with the resources⁸⁵. This assumes that the donor values the outputs/outcomes and the act of giving. The resources are then put through a transformation process by the entity, which results in goods or services to a group of beneficiaries. For the most part these beneficiaries do not exchange money for the goods or services. Consequently, there is no negative entropy gained directly from the beneficiary. Negative entropy must continue to come from, in the most part, ongoing donations from donors. (Figure 4.2)

In the case of a not-for-profit organization, the linkage between negative entropy, the lifeblood of the entity, and the client now called the beneficiary, is broken. The consequence of this is to dramatically increase the number and complexity of information loops that will be created and maintained. The power balance, which exists between an entity and a client, is now challenged and no longer furnishes the same degree of choice that exists for clients in a business setting. Beneficiaries have their power reduced through their dependence upon a relationship existing between the entity and the donor. In the normal course of its pursuits the entity will come under pressure to ensure that the information it provides to the donors and the beneficiaries is for the most part consistent with the information exchanged between the donors and the beneficiaries⁸⁶. To maintain equilibrium the entity must determine the best decision making framework to manage the information and hence the decision making uncertainty of the relationships. In general, it may deal with this in several ways.

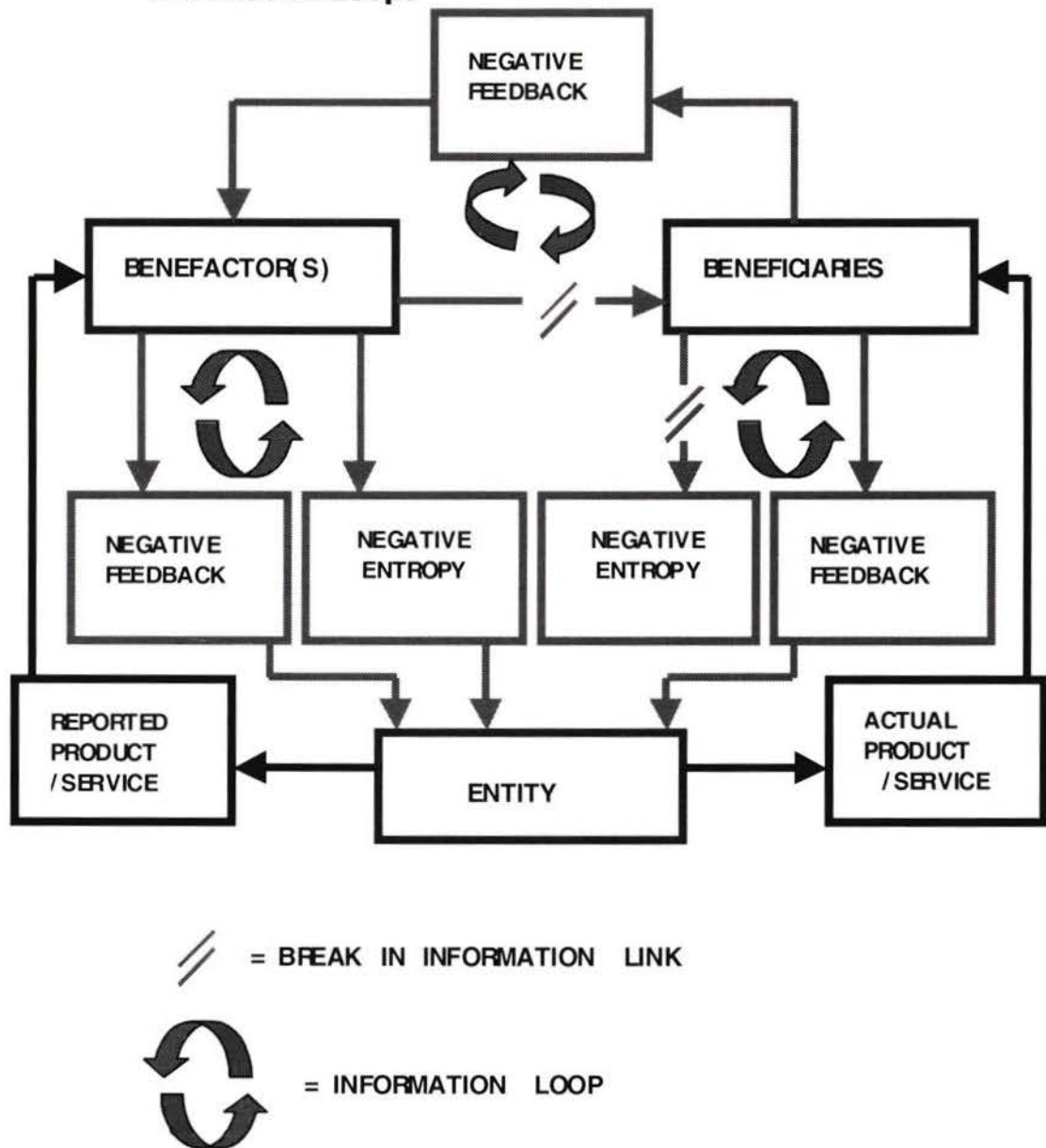
- The entity can choose to speak openly to the donors as a/the voice for the beneficiaries and hope that no strong voice of disagreement surfaces. This also requires that it speak openly to the beneficiaries as a/the voice for the donors and hope that no strong voice of disagreement surfaces.

⁸⁵ To encourage this behavior the government frequently provides tax incentives to those entities that give resources to specially recognized not-for-profit organizations called registered charities.

⁸⁶ For the most part this type of information exchange takes place through the public media and/or during public representations made by the beneficiaries or the donors or the agencies.

- The entity can choose to speak secretly to the donors as a/the voice for the beneficiaries and use the power of its position to undercut any voice of dissatisfaction. This also requires that it to speak secretly to the beneficiaries as a/the voice for the donors and use the power of its position to undercut any voice of dissatisfaction.

Figure 4.2: Not-for-profit Negative Entropy Cycle and Information Loops



- The entity can sponsor a process in which the information loops between the entity; the donors and the beneficiaries are managed secretly so that the

parties involved in the negotiation maintain the power which results from information. This can be the best choice if there are competitors/ free-riders⁸⁷ in the system that would enjoy the benefits associated with the information that results from the investment of the entity. Given organizations must compete for resources from donors it is difficult to imagine a circumstance where an entity would freely distribute information that could be used against its best competitive interests.

- The entity can sponsor a process in which the information loops between the entity, the donors and the beneficiaries are managed openly so that the parties involved in the negotiation share the power with others who wish to add voice and contribute to and enjoy the benefits of the information created. This can be a risk if there are free riders in the system who would enjoy the benefits associated with the open distribution of information which results from the investment of the entity but who would not contribute to the resources required to reduce uncertainty and so improve decision making. In this context information sharing becomes a competitive disadvantage and so must be carefully considered in order to construct a decision-making framework where this could be rewarding for the participants.

The important point that comes through in considering the information management options of the entity is the context for the entity and the information economics of their situation. For example, a monopoly position in the not-for-profit sector reduces the pressure on the entity to provide information and reduces the probability that conflicting information will become known. Further, a not-for-profit monopoly can use its position of power over its beneficiaries to minimize the probability that information may become known that jeopardizes the flow of negative entropy to itself. Finally the legal protection of directors in a not-for-profit entity reduces the risk of negative consequences associated with errors in

⁸⁷ Free-riders are a common concept in economics and refer to individuals who enjoy the benefits of group membership without contributing their "fair share" to benefit the rest of the group.

judgement which result from a failure to capture information and or use current, accurate and reliable information in their decision making⁸⁸.

From the complexity of the relationships it is possible to see the natural development of “political influence” to minimize the uncertainty inherent in the decision making process and to reduce the cost associated with information collection, verification and analysis. It is easy to see why individuals and organizations in the not-for-profit sector have tended to adopt the perspective that if they believe they are doing good, they must be doing good.

4.1.2.3 Information Economics

The economic power of information and the influence of information on decision making and resource allocation is without question. Information economics considers the costs and benefits of information in a variety of contexts.

An example of a problem associated with information economics is the cost of collecting and verifying information, which is extremely expensive. However, once released you can't take information back the way you can other goods. I.e. once you know the answer is 47, it can't be taken from you. The problem is made more difficult because information can be distributed so widely and quickly that it requires ongoing efforts to protect ownership.

Within this context, the cost of producing information must be balanced with the return of benefits to the producer. It is difficult to provide a sample of information without building and verifying a least a prototype of the information system. The investment is substantial and once built, the benefit of the information must be constrained to those who will pay for what has been provided. If open access is provided the resulting free riders tend to kill the system by removing the incentive of information producers to invest in the development of high quality information. If proper returns are not available for quality information then the incentive will be to produce data without the required checks and balances to ensure validity and

⁸⁸ A case study of these issues can be found in transcripts of Justice Krever's final report on The Commission of Inquiry on the Blood System in Canada (1997) the investigation of the Canadian Red Cross and the tainted blood scandal, which ultimately caused government to take the blood collection monopoly position away from the Red Cross and create a new monopoly, the Canadian Blood Agency.

reliability. This is possible when data producers know that the cost to verify the data is high, and that it is unlikely any party will invest the resources to verify the data/information they provide. When this possibility exists, a great effort is required to make the distinctions between best available science, advocacy, and duplicitous misrepresentation because the consequences of guile and ignorance are often the same. It is for this reason that good intentions are irrelevant.

Information is a major obstacle in the not-for-profit sector because information related controls and incentives are difficult to create and maintain. The barriers are related to:

- the complexity of the decision making process, which includes incomplete models of decision making and poor decision making practices;
- the failure to associate appropriate incentives and disincentives with the provision of different qualities (valid/reliable) of data/information. The lack of negative consequences associated with organizations that fail to create and use valid and reliable information;
- the willingness of analysts to process invalid and unreliable data as though it was valid and reliable information. This is further compounded by the willingness of politicians and senior civil servants to use this dross to explain or defend their decisions;
- the influence of decision-maker values and organization culture in determining a best course of action. This is exacerbated by the overtly political nature of the not-for-profit sector because the beneficiaries are not the donors and so negative entropy flows from individuals who may have different values than the beneficiaries and the not-for-profit entity;
- the low standards for information management and the lack of expertise available in building and managing the decision/information systems required by not-for-profit organizations;
- the failure to create mechanisms which utilize the pressures upon the not-for-profit sector to support financial corporation between not-for-profit organization;

- the number of community factors which cannot be controlled by the service provider. I.e. the difficulty in determining causal relationships between the service providing the outputs and the individual and community outcomes. This is made more difficult because of the minimal community research which has taken place to relate the measurable outcomes of not-for-profit services/outputs to individual and community outcomes;
- a minimal relationship between level of government support to a not-for-profit and impact upon the government's expenditures for government required services and
- the absence of mechanisms which reward not-for-profit organizations for innovation, higher efficiency or effectiveness.

The incentive to better coordinate and align the activities and programs within a single not-for-profit agency within a community is based upon the belief that this will be associated with an increase in efficiency and/or effectiveness of the services provided. The consequence of this would be:

- the identification of slack funds or reduction of organizational slack which could then be redirected towards other programs within the entity or other entities
- a reduction in the number of beneficiaries awaiting service or an increase in the number of beneficiaries
- an improvement in the condition of the beneficiary so that other services may not be necessary.
- a reduction in the resources necessary to achieve an equivalent level of expected utility to the beneficiary.
- improvements in alignment with other community agencies such that there would be an improvement in the combined outcomes of agencies within the community of the donor.

These points identify the potential measurement challenges associated with a not-for-profit entity. The last point brings to the surface the issues associated with the

coordination of multiple entities which must compete to gain the resources they believe are necessary to improve the expected utility of the services they provide to a population of beneficiaries. Given there is no exchange of negative entropy from the beneficiary to the entity there is no commensurable measure of value provided by the beneficiaries which could be used to assist in the coordination of resources provided by donors.

Not-for-profit organizations represent many purposes, donors, and beneficiaries within the community. The Value Sieve addresses the information and decision making requirements associated with harnessing the normal human desires of the individual programs, entities, beneficiaries and donors which are found in communities, and how this might be accomplished at the least possible cost while providing the maximum possible short and long term benefit to the community, donors and beneficiaries. The resource allocation decision making process in such a complex and emotion laden context will be mindful of the strategies and tactics of principled negotiation and dispute resolution.

4.2 Conceptual Elements in Not-for-profit Sector

4.2.1 Welfare Economics

To create an optimal distribution of resources requires that a measurement system exist which generates numerical representations of utility that are agreed to by the various participants. Welfare economics concerns itself with the public policy issues of resource allocation in situations where the ability to compare individual utility is not present.

If it is not possible to compare utility levels scientifically then it is not possible to tell whether one distribution of resources is better than another. The Pareto criterion requires that a change which causes harm to no one and yet improves the lot of some others is an improvement. Therefore, Pareto efficient distribution of resources would require that the resources available could not be distributed in a different way to achieve better utility without the loss of benefit to another. This would require that the beneficiaries could not benefit from trading and that additional utility cannot be produced through changing the distribution of resources to service providers.

For example, health and individual preferences for health are based upon personal values. This is most clearly demonstrated by beneficiaries of the health system with identical disorders selecting different treatment strategies for their disorder. Individuals value aspects of health differently. There is no scientifically meaningful way to compare the health utility levels of various individuals. The Pareto optimal distribution of health cannot be scientifically determined because health utility is value based by individuals.

Values are the single most salient criteria for the development of a resource allocation decision-making framework. The management and coordination of values will be essential in the establishment of a workable/acceptable decision framework.

4.2.2 Values

Welfare economics instructs that the values of the people making resource allocation decisions determines what programs/services will be available because the individuals making the decisions cannot help but attend to their own values in making these decisions. It is this fundamental truth which creates much of the conflict in the not-for-profit sector and why these problems are known as "wicked" problems". Their resolution cannot be achieved through technical or scientific means.

Personal values are created as a function of training and life experience. In particular values can be dominated by membership in a group which gains benefit from one outcome versus another. The values of workers inside the not-for-profit sector are often entwined in personal economic interests, professional requirements, legal obligations and peer expectations. Their values are often seen as problematic by various other participants in the not-for-profit sector.

For example, physicians are instructed to value the life of the patient above all else. They are consequently encouraged to utilize all possible resources in resolving a problem for a particular patient. It is not difficult to see that this would comfort the patient and be perceived as high quality care. This basis for work should so dramatically affect a physician's outlook that there would be little willingness to accept limits placed upon resources. Indeed these constraints would

generate concerns about rationing if the reduction in resources resulted in an inability to provide acceptable service to the customer. Values can also be expected to affect different health professions in their positioning as an important expertise for the provision of quality health care. It is unlikely that any health profession would determine that there is no further need for their profession and that they should be replaced by another profession. Professional pride and the resulting competition among health professions is natural and in itself does not pose a significant problem. However, when those health professions are applying themselves to resource allocation decisions it is difficult to believe that their values disregard professional pride and technical training.

Values conflict in the not-for-profit sector will frequently take the form of arguments associated with the technical nature of a problem and that one party or another does or does not have the necessary training to provide the service. Examples include physicians versus nurse practitioners versus nurses versus licensed practical nurses versus volunteers.

4.2.3 Outcomes

Any industry in development is full of conflicting technical opinion and arguments about the best ways to solve problems. Technical experts and specialists struggle to develop the best methods possible and work to promote these ideas and practices to the potential customers of their particular organization. Innovation occurs as a direct result of working within a competitive environment where technical approaches challenge real problems and the outcomes, not the elegance of the science or technology, determine who has the better solution.

The measurement of outcomes moves the donor/beneficiary into a position of making a procurement decision. Until outcomes are known or predicted, the customer is not in a position to procure. In general, the donor/beneficiary does not make a procurement decision based upon their knowledge of the technology or methods used to create a product or service.

This being the case the donor/beneficiary does not need to involve itself intimately with the technical arguments associated with a product/service being

provided. The donor/beneficiary needs to ensure that they have agreed to procure specified outcomes from the service provider. Outcomes liberate the service provider organizations to work with their knowledge to innovate new solutions that are more effective and more efficient utilization of resources to support the services provided.

Valid and reliable measures of outcomes:

- liberate the service provider to do the contracted job the best way possible and reminds them of what their objectives are.
- allow citizens to apply their own values to the services provided and make their opinion known to the service providers and the donors.
- give beneficiaries an ability to use their own values to choose among different products/services available.
- allow the service providers entities to prioritize programs/program/projects so that they optimize the expected utility gained by the resources available.
- encourage new service provider programs/program/projects by demonstrating the amount of VfM they must provide to be considered for funding from the resource allocators.
- ensure the donors, the beneficiaries, the citizen and the service provider all know simultaneously when the service provider is failing to meet the contracted obligation.
- link resources to expected utility

The notion that a service beneficiary has choices is important to include in the framework of the decision making process. In so doing there is an increased likelihood that the practical priorities of the beneficiaries may be taken into consideration. This is important because beneficiaries of the not-for-profit sector will tend to be offered choices, which the donors, in concert with the entities value as appropriate given the resources and context.

4.2.4 A System of Relationships

The normal model of a market envisions a complex fabric of inter-relationships where organizations produce complementary and substitute goods and services. Competitors work tirelessly to gain advantage through the provision of goods and services that are more likely to draw out negative entropy from the customer. In this way, cooperation may be limited to those activities that have a direct positive expected utility to the objective functions of the organizations participating. The desire to identify unexpected/perverse consequences is related to the well being of the decision-maker's organization. Due to legal consequences, market endowment, reputation, and the fact they are human⁸⁹, this concern is expected to generalize to the customers of the organization.

The fabric of relationships is more easily defined by a for profit organization because business culture expects the perspective to be limited/bounded by program performance and concerns for well being to the boundaries of the organization. This would include its relations to its present and future customers. Within the boundary of the organization, complexity is still a significant problem. Alignment of incentives and coordination of activities to satisfy the objective function is challenging as different activities/programs are motivated to compete for scarce resources. The coordination of tasks is made easier by the commensurable measure of money, the clear often one to one relationship of complementary activities and the use of money to estimate and confirm performance related to risk and reward. Competing organizations in the same industry shape the expectations of the customers, managers, and investors.

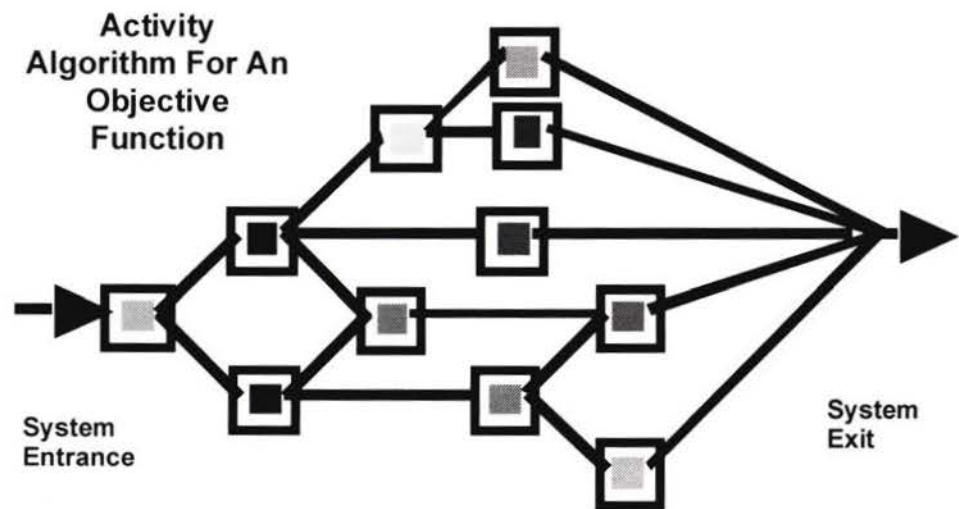
Coordination is essential within an organization. For example we might consider the sequence of activities in the production of a good within a single company as an algorithm of activities, one following the other, each step building upon the former and adding value until a final product is made available to a consumer. The algorithm concept could be refined by considering each step within the

⁸⁹ The humanity of business people is often questioned by the participants of the not-for-profit and government sectors. This of course is a slight and based upon a surface understanding of how organizations, information, and the world in general operates. In my experience stupidity, ignorance, and mean-spiritedness are evenly distributed. It is however their impact upon organization and decision systems which is of interest.

organization to be the performance of an objective function which adds value to the product ultimately provided to the consumer.

Based upon this notion an organization is a system of activities whose individual “micro” objective functions are directed towards the completion of a “macro” objective function. (Figure 4.3) The completion of each “micro” objective function adds value to the “macro” objective function which is recognized from the perspective of the client as worthy of negative entropy.

Figure 4.3: Objective Functions and Systems of Bounded Relationships



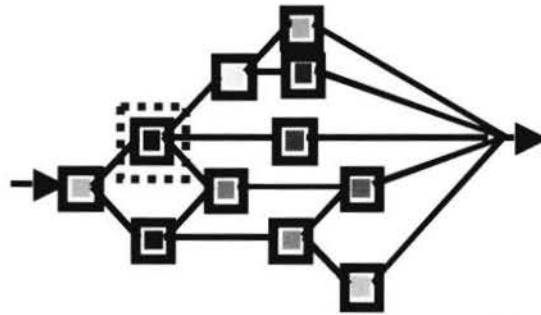
Each box represents an activity/program/project/entity.

The selection and alignment of activities which address the micro-objective functions is the purpose of management. Alternatively, when the situation is too complex because interests are too diverse, a market, which requires individuals to identify niche activities from which they may generate negative entropy, may arise.

In Figure 4.4, the dots identify an organization which has identified its niche within a macro objective function. A product produced by this algorithm must return sufficient negative entropy to the various organizations to justify their

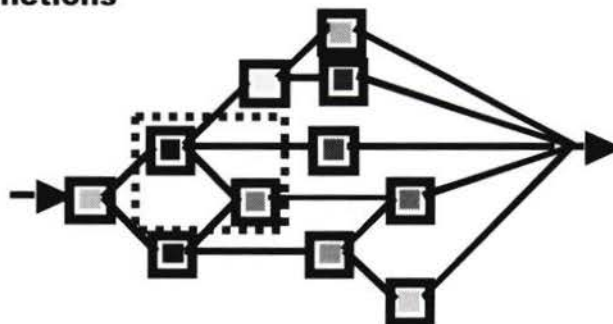
participation. In cases where sufficient negative entropy is not available, the organization will direct its resources to produce something else. Contrary to a Taylorist “one right way” perspective, open systems theory advises us that there are many ways to structure systems. For the most part this can be seen as a combinatorial problem but in fact must also be understood from the perspective of individual differences (The failure of standardization to ensure that all components can be prescribed) Further, systems continue to differentiate and will continue to differentiate as long as they are provided negative feedback and negative entropy. As these systems differentiate new knowledge is gained and new approaches are discovered.

Figure 4.4: An Organization in a System of Objective Functions



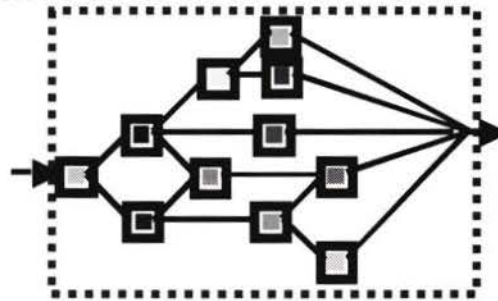
From an open systems perspective each micro objective function is a system unto itself and each macro objective function will be composed of one or more micro objective functions. In this context, an algorithm may be contained within a single organization or a complement of many independent organizations. In Figures 4.5, 4.6, and 4.7, the dotted line defines the organization within a system of objective functions. The system is composed of other organizations working in a market whose members may or may not be aware of their positive and/or negative influences on others.

Figure 4.5: A Larger Organization in a System of Objective Functions



Organization theory indicates that organizations are new phenomena and exist due to the economies of operation which occur when trust and the opportunity for standardized practices reveals advantage for an organization. When these conditions are identified organizations may choose to expand through either purchase of a complementary organization or the development of similar capability internally.

Figure 4.6: A Very Large Organization Controlling A System of Objective Functions

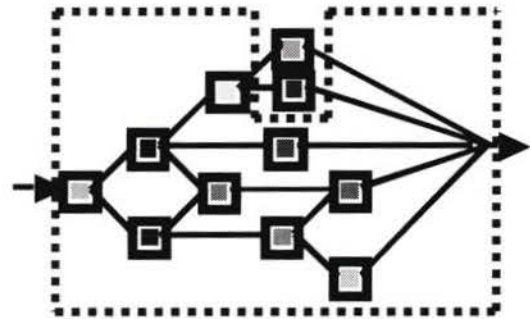


As contrasted in Figures 4.5 and 4.6 an organization may grow to consume many complementary organizations with a view of increasing negative entropy through the increase of trust, information and/or standardization. While this may seem straightforward many mergers of this kind fail. The integration of corporate cultures and operating values may not be as easily adjusted as the legal ownership of an organization. The underlying question must be the unforeseen shift in organizational equilibrium and the theory of regression towards the second best. The introduction of two organizations suggests a shift in their respective equilibria⁹⁰.

Figure 4.7 proposes a different circumstance. In this case, a large organization realizes that several functions are better accomplished by establishing working relationships with other organizations. It is not unusual for organizations to divest themselves of working units. This may be due to a failure of internal capability, a desire to direct resources into activities that provide greater VfM, or a belief that the units provide a lower VfM added than can be acquired elsewhere.

⁹⁰ Note this is similar to the comment by Jung who felt that to be introduced to another person could not help but have an effect that would change both parties.

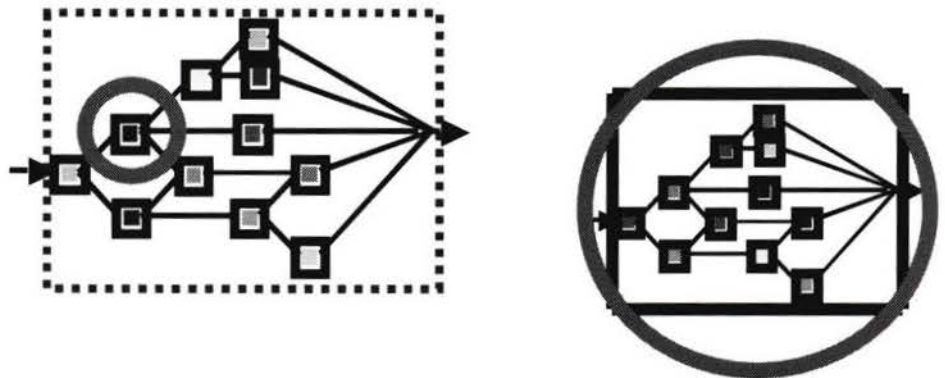
Figure 4.7: A Very Large Organization Controlling A System of Objective Functions Less Several Objective Functions Which Can be Accomplished By Other Organizations More Effectively



The advantage of a large organization is that it can maintain stability when making significant decisions which will have an impact on some aspect of its equilibrium. The disadvantage of a large organization is its difficulty in making changes quickly to adapt to a changing environment.

From an open systems perspective each activity is itself differentiable into additional activities. (Figure 4.8) The strength of our lens is controlled by our current knowledge and technology in addition to the constraints placed upon differentiation due to insufficient negative entropy. If we don't see an advantage in knowing or manipulating something resources tend not to be directed towards it.

Figure 4.8: Inside Every Activity Unit in an Open System Is A Family of Sub-Systems with Their Own Objective Functions



Within knowledge based activities, standardization may be very difficult because there is insufficient information to provide external standardization which can be structured "external" of the body of the worker. I.e. in knowledge work, a significant part of the decision making takes place within the applied expert

opinion of an individual or group of individuals. This is a significant concept because it makes evident that many of the critical elements of the production process may take place within the mental models operating within the individual knowledge worker.

If this is the case then the equilibrium of mental models must also be a concern for systems developers. To what extent does regression towards the second best, take place when new models are proposed to knowledge workers? What are the parameters that can be used as landmarks for orientation? In for profit business the relationship of the activity to others and the overall need to produce negative feedback and negative entropy allows the financial constraints of the systems to direct the attention and the purposefulness of the activities.

However, as stated earlier, not-for-profit organizations experience greater challenges than do for profit organizations because they must establish and manage information systems that manage, at a minimum, relationships with their beneficiaries as well as their donors. Further, these organizations will experience greater challenges of performance measurement due to uncertainty ambiguity and the context of those who receive their service. Many of these challenges are the result of organizational cultures which tend to be more value based because their objective functions have few if any commensurable measures which may be used to evaluate performance and align motivations.

While a single not-for-profit organization may work to manage internal priorities in the same way as a for profit entity a not-for-profit entity is also expected to cooperate with other not-for-profit agencies which provide complementary or substitute services to the same or similar beneficiaries. An important source of cognitive dissonance may be the challenge not-for-profit administrator's experience when they are expected to cooperate to improve the services for beneficiaries but compete for resources from donors. Regardless, the use of donor capital requires that not-for-profit entities cooperate with other not-for-profit organizations and their beneficiaries. Unintended consequences that occur will tend to be deeply embarrassing to the entities because negative consequences will often be characterized as unthinking or uncaring.

Without the exchange of negative entropy from a beneficiary who is responsible for making a personal determination of VfM, not-for-profit organizations must have access to decision frameworks which address the expected utility of both the donor, the beneficiary at a minimum and the multitude of other community based organizations would be preferred. Improvement can be measured within a program in terms of changes in efficiency and effectiveness in providing a specific service.

4.3 Information Burden

The requirement for a profit organization requires that they communicate to their suppliers and their customers. The rules of the game permit them to expect that those who buy their product are satisfied with the cost and quality. In many cases, they expect their customers to provide negative feedback that can be used to improve the expected utility of the product or service.

In most cases, standardization of products is desirable to all parties in the chain of value added relationships. Standardization reduces the information which must be managed by the other organizations in the algorithm. The variety of “standards” outputs is determined by the customer’s willingness to value the variety through an exchange of negative entropy. Variety is adjusted based upon the cost to produce it and the willingness of customers to exchange negative entropy for it.

Many techniques exist to allow an organization to investigate the interest of the population in exchanging negative entropy for a “prototype product or service”. This can be followed by sequences of litmus tests to validate an increase in production.

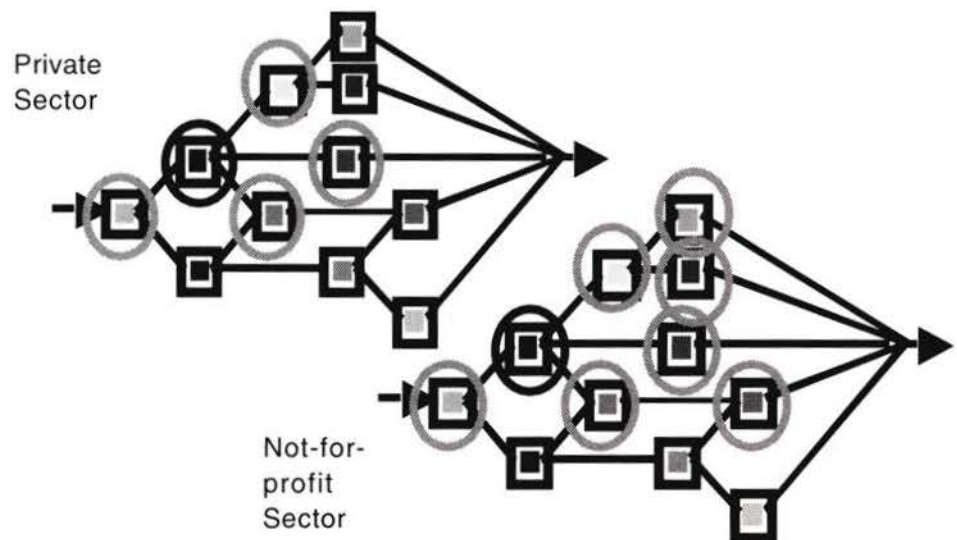
The not-for-profit organization must determine the value of the utilization of resources based upon feedback from beneficiaries who are not required to demonstrate the value of the service through an exchange of negative entropy. Consequently, it is difficult to capture negative feedback which can be used to realign the production process. In addition, the output from a not-for-profit is not sufficient evidence to justify the provision of a good or service. The outcomes are also important to understand. The inclusion of outcomes requires an effort to

understand and relate a service provided to the determinants of health and consequently a larger collection of other not-for-profit services.

In order to facilitate the alignment of components in a context where outputs are variable and standards are elastic, information systems must be developed which are capable of managing this degree of variability. While the initial instinct is to articulate measurements, which provide a more precise impression of measures, some caution is required to ensure that the measures are valid and reliable.

In cases where the outputs are not easily standardized, information must be provided or produced which will allow those in the following stages to understand the process and expected results. In these cases, this is the only mechanism that can attempt to link an entity's output with the appropriate negative feedback. This negative feedback is essential in order to facilitate the improvement of the activity. Figure 4.9 shows an active program within a black circle and indicates (through the use of gray circles) that not-for-profit organizations may need to collect negative feedback from a larger number of other complementary programs than is required by a private sector entity.

Figure 4.9: Private Sector versus Not-for-profit Information Burden



For example, Program A and Program B treat drug alcohol dependency. Both programs are of equal size and each produces an equal number of outputs. The

programs however utilize different techniques. After treatment, both Program A and Program B send their “outputs” to Program C for support and follow-up. Program C indicates that it has a 50% success rate i.e., recidivism of 50%. What information can be provided back to Program A and/or Program B?

- It may be the case that 100% of Program A outputs are “cured”.
- It may be the case that 100% of Program B outputs are “cured”.
- It may be the case that 50% of Program A outputs are “cured” and 50% of Program B outputs are “cured”.

This simple example is intended to demonstrate that in many cases, a failure of down stream processes to provide negative feedback to prior programs means that programs are left to speculate regarding their success or failure. When negative entropy is not contingent upon the degree of success in a program, a program may choose to save money by not investing in information and decision systems. If this were to take place, the program would be unable to relate the consequence of its activities to the beneficiaries. Further, it is unreasonable to believe that feedback could be provided to programs and activities which occurred in prior stages of a process.

If negative entropy is not contingent upon performance to encourage negative feedback then a broader negative feedback, program alignment and coordination process is required. To ensure the development and maintenance of a negative feedback system, which meets the needs of the beneficiaries, elements of the negative entropy system must be attached to the feedback systems.

This is an extremely complex process and is the purpose of the extended features of the Value Sieve known as cooperatives. These are described later.

4.3.1 Fundamental Value Sieve Activities/Features

1. Identify and explain rules of the game.
2. Construct preliminary information system.

3. Inventory current activities. This includes resources available and agreements in place.
4. Construct inventory information system.
5. Identify opportunities to create Cooperatives.
6. Construct expanded inventory information to include collaborative system(s).
7. Collect feedback. (Includes all cooperatives)
8. Inventory options and alternative.
9. Prioritize
10. Collect prioritization feedback. (Includes all cooperatives)
11. Identify exact resources available.
12. Final prioritization and decision making.

4.3.2 Fundamental Technical Elements

1. Choosing among incommensurable measures.
2. Alignment and coordination of activities by accountable decision-makers. Contingent negative feedback.
3. Linking negative entropy to the negative feedback system.
4. An inventory system. (*A "Fuzzy Information" system to support decision making.*)
5. Valid and reliable measurement of outputs and outcomes.⁹¹
6. Management of motivation.⁹²

⁹¹ This is discussed in Appendix B.

⁹² *ibid.*

4.4 Making Choices Among Incommensurables

4.4.1 Prioritizing Outcomes

Sorting and rank ordering options is a common activity within the psychological and economics literature. The findings indicate that individuals can effectively sort a wide variety of different options/items according to specified dimensions. Utilizing this basic capability, a Vfm prioritization method can be constructed

Premise One – an accountable decision-maker can compare two program/projects with equal resource requirements and different outcomes and come to a decision about which one offers the organization the greater versus the lesser-expected utility. (Figure 4.10)

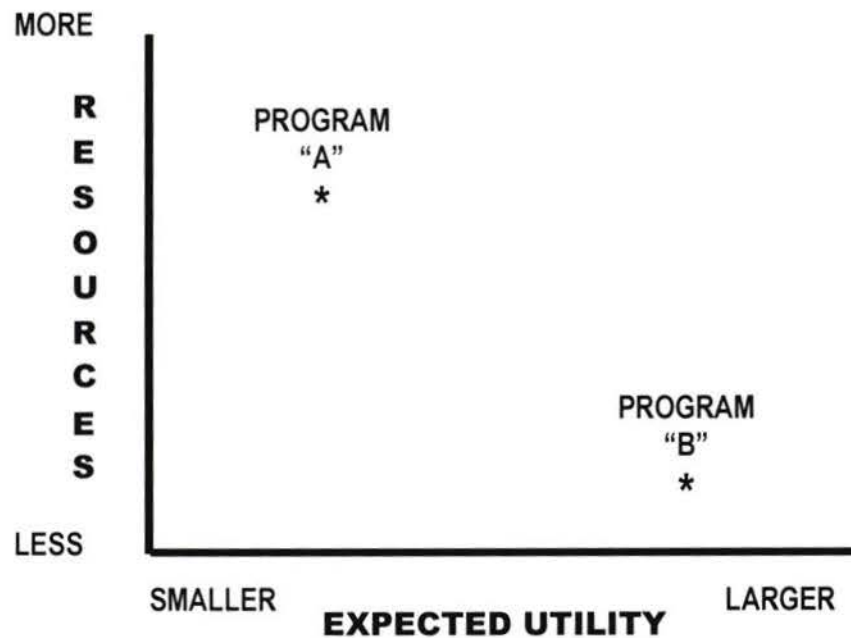
Figure 4.10: Values applied to outcomes



Premise Two - an accountable decision-maker can compare two program/projects with different outcomes and different resource requirements and come to a decision about which offers the organization the greater versus the lesser Vfm.

The figure 4-11 shows Program A and Program B. The location on the graph represents the expected utility the accountable decision-maker believed each program/project offered towards the objective function of the project, program, division, and/or organization. Program B delivers more expected utility and at a lower cost than program A. Given this situation it is probable that the accountable decision-maker, if only allowed to choose one program would choose program B. However, if sufficient resources were still available after program B had been funded then program A, the only other program available in this example, would also be funded.

Figure 4.11: Graphing two programs by resources and expected utility

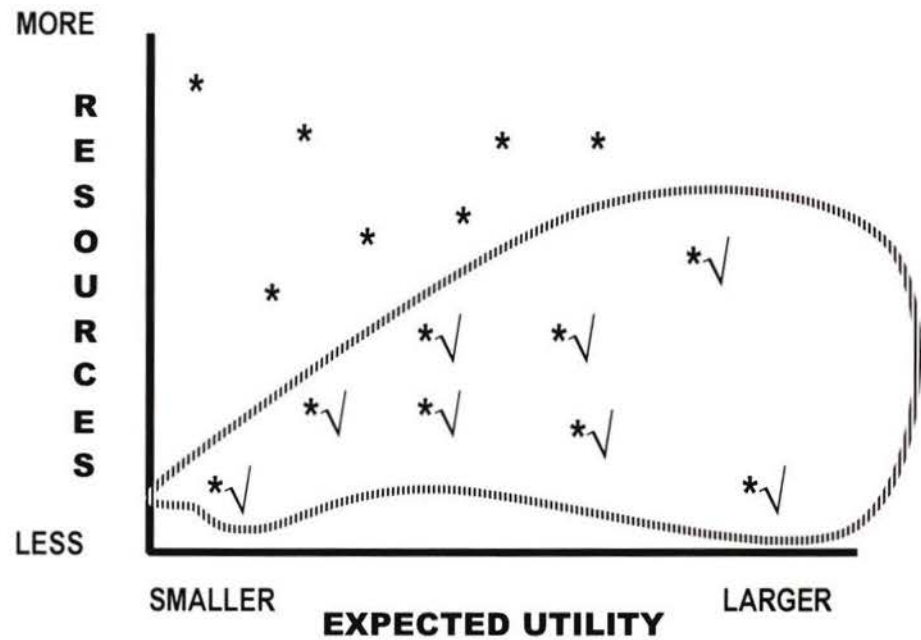


Through the process of comparative program/project evaluation the accountable decision-maker could prioritize those program/projects which the program, division and/or organization could afford to fund within its resource envelope.

Premise Three - the accountable decision-makers will use the resources available to fund the program/projects in order of most VfM to least VfM. The last program/project funded would have the least VfM within the optimized/satisfied objective function associated with the funding envelope.

The funded programs (marked with a tick shown here in figure 4-12) would consume the entire resource envelope. The included (funded) program/projects would also "define" the objective function as practiced within the organization and demonstrate the organization's priorities within the allowable resource envelope. The actions defining the organizations objective function are contained within a gray line drawn around the funded programs in Figure 4.12.

Figure 4.12: Graphing multiple programs by resources and expected utility



4.6.2 Collective Choice

Individual decision-maker's rank ordering of programs/projects will establish a prioritized list based upon the individual VFM they estimate will be provided by each program/project. This prioritized list of program/projects, represents that individual's optimization of the resources available. However as previously discussed these individual expected utilities cannot be measured in a scientific process which will allow a group/committee of individual accountable decision-makers to have their prioritized lists of program/projects combined. The combination of priorities requires a collective choice rule. A collective choice rule takes preference profiles and produces collective preferences.

In a democratic setting, majority rule by voting is frequently used as the preferred method for aggregating individual preferences. Arrow's impossibility theorem⁹³ suggests that the characteristics of an ideal system (time rational, decisive, and

⁹³ Arrow's Impossibility Theorem is included in the glossary.

egalitarian) are in fact incompatible. A method of voting may avoid arbitrariness, deadlock, or inequality of power but it cannot escape all three.

Arrow's theorem casts doubt upon any notions that explicitly or implicitly attribute preferences to society that are comparable to preferences for an individual. Consequently, it should be clear that any mechanism proposed would not satisfy all the axioms of Arrow's Impossibility Theorem.

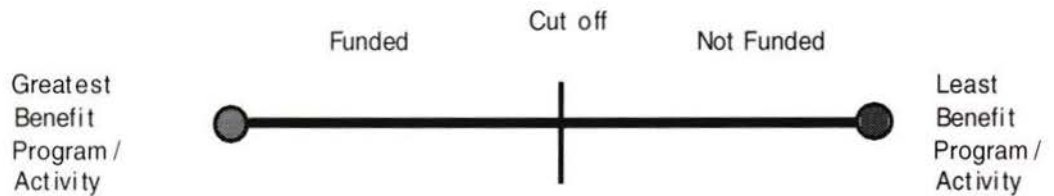
4.6.3 The Value Sieve

The availability of resources will result in a great variety of program/project proposals being received which justify themselves within the broadest possible context of the objective function. This cannot be controlled without increasing the possibility of eliminating an innovative proposal or the perception within the organization that participation is not welcome. Therefore, the process must permit a broad range of proposals to be received.

The proposals received must be reviewed and organized in such a way as to ensure that they can be managed within a realistic time frame and administrative resource pool. A primary administrative objective will be to create a process that quickly focuses the energies of the accountable decision-makers and the administration on those program/projects that will require the greatest amount of attention and dialogue. The greatest debate will not be upon those programs/projects that obviously fill an important need or those which clearly provide minimal benefits to the organization. The greatest attention needs to be focused upon those program/project proposals which fall into the middle category. In particular those program/projects which fall within a few program/projects, either side of the cutoff for the envelope of the resources available. (Figure 4.13)

The "medium" benefit program/projects that are distributed "equally" on both sides of the cut off point deliver benefits that are not so clearly seen by the decision-makers as "high benefit program/projects or low benefit program/projects". They therefore will be more effected by the values of the decision-makers in terms of their relative worth, association with conflicting motivations, and consequent location in the ranked continuum of program/projects.

Figure 4.13: Programs Can Be Valued Around a Funding Cut-Off



A three category discrimination process (Figure 4.14) will allow an accountable decision-maker or panel of individuals charged with the responsibility of ordering the proposals to quickly determine which proposals should be eliminated from additional review or consideration due to either: the proposal representing a great deal of VfM; or the proposal representing a very minimal VfM. This very coarse ranking approach is based upon the idea that the actual detailed ranking is not necessary until the cut off funding position is being approached.

Figure 4.14: Programs Will Break Into Three Categories

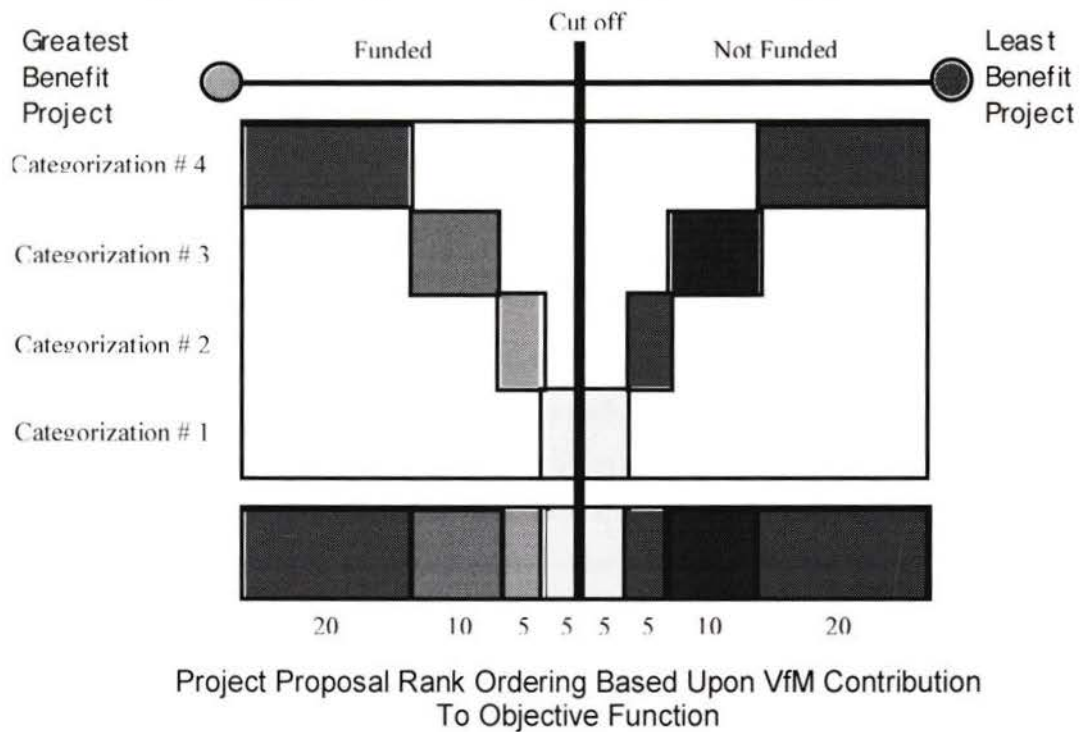
Greatest Benefit/ Value	Medium Benefit/ Value	Lowest Benefit/ Value
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The sieve can work with any amount of resource, any number of program proposals, any combination of percentages for each categorization, and with variation in iterations of the sequential categorization processes. However, for the purpose of the first explanation of a working model we will assume:

- enough resources to finance 50% of the proposals,
- each proposal requiring equal levels of resource.
- the first categorization procedure selects the greatest 25% and the lowest 25%.

- the remaining 50% would then move on to further iterations of the categorization procedure using the same 25/50/25 categorizations to result in clear segments of preference.
- The iterating process is done until there remains only approximately 10 program/projects which fall into the medium health benefit category. The reason for the number ten is that this is approximately the number of items that the psychological literature indicates that an individual can be expected to be able to rank order.

Figure 4.15: Programs Are Sorted and Ranked



The iterative categorization process described in the assumptions would result in a prioritized list of programs which range in grouping from most beneficial to least beneficial from the perspective of the decision-maker(s) as they relate each program/project to the objective function. (Figure 4.15)

4.6.4 Preference Voting

In the circumstance where there is a single accountable decision-maker (such as a benevolent dictator) the process can stop after the Value Sieve prioritization

process is completed. However, in cases where multiple accountable decision-makers must combine their preferences, a preference voting procedure is necessary.

In order to resolve the sequencing issues of the final prioritization steps approval voting will be used. Preference voting provides each accountable decision-maker with an equal number of votes which they may use as they see appropriate to indicate their preferred choices. This is different than in traditional voting situations where there is a concern that larger and more powerful lobbies within the decision making group will be allowed to control the situation by collecting votes of support on each and every agenda item and thereby minimize the ability of smaller groups to compete for priorities they have. The benefit of this approach is that accountable decision-makers will be forced to use their votes to ensure their preferences but will not have the votes necessary to bias other accountable decision-makers preferred choices.

An example:

Eight accountable decision-makers have to select between 10 remaining program/projects. 5 of them can be funded and 5 cannot. Each accountable decision-maker is given 5 votes which that accountable decision-maker may use in any combination that they wish. Thus an accountable decision-maker could give a single program/project all five votes and eliminate their ability to provide any approval for any other program/project. This would take place if it were so strongly desired that the accountable decision-maker wished to do everything possible to ensure that the program/project was approved. Conversely, an accountable decision-maker could give each of 5 program/projects 1 vote to indicate general support for a range of program/projects. Each of the other 7 accountable decision-makers would be able to allocate their votes as they saw fit. Some accountable decision-makers will apportion their votes in other combinations working in concert with others when possible to give a specific program/project greater certainty. However, the cost of providing certainty to one program/project is to reduce your influence on the others.

4.6.5 Arbitration of Disputes

In cases where the approval voting results in situations where the accountable decision-makers themselves cannot resolve the situation within the allotted time, a Chairperson, named a priori, will have the final decision.

4.6.6 Example⁹⁴ for an Allocation of Funds for 40 Program/Projects

Categorization 5

- total program/projects accepted for review would be limited to 200% of program/project proposals which can be funded. The first review will attempt to constrain the review to 200% of the available resources. In this example, 80 proposals are made available for consideration.

Categorization Four

- Eighty program/project proposals have been received. These program/projects would be reviewed within the context of the objective function and the highest VfM 20 program/projects (25%) would be accepted while the lowest VfM 20 program/projects (25%) would be rejected.

Categorization Three

- The remaining 40 program/projects (50%) would go on to a second round of categorization. These 40 program/projects would be reviewed and the highest VfM 10 program/projects (25%) would be accepted while the lowest VfM 10 program/projects (25%) would be rejected.

Categorization Two

- The remaining 20 program/projects (50%) would go on to a third round of categorization. These 20 program/projects would be reviewed and the highest VfM 5 program/projects (25%) would be accepted while the lowest VfM 5 program/projects (25%) would be rejected.

⁹⁴ assumes that all program/projects have equal costs so that expected utility is the essential consideration of VfM.

Categorization One

- The remaining ten program/projects are rank ordered by VfM (benefit).

An important element in this model is that it results in a useful prioritization structure of program/projects which is retained after the process has been completed. This would mean that resource adjustments, increases or decreases in budget could be applied quickly to the program/projects within the prioritized list. More resources coming available would logically be applied to the first program/project not funded which could effectively use the new monies to deliver VfM benefits to the organization. Less money coming in would immediately jeopardize the lowest prioritized program/project that had been funded.

The model anticipates funding to be made available to the accountable decision-maker on an annual basis and therefore the sieve would likely operate once or at a maximum twice a year. A benefit of the sieve is that it preserves the program/project preferences of the organization for all program/project developers to consider. In addition, program/projects requesting funding during the year would be required to demonstrate greater VfM than the program/projects already evaluated and waiting in the resource allocation queue. I.e. the sudden availability of new money tied to a specified purpose from the organization would be able to be placed in prioritized context so that a logical argument to the purpose of the organization could be provided.

The categorization steps of the sieve model clearly delineate successive levels of judgements which require increasing levels of involvement by individuals representing the organizations values. The model allows for a dramatic increase in proposals without a dramatic increase in the number of categorization steps. For example 80 proposals requires 4 categorization steps, while 800 proposals requires 7 categorization steps. I.e. an accountable decision-maker may not call in technical experts to review the proposals which are clearly in or clearly out. The Value Sieve allows the accountable expert to focus knowledgeable opinion and discussion around those proposals and programs which are at the margin.

The administrative clarification that is required will be from the accountable decision-makers within the hierarchy. A principal will expect the prioritization

lists from their agents. The principal may consequently override the decisions of the agent but will in so doing acknowledge the difference of opinion and be able to provide guidance to the agent as is customary in hierarchical organization structures.

Thus, the bundles of priorities can be rolled up through the organization hierarchy. A record exists as to options and preferences that can be investigated as desired by senior and junior participants. Motivations, and practical matters or assumptions and deliverables are also captured in the Value Sieve documentation which will facilitate negative feedback and therefore adjustments to improve the delivery of outcomes consistent with the objective function.

The Value Sieve accepts that there will be competition for resources and individual differences in how well different programs achieve their objective function(s). Given that there are many ways to achieve a purpose, the Value Sieve supports the use of motivators such as self-interest and fairness to improve the efficiency and effectiveness of the organization.

4.7 Alignment and Coordination of Activities by Contingent Negative Feedback

4.7.1 Incorporating Self Interest to Support Cooperation and Fairness

Self interest is an element brought to the table by all parties in a conflict over scarce resources. Therefore, the framework needs to be constructed to encourage the strengths and not the liabilities of self-interest. The benefits of self-interest require that we attend to the following theoretical observations.

- Game theory demonstrates that participants in a negotiation will work with the tools available to optimize their outcomes (Axelrod, 1984). One tool is cooperation, which will occur in circumstances where it is clearly in the interests of the parties.
- Axelrod (1984) suggests that the evolution of cooperation is achieved when the parties involved understand that their relationship will be of a long duration. This is because the cost associated with a short-term high pay-off strategy is likely to result in lower long-term benefits.

- The larger the system, the larger the share of society that an organization represents, the greater its incentive to try to increase the size of the social product, since redistributive gains can be taken only at the expense of its own members (Kenworthy, 1997). This means that parties with vested interests (for example, professionals or unions) will tend to find it more difficult to negotiate without concern for the other parties if they must negotiate within a larger, more "public" process, where the consequence of their negotiation can be directly related to a reduction in social welfare.
- Fairness is a value that has a tangible economic presence and that does cause participants to make "less than rational"⁹⁵ economic decisions in order to ensure their perception of "fair treatment" occurs (Kahneman, Knetsch, and Thaler, 1987). Attention to principled negotiations and the mechanism of preference voting should resolve most difficulties.

4.7.2 Benefits of the Value Sieve

The sieve mechanism has significant value to the organization in that it automatically coordinates the program/project providers in a competitive market and allocates resources based upon the values of the accountable decision-makers. The sieve itself effectively represents the values of the organization and incorporates changes in values as easily as it incorporates changes in the ability of program/project providers to provide expected utility to the objective function. The expected utility of program/projects is open and available in its most useful form, how the accountable decision-makers compared each program/project VfM to other funded and non funded program/projects. The mechanism accommodates change in the funding provided from the organization with a clear administrative purpose. Its procedure of resource management protects the program/projects that deliver the most VfM. The sieve ensures that the process of optimizing VfM in the organization is not confused with whether or not there is enough resource to meet all the needs in the organization. The board of directors still clearly maintains the responsibility for adequately funding the organization to achieve its purpose. The organization will be able to clearly indicate which program/projects

⁹⁵ Some caution is due here because it can be argued that fairness is a long term, rational economic consideration.

were discontinued due to funding cut backs and which program/projects will be funded if additional resources are made available.

4.8 Linking Negative Entropy to the Negative Feedback System

4.8.1 Not-for-profit Industry

The Value sieve is designed to assist an entity in attaining its goal of improving the expected utility of a beneficiary population through a decision process which results in the allocation of resources. These resources are allocated to programs within the entity and to external individuals and organizations within the community. It must be acknowledged that organizations that have nothing to do with the specific beneficiaries do, through the determinants of health, have something to do with the VfM delivered to the population. Consequently, the entity must consider itself part of an open system.

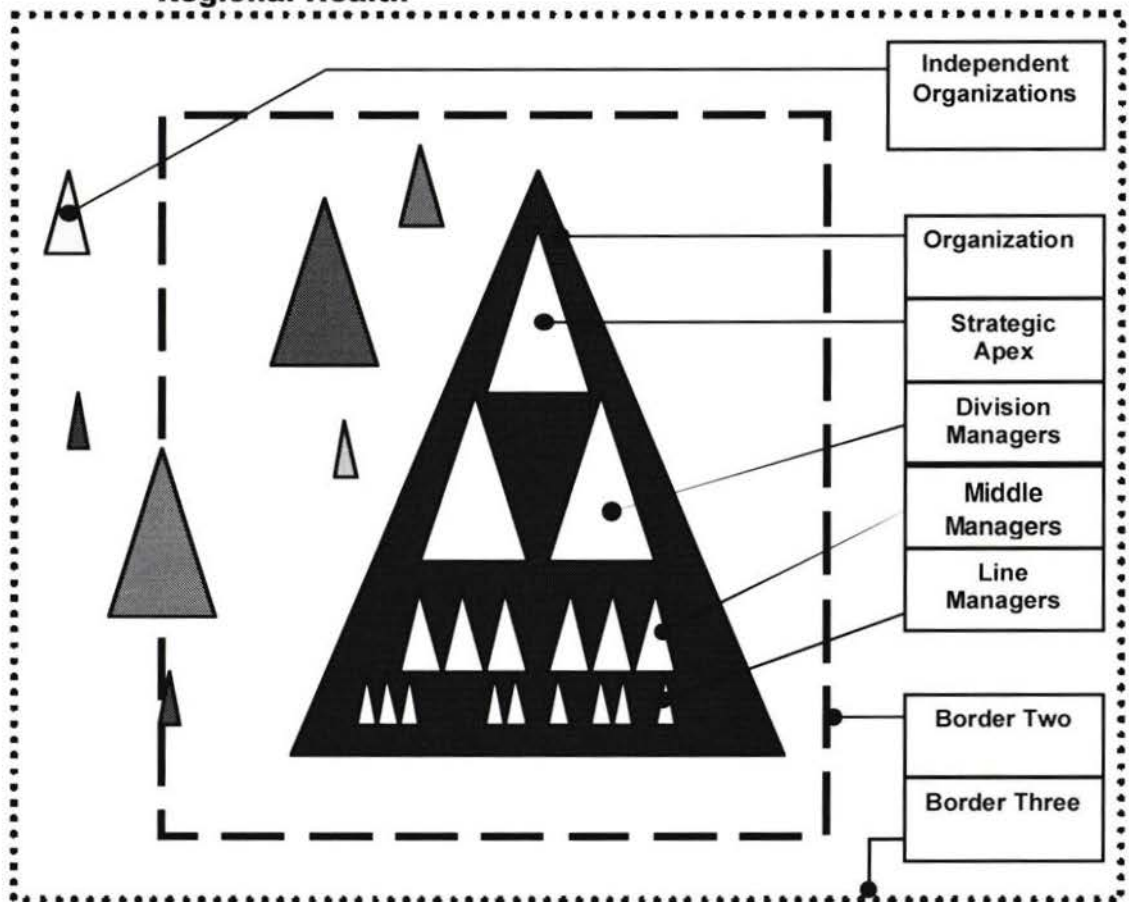
The entity may use a variety of organizational structures. Some will be simple adhocracies, some machine bureaucracies while other will be professional bureaucracies (Mintzberg, 1979). Professional bureaucracies (such as hospitals) are particularly difficult because of the parallel development of authority within the organization that is required to separate the management of professional staff versus the management of line staff. The consequence of this is that although teams composed of line staff and professionals work together to achieve objectives, they are not supervised and administered as a group. Conflict and disputes not resolved within the team cannot be solved except through negotiation by senior representatives of the profession and senior representatives of the administration.

The Figure 4.16 shows that there are relationships within the entity and between the entity and various independent entities⁹⁶ involved in the delivery of expected utility towards the determinants of health. The white triangles within the entity indicate that there is a hierarchical structure. This is true for the

⁹⁶ Organizations may be composed of a single person. For example a doctor or a psychologist.

management and supervision of employees⁹⁷ within the entity. The white triangles are intended to show a traditional hierarchy where line programs report upwards to more senior management programs which report upward to more senior management. Many relationships will exist within the entity between its "white triangles". There will also be many relationships between the "white triangles" and the larger open system of independent entities⁹⁸.

Figure 4.16: An Open System Of Organizations Supporting Regional Health



⁹⁷ Note: Doctors in most cases are not employees of the entity. Their compensation is paid through their collective agreement with the BC Ministry of Health.

⁹⁸ For example - an independent AIDS hospice organization may work with the hospital (entity) social workers to keep an AIDS client at home (clients parents) instead of in a hospital (entity - hospital ward) bed. In this example, two different "white triangles" were involved. Three "white triangles" if the independent AIDS hospice program is funded by senior decision-maker of the entity.

The independent organizations are shown as multi-shaded triangles. The independent organizations that occur within "Border Two" are service providers dealing with the same beneficiaries. Examples might include hospitals, long term care facilities, and doctor's offices. The independent organizations that exist between "Border Three" and "Border Two" are organizations which are involved in the health of the population but not the provision of services to the same beneficiaries within the region. Examples of these organizations might include the Ministry for Children and Families, Schools, and the YM/YWCA. The figure intends to show that there are organizations that bridge between services for a specific beneficiary group and the population in general.

Figure 4.16 shows the entity is joined by seven other independent organizations. There are 28 combinations⁹⁹ for any two of these eight organizations to work together about one thing. There are 300 combinations for any two of the 25 (white triangles and the independent) organizations to work together about one thing. One hundred elements would result in 4,950 two-element combinations. The purpose of this mathematical exercise is to show the combinatorial explosion that takes place when several thousand service providers are working together on multiple topics. The combinations are enormous and the complexity is awe-inspiring. The potential for conflict and dispute, given the values base of the determinants of health, the vested interests of the participants and the anxiety of beneficiaries is daunting.

Consequently, the Value Sieve takes an open systems approach which acknowledges that while resource allocation associated with a specific beneficiary group may only take place to organizations which deliver services to that group the information and knowledge of a larger array of organizations and their activities must be entertained in order to optimize the system's influence on the determinants of health of the population. To accomplish this the process must allow decision-makers throughout the organization to acquire information, opinion, and recommendations from many sources, develop alternatives, evaluate

⁹⁹ Standard combinatorial nomenclature for the formula is $n!/(n-r)!r!$ Where n = the number of items to be selected from and r is the number of items in a selection.

these alternatives within the context of their goals and objectives and then allocate the resources available.

4.8.2 The Value Sieve Terminology

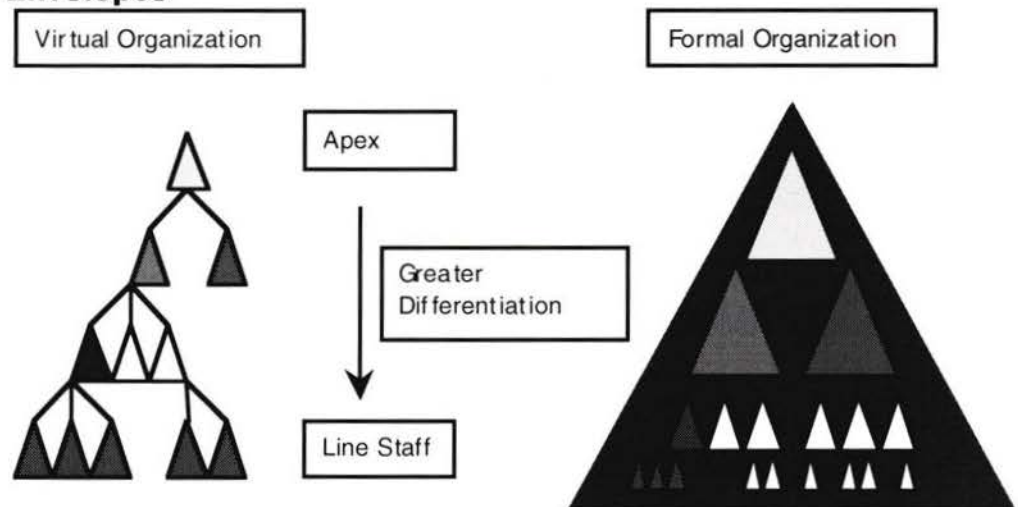
To accomplish its goals an organization differentiates its work into specialized work units. Specialized units of work can be called divisions, assignments, programs, services, program/projects, or activities. All of these various types of coordinated actions will be called programs. Each of these is associated with the achievement of certain outputs and outcomes that will be called accomplishments. Each program is associated with a specific financial requirement, all costs, human or capital, will be called resources. Decision-makers¹⁰⁰ determine how the resources of a program will be allocated. Decision-makers direct resources that allow programs to accomplish goals. A decision-makers budget envelope may contain numerous programs. As you move down in the hierarchy programs will differentiate. Consequently, a senior decision-maker's budget envelope will likely contain programs that are full budget envelopes to decision-makers lower in the hierarchy.

A single program or budget envelope will be represented by a triangle. Shades will be used only to aid discussion. For example in the diagram, three dark programs report to a gray budget envelope. Three programs, a gray and two whites, report to the penultimate budget envelope.

Figure 4.17 shows a virtual organization and a formal organization only to reinforce the point that the organization of work is essentially the same regardless of the type of the organization. The only difference is the ownership of the problems and the flexibility of the solutions that may be identified. The Value Sieve operates regardless of the organization or system frame provided.

¹⁰⁰ Decision-makers may be individuals or collections of individuals such as a board of directors. The Value-Sieve process provides procedures including preference voting strategies to combine the values of multiple individuals whom must "speak" with a common voice.

Figure 4.17: The Organization of Programs and Budget Envelopes



4.8.3 The Value Sieve Components

There are five components of the Value Sieve process.

1. The Program Inventory - Mapping The Sphere of Influence
2. The Value Sieve Kernel - Understanding A Program
3. Closed System Dynamic Consensus - The distribution of the Value Sieve Kernel information/results within the organization.
4. Open System Dynamic Consensus - The distribution to and collection of Value Sieve Kernel information/results from participants throughout an open system.
5. Beneficiary and Provider Cooperatives - utilization of self organizing feedback systems.

4.8.4 The Program Inventory

The foundation of the Value Sieve is the construction of an inventory of programs which links each program to its accomplishments and resource requirements. The inventory document is detailed and includes information regarding program

inputs, throughputs, outputs, and outcomes¹⁰¹. The inventory of the entity-funded programs would form a regional health care system map¹⁰².

4.8.5 The Value Sieve Kernel

The Value Sieve Kernel is the prioritization, by a decision-maker of the programs within a budget envelope. In the entity, this would represent a manager X anywhere inside the organization.

To use the Value Sieve Kernel¹⁰³ requires that the decision-maker understand:

1. the resources available
2. the programs which are currently offered
3. the new programs which could be offered to their beneficiaries which would result in positive accomplishments
4. the impact to offered programs if their budget were increased or decreased by 15%
5. the resource costs associated with each of the existing or new programs and
6. the accomplishments achieved by each of the existing or expected for the new programs.

Based upon the accountable decision-maker's goals all the existing and potential programs are prioritized by the accountable decision-maker from highest priority

¹⁰¹ The Value-Sieve inventory fully documents a program and acts as the foundation for the construction of a stem map of the organization and its relationships with other programs and organizations. An example of an inventory document would be Appendix C, The Basic Value Sieve Inventory. This is the inventory document used in the original Value Sieve research and later approved for implementation in the Capital Health Region.

¹⁰² The mapping of a region using the inputs and output of the various programs allows the organization to understand the flow of clients through the services they are responsible for and to see the some of the linkages regarding where clients come from before entering the system and where clients go to when they depart the system.

¹⁰³ A complete detailing of the Value-Sieve prioritization technique is available in Corbett (1994)

to lowest priority. It is assumed that there will be more program ideas¹⁰⁴ than there are resources and therefore the resource limits will produce a resourcing cut off line. The final prioritized listing represents the decision-maker's valuation¹⁰⁵.

The Value Sieve Kernel uses a sequence of steps and processes that accelerate the prioritization process¹⁰⁶. The process includes the necessary procedures for an individual decision-maker, or a group of individuals in a decision-making body. The outcome of the Value Sieve Kernel process looks something like Table 4.2.

The decision-maker has arrayed the programs in the budget envelope along with the resource requirements, accomplishments and priority ranking (1 is best).

4.8.6 Information in the Value Sieve Kernel¹⁰⁷

While the Value Sieve Kernel is very simple, it contains a great deal of information that can be conveyed very quickly to determine if conflicts or disputes exist. Further, the nature of the conflicts or disputes will tend to suggest an appropriate conflict management or dispute resolution strategy. At a minimum, the Kernel can be used to provide decision support for the decision-maker alone or it can be distributed to program managers and team members within the budget envelope.

4.8.6.1 Choices

The Kernel lists the program choices whether or not they were provided resources. These choices include increasing and decreasing resources to the existing programs. The list is only constrained by limiting it to the programs that

¹⁰⁴ It should be made clear that a budget increase or decrease to an existing program would be rank ordered with the other alternative program choices. In the full description all programs are required to indicate what they would accomplish with 15% fewer resources and 15% more resources.

¹⁰⁵ Valuation refers to the decision-makers perceived health utility of the program versus the other programs. The qualitative and quantitative accomplishments information provided for each program will not likely have units which can provide a quantitative comparison. Consequently, the prioritization is a value judgement made by the decision-maker. Another decision-maker might value the programs differently and consequently rank orders them differently.

¹⁰⁶ These prioritization steps while simple require detailed description, which are believed to be beyond the scope/needs of this paper.

¹⁰⁷ A more complete table of the information contained in the Kernel is contained in Appendix G: **Health Resource Allocation Knowledge Requirements**.

are believed to be possible¹⁰⁸. Based upon the list of possible choices it is possible to know the choices that were not identified and therefore not considered. The listing of possible choices is the same as brain storming for ideas - the central issue is to ensure that the provision of choices is separated from the selection of choices. Bad program ideas will tend to stay at the bottom of the prioritization list of choices.

Table 4.2: Budget Envelope Manager X - Value Sieve Kernel

Program Possibilities	Resource Requirements	Qualitative Accomplishments	Quantitative Accomplishments	Rank Order
Program A	100 X	Information	Information	2
Program B	12 X	Information	Information	9
Program C	67 X	Information	Information	5
Program D	998 X	Information	Information	4
Program E	453 X	Information	Information	7
Program F	234 X	Information	Information	1
Program G	98 X	Information	Information	6
Program H	657 X	Information	Information	8
Program I	134 X	Information	Information	3

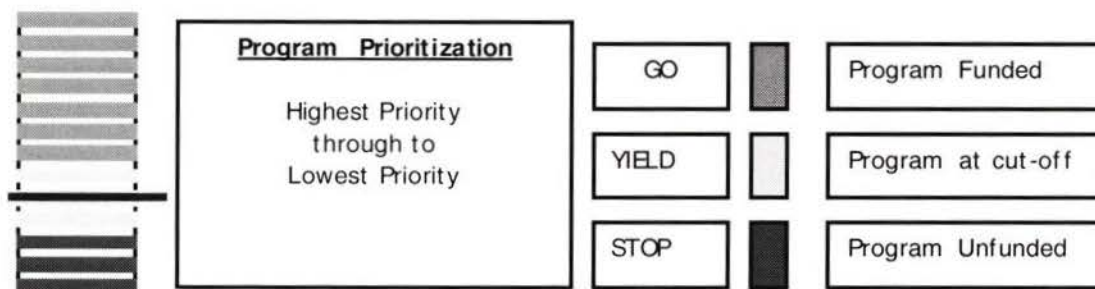
4.8.6.2 Common Interests

The common interests of the parties reviewing the Kernel are identified through the prioritization process. The Value Sieve Kernel shifts attention from those funding choices the parties agree on (Go and Stop) and directs their attention to the areas where there is a higher probability of disagreement (Figure 4.18). These are the “border programs” around the cut-off point. These programs are expected to have the lowest acceptable VfM and consequently be more subjective. In some cases the VfM between one border program resourced and another border program not resourced, may be very slight to the decision-maker. Only the limits of resources force a choice. Border programs identify to the parties involved that

¹⁰⁸ Given there is no cost associated with listing a program as a possible choice there is, in most cases, very little downside listing all possibilities. Some care must be taken given that there are extremes of belief and values in health care which suggest unacceptable, unproven or illegal remedies.

to increase the resource security of the program, improved accomplishments, or reduced costs are in order.

Figure 4.18: The Prioritization of Programs



4.8.6.3 Accomplishments

The accomplishments provided indicates the quantitative and qualitative information that is associated with each program. These will include numbers receiving service and the qualitative and quantitative outcomes associated with service. The listing of accomplishments will include the available scientific and technical support information.

4.8.6.4 Application of Knowledge and Values

The prioritization provides an understanding of the values of the decision-maker. Those programs of a higher priority should be expected to relate to the decision-makers belief of what is most important. It may also identify practical constraints that may require resolution. Areas of disagreement can be identified. Alternative sources of information and knowledge used to arrive at a different prioritization can be provided. Programs that are not on the list suggest possible areas where the decision-maker does not have information, or the information is considered of low quality or the decision-maker does not have information or knowledge.

4.8.6.5 Resource Costs

The Kernel identifies the actual resources used by each program to achieve the accomplishments. This also reinforces the scarcity of resources by indicating the programs in total that receive resources and those that cannot. Resource costs for a program allows benefit costs analysis to be carried out on different programs to determine their impact.

4.8.6.6 Budget Changes

The prioritized list of programs provides a reasonable understanding of what would happen to the program or budget envelope accomplishments if resources were to change. Additional resources would likely add the next priority program. A budget reduction would logically reduce the lowest priority funded program in a budget envelope.

4.8.6.7 Constraints on Decision-Making

The process allows the costs for policy, legal or professional requirements to be demonstrated in terms of their impact upon the ability to have programs to achieve accomplishments. Resources, that are restricted in some way, are identified so that decision-makers understand the degree of flexibility that exists. For example, some budgets specifically require that capital costs be kept separate from personnel costs. Funds in one category may not be moved to another.

4.8.6.8 Consequence of Resource Scarcity

The prioritization assist parties in building resource scarcity into the discussion. While all parties would like all the resources possible, the identification of scarcity with a budget focuses the parties on what can best be accomplished with the available resources and may unify the parties in working to acquire additional resources for their common interest. There will be pressure to work cooperatively to identify new resource opportunities.

4.8.6.9 Consequence of Program Change

It makes it very clear that to add a new program may require an existing program to be removed or downsized. The trade-offs which are often very difficult become part of the discussion or negotiation. It isn't reasonable to demand more resources from an administrator when you already agree on how the current resources are allocated. In addition, saving money on existing programs (cost compression) is good because it allows those resources to be redirected and so acquire additional programs or accomplishments.

4.8.6.10 Accountability

The decision-makers are identified as being accountable and responsible for the accomplishments that were selected. Further, the individuals who provided the

cost and accomplishment information for each program are at risk of losing credibility if their estimates are not achieved. Thus through the establishment of statements of budget and accomplishment, decision-makers are aware of their responsibility to deliver. Programs, which do not deliver as proposed, will be devalued as discrepancies appear between what they say they do and what they really do.

4.8.6.11 Testing Ideas

Resources allocated on new ideas can be seen within the context of accomplishments that are being deferred in exchange for the promise of future accomplishment. The notion of investment is more clearly identified with the risks and rewards or experimentation.

4.8.6.12 Consistency with Goals and Objectives

The Value Sieve documentation provides the ability to confirm that the resourced programs of the organization are consistent with the values, goals, and objectives of the organization. That is, each decision-maker between the line staff delivering a program and the strategic apex of the organization is ensuring that the accomplishments of their programs and budget envelopes are in keeping with the organization's goals and objectives.

4.8.6.13 Qualitative and Quantitative Measurement

The Value Sieve Kernel supports a learning environment for all parties by requiring a statement of what a program expects to accomplish and how it is intended to document whether or not it was accomplished. The accomplishments of a program can be represented in any way that the decision-maker feels is appropriate. The decision-maker will explain how the accomplishments are identified using qualitative or quantitative measures. In some cases, measurement will be very difficult and a pure qualitative statement will be all that is possible. In these cases, this should be seen as acceptable. However, the Kernel will place pressure on programs that cannot demonstrate a clear, positive and believable impact on the health of the population because alternatives will be suggested.

4.8.6.14 Communication

The Value Sieve Kernel communicates large amounts of information about the work unit, the work units programs and identifies opportunities where programs may work collaboratively to improve quality or reduce costs. Further, it allows another individual to quickly identify areas of agreement and disagreement. Upon identifying an area, it is possible to have sufficient information to begin a constructive process of investigation or questioning.

4.8.6.15 A Map

The Kernel provides the basic information required to construct a map of the relationships of one program to another program within a budget envelope. It further, identifies areas where cooperation can improve the situation or where barriers to improvement exist.

4.8.6.16 A Record

The Kernel acts as a record of what was thought, expected, and understood at the time of the decision-making. Inherent in the process is the ability to bring a focus upon the issues once again during the next budget cycle to determine if the accomplishments were achieved, the client population changed, the technology has evolved or new treatment strategies are available and should be considered or tested.

4.8.7 An Example of Using the Kernel to Contrast Perspectives

Table 4.3 compares fictitious responses from three program managers within a budget envelope. There are 729 different possible combinations that could draw discussion if the Kernel was not used to focus attention. The Kernel identifies the conflicts of opinion centered on Programs A&F, Programs C & D, and Programs E&H.

Discussion of Programs A&F will not be particularly likely given both programs will be funded. Discussion of Programs C&D will occur only if resources are not available to fund the managers 4th and 5th ranked programs. If 4th and 5th ranked programs are funded then the conflict while informative will not be strong. A similar case exists for the discussion on Programs E&H. It is unlikely sufficient resources will be available to fund these lower ranked priorities, therefore this

conflict will require attention only if it is the case that resources are available to fund up to seven programs¹⁰⁹.

Program Possibilities	Resources	Qualitative	Quantitative	Manager X	Manager Y	Manager Z
Program A	100 X	Information	Information	2	1	2
Program B	12 X	Information	Information	9	9	8
Program C	67 X	Information	Information	5	4	5
Program D	998 X	Information	Information	4	5	4
Program E	453 X	Information	Information	7	8	7
Program F	234 X	Information	Information	1	2	1
Program G	98 X	Information	Information	6	6	6
Program H	657 X	Information	Information	8	7	9
Program I	134 X	Information	Information	3	3	3

4.8.8 Using The Kernel To Collect Alternative Views

The Kernel produces valuable information in its own right. Its power multiplies when other individuals within a program or budget envelope use it. These individuals may comment upon the Kernel produced by the decision-maker or they can be asked to produce their own Kernel regarding the same program or budget envelope. When compared the information richness of the Value Sieve Kernel and its practical focus will strongly support principled negotiation if differences are identified.

Therefore, while the Value Sieve Kernel is an important and useful activity for a single decision-maker within a program or budget envelope, the power of the Value Sieve Kernel grows when others use it within an organization. This is because the information contained within the Value Sieve Kernel can assist other decision-makers in other programs to identify practical areas of conflict that can result in useful collaboration opportunities.

¹⁰⁹ Please note that this discussion is a vast simplification of the possible sources of conflict. A shift of resources can result in multiple programs being involved in a single focused discussion. The central point is that the Kernel dramatically focuses the discussion to areas of conflict which have a practical impact on what can be done with the resources available.

4.8.9 Closed System Dynamic Consensus¹¹⁰

The next step in the Value Sieve Model is the utilization of the Value Sieve Kernel by all programs and distribution of the Value Sieve Kernel information within the organization. Additional information will result as the Kernels of different programs and budget envelopes are distributed within the organization. These are the:

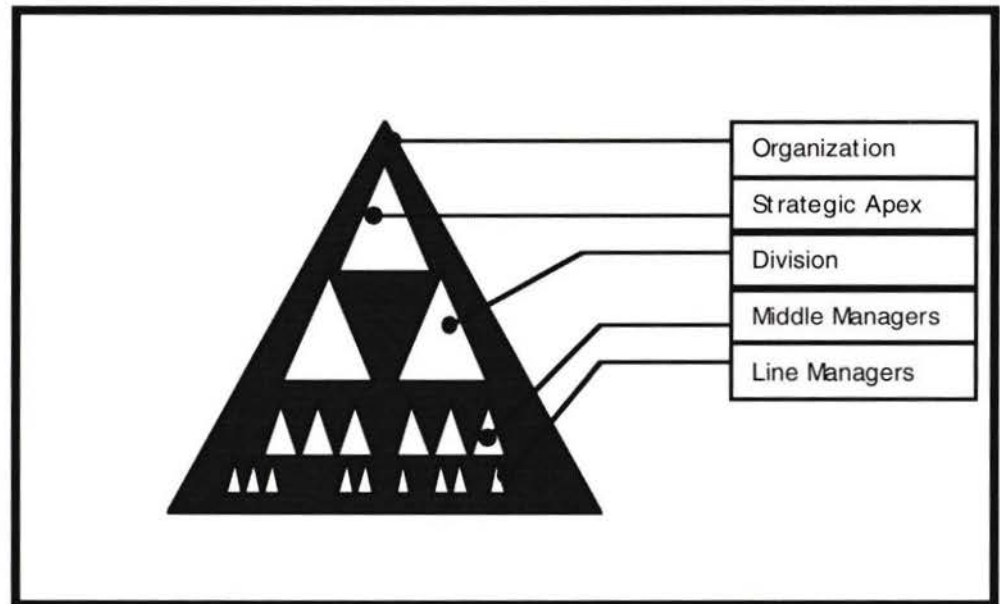
- impact on other costs associated with other programs
- impact upon the goals of other programs.
- impact upon other accomplishments achieved by other programs.
- impact on beneficiaries of other programs
- relationships between programs on specific beneficiaries groups.
- an understanding of the additional accomplishments that can be achieved if additional resources are identified through cooperation, or cost compression.

The organization is a closed system. (Figure 4.19) The programs within the organization can communicate with each other but do not communicate outside the boundary of the organization. I.e. Outside the organization boundary is where the beneficiaries come from and that is where the beneficiaries are sent after we have provided service(s). The organization has a hierarchy of programs and budget envelopes. The boundary of the organization encloses the programs. Programs may consider the activities of other programs within the organization but no consideration is made to the world outside the organization.

¹¹⁰ I coined this term because it seemed to represent the long-term goal of the Value-Sieve. However, from an academic perspective I struggled with the notion of using Negotiation, or Mediation instead of Consensus. While I would tend to argue on technical grounds that this is really negotiation, many in practice would call this mediation. Others would say this isn't consensus because there is no requirement for the entity decision-maker to incorporate to the counsel of others. However, it is my process and I choose CONSENSUS because it represents the long-term view of repeated annual iterations where the participants have an opportunity to develop a trust relationship and build a consensus.

The distribution of Kernel information between programs allows the decision-makers to identify and resolve common problems and to coordinate their planning and accomplishments.

Figure 4.19: A Closed System Using Value Sieve Kernels



The exchange of Kernel information allows coordinated action based upon each program's understanding of its peer, subordinate, and superior programs. Knowledge of priorities, activities and the resulting accomplishments provides an information rich environment for collaboration. Discussion can take place to identify how through cooperative action improvements can be made without increased resources. In conflict management, this is known as finding new resources.

Coordination is now more easily achieved because the internal system of programs and their relationship is clearer. Organizational, values, goals and objectives can be matched to the values and intended accomplishments of each program. The impact of changes in one program can now use the Value Sieve Kernel information to identify possible positive and negative consequences for other programs and the organization. Management by exception becomes more probable as the Value Sieve recruits the constructive participation of the program

teams. The consequence of resource and policy changes is clearer and can be more reasonably planned.

The utilization of the Value Sieve Kernel should result in important capacity building inside an organization. However, greater improvements are expected when the Value Sieve Kernel is used in an open system.

4.8.10 Open System Dynamic Consensus

In the case of health care it is reasonable to assume that while much of the supervisory function of a decision-maker may be associated with the activities they specifically control, there is a requirement that they look beyond their borders and consider their impact upon other decision-makers. The use of the Value Sieve Kernel in an open system can assist in the identification of cooperative and collaborative potential. It can also identify situations where programs are frustrating each other. The larger the system the more likely these opportunities are available.

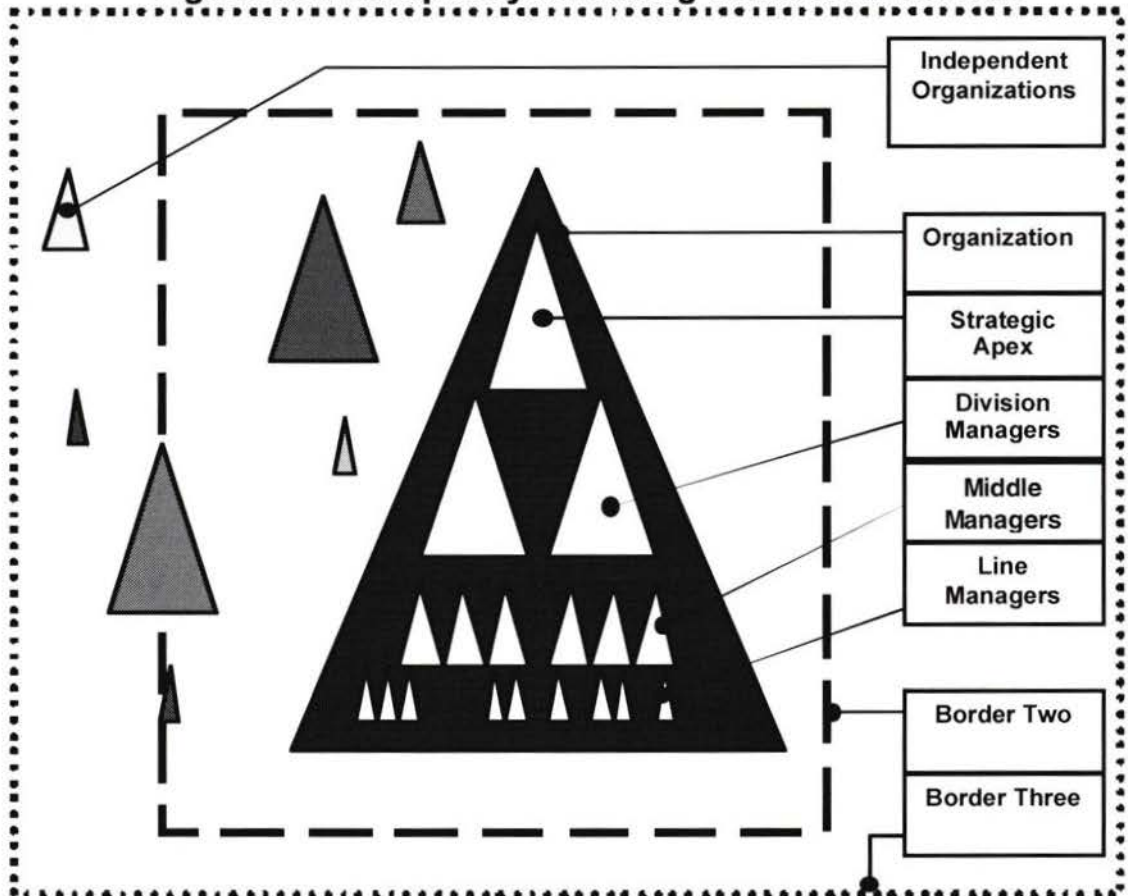
By taking an open system perspective and distributing the program Kernel information, other organizations, and their programs can identify common interests and collaborative opportunities. Consequently, additional information will be added to the knowledge of the entity.

Additional information will include:

- impact on other costs associated with other programs and organizations within the system
- impact upon the goals of other programs and organizations within the system.
- impact upon other accomplishments achieved by other programs and organizations within the system
- impact on beneficiaries of other programs and organizations within the system
- relationships between programs on specific beneficiary groups and organizations within the system

- an understanding of the additional accomplishments that can be achieved if additional resources are identified through cooperation, or cost compression by organizations within the system

Figure 4.20: An open system using Value Sieve Kernels



The Open System Dynamic Consensus process makes the Kernel information available from all programs in the system to all programs in the system.

The final stage of the Value Sieve process is the development of system feedback loops to the decision-makers within the programs, budget envelopes, and organizations. These are called cooperatives and may include beneficiaries, families, workers, health professionals¹¹¹, and provider organizations. A cooperative is a self-organizing group that shares a common interest in a particular disorder or a particular technology or treatment method.

¹¹¹ In this context a health professional is any party regulated under the Health Authorities Act. (British Columbia) i.e., Any individuals who provide service for the health and social benefit of individuals.

4.8.11 Self Organizing Feedback Systems - Cooperatives

The final tool of the Value Sieve Model is the extension of the Kernel to a broader population of interested parties. This is the expansion of the Kernel utilization to beneficiaries and health professionals. While this has been implicit as a choice for decision-makers in the discussion, it will now be considered as an explicit choice that can be made by the entity (Corbett 1994)

The Value Sieve Model is designed to allow the participatory consensus process to match the variety¹¹² found in the existing determinants of health system of the region¹¹³. This is done through the facilitation of "self organizing cooperatives". A cooperative is a group of individuals who share a common interest and wish to participate in a group which considers the allocation of resources to optimize the health care of their particular interest. The groups are not administered by the entity and communicate to decision-makers within the entity through the exchange of Kernel information. There are two types of cooperatives, Beneficiary Cooperatives, and Provider Cooperatives.

Beneficiary Cooperatives are composed of beneficiaries and their families. These are the individuals who experience the health care services provided and may wish to see different priorities given to themselves and their peers than those in the profession of health care. Provider Cooperatives may be composed of individual workers, professionals, and representatives of providers who are involved in the delivery of service to a specific health care population. A Provider Cooperative may find that it focuses of the provision of services to specific types of beneficiaries. (E.g. diabetics.) Provider Cooperatives may also focus upon the provision of specific types of technical services (E.g. medical imaging.)

It is important to note that the two types of cooperatives, Beneficiary and Provider, are kept separate to manage the power differential and the different

¹¹² Requisite variety is a central concept in general systems theory and cybernetics. Roughly speaking the idea is that in order to build a representative system it is critical to ensure that the model system captures the key elements (variety) of the real system.

¹¹³ In many cases entities already exist to represent the interests of the clients of the health care system and professional groups also exist to discuss the needs of the professions. It is possible that much of the structure of cooperatives already exists within the region.

vested interests. Separation does not suggest that the cooperatives should not communicate. Indeed, there is a strong desire to see them use the Kernel to identify their differences and similarities.

It may be argued that the Value Sieve processes associated with the use of Cooperatives is overly complex and managers will believe that their efforts will be endlessly second guessed by small lobby groups of self interest. My perspective is that the small lobby groups do exist and already influence policies. If this is the case then organizations already have the worst aspects of lobby power and might benefit by harnessing their energy to better understand preferences and available information sources. An example of an extremely difficult application environment is the Regional Health Authority, RHA. The Value Sieve was initially developed for application in this extremely complex working environment. A more detailed examination of this environment will be developed in Chapter Six.

4.8.12 A Robust Implementable Decision Making Framework

In a traditional model of governance the controlling senior decision-makers determine a policy and expect all participants to follow their instructions and guidelines. In the case of a large complex organization such as a government entity, the senior decision-makers would expect to identify the Value Sieve as the method of resource allocation and implement it widely. This would traditionally require a large and effective control system which supervised the actions of the controlling decision-maker's agents throughout the organization. It might include a large and technical information system that would be developed to manage the information exchanged and coordinate it.

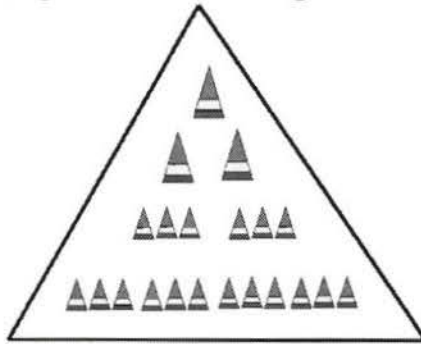
If a program was using the Value Sieve, we might represent it as a pyramid of values. The greatest priorities to meet the program's objective functions are gray the borderline activities of the program in light gray and the impossible to fund priorities in black. Thus, figure 4.21 represents a program using the Value Sieve decision-making framework.

Figure 4.21: A Program Kernel



Extending the idea Figure 4.22 shows an organization using the Value Sieve. At a macro level, an organization could also be represented as Figure 4.21. The objective functions of each program and the required information rolls up to an executive level in the hierarchy.

Figure 4.22: An Organization Filled With Kernels



Given an open system perspective Figure 4.23 shows an organization within its industry that is in the larger market of the system. The view of many administrators would be that the next step in a health and social service implementation would be the required implementation of the Value Sieve methodology into the industry (Figure 4.24) and then the full open system (Figure 4.25).

However, the challenge in this command and control based strategy is to determine the method through which such an alignment of incentives and motivations can be accomplished. By developing a quasi market and creating incentives valued by the accountable decision-makers within the context of their complementary objective functions, resource allocation using the Value Sieve framework becomes the engine which recruits participation.

Figure 4.23: An Organization in an Open System Uses the Value Sieve

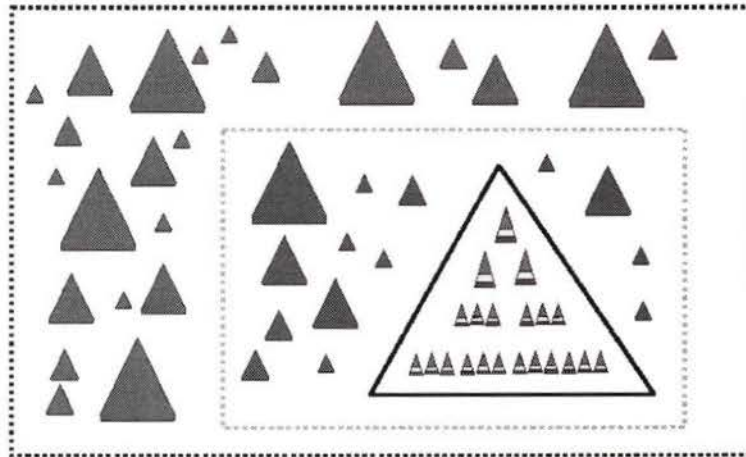
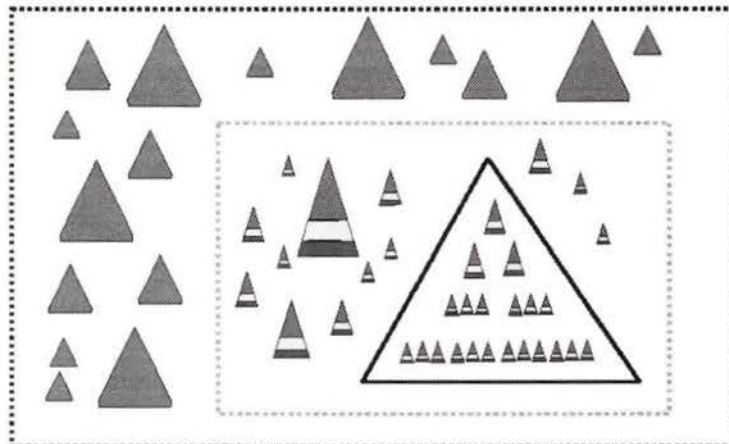


Figure 4.24: An Organization and Its Industry Use the Value Sieve



Any resource allocator can use the Value Sieve process to align the interests of programs with the objective function of the accountable decision-maker. I.e. the decision-maker does not have to care about why the program wants to produce the desired outcomes. The accountable decision-maker only needs to want to purchase the best outcomes which coincide with the objective function of the accountable decision-makers at the best price.

Figure 4.26 shows an organization in a complex not-for-profit system which is using the Value Sieve to cause some of the service and product providers in the industry to communicate using the Value Sieve quasi market. It is expected that over time the consistent use of the Value Sieve in this environment will, because it aligns the interests of the participants, result in more and more entities and

programs who value the information incorporated in the Value Sieve process. In turn Figure 4.27 suggests that this pattern will extend into the fuller open system.

Figure 4.25: An Open System Filled With Kernels

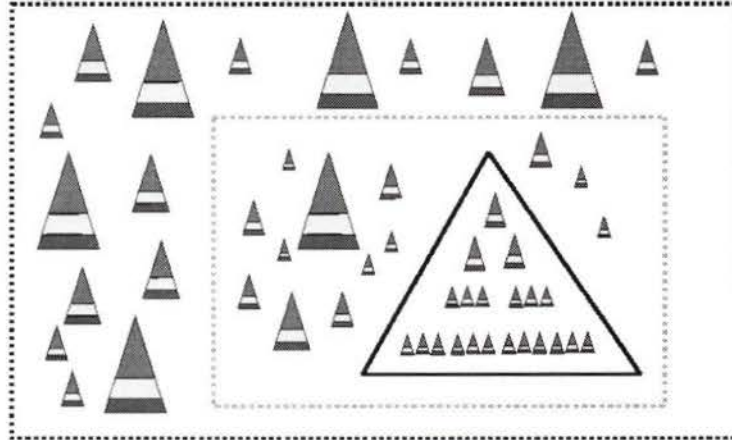
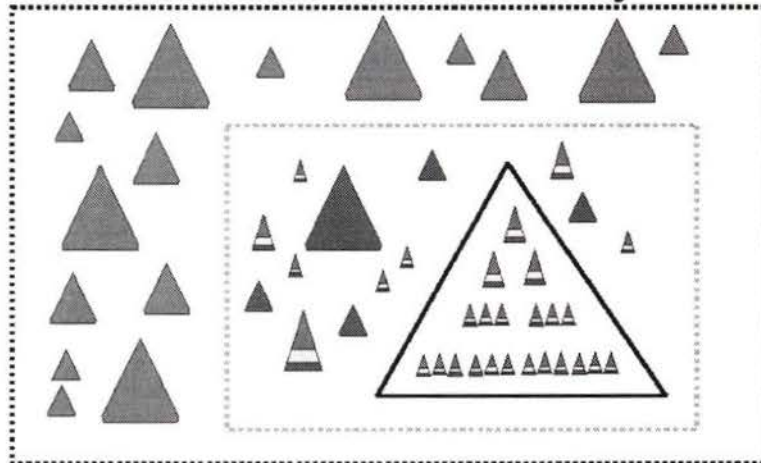


Figure 4.26: An Organization Uses the Value Sieve in Concert with others within the Industry



While the above figures suggest any orderly development process reaching out from a single major organization uniformly utilizing the Value Sieve decision framework it must be noted that this view of the development stages is not necessary. Through the use of the methodology entities throughout the system that find benefit in the use of the Value Sieve in the improvement of their individual and collective objective functions will find that this means of cooperation through information is most useful. Figure 4.28 shows that programs within an entity may cooperate through the use of the Value Sieve without the need for other participants within their organization. Consequently, the Value Sieve

methodology can assist in the alignment of actions towards objective functions using resources to optimize value for money.

Figure 4.27: An Organization Uses the Value Sieve in Concert with others within the Industry and the Open System

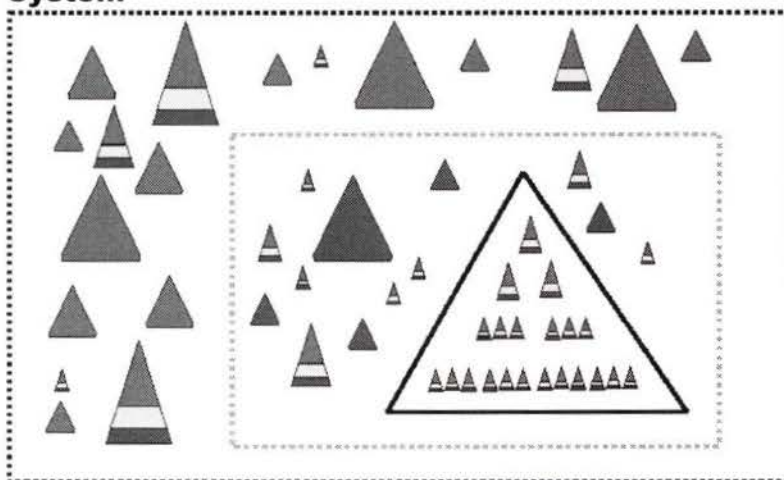
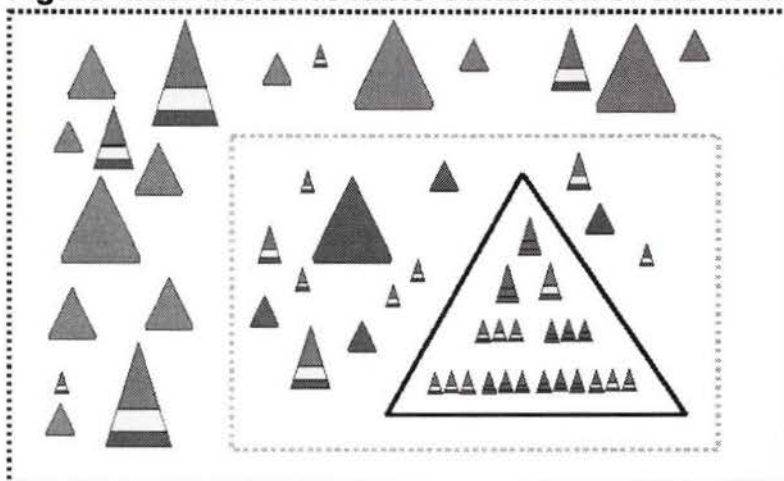


Figure 4.28: Most Probable Utilization of the Value Sieve



In the health and social service sector Figure 4.28 might be a group of programs focused upon the provision of services to alcohol and/or drug dependent individuals. Alternatively, this might be seen as the relationship of programs focused upon the prevention and treatment of mental health disorders.

4.8.13 Conclusion

The Value Sieve Kernel requires a decision-maker within the entity to use available information (resources required and accomplishments) to prioritize

programs within scarce resources. The technique accepts the prioritization of program choices as representing the values of the decision-maker. The process does not remove the responsibility or accountability of the entity decision-maker for making optimal choices. However, the process does encourage constructive discussion using the Kernel which can identify choices, resource costs, preferences and opportunities for cooperative actions which benefit the program or budget envelope.

The Kernel reinforces the selection of efficient and effective programs that can be implemented and practically carried out. This is because individuals proposing program choices must believe that the VfM of the new program proposed is as high or close to as high as the lowest ranked approved and resourced program. Simply put, why would I suggest implementing a new program which I did not believe could, "under the right circumstances", be considered of at least equal to or higher priority than the lowest currently resourced program? From an optimization perspective, the VfM of the discontinued program must be lower than the VfM of the new program.

This will tend to direct the thinking of the participants to their common interest of identifying additional resources. Additional resources are possible from three approaches. First, they can look for additional external funding for additional programs. Second, they can identify opportunities for savings within the existing program(s). Third, they can identify cooperative actions with other programs or organizations that will assist them mutually in the accomplishment of their individual goals.

From the Kernel, the expansion of the Value Sieve model is through recruiting additional Kernel users and exchanging Kernel information. The exchange of Kernel information may be simply to assist personnel in understanding a program or budget envelope. However, it can also assist in the identification of new opportunities by requesting personnel or other parties to complete a Kernel of the program or budget envelope of interest. The power of the Kernel is that it is simple to use, open, fair, builds trust, identifies common interests, uses the same simple process for all parties, and has no information prerequisites that are not already known by the decision-maker.

The Kernel's ability to focus constructive conflict is retained in each successive layer beginning with the individual program. The next layers of Kernel exchange pass from within the organization (closed system) and then to others in the health care industry (open system). The final point in the continuum is through the utilization of self-organizing cooperatives of self-interested parties.

Susskind and Cruikshank (1987) stipulate that there are four characteristics for good negotiated agreements. They are fairness, efficiency, wisdom, and stability. The Value Sieve Model attempts to establish these characteristics inside the complex working environment of resource allocation in complex organizations and their environments.

Chapter Five: Application and Implementation of the Value Sieve Model

The Value Sieve Case Studies: 1993 to 1999

"...if research is to jointly contribute to theory and practice, it must be designed to accomplish this objective. It cannot simply be taken as a matter of faith that adhering to certain scientific research principles will lead to jointly useful research. Indeed, it may be that adhering to principles that were designed to produce research that contributes to scientific knowledge will make it certain that this research will not contribute to practice."

E.E. Lawler

"...science also has many limitations. Within science there are problems of methodology as we move from the 'restricted' sciences (e.g. physics) to the 'unrestricted' sciences (e.g. biology). [...] Complexity, in general, and social phenomena, in particular both pose difficult problems for science; neither has it been able to tackle what we perceive as 'real world problems' (as opposed to the scientist-defined problems of the laboratory)."

P. Checkland

5.0 Value Sieve Development, Research and Model Testing

5.0.1 Overview

This section of the paper describes the testing and continued development of the Value Sieve model from its first stages in 1993 through to the summer of 1999. I have chosen a case study approach because the development of the model and its testing was carried out entirely in applied environments where the model is intended to operate. Consequently, the cases followed Lewin's action research approach where normal experimental procedures and controls were not possible. Lewin (1946) (1951) believed that "action research"¹¹⁴ was the appropriate

¹¹⁴ [Action Research] ...aims to contribute both to the practical concerns of people in an immediate problematic situation and to the goals of social science by joint collaboration within a mutually acceptable ethical framework. - Rapoport (cited in Hopkins, 1985) Hopkins, D. (1985). A teacher's guide to classroom research. Philadelphia: Open University Press.

method for the study of organizational development. The method accepts that you cannot understand an organization without trying to change it. The result is that the consultant/researcher/diagnostician must acknowledge the risk of intervening and think about the nature of the intervention, the consequences of the intervention and what is safe for the organization. Lewin required that organizational researchers acknowledge that their actions within an organization made them change agents and participants within the organization who could not separate themselves from the dynamics of the organization.

All implementation work took place in British Columbia within the government and not-for-profit sector. This means that some adaptation of the procedures took place to meet local concerns, politics, and policies. The case studies research has been broken into multiple stages, which begin after the development of the Value Sieve model from an academic and intellectual approach. I.e. does the model have intellectual integrity and does it seem to be supported by appropriate research findings?

The questions addressed in the case studies are:

- First, will the model be accepted for trial by the gatekeepers/decision-makers that control the resource allocation models used in applied environments?
- Second, does the model work in the applied environment for which it was intended?
- Third, are there supporting tools needed to ensure the model will work effectively in the applied environments?
- Finally, what criteria should be used to determine if the Value Sieve model should be implemented and what methods might be used to optimize the

Action Research is a form of self-reflective enquiry undertaken by participants in social (including educational) situations in order to improve the rationality and justice of (a) their own social or educational practices, (b) their understanding of these practices, and (c) the situations in which the practices are carried out. It is most rationally empowering when undertaken by participants collaboratively... sometimes in cooperation with outsiders. - Kemmis (cited in Hopkins, 1985)
Hopkins, D. (1985). *A teacher's guide to classroom research*. Philadelphia: Open University Press.

successful introduction, implementation, and operation of the model in applied settings?

This incremental case study approach required multiple independent organizations to participate in the development and testing of the Value Sieve resource allocation model. In all cases where implementation took place I was approached by the organization to look at the problem based upon their knowledge of my work on resource allocation problems¹¹⁵ and a contract purchasing my management consulting services placed me under the direct supervision of the senior administrator of the organization. As such my responsibility was to ensure that the best interests of the organization were met. Informed consent ensured that the organizations knew the Value Sieve model was new and in development by myself. Therefore, before the Value Sieve could be used in any one of the case studies discussed here it required all the normal administrative and management meetings to determine whether the model could work in the specific administrative environment. Senior executives had to believe and support the model intellectually and financially. To proceed required all parties to believe the Value Sieve could resolve their resource allocation and information management dilemmas and that it was their best choice among all alternatives.

In this regard these case studies are the reports of a management consultant who competed for and won contracts to implement the Value Sieve, a new resource allocation and information management process. It should be clear that the conditions and expectation of the Value Sieve were within the most demanding applied settings possible and no latitude was cut for academic merit. I expect that some may find as much value in this research from the description of the working environments as the Value Sieve is a solution to resource allocation within these environments.

In each case study the implementation effort emphasized a central theme of the research which is that a constructive resource allocation methodology must be an effective change management tool which begins to work incrementally from whatever state the organization is in. Further, that to be successful the operating

mental model¹¹⁶ held by the personnel working within the entity in question must be seen as an important barrier to change in complex open systems where different participants tend to work within bounded rationality. These mental models are supported by policies and procedures as well as experiences of the participants within the entity/system. If a change is to take place then a new mental model may be required to be implemented. The new model must be capable of replacing the existing “in place” mental model held by the participants in the entity and the system of organizations which influence the entity. In this regard, the puzzle for the implementation process is not simply resolved by developing a suitable model from an academic perspective. The effort associated with the implementation must be to determine how to best understand the information culture within the organization. This includes the current system of thinking and acting and from this to identify the stages/steps that can realistically be used to adjust the participant’s thinking and acting to a new more appropriate mental model and therefore information practice.

The implementation of the Community Based Information Resource (CBIR), the broader community based information system which was part of the final case study, is important research by itself, without consideration of the underlying Value Sieve and Health Informatics issues. The number of related concepts and issues, which were uncovered as a consequence of the CBIR implementation, is vast and therefore it is only possible to cover the essential issues which are involved.

5.0.2 Introduction

In 1991 the findings of the Seaton Royal Commission recommended the restructuring of health care to move health services and decision making “Closer to Home” (Seaton et al. 1991). The province of British Columbia Ministry of Health Responded with the “Closer to Home” initiative which included the creation of the Health Authorities Act in 1992. The Health Authorities Act called

¹¹⁵ In the case of the original implementation and testing work with the Capital Health Board, my selection was the result of an open competition for the project.

for the regionalization of healthcare services within the province and required the creation of new regional independent not-for-profit organizations to administer the health programs. These organizations were to be known as Regional Health Boards (RHB) and Community Health Councils (CHC) and would take over the management and administration of provincial health services for specified geographic regions. In 1993 I began working with the Finance Chair¹¹⁷ of the Capital Health Board¹¹⁸ (CHB) to consider the issues of resource allocation by the Board. The CHB had a total health expenditure in the order of \$450,000,000 which was directed to more than 100 agencies. This work required that I review and discuss in detail the information and decision making practices of individuals and organizations throughout the CHB. In 1994 I had completed the prototype model of the Value Sieve and written it up as masters thesis in Public Administration.

During 1994 and 1995 I continued testing the Value Sieve model with a contract to review and customize the Value Sieve for use by the Capital Health Board and another contract to apply the Value Sieve to identify a \$1,000,000 (5% of the budget) savings in spending of the Capital Regional District Health Office. In 1996, I began my Interdisciplinary Ph.D., which has been focused upon the continued development and testing of the Value Sieve resource allocation model. In 1997, I carried out the practical trial of the Value Sieve model for the YM/YWCA. This effort resulted in budget savings of \$250,000 (about 5% of the budget). This was followed by a review of the resource allocation process of the United Way. The study carried out for the United Way was to assess their newly implemented resource allocation process. The history of resource allocation within the United Way demonstrated the impact of a poorly designed resource

¹¹⁶ A mental model is a common view of the enterprise and its environment that guides the actions of many individuals within the enterprise. It does this invisibly in many cases by bounding individual and collective choices, and perspectives which modify behavior and actions to conform to the model.

¹¹⁷ Professor Tom Shoyama from the School of Public Administration at the University of Victoria

¹¹⁸ This was the initial RHB for the Capital Regional District. The Capital Region District is essentially the lower part of Vancouver Island from Victoria to Mill Bay and includes the majority of the Gulf islands.

allocation methodology on the trust of the participants and consequently the health of the organization (Corbett, 1998)

In 1997 I began work under contract with the Central Vancouver Island Regional Operating Administration for the Ministry for Children and Families. The effort began with a review of the applicability of the Value Sieve for application within the region, a review of regional information resources and was followed up in 1998 with the first effort of creating the Community Based Information Resource (CBIR). The CBIR was concluded to be the logical way to facilitate the Value Sieve methodology within a region. The effort was supported by the regional office of the Ministry for Children and Families and Regional Health Board. In 1998 the CBIR was declared a Provincial demonstration project and was supported by all regional operating administrators and the central administration of the Ministry for Children and Families. The program is currently under review to acquire necessary funding to proceed.

In carrying out the testing of the Value Sieve model, several elements were considered essential to establish a sufficient foundation to justify the Value Sieve or eliminate it as a management tool for resource allocation decision making. The testing carried out on the theoretical and applied aspects of the Value Sieve show sufficient promise to recommend further investment in further trial implementations.

5.0.2.1 Objectives of the Trials

The testing of the Value Sieve as a management information and decision framework requires that the testing pass through successive iterations which produce both understanding and new questions. These are addressed in subsequent iterations. Consequently, each successive trial of the Value Sieve endeavors to acquire an additional level of information. The reader is reminded that this is action research and as such a working experience with the tool and the problems experienced within each of the settings is essential to gain a better understanding for the utility of the framework and to identify the direction of future testing and development of the Value Sieve. For example, in the case of the Value Sieve, after the preliminary theory based research supporting the Value

Sieve was completed the critical question which had to be addressed was the ability of the Value Sieve framework to be accepted in an applied environment.

5.0.2.2 Essential Questions

The questions that were initially of interest to the research and development of the Value Sieve were organized under the following general headers and were then stated more specifically in the “score card” used to summarize the findings from each of the trials. The questions presented within the score card strive to capture reasonable and objective elements which converge upon the general suitability of the Value Sieve as a framework for resource allocation. As a record of action research, these first efforts in application have tended to generate a better understanding of the forces at play and the methods that might be employed in the future to improve the framework.

5.0.2.2.1 Support and User Satisfaction (Table 5.1)

- From a practical point of view does the model establish a basis for decision making within and between programs and organizations that permits evolution of the participating programs and organizations with a minimum of procedural constraints.
- Does the model receive the necessary support from the various levels of principals to be implemented and maintained?

Table 5.1: Support and User Satisfaction	
1.	Is the model supported by managers.
2.	Is the model supported by the senior executive of the implementing organization or region.
3.	Is the model supported by the actions of the Central Administration
4.	Is the model supported by other organizations within the system

5.0.2.2.2 Time to Execute (Table 5.2)

- Does the Value Sieve meet the practical needs associated with a management information system including the costs associated with the production of a working system?

- Given the system works with the current, available information, time is the key variable focused upon. I.e. a process might be very good but fail if it were too demanding of the management and staff. Initiatives to acquire additional information to reduce uncertainty are assumed to be processed through the Value Sieve framework and as a consequence the costs associated with future information collection and analysis will be screened using the competitive Value Sieve prioritization framework.

Table 5.2: Time to Execute (minutes)
• Training time - briefing and orientation to the concept.
• Preparation of a program description requires how long.
• Review, feedback and adjustment regarding each program requires.
• Prioritization process, including voting and summary requires.

5.0.3 Measures of Success (Table 5.3)

- Is the Value Sieve model logical to a decision-maker or group of decision-makers? It is essential that the participants in the system believe that the model being discussed could be implemented by their organizations without significant cost or disruption and that the model organizes activities and information within an organization in a logical way. Further, it is essential that senior personnel in particular uphold the model and so create the necessary support.
- Does the Value Sieve pass the Rawls "veil of ignorance test" for participants? In other words does the Value Sieve process seem to provide a level playing field where participants are willing to compete for resources and expect an evenhanded result from the competition.
- Does the Value Sieve establish the environment for the improvement of the decision making process by identifying accountability and fundamental data which is necessary for informed decision making?
- Does the Value Sieve as a process clarify the accountability of the participants and reduce the probability of procedural errors thus helping organizations reduce wasteful procedures and activities. Some of these activities being associated with the development or refinement of measurement systems whose improvements will not improve the effectiveness or efficiency of the

operation. In other cases, the technique may identify that an investment in information technology is premature.

Table 5.3: Measures of Success	
➤	Does the Value Sieve provide an important bridge between political and technical arguments?
➤	Is the model logical to participants.
➤	Does the model appear to the participants to establish a level playing field among programs.
➤	Decision-makers find the process straightforward to execute
➤	Decision-makers feel the inventory reflects their programs.
➤	Decision-makers feel the prioritization adequately reflects their programs.
➤	Decision-makers indicate they gain a better understanding of the interrelationships between programs
➤	The consequences of the model are consistent with expectations.
➤	The decision-makers feel that they would like to continue to use the process.

5.0.3.1 Change Management Issues (Table 5.4)

- Does the Value Sieve identify the information culture of an organization and provide information behaviors which improve the information culture of the organization.

Table 5.4: Change Management Issues	
1.	Is there an incentive for adopters?
2.	Are "some participants vilified?" i.e. are there bad people who need to change?
3.	Does the communication from the change instigator stay fact based?

5.0.3.2 Found Information Behaviors (Table 5.5)

- Will the Value Sieve work in a variety of organizational environments in a consistent fashion? This issue considers the ability of the Value Sieve to work in small, medium and large organizations. Further, it must consider different organizational work strategies. These include organizations that perform the majority of their work using in-house staff versus organizations which use mixed strategies of in-house and contracted services.
- An important issue is the ability of the sieve to work in environments where the current information behaviors are poor and consequently will be required to work in settings where information is incomplete.

Table 5.5: Found Information Behaviors
• In general is outcome information available?
• In general is program output information available?
• In general is program costing information available?
• In general is there evidence that the output and costing information have been put together to itemize the cost to provide an output?
• Is the organizational information model a HUB?

5.0.3.3 Summary Structural Questions (Table 5.6)

- Does the Value Sieve provide a basic/essential information structure necessary to support the use of information science to support the future of the organization(s)?
- Can the Value Sieve meet the challenges associated with being implemented in a current health/social service working environment? This would require the methodology to deal with a large variety in the quantity and quality of information in addition to the variety of knowledge and training levels of the personnel.
- To what extent does the Value Sieve process provide constructive approaches to multi-player solutions?
- What are the key barriers to implementation of the Value Sieve?
- Are there indications that the Value Sieve may identify errors in judgement which are associated with the psychology/economics of uncertainty?
- Are new patterns detected based upon the need to look for 15% budget reduction and 15% budget increases?
- Does the Value Sieve support evidence-based practice, best practice, quality initiatives and contract reform?
- Does the Value Sieve framework seem to prevent any desirable behaviors?

In general, the research/action iterations flowed along the following pathway:

- the determination of the status of the information environment,
- to the logic of the model,

- to the logic of applied decision-makers,
- to the technical information tools and decision making process, and
- finally to the implementation of a system as a working web site.

5.1 Data Summary Sheet

Table 5.6: Summary Questions For Value Sieve Trial	Yes / No
a) Support and User Satisfaction	
<ul style="list-style-type: none"> • Is the model supported by managers. 	
<ul style="list-style-type: none"> • Is the model supported by the senior executive of the implementing organization or region. 	
<ul style="list-style-type: none"> • Is the model supported by the actions of the Central Administration 	
<ul style="list-style-type: none"> • Is the model supported by other organizations within the system 	
b) Time to Execute (minutes) (approximately N programs)	
<ul style="list-style-type: none"> • Training time - briefing and orientation to the concept. 	
<ul style="list-style-type: none"> • Preparation of a program description requires how long. 	
<ul style="list-style-type: none"> • Review, feedback and adjustment regarding each program requires. 	
<ul style="list-style-type: none"> • Prioritization process, including voting and summary requires. 	
c) Measures of Success	
<ul style="list-style-type: none"> • Is the model logical to participants. 	
<ul style="list-style-type: none"> • Does the model appear to the participants to establish a level playing field among programs. 	
<ul style="list-style-type: none"> • Decision-makers find the process straightforward to execute 	
<ul style="list-style-type: none"> • Decision-makers feel the inventory reflects their programs. 	
<ul style="list-style-type: none"> • Decision-makers feel the prioritization adequately reflects their programs. 	
<ul style="list-style-type: none"> • Decision-makers indicate they gain a better understanding of the interrelationships between programs 	
<ul style="list-style-type: none"> • The consequences of the model are consistent with expectations. 	
<ul style="list-style-type: none"> • The decision-makers feel that they would like to continue to use the process. 	
d) Change Management Issues	
<ul style="list-style-type: none"> • Is there an incentive for adopters? 	
<ul style="list-style-type: none"> • Are "some participants vilified?" i.e. are there bad people who need to change? 	
<ul style="list-style-type: none"> • Does the communication from the change instigator stay fact based? 	
e) Found Information Behaviors	
<ul style="list-style-type: none"> • In general is outcome information available? 	
<ul style="list-style-type: none"> • In general is program output information available? 	
<ul style="list-style-type: none"> • In general is program costing information available? 	
<ul style="list-style-type: none"> • In general is there evidence that the output and costing information have been put together to itemize the cost to provide an output? 	
<ul style="list-style-type: none"> • Is the organizational information model a HUB? 	

5.1.1 Organization of the Presentation of the Case Studies

I have chosen to present the case studies in the actual temporal sequence in which they occurred. While other strategies suggest themselves, it may be that the sequence itself provides insight into the strength or weakness of the research and the development of the Value Sieve and its associated support tools.

- Case Study One - The Capital Health Board
- Case Study Two - The YM/YWCA of Victoria
- Case Study Three - The Central Vancouver Island Regional Office of the Ministry for Children and Families

A great deal of research has been carried out looking at the issues of resource allocation in organizations and the use of information theory and technology to improve the use of information within complex environments in order to support the ease of implementation of the Value Sieve in large and complex environments. However, some of this work has been diverted into two additional short appendices as an attempt to keep the focus of the case studies research on the central issue of the testing of the Value Sieve.

Additional supporting information is provided in the appendices where published papers and reports document:

- the United Way resource allocation process as demonstrative of the pathology of current resource allocation practices; and
- the Community Based Information Resource (CBIR) project which sought to create a regional information environment which would support and be supported by the Value Sieve. The CBIR is a demonstration of community informatics using a determinants of health perspective. This requires the use and development of information technologies which encourage and support the information needs of a “healthy” community. Supporting materials are available in the appendices and the World Wide Web (<http://www.thewebpress.com>).

5.1.2 Case Study (Trial) Organization

Each of the Value Sieve trial studies will be summarized using the following template. Any additional items and insights will be added below the summary data sheet. At the end of all the case studies, a summary of the information will be made.

Each case study will follow the Case Study Outline. In most cases, supporting documentation will be provided in the appendices.

Case Study Outline

- Overview
- Introduction
- Procedure
- Results
- Conclusions
- Recommendations

5.2 Capital Health Board Case Study¹¹⁹

5.2.1 Overview

The Capital Regional District (CRD) is a collection of communities which include and surround the city of Victoria BC. The objective of the Capital Regional District administration is the development and coordination of specific services for the region. This is not the office of a city government but the offices of an administrative unit intended to work within the geographic space coordinated by several municipal/city governments. The CRD Health Unit provides public health services and a variety of other health-related programs within the CRD.

Historically the Capital Regional District municipal government itself supervised the administration of a number of health service delivery programs in the community. This was done through its Capital Regional District Health Department. Contract based funding for health programs was paid directly from the Ministry of Health to the CRD Health Department. Frequently the health programs provided by the CRD Health Department were based upon cooperative funding relationships which had the Ministry of Health contribute a significant portion of the cost of the program while the CRD municipal government, through its tax base of the regional citizens, contributed the remainder. Although not all health programs were cost (70% to 90%) shared, a number of the CRD Health Department programs were 100% funded by the Ministry of Health.

5.2.1.1 Program Funding

In 1995, as required by Bill 45, the shift of control from the Ministry of Health to the Regional Health Board was being implemented. In the Capital Region District, the Ministry of Health began by shifting responsibility for the control of the CRD Health Department contracts to the Capital Health Board (CHB). The CRD Health Department represented approximately 5% of the health budget which operates the health services within the geographic region to be administered by the CHB.

¹¹⁹ Corbett J.C. (1995) "Capital Health Board Resource Allocation Project, CRD Health Budgeting Process". A Report to the Board of Directors and Administration of the Capital Health Board. The full report of the CRD Value Sieve implementation for the Capital Health Board is provided in that document.

As part of the agreement between the CRD and the CHB, the Ministry of Health agreed to pay what formerly had been the CRD tax payers portion of all of the health delivery programs managed by the CRD Health.

This change in program funding changed the accountability structure for the CRD municipal administration by removing the dual responsibility of funding health programs and delivering health programs. This was done by eliminating approximately \$3,000,000 of CRD taxpayer spending and fully funding the entire Ministry of Health sponsored health service delivery programs. This placed essentially all of the CRD Health activities under direct contract to the CHB. In keeping with the cooperative nature of the relationship between the CRD and the CHB the CRD Health agreed to act as a development and testing environment for the new contracting and budgeting procedures (Value Sieve) which had to be developed by the CHB to ensure the effective and efficient delivery of health to the regions citizens. This study represented a further step in the process of defining the necessary changes and preparing the elements of an implementation strategy.

An important context for this implementation of the Value Sieve was based upon the author's recommendations which had been approved by the CHB Board of Directors to avoid the arbitrary consolidation of independent health organizations. The implementation of the Value Sieve anticipated the utilization of the monopsonistic powers of the CHB to allocated resources to the existing, independent health provider organizations which had already been created and funded by government to provide health services to the population. There was great concern that the arbitrary consolidation of organizations would result in a number of unintended consequences. These might include: increased costs through the forced unionization of non unionized not-for-profit organizations; the elimination of community volunteer organizations due to their inability to provide health related services in unionized environments, a loss of essential knowledge due to the reduction of middle managers who had traditionally been the layer of expertise which translated requirements between the front line service workers and the administration of the organization. The CHB did not believe that the further development of health monopolies within the region would assure savings, more efficient services, or more effective services to improve the health of the

population of the region. Thus, while it was acknowledged that organizational consolidation might make sense in certain circumstances it was also acknowledged that some organizations might be better if they were broken/differentiated into smaller specialized working organizations.

To fully understand the details of any budget process an organizational context must be provided which provides information about the organization and the type of environment the organization operates within. This section describes the organization and environment of the CRD Health in addition to the budget process used by the CRD Health.

5.2.1.2 The CRD Health Organization

The CRD municipal administration contained within it a number of relatively independent functioning departments. One of these was the Health Department. The CRD Health is supported by other centralized CRD administrative services such as finance. To describe the Health Department without taking into consideration the costs and capabilities of support services provided by the CRD Administration could result in misunderstanding the full nature of the CRD Health. For this reason, this document refers to the combined enterprise of the CRD Health Department and the CRD Administrative Support Services as the CRD Health Organization. The CRD Health Organization (CRD HO) is intended to include all CRD controlled, direct and indirect, human and financial resources utilized in the coordination and delivery of CRD Health Department programs.

5.2.1.3 The CRD Health Department

The CRD Health Department was managed by a medical health officer who reported to the CRD Health Committee, a committee composed of elected officers of the Capital Region District. With a 1994 total expenditure of \$24,777,340.62, the CRD Health Department was composed of five divisions managed by division directors. The medical health officer and the directors of the health divisions met regularly as a committee. This administrative committee was called the Health Executive Committee (HEC).

The CRD Health Department Divisions were:

- Administration and Information Services Division
- Health Protection & Environment Division
- Health Promotion Division
- Epidemiology & Disease Control Division
- Care Division
- Health Planning Division

5.2.1.4 Political Environment

The utilization of the Value Sieve required that the implementation and resource allocation process manage the administrative and management relationships between CHB, CRD, CRD Health Department, and MoH. Further, the process was required to manage the political dynamics between these parties and to do it in such a way that the problem did not become political fodder for the various levels and layers of political and administrative interests. It is important to note that the delivery of health service is one of the strongest expectations that Canadians hold and consequently the family of services which can best be used for political benefit.

5.2.2 Problem Definition

In the spring of 1995, the responsibility for overseeing the health services funded by the Ministry of Health and executed by the CRD Health Department was transferred. Consistent with Bill 45 the resources, supervision and funding allocation for these collected health contracts was being transferred from the Ministry of Health to the Capital Health Board (CHB).

The agreements between the Ministry of Health, CRD Health Department, and the CHB were composed of several key features. They included:

- the Ministry of Health guaranteed continuation of the required funding.
- CRD Health Department, which had different programs funded at different percentage levels from the Ministry of Health, was to have operating costs funded at the 100% level by the Ministry of Health. The complementing funds

formerly provided by Municipal tax revenues to the CRD Health Department were to be retained by the respective municipal governments.

- CRD Health Department guaranteed continuation of the health services to the population on a contract basis.
- the CHB guaranteed that as the funds were transferred from the Ministry of Health to the CHB that they would continue to honor the existing service provider agreements which formerly existed between the CRD Health Department and the Ministry of Health.
- the relationship between the CHB and the CRD was contractual and that in no way was it appropriate that the CHB administer or manage the health services of the CRD Health Department.

After the agreements between the three parties were signed it became clear that there was a disagreement between the CRD Health Department and the Ministry of Health as to the financial contribution which was required to carry out the CRD Health Department activities for the 1995/96 year. Due to this difference between the CRD Health Department and the Ministry of Health the CHB became involved in working to resolve the difficulty of an immediate \$1,000,000 budget shortfall.

The immediate 95/96 funding shortfall required the parties to address spending decisions already made or programs which had already been in operation for a significant period of time. Each passing week made any spending overages more difficult to compensate for through reduction of spending on some or all of the health services provided by the CRD Health Department.

The strategy for managing the CRD Health Department funding shortfall had to resolve the problem in as short a time frame as possible. It was determined by the

CHB that this could best be done through the implementation of the Value Sieve¹²⁰. The features, which were believed to be critical, were:

- a statement of outcomes achieved by a program
- a statement of the resources used by a program
- a statement of the resource costs associated with the delivery of a program
- a budget approach¹²¹ which requires the program manager to justify all activities within the basic program proposed
- a budget approach which allows the program manager to indicate the changes in outcomes which would take place given fixed positive or negative changes in the basic funding on a specific program basis
- an understanding that an open peer review process will be used to evaluate individual programs

¹²⁰ The Value Sieve process had been approved as the resource allocation procedure to be used in the future by the CHB. The Value Sieve process in an applied environment includes contracting and budgeting procedures.

¹²¹ The type of approach under consideration is conceptually similar to zero based budgeting (ZBB). While there are numerous technical arguments involved in the practice of ZBB a basic understanding of the concept is provided here to clarify the objective of the budget approach.

"In preparing an ordinary budget for the next period, a manager starts with the budget for the current period and makes adjustments as seem necessary, because of changed conditions, for the next period. Since most managers like to increase the scope of the activities managed and since most prices increase most of the time, amounts in budgets prepared in the ordinary, incremental way seem to increase period after period. The authority approving the budget assumes operations will be carried out in the same way as in the past and that next period's expenditures will have to be at least as large as the current period's. Thus, this authority tends to study only the increments to the current period's budget.

In ZBB, the authority questions the process for carrying out a program and the entire budget for the next period: every dollar in the budget is studied, not just the dollars incremental to the previous period's amounts. The advocates of ZBB claim that in this way: 1) programs or divisions of marginal benefit to the business or governmental unit will more likely be deleted from the program, rather than being continued with costs at least as large as the present ones, and 2) alternative, more cost effective, ways of carrying out programs are more likely to be discovered and implemented. ZBB implies questioning the existence of programs, and the fundamental nature of the way they are carried out, not merely the amounts used to fund them. " (Davidson , Mitchell , Stickney , and Weil 1982)

The Goal(s) of the project were:

- to identify cost savings of \$1,000,000 without having a negative impact upon the delivery of health services within the community. Given the requirement was made after the beginning of the fiscal year the savings which were required were in fact approximately 5% of the operating budget of the organization.
- document the CRD Health Department budget process and identify the most appropriate method to move the process to one that could conform to the CHB expectation and time frame. Specifically to use the Value Sieve¹²² process to prepare the foundation for the long term implementation of the Value Sieve as the central element of the Decision Support System for the Allocation of Resources (DSSAR/Value Sieve) a regional resource allocation and contracting methodology.
- demonstrate the capacity of the DSSAR (Value Sieve) to manage the resolution of complex value based resource allocation choices.

5.2.3 Procedure

The administration of the procedure followed these steps¹²³:

- Briefing to CRD Health Department by CHB
- Preparation of program specific information by CRD
- Selection of peer reviewers by CHB
- Distribution of CRD program information to peer reviewers by CHB
- Receipt of responses from peer reviewers by CHB
- Provision of peer review comments to CRD from CHB

¹²² At this time the Value Sieve was known as the "Corbett Sieve" and the resource allocation process was known as the Decision Support System for the Allocation of Resources (DSSAR)

¹²³ Corbett, J.C. (1995 August) CRD – CHB Review Process July/August 995 - Peer Review Process Summary For 1995/96 Budget. Aug 31, 1995

- Review of peer responses by CRD directors
- Response to peer comments by CRD
- Review of information by CHB
- Presentation and review by CD&P committee of the CHB
- Recommendation and review by the CHB
- Instruction to the CRD from the CHB

5.2.3.1 Preparation and Orientation of Decision-makers

After the confirmation of transfer of responsibility had been received from the Ministry of Health, a senior level approval to proceed was received from the CHB and the CRD Health Committee.

- A briefing was delivered to the CHB executive and Board regarding the Value Sieve resource allocation process and how it would be implemented in the CRD Health Unit. Each person was given a document that simply explains in summary form the goals and objectives of the “Value Sieve” resource allocation process.
- A briefing was delivered to the CRD Finance Officer, the Medical Health Officer, and the directors of the Department Divisions, regarding the Value Sieve resource allocation process and how it would be implemented in the CRD Health Unit. Each director was given a document which simply explains in summary form the goals and objectives of the “Value Sieve” resource allocation process.
- An important element of the process would be an open review and commentary of the documentation by an “administrative cooperative” composed of outside administrators supervising similar organizations within the community.

5.2.3.2 Inventory Process¹²⁴

The process required that each CRD Health Department Division Director provide what they deemed necessary information for an external review by peer individuals and organizations within the CHB region. The information requested from the CRD division directors included the following:

- describe the programs that are offered within their supervision
- provide basic budget details of each individual program
- prioritize the health programs offered by the CRD Health Department without regard to divisional boundaries.

Several meetings were held at the CRD Health Unit to assist any persons having difficulty completing the required documentation.

During discussion between the CHB and the CRD Health Executive Committee (HEC) it was indicated by HEC that the task of prioritizing all the health programs without regard to divisions was too difficult and that prioritization of programs would be provided within divisions only. Further it was suggested by HEC that they would provide a target budget with plus or minus 3% options¹²⁵ as a method of providing the CHB with an opportunity to begin adjusting the CRD Health Department program funding to meet the values of the regional population.

The CRD Health Department compiled a document called the “CRD Health Department 1995/1996 Funding Allocation Review Package”. The document contained a section for the budget and description of each division and the programs within each division. These division summaries began with an overview

¹²⁴ While there was a desire to implement the complete Value Sieve inventory tool, it was clear given the circumstances that the implementation of the Value Sieve was to be done in stages over several years. Consequently, this first stage would begin to shape the information expectations of the directors but accept the practical reality that current information and information reports would be heavily relied upon.

¹²⁵ The formal Value Sieve process requires a plus or minus 15% budget orientation however given this was a first step and time was limited it was acknowledged that there was little to be gained at this time in argument. The 3% was accepted as the requirement for this year only and that subsequent years would be 15%.

of the division and the overall budget and outputs achieved and then discussed the specific programs involved.

5.2.3.3 Feedback

All directors' documents were completed and copies were made. A copy of each director's program documentation and the priorities were circulated to all other CRD Health Director's and managers for review and comment. The goal of the peer review process was to determine what if any constructive suggestions might be forthcoming from other health providers in the region.

- Inventory information was collected and provided to CRD Health Organization directors and managers for comment. Comments were collected from these peer reviewers and provided to the CRD Health Unit divisions for comment and clarification.
- When the information materials were received from the CRD Health Department, they were provided to a selected group of health service providers. These peer reviewers were identified through a review of the CRD documentation which indicated that these peer organizations were involved on a regular basis in discussions with the CRD Health Department in the development and implementation of the identified programs.
- Responses were provided from the CRD Health Organization regarding questions of criticisms from the peer reviewers. This information was provided back to the peer review organizations.
- The former relationship between the Ministry of Health and the CRD did not require the CRD Health Department directors to determine their health priorities within the funding available. Priorities were determined in a binary (fund/do not fund) process managed by the Ministry of Health who had control of the funding. As a service provider, the CRD acquired funding to implement the programs deemed worthwhile by the Ministry of Health.
- It should be noted that feedback was not available from the Ministry of Health. In the disagreement between the CRD and the Ministry of Health about the funding required to operate the 95/96 fiscal period, minimal

guidance was provided by the Ministry of Health to the CRD or the CHB indicating specifically which elements or programs being offered by the CRD Health Department were over resourced, delivering too much health service, inefficient, ineffective, too costly for the results, or which services received by the population should be adjusted or eliminated.

- Each director reviewed and commented in writing upon their peer director's program description and priorities. Each director's compiled notes regarding their peer director's documentation were open to HEC. There was no confidentiality¹²⁶ for the external peer reviewers however it was believed that in future peer reviewers in a circumstance of significant power discrepancy might be provided a degree of confidentiality to minimize the risk of retribution which might be associated with participation.

5.2.3.4 Prioritization Summary

- Directors were brought together to discuss the cost savings strategies that were possible.
- Directors were asked to review all the program descriptions and the priorities as described by all the directors/managers. After this review, the directors were asked to prioritize the programs under their supervision.
- The directors were brought together to review the program descriptions and to discuss in general the descriptions and priorities they had reviewed.
- The directors were brought together for several hours at a time, over the course of several days, to discuss their respective divisional prioritization and to discuss which lowest priority elements across the divisions would be eliminated.

¹²⁶ The issue of confidentiality is an interesting one in that it may be a variable which organizations prefer to maintain for longer periods of time in order to minimize the problems associated with power and retribution.

5.2.3.5 Details of the Prioritization Process

5.2.3.5.1 Step One:

- The directors collected to review the 3% budget reductions and prioritization that they had completed for the division they supervised.
- all directors had a complete package representing each divisions programs and had reviewed the package. This package was approximately 50 pages in total. In most cases, each program required a single page version of the program description form.
- each division's proposed prioritization of reductions was made clear to the other directors.
- a discussion of the issues and rankings associated with each director's recommended prioritization of reductions was carried out with the directors.

5.2.3.5.2 Step Two

- The directors collected to review the 3% budget reductions and prioritization that they had completed for the organization.
- Directors were brought together to make their final priority reduction recommendations.
- The directors (HEC) made recommendations for the reduction of \$1,000,000 in their budget that they indicated would have no impact upon the delivery of services to the population.
- The recommendations of the CRD Health Executive Committee were provided to the Capital Health Board by the Regional Health Officer and were accepted.

5.2.4 Results

- The preparation of program information and the discussion/prioritization activities of the directors required approximately 16 hours each during the Value Sieve process.

- The directors indicated that while general program documentation was available to describe programs the level of detail expected by the CHB was not readily available. To provide basic program documentation required approximately eight-hour per division.
- The directors' review and commentary provided on other programs took each director several hours in total.
- The external peer reviewers required several hours to read the materials and several hours to document their critiques.
- The directors identified approximately \$1,000,000 in cost reductions for the year as required.
- The directors indicated that they believed that the reductions would have no impact upon the provision of services to the population.
- The directors indicated that the Value Sieve process was a useful method for organizing their budget process and that they would find it easier to use in future as the overall budget process adjusted to the utilization of health outcome measures.
- On a confidential basis, some directors reported that the Value Sieve process brought light on wasteful practices of other directors. Many believed that in the future this approach would be reinforcing for those directors who were not wasteful by allowing them to direct cost compression pressure on those who were.
- Community peer reviewers felt greatly rewarded that an open process was included in the review process. There was no direct cost associated with the peer review although it should be clear that each of the peer review organizations did likely pay for the time of the reviewer as part of their normal administrative duties.
- During the initial stages, the CRD had begun to utilize a political/media strategy to fight the notion of a budget reduction. However upon the explanation and implementation of the Value Sieve process the political

discussion before the media stopped and there was no political media attention upon the acceptance of the recommended budget reductions.

5.2.5 Observations

- The full report regarding the CRD Health Organization and resource allocation is Corbett (1995). In that report, a more detailed review of the budget process is used to identify the need for the DSSAR/Value Sieve resource allocation and budgeting process.
- The CRD Health Organization was structured in such a way that individual program directors proposed and acquired resources from the Ministry of Health to directly fund programs. Thus, Ministry of Health priorities were applied to determine programs to fund. This meant that there were no “regional priorities” for how resources were directed and consequently there was little incentive for the directors to consider the management of the organization as a single working unit optimizing the resources to benefit the entire population. They were instead, through the mechanism of funding, considering only how the specific funds for specific programs could be optimized. With the exception of the CRD administrative group which provided shared overheads and support for all health programs there was very little need to coordinate.
- Funding for the organization and programs came from a sufficiently diverse group of funders who each had different year-ends and reporting periods. This meant that there was considerable opportunity for confusion about the funding consequences of changing a program or the consequences of one funder withdrawing funding from a program that enjoyed multiple funder support.
- The shift to a regional monopsonistic funder for services looks to be a good solution for the reorganization of the health system. A regional funding and evaluation organization which is not directly responsible for the delivery of services is in a position to dispassionately use the available knowledge within the region and the alternative programs available to improve the delivery of services to the population.

- The use of core budgets that bundle a variety of programs together and protects them as the “essential programs” fails to provide sufficient differentiation and pressure to demonstrate outcomes. The consequence of this approach to budget management is that there is a great deal of work that must be done to identify which programs are highly valuable and those which are not. Further, the defense of the core budget will tend to defeat the development of new programs except in times where additional “new money” is made available. This would suggest that the budget structure itself defeats the ability to innovate and defeats the ability to analyze the efficacy or efficiency of a single program.
- The use of the peer group review was seen as a strong signal to the other service providers in the region that there would be a concerted effort to establish a level playing field for resource allocation and evaluation of health outcomes. That the Capital Health Board through the Value Sieve process was meeting its obligation to generate a cooperative and community based working environment. A summary of the peer review comments is included in the Corbett (1995)
- The peer review process operated as expected by producing pressure upon the directors to adequately explain themselves and their priorities. Exaggeration or misrepresentation was much more difficult and more “risky” in that the program documentation did not just have to pass the scrutiny of administrators without specific expertise in the areas it meant that those who were working with the programs on a consistent basis were able to identify issues or problems which would never have been identified by the administrators alone. The opportunity for feedback demonstrates the willingness of peers to participate and positively contribute in the program evaluation process. This is the first confirmation that the use of cooperatives can be constructive, cost effective, and improve the coordination of the programs providing service within the region.
- The responses of the CRD directors to the peer comments demonstrates the utility of the peer review process and how this level of practical

communication can quickly begin a constructive dialogue amongst regional health service providers.

- The use of directors' own values instead of externally provided measures placed the onus on directors to use their knowledge to minimize waste and any reductions in client services. From my perspective, the absence of externally provided measures moves the pressure on the medical professional/administrator to expose their personal values. Given the assistance of peer review this means that an administrator caught either misrepresenting the impact of their programs the most effective method of delivering programs or the outcomes of the programs will quickly be identified as a poor manager. This should have a negative impact upon the trust and reputation of the manager.
- Measurement dysfunction should be minimized using this approach because an incomplete family of measures is used to assess the allocation of resources and the utility of what has been produced. In other words by not setting the measures the resource allocating organization requires the expert administrator to establish the measures and balance between measures. This should minimize the probability of measurement dysfunction.
- The process was easily understood and can be easily adjusted to facilitate the implementation. In the case of the CRD Health Organization an initial compromise was made in the percentage plus or minus for program budgets. This was agreed to be a stepping stone to the required 15% which is suggested in the model. What is important to note is that the argument was not with the underlying concept of the model or its procedures but with the best way of beginning to introduce and implement the Value Sieve model over a period of time. This ability to preserve the integrity/intention of the model while adjusting to meet the true or perceived needs of the administration and managers is a great strength of the Value Sieve.
- At the conclusion of the process, there was unanimity of the directors for their chosen course of action. The recommendation of the CRD Health Organization was approved by the Capital Health Board as recommended.

- There were no political consequences of the budget reduction to the CRD Health Organization.
- There were no negative media stories of the budget reduction to the CRD Health Organization.

5.2.6 Conclusions

The CHB assumption of responsibilities for the supervision of funding of the CRD Health Organization from the Ministry of Health and the CRD Board was an extremely difficult circumstance for all parties which was made more difficult through the last minute funding cut of \$1,000,000. It was expected that this would result in significant bad press and much political posturing. However, the use of the Value Sieve in this circumstance ensured that consequential accountability would be directed towards those accountable for the different elements of the situation. Given the complexity of the situation only those involved would be able to knowledgeably signal that there was going to be an inappropriate consequence to the health of the population.

By using the Value Sieve, the CHB placed responsibility upon the “expert” administrators to use their intimate knowledge of their programs to resolve the funding shortfall and by not providing guidelines other than prioritization and the description of programs and their health outcomes the directors are unable to hide behind arbitrary and incomplete measurement systems which may have been generated to aid in the decision making process. Further, by including the peer review process, the risks associated with misrepresenting the circumstances were kept with the responsible “expert” administrators. The Value Sieve process also protected those “expert” administrators from inappropriate political opportunism because it would require someone else to demonstrate through the program prioritization and resource allocation process that another more appropriate outcome was possible given the same constraints.

Table 5.7: SUMMARY QUESTIONS FOR CRD HEALTH TRIAL	Yes/No
a) Support and User Satisfaction	
▪ Is the model supported by managers.	Yes
▪ Is the model supported by the senior executive of the implementing organization or region.	Yes
▪ Is the model supported by the actions of the Central Administration	Yes
▪ Is the model supported by other organizations within the system	Yes
b) Time to Execute (minutes) (approximately 40* programs)	
• Training time - briefing and orientation to the concept.	120 min.
• Preparation of a program description requires how long.	60 min.
• Review, feedback and adjustment regarding each program requires.	60 min.
• Prioritization process, including voting and summary requires.	960 min.
c) Measures of Success	
• Is the model logical to participants.	Yes
• Does the model appear to the participants to establish a level playing field among programs.	Yes
• Decision-makers find the process straightforward to execute	Yes
• Decision-makers feel the inventory reflects their programs.	Yes
• Decision-makers feel the prioritization adequately reflects their programs.	Yes
• Decision-makers indicate they gain a better understanding of the interrelationships between programs	Yes
• The consequences of the model are consistent with expectations.	Yes
• The decision-makers feel that they would like to continue to use the process.	Yes
d) Change Management Issues	
• Is there an incentive for adopters?	Yes
• Are "participants vilified?" i.e. are there bad people who need to change?"	No
• Does the communication from the change instigator stay fact based?	Yes
e) Found Information Behaviors	
• In general is outcome information available?	No
• In general is program output information available?	Yes
• In general is program costing information available?	Yes
• In general is there evidence that the output and costing information have been put together to itemize the cost to provide an output?	No
• Is the organizational information model a HUB?	Yes
Notations	
* It should be noted that the programs tended to be large and in many cases contained activities that if differentiated would take less time and provide greater clarity.	

The Value Sieve uses “trust” and an open process to facilitate consequential accountability. The resulting open process is expected to facilitate the evolution of standards and innovation within a complex organization or system of organizations. On a confidential basis members of the health executive indicated that the process brought pressure on those who were wasteful to openly identify wasteful practices. In the former budget methodology, peer directors were not involved in commenting upon the efficiency or effectiveness of a peer’s program. In most cases, that discussion would take place between the funder and the specific program provider. This would mean that the program director would only need to identify and resolve those concerns expressed by the funder and meet the measures imposed by the funder. While it was frustrating to some directors to see others use resources inefficiently or ineffectively, there was no mechanism available to warrant the aggravation associated with becoming involved in developing a better solution.

The methodology demonstrates the problems which are associated with the development and utilization of regional health service provider monopolies. The trend for government to generate monopolies reduces the ability to use competitive pressures to create the most efficient and effective enterprises. The notion of elimination of duplication and redundancy is misplaced because in many circumstances this “administrative simplification” makes the availability of direct external critique difficult. However, the Value Sieve resolves this to some extent by creating a clear understanding that alternatives, which provide alternative health utility, may be selected.

The time required to execute the documentation and prioritization process required approximately three or four man-days per director of the organization. This was seen as very fast and efficient although there was grumbling among the directors who felt that the development of information which highlighted outcomes was in excess of what had been required in the past. This suggests that the process will require less time in the future as documentation for some programs and their measurement become more appropriately adjusted to qualitative and quantitative outcome measures.

It should be noted that the Ministry of Health had indicated to the CHB that the region was “over-funded” in the order of 5% to 15% compared to other health regions of the province. The consequence of this realization was that there was a strong need for resource allocation tool and budget mechanism that could facilitate the compression of costs of programs and increase the coordination of activities which supported the determinants of health. There would be ongoing pressure on the region over the next five years to constructively adjust to the commensurate resource levels.

There have been no indications that the hypothesized benefits of the Value Sieve are in error.

5.2.7 Trial Summary

The Value Sieve establishes a simple and stable working concept for the resource allocation process and is seen as fair and appropriate by participants. The use of an open peer process harnesses the knowledge located within the same organization and other organizations to direct their knowledge and support or challenge the approach or statements of a program. While I expect many organizations may disdain the use of peer reviewing as too time consuming it is clear that this is not the case. The peer review improved the quality of the assessment of the programs, did not require more than a few hours to prepare per program peer reviewer, and did not require more than a few hours for response. Given peer review is a voluntary activity on the part of the peer reviewer it is reasonable to assume that on average, programs which accurately represent themselves, their strengths and weaknesses will find minimal peer commentary whereas those which do not represent themselves accurately or fairly should anticipate a great deal of attention from peer reviewers. Given the complexities of the interrelationships which maintain and produce health it is unreasonable to believe that another less expensive, more informative process is available.

The implementation of the process is flexible enough to adapt to meet specific organizational implementation requirements and or sensitivities. While I believe this to be a strength, it is not clear whether, early adaptations will have an impact on complete implementation of the process. It is possible that early compromises will suggest that there is no need to go further to implement the full model. For

example, in the case of the CRD there was concern that staff would be distressed if budget prioritizations of plus or minus 15% were used. In this context, I would be concerned that the organization would choose to stay at 3% plus or minus. This would defeat the purpose of the large assessment and the pressure to reassess on a regular basis what the program(s) or organization could best accomplish with the resources.

The notion of confidentiality of feedback must be closely considered. There are arguments for and against secrecy of critique, however in this trial there were no negative consequences associated with the open peer review process. It is possible that the formal use of a Delphic approach will meet the requirements of the process. The use of the Delphi method should be considered.

Trust is required. Given that outcome measures are not available to demonstrate a relationship between all of the activities of the program and the outcomes of the client the Value Sieve requires that the process trust the judgement of the accountable decision-maker within the fuller process. The only mechanism that the CHB could use to evaluate the CRD Health Organization statement that there would be no negative health consequences which would result from the cost reduction was trust in the directors and the peer reviewers. This means that the absence of outcome measures in health makes it difficult to know the true impact of resource changes and that the process must support the experts while making their decisions/prioritization open to independent analysis, constructive criticisms, and alternative proposals to generate or maintain health in the population.

The process has not yet tested the use of client cooperatives however, the result of a peer cooperative suggests that a client cooperative would be appropriate and useful.

5.3 The YM/YWCA Case Study

5.3.1 Overview

The YM/YWCA of Victoria is a well-recognized not-for-profit organization with an annual budget of approximately \$5,000,000. The organization offers programs and services to a broad spectrum of the community. These services include recreational, educational and fitness programs. Fees are charged members, which in general support the core activities of the organization. Charitable donations and contracted services fund additional outreach programs with a greater focus on social services.

The organization is supervised by a volunteer Board of Directors, which supervises the operation through the office of an executive director. The hierarchy of the organization is executive director, senior department/program directors, program managers, and staff.

5.3.2 Introduction

In October of 1996, the YM/YWCA was proceeding through its annual budget formulation process. The executive director was concerned that the organization was going over budget in the present fiscal year and that this was a pattern over the last few years. It was realized that a different approach to budget making and was necessary and that some effort needed to be directed towards organizational and program priorities. The YM/YWCA board of directors had indicated their preference was to have the new budget scenarios based upon no growth in revenues. Consequently, it would be necessary to find strategies that would reduce expenditures. It was not clear to the executive director that there was "budget fat" in any specific area.

The primary difficulty to be addressed was the need to identify the most appropriate areas for cost compression and organizational reduction. While the timetable would not permit a full implementation of the Value Sieve there was time enough to use the Value Sieve to assist in the development of organizational priorities and achieve program director level consensus regarding those priorities. Further, consensus would include agreement about what program and administrative activities would be reduced or eliminated.

The entire budget plan would need to be approved by the Board of Directors.

5.3.3 Procedure

5.3.3.1 Preparation and Orientation of Decision-makers

- A briefing was delivered to the executive director, and his senior staff regarding the Value Sieve resource allocation process and how it might be appropriate for the YMCA. An approval to proceed was received from the executive director and the management team
- A briefing was delivered to the executive director and the senior departmental managers of the YM/YWCA. Within the organization, these managers are known as directors. Each director was given a document which simply explains in summary form the goals and objectives of the “Value Sieve” resource allocation process.

5.3.3.2 Inventory Process

- In concert with a senior director a short program information tool¹²⁷ was developed which would allow managers to describe the programs they supervised. This was to include each programs goals and objectives and the priority position of each program in order of most important program to least important program. In addition, each senior director was to ensure that a cost estimate of the program was provided for each program description.
- A briefing was delivered to the executive director, all directors and their sub managers regarding the prioritization process and the documents they were to complete for each program.
- A meeting was held at the YMCA to assist any managers having difficulty completing the required documentation.
- All managers’ documents were completed and copies were made. Copies of each manager’s program documentation and the priorities were circulated to all other managers for review and comment.

¹²⁷ A copy of the form is included in Appendix H.

5.3.3.3 Feedback

- Each manager reviewed and commented in writing upon their peer managers program description and priorities. Each manager's compiled notes regarding their peer managers' documentation were kept confidential to the researcher. The researcher took all comments and provided them back to the pertinent manager in a sanitized form. Sanitized simply meant the comments were organized and the authors' names were removed. Note: it was explained that this confidentiality¹²⁸ was to be for the first trial of the process only and that in future their comments would be openly provided back to their peer managers for further review and comment.

5.3.3.4 Prioritization Summary

- Directors were asked to review all the program descriptions and the priorities as described by all the managers. After this review, the directors were asked to prioritize the programs under their supervision.
- The directors were brought together to review the program descriptions and to discuss in general the descriptions and priorities they had reviewed.
- The senior program directors were brought together over the course of several days to prioritize the 60 program descriptions as completed by the program managers.

5.3.3.5 Details of the Prioritization Process

5.3.3.5.1 Step One:

The directors had indicated their desire to prioritize programs without the 15% cut and 15% increase rule of the Value Sieve. It was agreed that we would approach the implementation first without the 15% rule and then if necessary would employ the 15% rule.

- all directors had the complete series of the 60 one-page program descriptions that had been completed by the appropriate managers.

- all directors provided a budget estimate¹²⁹ for each of the 60 programs as described and ensured that each director's copy had the budget written in the top right hand corner.
- directors were asked to individually prioritize the programs in organize the 60 descriptions into three piles of 20 programs each. The first pile indicated the "highest priority" programs, the second pile the "lowest priority" program and the third pile held the "medium priority" programs.
- once completed with their individual rankings the directors marked on several wall mounted flip board sheets their ranking (H = High, M = Medium and L = Low) of each program. Each director used a different color marker so that it was clear whose opinion was whose.
- discussion then took place regarding the rankings made by each director, when clarification resulted in changes the director was allowed to shift the ranking of a program.
- programs, which had consensus regarding highest priority, were removed from the process and programs, which had consensus regarding lowest priority, were removed.
- those programs, which had not been removed due to unanimity, were ranked again by the directors.
- this procedure took place three times and each time resulted in a reduced set of programs for the next ranking
- after three rounds of the process there were three equal ranked piles which all participants agreed were in the proper category

¹²⁸ The issue of confidentiality is an interesting one in that it may be a variable which organizations prefer to maintain for longer periods of time in order to minimize the problems associated with power and retribution.

¹²⁹ It is worth noting that the normal accounting information system does not given directors financial information related to their specific programs. It was the case that managers had to estimate the budgets of the specific programs.

- the lowest ranked collection of 20 programs was then given to each director to order into 3 piles from highest to lowest priority.
- after this was accomplished, each director listed his rankings on the wall sheets.
- discussion took place and the directors were able to come to agreement regarding the prioritization of the lowest ranking programs
- the cost information, which was apparent through the entire process, clearly indicated that the discontinuation of the lower priority items was not going to generate the needed savings to meet the expenditure target. The figures were totaled to confirm this.

5.3.3.5.2 Step Two

Using the Value Sieve process with the 15% rule. Prioritizing budget cuts.

- The directors were given several days to go back to their program descriptions and organizational strategies and come back with component cuttings which would total 15% for each of their areas. These cuts would then be prioritized.
- Directors were brought together to discuss the cost savings strategies that were possible. Because these would mean staff cuts and restructuring of jobs, legal counsel was brought in to provide estimates for dismissing staff. These costs were documented along with the savings from the cuts.
- Directors were brought together to discuss the areas where funds could be saved and where cuts would produce the least negative impact to the organization. The options were listed on a wall chart and the savings were listed beside them.
- The directors discussed the options and selected those combinations they believed would provide the savings necessary to meet the board of directors requirement for a balanced budget over a two year period. The ability of making the saving in one year was seen as too difficult given that staff changes would require a six months severance package to each eliminated staff position. This was a preliminary plan given that additional details need to

be confirmed and the board had to approve the financial changes and the reduction of some programs.

- Based upon the Value Sieve process the YM/YWCA senior program directors recommended that there be immediate changes to the low priority elements, which would save an immediate 5% in the current year. Further, the process encouraged the development of a multi-year plan which would move the organization to further cost efficiencies.
- The YW/YMCA senior program directors indicated their desire to continue to use the process in the future.

5.3.4 Results (Table 5.8)

- The preparation of program information and the discussion/prioritization activities of the program directors required approximately 8 hours each during the Value Sieve process.
- The program managers indicated that the program documentation required approximately one hour per program.
- The managers' review and commentary provided on other programs took each manager several hours in total.
- The directors identified approximately \$250,000 in cost reductions for the first year.

5.3.5 Observations

Several noteworthy items became apparent during the ranking and prioritizing process. I listed them in point form and in no particular order.

- The YMCA is a solid organization run by dedicated staff. Their ability to "fearlessly" begin the process and work through the issues was very impressive. It was a pleasure to work with this organization.
- The Value Sieve rank ordering process was very logical to the participants throughout the organization. They felt that it was a fair way of getting the issues and options on the table and felt positive because they were to

- During the discussions around priorities, directors began exploring alternatives that could reduce costs and several cooperative strategies were developed which would reduce the organizational expenses. By having all the directors at the table within the context of determining priorities “at the margin”, it meant that these ideas could be explored without a great deal of typical administrative posturing.
- Several budget elements/programs were discussed that could not be solved because they had board and public relations constraints. Nevertheless, the problems were identified and the managers did begin to see that in the future these protected activities could be shown in the context of the value of the alternative that had to be foregone. The examples of this were the swimming pool and the coffee shop.
- The consistent approach forced by the process meant that it was difficult or impossible for any director to hide an area which others did not feel was worthy of funding. The process resulted in several programs which initially were seen to be a high priority move to a low priority without significant frustration.
- The process assists in defining programs. In some cases, programs were broken apart and recombined with others to leave some pieces in the high priority ranking and others in the low.
- The need for information became clear and this was used to assist in thinking about what data should be captured in the future so as to assist in the decision making process.
- At the conclusion of the process there was unanimity among the directors about the course of action they had determined they must take and a clearer understanding that there were consequences when an element of the organization did not perform.
- Constructive ideas were developed around the role of revenue generation and that just because one program broke even did not mean that the rates being charged were enough. Revenue was seen as the “property” of all directors and

simply because a director had a program that had revenue did not make the revenue the property of one division only. Good questions were raised about the utilization of resources to create more revenue generating programs which could assist in the support of some programs the directors felt were important but knew were “money losers”.

5.3.6 Conclusions

While this was not a full implementation of the Value Sieve, it was clear that the basic ideas of the Value Sieve do work well in an organization which has a goal to reduce expenditures through focusing on priorities. The managers and directors were pleased with the process and felt that it got at the heart of what they wanted.

The leadership to implement the Value Sieve process requires the leader to support the “process” and emotionally support the personnel by indicating that he/she understands the information to be used will not be perfect. Further, the prioritization process and the method of using the level playing field will be honored as long as the procedure is respected.

The Value Sieve linked financial, procedural, and consequential accountabilities together both conceptually and in practice. The information behavior of the managers and directors was changed to see the need, utility of integrating financial, and performance information. In this context the need to link current information suggested that they did not necessarily need “new data” to get “new and useful management information”. This would suggest that future annual cycles of the Value Sieve would become more effective as improved management information brings programs into focus.

Programs which could be restructured into more logical units were taken apart and reassembled with some parts increasing in priority and others dropping. This suggests that the managers understand that programs are collections of activities that can be edited to meet requirements that are more specific. This supports the notion that within the larger concept of the mission of the organization managers do see the component elements that best support the overall mission of the organization.

Table 5.8: Summary Questions For YM/YWCA Trial	Yes/No
a) Support and User Satisfaction	
▪ Is the model supported by managers.	Yes
▪ Is the model supported by the senior executive of the implementing organization or region.	Yes
▪ Is the model supported by the actions of the Central Administration	NA
▪ Is the model supported by other organizations within the system	NA
b) Time to Execute (minutes) (approximately 60 programs)	
• Training time - briefing and orientation to the concept.	120 min.
• Preparation of a program description requires how long.	60 min.
• Review, feedback and adjustment regarding each program requires.	30 min.
• Prioritization process, including voting and summary requires.	480 min.
c) Measures of Success	
• Is the model logical to participants.	Yes
• Does the model appear to the participants to establish a level playing field among programs.	Yes
• Decision-makers find the process straightforward to execute	Yes
• Decision-makers feel the inventory reflects their programs.	Yes
• Decision-makers feel the prioritization adequately reflects their programs.	Yes
• Decision-makers indicate they gain a better understanding of the interrelationships between programs	Yes
• The consequences of the model are consistent with expectations.	Yes
• The decision-makers feel that they would like to continue to use the process.	Yes
d) Change Management Issues	
• Is there an incentive for adopters?	Yes
• Are "some participants vilified?" i.e. are there bad people who need to change?	No
• Does the communication from the change instigator stay fact based?	Yes
e) Found Information Behaviors	
• In general is outcome information available?	No
• In general is program output information available?	Yes
• In general is program costing information available?	Yes
• In general is there evidence that the output and costing information have been put together to itemize the cost to provide an output?	No
• Is the organizational information model a HUB?	Yes

Directors were pleased that there would be an avenue that allowed them to comment on the actions or programs of others so that waste in the organization was managed constructively and the benefits were clearly directed to aid the organization. Further, the clarification that the prioritization would be based upon the values they held and interpreted as the organization's meant that there was no attempt to generate invalid or inappropriate scales to justify their conclusions. The Value Sieve made it clear that it was their responsibility as individuals to do the right thing. This would suggest that there would be no increased probability of measurement induced dysfunction which would result from the exercise.

Concerns regarding the amount of time it would take to manage the process were alleviated. It is apparent that the sorting and prioritizing process of the Value Sieve can be done very quickly. There is a suggestion in the data that the results of the first two sorts could be used to accurately predict the final outcome prioritization. This will need to be explored. It is expected that the time for the operation of the Value Sieve will go down as information needs are clarified and the basic program descriptions, justifications, measures and financial information is brought together as part of a regular management pattern.

The Value Sieve process allowed the executive committee to recognize the need to develop a multi-year budget plan because the adjustment process could not be executed without damage to the fabric of the organization in less than several years. The consequence of this was that the steps needed to be taken over multiple years were discussed and identified as part of the prioritization process. This suggests that the Value Sieve also directs attention to the steps and consequences required to execute, efficiently and effectively, organizational changes over multiple years. The procedure identified those programs and events which must take place and their correct sequence and consequence over multiple years. While the theory of the Value Sieve suggested that such multi-year planning would be a logical element, this implementation showed that it brought these critical issues up in a practical and reasonable way for the executive team to address. The Value Sieve demonstrates that it is a useful planning tool that can ensure that the actions of individual program managers are coordinated and considered during the

development and execution of a project. This is an example of the Value Sieve's impact upon an executive team's acceptance of consequential accountability.

There have been no indications that the hypothesized benefits of the Value Sieve are in error.

5.3.7 Trial Summary

- The Value Sieve process requires a longer-term implementation so that its effects can be monitored over a period of several years.
- The notion of confidentiality of feedback should be considered an option within the process. Initially it was believed that small power participants would need to be protected from larger power participants. This may be a function of the relationships within the organization.
- The use of the Value Sieve as a planning tool should be investigated further.
- Value sieve organizations should first be required to use the data they have at hand for the process. They should not be allowed to direct their attention outside themselves for more or better data.
- A stable information system could be structured which reduces the effort of repeating the same data gathering and documenting activities. This might be a software/internet version of the Value Sieve¹³⁰.
- In the future, as the Value Sieve process stabilizes a common data repository would be useful for managers¹³¹.

¹³⁰ A prototype of this Internet Value Sieve is built later in my research.

¹³¹ A prototype of this data depository is built later in my research.

5.5 The Central Vancouver Island Regional Office of the Ministry for Children and Families Case Study

5.5.1 Overview

“In November 1996 the Government of British Columbia created a new Provincial administration known as the Ministry for Children and Families (MCF). The organization was created to address concerns and recommendations relating to the administration, coordination, and quality of services provided to children by provincial Ministries. The new Ministry consolidated control of programs for children that had formerly been offered through a number of independent government Ministries. This included programs from the Attorney General, Health, Social Services, and others.

The task for MCF was to “green-start” a new administrative structure which could efficiently and effectively take control of existing independent programs which were being offered by other ministries. Like Frankenstein’s Monster, the starting point for MCF was as an enterprise constituted from the components of other entities. Instead of stitches, the MCF was held together by a budget and a mission statement. The mission statement of the MCF provides a clear overview of the mandate: “ The Ministry for Children and Families must ensure a child centered, integrated approach that promotes and protects the healthy development of children and youth while recognizing their lifelong attachment to family and community. Communities and clients must be an integral part of the work of the Ministry. Quality assurance, accountability and openness are fundamental to its success.”¹³²

The MCF provincial administration divided the province into twenty Regional Operating Authorities (ROAs) which would administer, coordinate, and revise programs and services at the community level. This paper describes the efforts of a single ROA, the Central Vancouver Island Regional Operating Administration, (CVI-ROA) in operationalizing the mission statement.”

¹³² The overview is a direct quote from the Corbett et al (1998) The article is included in Appendix I.

The implementation of the Value Sieve process began in early 1997 and progressed until late 1998 when the implementation strategy developed in conjunction with the Value Sieve implementation, the Community Based Information Resource (CBIR)¹³³ was declared the provincial demonstration project for regional information management. The MCF evaluated the CBIR in 1999 and it is unclear whether funding will be able for the 2000 fiscal year. Although the complete implementation process is on hold a great deal has been learned through the implementation so far which sheds light on the utility of the Value Sieve, its implementation and issues which relate to the barriers of implementing a resource allocation process which focuses consequential accountability to the appropriate decision-maker(s) within an organization.

5.5.2 Introduction

In 1997 the Central Vancouver Island Regional Operating Administration (CVI-ROA) of the MCF managed a budget of approximately \$90,000,000 Of this amount roughly 75% is paid to 50 independent contractors (primarily not-for-profit agencies) who provided 150 health¹³⁴ related services. The remaining 25% of the budget being used to provide in-house administration, management, and regulatory¹³⁵ enforcement services provided by MCF staff.

The services provided under the aegis of the MCF are related to the determinants of health and include programs such as drug and alcohol rehabilitation, family counseling and sheltered housing. The breadth of services, and their relationship to programs and services offered by the Ministry of Health, School Districts, churches, and the not-for-profit sector within the multiple communities of the region identified a complex open systems environment. Service provision within the CVI-ROA is divided into 5 defined geographic districts with each district

¹³³ The CBIR web based demonstration can be found at <http://www.thewebpress.com>

¹³⁴ Health related is based upon a determinants of health perspective. Programs ranged from substance abuse to basic shelter to child protection enforcement.

managed by a specific district manager. The district managers were supported by an administrative group that provided planning, information, coordination, and finance services.

According to the CVIR-ROA executive the primary difficulties to be addressed were the need for better resource allocation methodology which would encourage improved program information, internal/external program coordination, contract management, cooperation between government and community resources and regional planning. It was acknowledged that there was little regional information and that this would be a requirement for a regional decision making capacity.

The CVI-ROA administrator indicated that the implementation could be carried out over multiple years, that regions while reporting to a central MCF administration in Victoria were to be given the latitude of developing their regional information and decision making infra-structure on their own and finally that funding would be stable during the multi-year implementation time period.

At the request of the Regional Operating Administration executive, a general briefing about the Value Sieve and its implementation was given to senior regional staff. At this meeting the senior administrator was supportive of the need for the Value Sieve and need to harmoniously structure the new CVI-ROA social service organization from the existing collection of service programs which had been inherited. It was understood that the Value Sieve would organize the service delivery of the region to a prioritization of most valued programs. The consequence would be that programs would begin to link quantitative and qualitative outputs and outcomes to the cost of providing the programs. Further, that information about programs and alternatives would allow the integration of non-MCF funded programs to begin to be more effectively and efficiently integrated into the provision of services.

¹³⁵ In child protection, the requirements and solution are based upon regulations. However, the services to children and families are not. A consequence of having a regulated program within the funding envelope is to place pressure on administrators to cannibalize other programs and services in order to meet the needs of the regulated service. I.e. if demands for regulated services grow and no budget increases are made from outside the region then existing services must be cut to feed the regulated service.

This supported the full implementation of the sieve model which included the development of both client and agency/professional cooperatives. It was acknowledged that the cooperatives would provide feedback prioritization however, ultimate decision making would as suggested by the model remain with the CVI-ROA senior administration.

5.5.3 Procedure

5.5.3.1 Briefing Senior Administration and Managers

- The implementation of the Value Sieve began with a review of the process with all senior ROA decision-makers of the region to ensure they understood the model and had an opportunity to voice concerns or suggestions.

5.5.3.2 Prepare a Multi Year Implementation Plan

- A staged implementation plan was developed which utilize a four-year implementation window with a fourth year being used to blend in longer contracting periods for some programs. In general the preliminary plan called for:

5.5.3.2.1 Year One (1997/1998 budget cycle)

- Implement the program and agency inventory for service provider programs and organizations receiving contracts from CVI-ROA. Training and implementation of the program inventory¹³⁶ and limited use of an open review of the program using feedback from service providers. Open availability of the inventory to all participants and the public. During this time all funding would remain stable. Internal district managers would begin using the prioritization process to gain insight into the process. These exercises in prioritization could remain confidential within the CVI-ROA executive depending upon the issues raised during the process.

¹³⁶ The inventory of each program followed the basic form used in the CHB. However, some minor changes were made to better suit the language and sensibilities of the organization. For example, clients and customers became persons served. A copy of the CVI-ROA inventory tool is located in Appendix H: CVIR MCF Version of the Inventory

- Identify information resources which may be helpful to decision-makers within the region.
- Identify information management and analytic skills which will be needed to support the various managers working within the region.

5.5.3.2.2 Year Two (1998/1999 budget cycle)

- Update of the inventory by service providers and program managers. Feedback regarding the programs from service providers and clients. Prioritization of the programs by the district managers would be carried out and made available on an open basis. During this time all funding would remain stable however, based upon the prioritization, managers of low ranking programs would be able to prepare their programs for restructuring and or elimination. New funding would be allocated based upon the use of the Value Sieve prioritization.
- Provide access to information resources which may be helpful to decision-makers within the region.
- Support the development of information management and analytic skills which are needed to support the various managers working within the region.
- Begin to inventory regional and community resources and programs available but not funded by CVI-ROA.

5.5.3.2.3 Year Three (1999/2000 budget cycle)

- Update of the inventory by service providers and program managers. Feedback regarding the programs from service providers and clients. Prioritization of the programs by the district managers would be carried out and made available on an open basis. At this time funding would be based upon the prioritization. New funding would be allocated based upon the use of the Value Sieve prioritization. Funding would be given for a one-year period only.

- Integrate information resources, and regional program inventory into a community information resource.
- Use the integrated information resource to support the development of information management and analytic skills which are needed to support the various managers working within the region.

5.5.3.2.4 Year Four (2000/2001 budget cycle)

- Update of the inventory by service providers and program managers. Feedback regarding the programs from service providers and clients. Prioritization of the programs by the district managers would be carried out and made available on an open basis. At this time funding would be based upon the prioritization. New funding would be allocated based upon the use of the Value Sieve prioritization. Funding would begin to be given for three-year periods.
- Continue to develop and support the integrated information resource.

5.5.3.3 Briefing of Service Provider Managers

- The managers of all contract agencies and programs were collected together and the Value Sieve process was reviewed. An opportunity was provided to allow managers to identify concerns and have general and specific questions answered. In total there were four multi hour briefings provided on separate occasions and in different locations over a one month period to ensure that all concerns were heard and that it was clear that the process of implementation would be open and the implementation team had a consistent perspective.

5.5.3.4 Development of a Program Inventory System

- Starting with the basic Value Sieve program inventory tool a variation was developed which more appropriately spoke in a language associated with social service programs. Changes were minor and the primary change was to the use of the term health benefits instead of health outcomes. The program

inventory tool¹³⁷ was developed and then reviewed by government managers and service provider managers to ensure that the information requested was clear reasonable. During the period allocated for the completion of the program inventory, a senior manager within the CVI-ROA was available to answer questions and ensure consistency of interpretation wherever possible.

5.5.3.5 Inventory of Existing Programs

- A program inventory was carried out to identify the outputs/outcomes and financial relationships of the programs provided funds from the ROA. In addition, an inventory of service providing organizations was carried out to collect details about these organizations. The inventory included the questions associated with the 15% increase and 15% reduction in funding for each program.

5.5.3.6 Development of a Program and Agency Database

- Software and hardware issues within the service provider organizations were reviewed and a database was developed in FileMaker that could be used centrally by the CVI-ROA management and distributed to service provider agencies as required¹³⁸.

5.5.4 Feedback and Review of Service Provider Inventory

- Meetings were held with service provider organizations. This was to allow them an opportunity to provide feedback about the inventory process and any concerns regarding the process. It also provided an opportunity to recommend

¹³⁷ This was a variation of the tool I developed in the original Value Sieve Thesis model. The original can be found in Appendix C and the CVI-ROA version can be found in Appendix H.

¹³⁸ The consideration of software was central to the design of the computer-supported aspects of the information system. From my experience, this aspect of systems analysis is often where projects insert the foundation of their long-term failure. This is because the analysis focuses on the problems of the developing organization instead of the problems of the client/user organizations. In these circumstances developers create information solutions which cannot be used in the field because the necessary hardware and software is not available and there is no budget to acquire such necessities. In these circumstances the technical solution is bounded within the developers rationality and does not incorporate the true requirements and needs of the intended clients/users.

changes to their information so that within the context of the inventory they believed that the information provided was accurate and appropriate.

5.5.4.1 Linking Program Inventory with Contracts

- The management support personnel of the ROA office were asked to collect copies of the contract documents for each program. These contract documents would include all contractually based obligations, costs, and deliverables.

5.5.4.2 Survey of Information Resources

- A review of information resources was carried out. Where possible samples were collected for review and analysis.

5.5.4.3 Confirmation of a Cooperative Relationship between ROA, Regional Health Board (RHB) and School Districts (SDs)

- Given the open system nature of the organizations addressing the determinants of health and consequently the healthy development of children the implementation of the Value Sieve included the briefing of organizations and service providers not directly funded by the ROA. The senior administrator for the MCF ROA discussed the project with the RHB and SDs. Support was received from both organizations.

5.5.4.4 Development of a “Community Based Information Resource”

- The program and service provider inventory was adapted to be served over the World Wide Web. In addition the information resources found and considered appropriate for the use of the CVI-ROA, its service providers and other community service organizations was developed and a demonstration site produced.
- Information resources were provided by the MCF central administration through the MCF office of Audit and Performance Management.

5.5.5 Results

5.5.5.1 Year One (Table 5.9)

- The orientation meeting for program managers required approximately two to four hours. A number of meetings were held to ensure that all participants

understood the process was to be open and part of a longer term Value Sieve implementation. Consequently, a service manager may have spent up to 8 hours in different meetings confirming the intention of the CVI-ROA budget planning and inventory process and asking questions.

- Service providers demonstrated a great degree of trust with the CVI-ROA and indicated their willingness to proceed on a trust basis. It was clear that the efforts to continuously communicate the facts of the situation and to ensure there was ample opportunity for feedback was central to maintain the trust and support of the service providers.
- The service provider and program inventory information was reported to require an average of 8 hours per program. It was acknowledged that in some cases this was the first time any effort had been made by some managers to bring this kind of information together regarding the programs they provided. The CVI-ROA agreed to fund the time of managers to complete the inventory. It is not known whether this skewed the time estimated to complete the inventory document.
- 100% of the contracted service providers responded to the inventory request.
- Many service providers found the inventory process useful and felt that it was helping organize their thinking towards a stronger and more professional approach to information, analysis, measurement and outcomes.
- 0% of government service providers responded to the request. It was indicated by the government managers that their programs were in transition and so they felt it inappropriate to invest the time to respond to the inventory.
- The CVI-ROA found it very difficult to find the contracts that were associated with each service provider program. In fact this task was abandoned because of the effort required to find the contract files within the MCF offices.
- The inventory and resource allocation model was supported by contract service providers. All service providers interpreted the Value Sieve as an attempt to implement a level playing field for resource allocation. All felt that

a level playing field would improve the delivery of healthy benefits to the population.

- The inventory and resource allocation model was supported by government district managers. All interpreted the Value Sieve as an attempt to implement a level playing field for resource allocation. All felt that a level playing field would improve the delivery of healthy benefits to the population. However, there was trepidation that there was little assistance to aid them in determining the “correct” values to apply to the prioritization process.
- There was no overt utilization of the media or interest group politics to adjust or change the process associated with the implementation of the Value Sieve.
- Support from the Regional Health Board or the School Districts was never tested beyond statements of support.
- The MCF Central administration, office of Audit and Performance management strongly supported the CVI-ROA Community Based Information Resource (CBIR)¹³⁹ project and provided resources, guidelines and information.
- The MCF Central administration, office of Communication management strongly contests the CVI-ROA Community Based Information Resource (CBIR) project and argues that all information should be issued directly from their offices. They acknowledge that should the project be operated by them service providers would not be allowed to provide their information directly to the web site nor would the service providers or other community groups necessarily be given access.
- The MCF Central administration, office of Information management supports the independence of the project when they realize that they cannot provide the flexibility needed for the project to succeed.

¹³⁹ The project became known as the Community Based Information Resource (CBIR) in its second year of operations due to the development of the web based presentation at <http://www.thewebpress.com>. All programming and web development work was carried out by this researcher.

Table 5.9: Summary Questions For CVI-ROA Trial Year One	Yes/No
a) Support and User Satisfaction	
▪ Is the model supported by managers.	Yes
▪ Is the model supported by the senior executive of the implementing organization or region.	Yes
▪ Is the model supported by the actions of the Central Administration	Yes
▪ Is the model supported by other organizations within the system	Yes
b) Time to Execute (minutes) (approximately 60 programs)	
• Training time - briefing and orientation to the concept.	120 min.
• Preparation of a program description requires how long.	480 min.
• Review, feedback and adjustment regarding each program requires.	NA
• Prioritization process, including voting and summary requires.	NA
c) Measures of Success	
• Is the model logical to participants.	Yes
• Does the model appear to the participants to establish a level playing field among programs.	Yes
• Decision-makers find the process straightforward to execute	Yes
• Decision-makers feel the inventory reflects their programs.	Yes
• Decision-makers feel the prioritization adequately reflects their programs.	Yes
• Decision-makers indicate they gain a better understanding of the interrelationships between programs	Yes
• The consequences of the model are consistent with expectations.	Yes
• The decision-makers feel that they would like to continue to use the process.	Yes
d) Change Management Issues	
• Is there an incentive for adopters?	Yes
• Are "some participants vilified?" i.e. are there bad people who need to change?	No
• Does the communication from the change instigator stay fact based?	Yes
e) Found Information Behaviors	
• In general is outcome information available?	No
• In general is program output information available?	Yes
• In general is program costing information available?	Yes
• In general is there evidence that the output and costing information have been put together to itemize the cost to provide an output?	No
• Is the organizational information model a HUB?	Yes

5.5.5.2 Year Two (Table 5.10)

At the end of the second year of the implementation all of the above items identified in year one continued to be true with the following additions.

- The MCF Regional Operating Officers met and reviewed the progress of the CBIR on several occasions in 1998 and on each occasion agreed that the CBIR pilot project should be expanded to include all ROAs in the province. This was supported by the MCF central administration.
- In the later part of 1998, the MCF Central Administration implemented a policy which pressured the service providers within the regions to merge into consolidated agencies. The result would be to eliminate approximately 50% of the not-for-profit organizations. It was argued that this would result in management savings and so reduce the management overheads associated with all projects. The consolidation process was seen to be very political in which agencies would be survivors.
- It was reported by the CVI-ROA administration that the approach by MCF to fundamentally change the nature of the service provider organizations quickly and dramatically eliminated trust between the service providers and the CVI-ROA management. CVI-ROA managers were considered by many service providers to be liars and untrustworthy.
- The service providers used media and interest group strategies and tactics to place pressure on the MCF and political leadership. . After applying considerable pressure to force consolidation the MCF Central office backed-off and indicated that it was no longer going to be mandatory.
- In the middle of 1999, the MCF Central Administration announced that it would cut each service provider program by 5%. The MCF expected the service providers to adjust their management 's structure to find the savings without having an impact upon the provision of services. Those organizations that indicated that they did not have any fat were vilified by the MCF administration. The budget adjustment was seen as arbitrary and counter to the Value Sieve budget process that was to be implemented in the CVI-ROA.

Again, the CVI-ROA was seen to be failing to meet their promise of stability during the change process.

- CVI-ROA administration indicates that the damage done in 1998 and 1999 had been severe and that a cooling off period would be required before the CBIR project could start-up again. Evaluations are currently underway to determine if and how the project may be restarted.

5.5.6 Inventory Results

A complete review of the inventory information gathered during the establishment of the baseline of information for the Value Sieve is beyond the scope of this analysis however it is instructive to identify several elements which have significance from an implementation perspective. These findings are:

- Very few programs know the actual cost of the services they provide on a per client basis.
- Very few programs measure/track the actual outcomes of the services they provide on a per client or group basis.
- Very few programs have measures which indicate when to stop providing services to a client.
- Very few programs have measures which indicate when to begin providing services to a client.
- Very few programs have clear cooperative working relationships with other service providers.
- Very few programs use regional data of any kind in making their management decisions.
- There are many disciplines and training backgrounds that are brought together in the provision of health related services.
- Most programs find it very difficult to determine what they would do with a 15% budget variation beyond "see fewer/more clients".

- Of the contracts which could be found by the CVI-ROA few had any measures of the service to be provided or its criteria for admission or discharge or cost per client targets. Consequently, it cannot be surprising that the service providers do not track that information. Most contracts used turnstile models, total expenditures, and descriptions of the service to be provided.

5.5.7 Observations

- The first year of implementation work was excellent. The CVI-ROA management acted consistently and spoke factually as we went through the implementation process. As expected the model was easily understood and seen to be a benefit to the service providers and their clients. The major concerns were associated with ensuring that the multi-year plan would be protected so that all parties had an opportunity to adjust their programs, documentation, and perspectives without being embarrassed or singled out. The service providers already saw themselves as competing for resources and saw an open process as an easier way to compete for their programs and the population of clients they served.
- The inventory tool works very well and while a little more work than expected to complete the first time, service providers indicated that the exercise was useful and would not be demanding to complete in the future. The idea was that we would support an electronic version of the program description that would only require updates as changes were made. Given this could be done electronically meant that the long term impact of the inventory and computerized database would be a labor savings and it was recognized by the service providers as such.

Table 5.10: Summary Questions For CVI-ROA Trial Year Two		Yes/No
a) Support and User Satisfaction		
	• Is the model supported by managers.	Yes
3	Is the model supported by the senior executive of the implementing organization or region.	Yes
	▪ Is the model supported by the actions of the Central Administration	No
	▪ Is the model supported by other organizations within the system	Yes
b) Time to Execute (minutes) (approximately 60 programs)		
	• Training time - briefing and orientation to the concept.	NA
	• Preparation of a program description requires how long.	NA
	• Review, feedback and adjustment regarding each program requires.	NA
	• Prioritization process, including voting and summary requires.	NA
c) Measures of Success		
	• Is the model logical to participants.	Yes
	• Does the model appear to the participants to establish a level playing field among programs.	Yes
	• Decision-makers find the process straightforward to execute	Yes
	• Decision-makers feel the inventory reflects their programs.	Yes
	• Decision-makers feel the prioritization adequately reflects their programs.	Yes
	• Decision-makers indicate they gain a better understanding of the interrelationships between programs	Yes
	• The consequences of the model are consistent with expectations.	NA
	• The decision-makers feel that they would like to continue to use the process.	Yes
d) Change Management Issues		
	• Is there an incentive for adopters?	
	• Are "some participants vilified?" i.e. are there bad people who need to change?	Yes
	• Does the communication from the change instigator stay fact based?	No
e) Found Information Behaviors		
	• In general is outcome information available?	No
	• In general is program output information available?	Yes
	• In general is program costing information available?	Yes
	• In general is there evidence that the output and costing information have been put together to itemize the cost to provide an output?	No
	• Is the organizational information model a HUB?	Yes

- There was no vilification of the service providers. No program, individual, or agency was identified as doing something wrong in the past. It was made clear that there was no history built into the Value Sieve process and that all programs were encouraged to work to realign themselves to an outcomes based VfM perspective. The incentive provided was that the Value Sieve project would work with them through the transition, and implementation phase to support them in coming to realistic conclusions about their services. The time frame was reasonable, with enough time for them to deal with their clients and their personnel fairly. However, at the end of that window the process would be in full operation and those that hadn't learned the skills and enjoyed the feedback would likely be at a disadvantage to those who had learned.
- The overview of the implementation of the Value Sieve and CBIR is described in more detail in Corbett (1998). A copy is in Appendix I.
- A CVI-ROA government information officer indicated that they had very good information available about the region. He/she indicated that many of the answers to the questions asked in the inventory were already clearly available. When asked to produce the information it became clear that the information did not exist. It is interesting to find that in working through in and around the organization there is a general tendency to find a distinction between the ROA personnel and the Central Office personnel. In general the difference is that the Central Office Personnel think that detailed information is available whereas the ROA personnel, in general know the information is either not available, unreliable, or not useful in making decisions in the field. This would seem to suggest that there is no clear organizational understanding about the different information needs for informed decision making at various levels within the hierarchy.
- The responses to the inventory questions were in general straightforward and without guile. Clear management and information issues were identified and it was clear that service providers were willing to cooperate and were in general desirous of developing professional and cooperative relationships. While in some cases the content of the responses was disturbing from a management

perspective it was hugely gratifying from an implementation perspective. It is not unreasonable for a service provider to provide the information requested by the contracting agency and to see that information as all that is needed to ensure funding continuity. Questions about the competency of the service are in most cases “self evident” to practitioners providing the service. I suspect that this is why a turnstile model works as a measure of productivity for these service providers.

- The government program managers initially indicated that they would have no difficulty completing the inventory however they predicted that the service providers would be unable or unwilling to participate. There was some mild surprise when it became clear that the contract service providers welcomed the development of a level playing field for resource allocation. Providers indicated that the majority were frustrated because much of the funding is allocated based upon justifications and rationales they believe to be based upon politics.
- The government program managers did not provide responses to the information tool. They explained that their programs were in transition and consequently, whatever they described would likely be wrong after the restructuring. It was my perception that the government managers were unwilling to expose themselves and that by delaying their response they would have a better chance at showing information that more appropriately reflected the current outcomes perspective. I believe that this shows the kind of pressure the government managers feel about having been doing the right thing in the eyes of their superiors. They missed an opportunity to set a baseline which would (I suspect) demonstrated that they to were trapped in dysfunction processes the same as the service providers.
- All of the implementation work of the Value Sieve the development of the databases and the CBIR was carried out by the researcher. This effort was complemented by the CVI-ROA, which contributed some of the time of the CVI-ROA Planning and Operations manager. The primary task of this manager was to ensure that the service providers had a consistent point of

contact, lead all public meetings, provide feedback about the development work, and represent the project to the MCF and other regional parties.

- There is very little sophistication in measurement issues with the managers and the desire to find information, which answers the priority questions, is very strong. There is a willingness to believe that, somewhere there will be data which can answer the difficult value questions. The desire to get better data could be a distracter from coming to grips with the notion that no matter what kind, or amount of data there is an unlimited demand for resources and consequently there will need to be a cut off which will be based upon incommensurable measures.
- A perverse outcome¹⁴⁰ of the MCF Central Administration actions has been to increase the unionization of the not-for-profit sector dramatically. The consequence of this is that there is less flexibility in the provision of services to the population and the costs associated with the provision of services has increased without there being any clear improvement in the quality of services.
- Cooperation between different government regional administrations is very difficult beyond the creation of superficial agreements. Each administration is working to get more than its fair share of the benefit and consequently trust between Ministries is difficult to maintain. The participants operate as though there is no long term nature to the relationship and consequently, from a game theory perspective, can be expected to take advantage of the short term at the cost of trust and a long term stable relationship. Political power or a significant carrot (money, prestige, and advancement) will be required to develop cooperative information resources that will enhance the determinants of health.
- Trust is a central requirement to implementing the Value Sieve in so large and complex an organization. It is essential that the resource-allocating agency speaks only facts and does not get into the values, the historic issues etc.

Service providers need to believe that the effort is intended to develop a level playing field where the demand for service, the qualitative and quantitative outcomes produced and the costs to generate those outcomes are the primary (only) considerations to the resource allocation process.

- The cyclic aspect of the Value Sieve model providing ongoing feedback regarding a programs priority, the opportunity to get additional resources based upon new innovations to performance and the notion that contract periods would be extended to include three year contracts were all seen as important incentives for the Value Sieve process. An incentive for early adopters would be to get access to some of the resources used by programs which failed to show VfM to the CVI-ROA.
- The change in the rules, imposed by the MCF Central Administration dramatically undermined the ability of the CVI-ROA to accomplish its goal of implementing a level playing field. The CVI-ROA in losing its ability to keep its word, lost its ability to develop trust relationships with service providers and other agencies.

5.5.8 Conclusions

The Value Sieve implementation worked well and was achieving its milestones as predicted. The Value Sieve model and the purpose of establishing the quasi-market is seen as sensible and appropriate to service providers and managers. The inventory tool works well as a basis of understanding the system of service delivery. The ability of the Value Sieve system to evolve and improve over-time is also acknowledged to enable resources to flow from lower VfM to higher VfM programs. The CBIR web site directly supports the model of the Value Sieve and demonstrates that a web based CBIR can be constructed and maintained inexpensively.

The implementation plan did assume that the CVI-ROA had sufficient control within the region to ensure that the needed stability could be provided during the

¹⁴⁰ This point was reported by several members of the CVI-ROA and has not been verified by any investigation on my part. I am respecting an agreement regarding confidentiality by not listing the sources.

implementation phase. This turned out to be an error and the resulting confusion within the CVI-ROA when the central ministry began to make changes prevented the use of a secondary strategy to protect the work that had been accomplished. By this I suggest that the implementation could have continued (and should have) during the Central Office involvement by continuing to focus on the facts of the situation and dealing with the influences as facts that had to be dealt with. However, the emotions and stress were so extreme that it was easier to disengage from the process. This caused the CVI-ROA to be seen as inconsistent with its earlier statements of honesty and a participant with the central MCF administration's changes.

The data collected makes it clear that there is no consequential accountability linking measured client health outcomes to the input resources in the current resource allocation process. The only accountabilities that could be found were financial and procedural. Financial accountability showed that the finance people knew where money went. Procedural accountability showed that in most cases administrative procedures were followed. However, the quality of the procedure, like record keeping was questionable. In the CVI-ROA there was no reason to believe that variance was due to anything more than overwork and the quality of reports and records which had been sent to the new office from the various organizations which formerly controlled the programs. There was minimal consequential accountability except where it related to media stories. In these cases, it was clear that the CVI-ROA managers were in the worst possible situation. The absence of measures and information about what they were accomplishing with their limited resources meant that there was no real data to defend themselves when problems with children or families became public. The absence of data makes it unreasonable in most cases for civil servants to defend themselves and made it reasonably easy for a politician or senior civil servant to indicate that issues of consequence were regional problems. The power of authority in the environment makes it likely that except in clear and overt circumstances there will be no "paper trail" to generate consequential accountability to senior administrator or politicians.

The change of position by the central administration of MCF to become involved in the management of the issues within the regions dramatically reduced the

needed trust between the service providing agencies and the CVI-ROA. It will be difficult for the CVI-ROA administrators to suggest that they have sufficient control in the future to protect service providers who would be willing to take the risk of investing their energies in change processes. The underlying problem is determining the argument or condition where the service provider will be willing to lay open any weaknesses that the service provider suspects may expose the program or organization to risk in the future.

Program managers of service provider organizations and the government seem to believe that the Value Sieve is an appropriate tool to implement a level playing field which can improve the delivery of service to improve the health of the population served and the organizations and professionals who provide those services. To be implemented the model must be clearly supported by the administration which will control the resource allocation process. If for any reason the service providers are led to believe that the process will not be supported then, like any change to a system in equilibrium the change will experience resistance.

It is very difficult for government managers to come to terms with the idea that services provided by an agency other than government must be protected because they save government resources or perhaps carry out services in a way which is inappropriate for government organizations. Managers tend to consider the solution to problems using resources they can control and to ignore those activities and programs which may directly aid their clients but for which they cannot be certain. The consequence of this is that complementary and cooperative actions are for the most part myths or superficial.

5.5.9 Trial Summary

5.5.9.1 Point One

In the current management environment the primary behavior which is triggered when there is a problem, is to get information. This behavior is maladaptive in all but two circumstances¹⁴¹:

¹⁴¹ note that condition 1 is simply a special case of condition 2

- where commensurable information is available which unequivocally resolves (refutes or supports) the problem and so there is a simple information argument.
- where there is incommensurable information the only solution is to have complete information about all of the incommensurable but measured activities. This complete picture will direct the parties to value the priorities of the incommensurable yet measured options. In this situation the argument will not be simple but can occur by focusing on the relative utilities (values and priorities) of the options.

When these two conditions of completeness are not met manager & technical people must accept political or administrative power based directives not because the directives are technically sound but because they work in an environment where senior administrators and politicians have sufficient authority to require this. However, it is unreasonable and maladaptive to require managers & technical personnel to enhance political arguments so that they may be made to look technically sound.

In future the staged implementation plan should first focus and protect the implementation and use of the Value Sieve and prioritization of programs. It should be expected that the desire to acquire additional information will be very strong however it should be ignored, even in case where there appears to be time and resources to develop the Value Sieve and CBIR in parallel. Even though I was clearly implementing the Value Sieve I allowed the effort to be distracted to attend to the collection of additional supportive information which could not possibly meet the actual needs of the managers.

5.5.9.2 Point Two

In the large complex open system through which the determinants of health influence the health of the population there are several rules of thumb which will increase the probability of success. These are:

- The senior administration and the politicians in control must agree to provide a truthful stable environment, consistent with the values embedded in the model of the Value Sieve.

- An open process is the only method which can ensure that consequential accountability reaches the decision-makers. In particular the senior levels of the organization and the political members.
- Participants must be allowed some degree of privacy while they go through their transformation and there should be rewards for early adopters of the process.
- Start at the lowest level of the organization because it is there that you have the most information and the greatest degree of control.

5.5.9.3 Point Three

The Value Sieve inventory collects information that will assist in identifying organizations, and programs which are not funded but participate in the provision of health benefits to the target population. It is important to encourage community resources and social capital, are used where possible to protect the existing supportive community ecology so as not to damage the efforts of the citizens themselves. Determinants of health programs need to do this to ensure that responsibility for the health of a community does not immediately become the responsibility of government. To prevent organization boundary blindness a short form of the inventory tool should be developed to better identify community determinants of health infrastructure.

5.6 Integrated Summary of Case Studies Findings, Observations and Conclusions

5.6.1 Overview

All of the organizations studied were government or not-for-profit organizations and all of the organizations are well regarded by the population and seen as useful and important community/regional endeavors. Each organization was under pressure to provide more efficient and or more effective services. None of the organizations had clear delineation of the boundary of its services within its operating community. I.e. all organizations felt that they could do more if given more resources and that the additional resources would develop new programs for the community. This would mean that each organization would also feel a sense of loss if it were to reduce its existing services provided to the community. In this

regard, another common pressure existed to find efficiencies that would have little or no impact upon the population currently enjoying a service.

In most of the discussions managers believed they had a budget problems to resolve and not information problems per se. Managers within these organizations tended to have training which focused on the services related to assistance provided. Thus, backgrounds would tend to include medicine, social work, nursing, education, and other health and social service professions.

5.6.2 Summary

In this section, I will go back to my initial questions and answer each based upon the information collected to date.

- Review the combined trial findings, for each section of the score card and the answers to each question originally posed within that section.
- Summary Observations within the context of the Design Parameters of the Value Sieve
- Summary Conclusions within the context of the Design Parameters of the Value Sieve

5.6.3 Support and User Satisfaction (Table 5.11)

Table 5.11: a) Support and User Satisfaction	CFD	YMCA	CVIR
• Is the model supported by managers.	Yes	Yes	Yes
• Is the model supported by the senior executive of the implementing organization or region.	Yes	Yes	Yes
• Is the model supported by the actions of the Central Administration	Yes	NA	Yes
• Is the model supported by other organizations within the system	Yes	NA	Yes

5.6.3.1 Is the Model Supported by Managers

The Value Sieve model was supported by all managers who would be directly involved in the prioritization of activities and programs. It is appropriate to note that this support was given after a briefing regarding the Value Sieve and its implementation strategy was explained.

Given that there was senior management support for the implementation in each case, it is difficult to know the extent that managers may have rejected the model if they believed there was no support from senior executives.

5.6.3.2 Is the Model Supported by the Senior Executive of the Implementing Organization or Region

The Value Sieve model was supported by all senior executive who would be directly involved in the prioritization of activities and programs within the organization responsible for resource allocation. This level within the organization would be capped at the board of Directors.

5.6.3.3 Is the Model Supported by the Actions of the Central Administration

In the case where there was a separate and distinct supervising administration to the executive in charge of the organization (example CRD and CVI-ROA) the Value Sieve model was supported by all central administration who would ultimately be involved in the prioritization of activities and programs.

5.6.3.4 Is the Model Supported by Other Organizations within the System

The Value Sieve model was supported by all management participants within the larger system of service providers involved. This larger system of service providers included the CVI-ROA and the CRD projects. In the case of the YMCA, no other service provider organizations were involved.

Essential Question From a practical point of view does the model establish a basis for decision making within and between programs and organizations that permits evolution of the participating programs and organizations with a minimum of procedural constraints.

Answer Yes, the Value Sieve appears to establish relationships within and between organizations. It does so in a way that does not constrain any participant in doing what it has been instructed to do or believes it must do. I.e. the technique promotes meaningful communication and cooperation.

5.6.4 Time to Execute (Table 5.12)

Table 5.12: b) Time to Execute (minutes)	CRD	YMCA	CVIR
• Approximate Number of Programs	40	60	150
• Training time - briefing and orientation to the concept.	120	120	120
• Preparation of a program description requires how long.	60	60	480
• Review, feedback and adjustment regarding each program requires.	60	30	NA
• Prioritization process, including voting and summary requires.	960	480	NA

5.6.4.1 Training Time - briefing and orientation to the concept

The briefing time is reasonably quick with two hours consistently covering an introduction and question and answer period. This was consistent in all settings. It should be noted that a short printed document was also provided to ensure understanding. No testing was done to confirm comprehension however; the behaviors of the managers in follow-up activities tend to confirm comprehension of the Value Sieve and its implications for the resource allocation process of the enterprise.

5.6.4.2 Preparation of a Program Description (time required)

In cases where there is some pressure on managers to quickly generate a program description a simplified version can be completed in one or two hours. However, in cases where the full inventory tool is completed it is the case that considerably more time is required. Estimates of up to 8 hours were required to complete the full inventory document the first time. It was expected, given program continuity over time, that a similar investment will not be required on an annual basis. It is important to note that in many cases the service providers indicated that they had never been asked to complete such an extensive program description before. So in some/many cases were required to calculate estimates of cost to achieve outputs for the first time.

5.6.4.3 Review, Feedback and Adjustment Regarding Each Program (time required)

The review of a program tends to require 1 hour. This estimate is based upon the times of the YMCA and the CRD. The CVI-ROA program documents were

reviewed by directors and managers who in general speculated that they had spent no more than one hour per program review. The CCVI-ROA experience was not entered because the reviews were for feedback and did not include preparation for prioritization.

5.6.4.4 Prioritization Process, Including Voting and Summary (time required)

The complete prioritization process for 40 to 60 programs required 6 to 12 hours complete. This includes all activities after reading the program description on to actual prioritization, voting and documenting the agreement.

This was the first time each group had carried out the procedure and I believe that there are arguments which could be used to suggest that the time in the future might be different.

- Less Time - The managers have a better understanding of the process and the programs within their organization and as a consequence the discussion and debate focuses more quickly.
- More Time - The managers have a better understanding of the strengths and weakness of the process and programs and so delve more deeply into the discussion of their programs and the relationship between programs and outcomes and costs.

5.6.5 Measures of Success (Table 5.13)

Table 5.13: c) Measures of Success	CRD	YMCA	CVIR
• Is the model logical to participants.	Yes	Yes	Yes
• Does the model appear to the participants to establish a level playing field among programs.	Yes	Yes	Yes
• Decision-makers find the process straightforward to execute	Yes	Yes	Yes
• Decision-makers feel the inventory reflects their programs.	Yes	Yes	Yes
• Decision-makers feel the prioritization adequately reflects their programs.	Yes	Yes	Yes
• Decision-makers indicate they gain a better understanding of the interrelationships between programs	Yes	Yes	Yes
• The consequences of the model are consistent with expectations.	Yes	Yes	Yes
• The decision-makers feel that they would like to continue to use the process.	Yes	Yes	Yes

5.6.5.1 Is the Model Logical to Participants

The Value Sieve model is clear and understandable to all participants. There are very few that do not immediately grasp the strengths and weaknesses of the approach. This means that implementation is reasonably easy because individuals within the organization understand the model.

It is important to note that in this situation some care must be taken in that there was no “test of comprehension” given to the participants.

5.6.5.2 Does the Model Appear to the Participants to Establish a Level Playing Field among Programs

The model appears to the individuals to establish a level playing field and managers are very willing to work within a model that allows a level playing field. However, many express concerns that the current “political” method will come back and result in the efforts associated with the Value Sieve being wasted.

5.6.5.3 Decision-makers Find the Process Straightforward to Execute

All managers found the Value Sieve process straightforward and easy to implement. This is not to suggest there were not careful considerations or some degree of trepidation about difficult choices. However, it is clear that the managers knew that the process was logical and more appropriate than an across the board cut.

5.6.5.4 Decision-makers Feel the Inventory Reflects their Programs

In all cases, the managers felt the program description did an adequate job of describing their programs. It should be noted that this did not mean that managers would not invest more in the program documentation in the future. The controlled but continuing investment in their programs is an expectation associated with the implementation of the model.

5.6.5.5 Decision-makers Feel the Prioritization Adequately Reflects Their Programs

The application of the sieve in the CRD and the YMCA continued to receive support from the managers after the results of prioritization were known.

5.6.5.6 Decision-makers Indicate They Gain a Better Understanding of the Interrelationships Between Programs

In most cases managers indicate that they have learned something from the description of the different programs and the opportunity to discuss the value of each program relative to others. There is some evidence that shifts in program value take place due to the discussion.

5.6.5.7 The Consequences of the Model are Consistent with Expectations.

Managers felt that the result of the Value Sieve inventory exercise and prioritization process delivered an outcome consistent with expectations. They also believe that future use of the Value Sieve will find additional “fat” as pressure is brought to compress organizational costs within the values of the management team.

5.6.5.8 The Decision-makers feel that they would like to Continue to Use the Process.

In all cases the decision-makers felt the process was useful and agreed that they would like to maintain the process. There has been no follow-up to know the extent that managers actually did continue to use the Value Sieve process.

Question: Is the Value Sieve model logical to a decision-maker or group of decision-makers. It is essential that the participants in the system believe that the model being discussed could be implemented by their organizations without significant cost or disruption and that the model organizes activities and information within an organization in a logical way. Further, it is essential that senior personnel in particular uphold the model and so create the necessary support.

Answer: Yes, the model is logical to a decision-maker or group of decision-makers.

Question: Does the Value Sieve process seem to provide a level playing field where participants are willing, to compete for resources and expect an evenhanded result from the competition.

Answer: Yes, the Value Sieve is seen as providing a level playing field.

Question: Does the Value Sieve establish the environment for the improvement of the decision making process by identifying accountability and fundamental data which is necessary for informed decision making.

Answer: Yes, the Value Sieve supports consequential accountability and the identification of fundamental data which is necessary for informed decision making. Caution must be expressed here in that there is the possibility of a dysfunctional adaptation. This would be caused when a decision-maker or group of decision-makers determines that the data must be collected before a prioritization can take place. The result of this will be an effort to expect the data to be collected to somehow resolve the value judgements that are required to work with scarce resources.

Question: Does the Value Sieve as a process clarify the accountability of the participants and reduce the probability of procedural errors thus helping organizations reduce wasteful procedures and activities. Some of these activities being associated with the development or refinement of measurement systems whose improvements will not improve the effectiveness or efficiency of the operation. In other cases, the technique may identify that an investment in information technology is premature.

Answer: Yes, the Value Sieve clarifies accountability of the participants.

5.6.6 Change Management Issues (Table 5.14)

Table 5.14: d) Change Management Issues	CRD	YMCA	CVIR
▪ Is there an incentive for adopters?	Yes	Yes	Yes
▪ Are "some participants vilified?" i.e. are there bad people who need to change?	No	No	No
▪ Does the communication from the change instigator stay fact based?	Yes	Yes	Yes

5.6.6.1 Is There an Incentive for Adopters?

In the briefings for the implementation of the Value Sieve, the incentive was based upon the maintenance of the current funding level. In all cases the rapid adoption of the model was based upon the manager's recognition that they were being required to protect the best interests of their clients and that they would

have several years to reorganize their efforts to more effectively compete for resources in the future. This window of opportunity was finite and so early adopters could expect to maximize their learning curve and so protect their current resources but also learn to gather new resources in the future. Further by providing a window there was a clear realization that errors detected would have no negative consequence. This would make the implementation period an opportunity to clarify circumstances and to ensure understanding without fear of immediate consequence.

There were no immediate, personal financial incentives made available to the individual managers or participants. It would be possible to conclude that future personal incentives could be tied to promotion etc. which could conceivably be linked in the mind of the implementing manager.

5.6.6.2 Are “Some Participants Vilified?” (i.e. are there bad people who need to change?)

In the initial implementation, great effort was taken to ensure that service providers were acknowledged as doing what they believed to be best and there was no sense that anything inappropriate had taken place. This was a conscious element to avoid service providers becoming defensive or obstructionist in the process. It is critical to cause the service providers to direct their attention to the transformation of their organizations with as little energy needed to save face or react to small issues that could distract the participants from the issues of change.

In the second phase of the MCF CVI-ROA project, the senior administration was distressed to see the central administration pressing independent service provider organizations towards merger. The clear implication associated with this effort was a lack of respect for the enterprises that had been created to meet the specific needs of the population. During this attempt to reduce the number of independent not-for-profit agencies some statements were made that implied managers that did not want to participate in the destruction of their own organizations were poor managers who were not interested in the community of the persons served. A similar pressure took place when not-for-profit service providers had their contracts arbitrarily rolled back by the government who indicated that the

contracted work agreed to within the service contracts could be done with less administration.

5.6.6.3 Does the Communication from the Change Instigator Stay Fact Based?

In the three implementations, the communications stayed fact based. All aspects of what was expected and required of service providers were made clear. There was no statement that the impact of cost compression would or would not result in a reduction of services. It was only stated that the decisions and priorities of the managers would be reviewed through an open process so that other internal managers and external experts, and in some cases clients would have an opportunity to review the programs and their prioritization. Should the prioritization result in a legitimate need to reduce services or change the way things were done then that would be dealt with openly after the prioritization process was complete.

Only in the case of the second phase of the CVI-ROA implementation did the procedure break away from fact based information. The disruption caused by this break from fact brought the entire regional organization into disrepute. Examples of breaks from fact include:

- there was no credible evidence that the consolidation of service providers and their contracts would produce cost savings or an improvement to deliver services to the persons served; and
- there was no credible argument that a 5% funding cut to service providers would have no impact upon the services provided to the persons served.

It is important to be clear that I am not suggesting that these statements may or may not have turned out to be correct. I am simply stating that there was no reasonable method in place within the organization to acquire the information which could then be shared with service providers so as to allow these statement to be regarded as factual. Consequently, the result of these non-fact-based arguments was to damage the trust relationship between the service providers and the regional CVI-ROA government managers and redirect what had largely been a constructive and cooperative effort.

I.e. the notion of fact based argument does not mean that all news will be good news. It does mean that the statements of fact will be able to be seen as fact and not opinion or manipulation by participants.

Question: Does the Value Sieve meet the practical needs associated with a management information system including the costs associated with the production of a working system.

Answer: Yes, the Value Sieve clarifies information required and provides an understanding of who will be responsible for the information to be put into a system and the value of that information to which programs and organizations.

5.6.7 Found Information Behaviors (Table 5.15)

Table 5.15: e) Found Information Behaviors	CRD	YMCA	CVIR
• In general is outcome information available?	No	No	No
• In general is program output information available?	Yes	Yes	Yes
• In general is program costing information available?	Yes	Yes	Yes
• In general is there evidence that the output and costing information have been put together to itemize the cost to provide an output?	No	No	No
• Is the organizational information model a HUB?	Yes	Yes	Yes

5.6.7.1 In General is Program Outcome Information Available?

In general, outcome information is not available for programs and/or organizations. These organizations may point to the measure of the problem and argue it as an indicator of demand for their services however in most cases they would not accept that their efforts could be directly inferred by measuring the change in the problem demand indicator.

For example: family violence could be seen as an important social/health problem. Organizations may acquire resources by identifying the need to address problems of family violence. The programs would not, in general be willing to agree a priori that should family violence increase their program was the cause. It should be noted that the programs would very likely use a favorable change in family violence as an indicator that their program was successful.

How do programs adjust themselves if the individuals they serve are not the same as the clients who pay for the service? To what extent is it possible to know that

persons served are getting the service they want and are not satisficing based upon the services that are available? What feedback mechanism would allow an organization to change the nature of its service to improve the satisfaction of the persons served? What barriers exist that would constrain the programmatic changes based upon what the “payer” believes is appropriate?

The absence of outcome information makes it difficult to determine the value of what is being accomplished by the program. I.e. the programs factual relationship between the problem it has identified as a concern and the efficacy of its services to address the problem. The absence of outcome information makes it difficult to know whether some efforts are better than others are.

In circumstances where outcomes are uncertain, it is important to know the traps that may befall decision-makers that ignore the inherent decision problems that human beings are subject to when drawing conclusions in complex and uncertain environments. This general concern can be seen as part of an increasing pressure to move to evidence based decision making in the health and social sciences. It is understood that an argument to move decision making towards evidence based effort hints that the current efforts are not based upon evidence.

In regards to evidence based practice I am not aware of systematic evidence which would suggest that an evidence based approach to health and social services will result in cost savings to the system or an overall improvement to the health of the population served. This is supported by the McMaster University Faculty of Health Science, Evidence Based Medicine Group who provide the following two statements.

“The proof of the pudding of evidence-based medicine lies in whether patients cared for in this fashion enjoy better health. This proof is no more achievable for the new paradigm than it is for the old, for no long-term randomized trials of traditional and evidence-based medical education are likely to be carried out.”

“Our advocating evidence-based medicine in the absence of definitive evidence of its superiority in improving patient outcomes may appear to be an internal contradiction. As has been pointed out, however, evidence-based medicine does

not advocate a rejection of all innovations in the absence of definitive evidence."¹⁴²

5.6.7.2 In General Is Program Output Information Available?

To a large extent organizations collect simple measures of output. The most common being the number of persons served by their programs.

In some cases, additional clarification should be required to clarify who receives service and what it means to receive service. This would include some indication of the change in the client served and define when service would be complete. In some cases, this may be very simple. For example, we take people measured at a reading level below grade 3 and they go through a sequence of programs that move them from grade 3 through to grade 10 reading levels. Some medical and social programs have these clear criteria to enter and exit a program. Yet it is remarkable to note that many programs do not have these established criteria or if they do, they are not enforced.

A community health example might be a street youth hunger program. Free food and medical/hygiene supplies are provided to youth that arrive on the doorstep (van step) of the program. Although the program is funded for youth, anyone may ask for food or hygiene supplies.

Based upon the experience of the CVI-ROA inventory, rigid criteria are seldom used for determining who may enter a program and frequently there are no criteria used to determine when someone should leave a program. The absence of these measures to support the number of persons served information suggests that client feedback will be difficult to acquire in a meaningful way. I.e. how should we define the persons we can best serve if we don't control the characteristics of persons and their participation? Further, how can it be known that a change in technical approach resulted in an improvement for a specific portion of the persons served?

¹⁴² McMaster University Faculty of Health Sciences, Evidenced Based Medicine Group public web page January 22, 1999
<http://hiru.mcmaster.ca/ebm/overview.htm#Contents> This document is included in Appendix E: Evidence Based Care Commentary By McMaster Health Sciences.

5.6.7.3 In General Is Program Costing Information Available?

There is a clear ability to track down and know what money was spent where. However in most cases resources are allocated by organization or by administrative division and not by program. Consequently, some effort is required to collect the spending information and make it available in a form that is suitable for program costing.

5.6.7.4 In General is There Evidence that the Output and Costing Information have been put Together to Itemize the Cost to Provide an Output?

In general costing information is not put together with output information. In most cases, the request to bring this information together for the Value Sieve is the first time that the managers/organizations put these pieces of information together. In most cases, the task was difficult and resulted in a first approximation. The task was not easy because information is not organized to link costs and outputs.

The difficulty in combining these two information streams suggests that the majority of programs do not acquaint themselves with the cost per output for the majority of their activities. Given this and the lack of measured and enforced criteria for many programs it is only possible to understand the mechanism used for decision making as relying primarily on individual service practitioner judgement.

This suggests that practitioners do not have an independent and consistent mechanism that provides feedback between the costs or outputs associated with their practice. Further, it would make it difficult for managers without technical expertise to work with the practitioners to adapt services to more cost effectively deliver outputs. Finally, it would make it unrealistic to identify the cost to achieve outcomes if costs to achieve outputs were not already known.

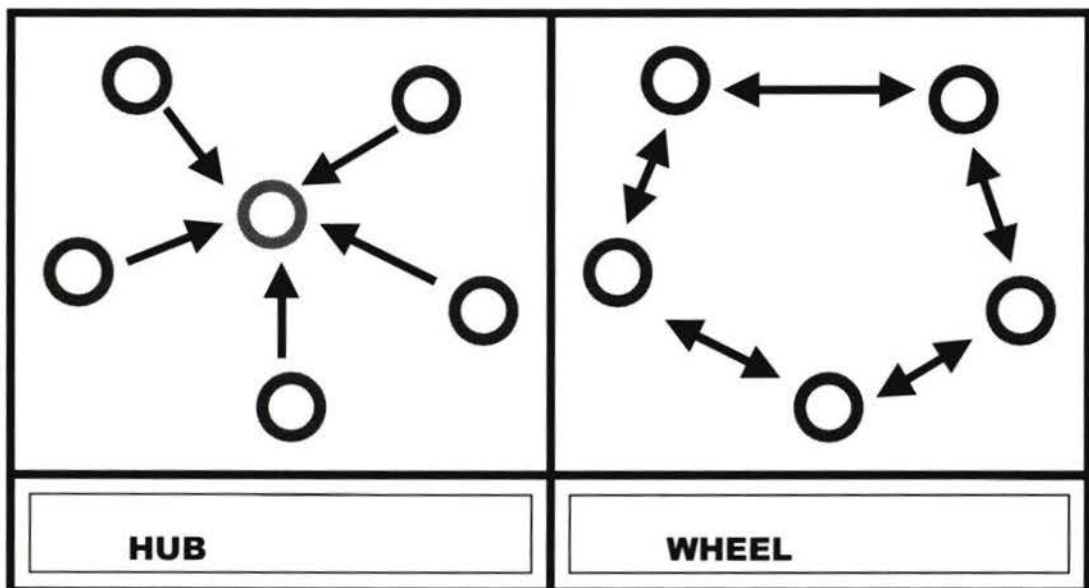
5.6.7.5 Is the Organizational Information Model a HUB?

While there are many different types of organizational structure most administrations within health and social services organize themselves in hierarchical working units where programs and divisions report "upwards" in the hierarchy and the responsibility for the integration of the activities of the different

programs and divisions happens at a more senior level. From a simplistic perspective, I am calling this a hub model¹⁴³.

The hub model (Figure 5.1) works well in solving problems in simple environments however as the task becomes more complex a stronger team structure is required. This team structure, known as a wheel, is shown more effective at solving problems within complex environments.

Figure 5.1: Bavelas Hub and Wheel



In all cases reviewed, the organizational information model was a hub. Consequently, there was a requirement for coordination and feedback from a central coordinator to managers and their programs. In all these cases, a central administrative unit managed the financial details of the organization while managers were primarily focused upon the coordination of the delivery of service. This would mean that in general directors or managers rarely if ever reviewed the strategies of their peers for any reason. Adjustment and coordination take place between a manager or director and the senior executive.

Question: Will the Value Sieve work in a variety of organizational environments in a consistent fashion. This issue considers the ability of the Value Sieve to work

¹⁴³ This is in keeping with terminology used by Alex Bavelas in his communication and problem solving experiments.

in small, medium and large organizations. Further, it must consider different organizational work strategies. These include organizations that perform the majority of their work using in-house staff versus organizations which use mixed strategies of in-house and contracted services.

Answer: Yes, the Value Sieve appears to work well in organizations of different scope.

5.6.7.6 Summary Structural Questions

Question: Does the Value Sieve provide a basic/essential information structure necessary to support the use of information science to support the future of the organization(s).

Answer: Yes, the Value Sieve appears to assist in defining outputs, costs and the relationships between a programs outputs and costs and those of others. The clear separation of outputs and outcomes is expected to support the understanding of the difficulty of inferring causal relationships based upon the determinants of health. Therefore the use of evidence based practice will allow the causal arguments to be made using valid and reliable research “references”.

Question: Can the Value Sieve meet the challenges associated with being implemented in a current health/social service working environment? This would require the methodology to deal with a large variety in the quantity and quality of information in addition to the variety of knowledge and training levels of the personnel.

Answer: Yes, the Value Sieve can be implemented into a current environment with minimal disruption to the workflow. Training is simple and support for the process is minimal. The cases to date would suggest that benefits associated with decision-maker prioritization would include opportunities for cost compression.

Question: Does the Value Sieve identify the information culture of an organization and provide information behaviors that improve the information culture of the organization.

Answer: Yes, the Value Sieve appears to begin by developing a clear and consistent mental model for resource allocation with consequential accountability.

From this underpinning improvement, information behaviors are fostered and rewarded. The benefits to the information culture would appear to be an acceptance that information culture is important and is necessary to support the essential information behaviors. Participants find the model meets their need to distinguish between qualitative and quantitative outcomes and the difficulty of confirming causal relationships.

Question: Does the Value Sieve provide an important bridge between political and technical arguments?

Answer: Yes, the Value Sieve allows the consistent integration of political administrative and technical authority. By allowing each to be identified within the prioritization of programs and the consequences to be inferred from the prioritization.

The Value Sieve allows the priorities of the program to show the balance of technical and political preferences. This allows the question to be asked of both politicians and technical persons why they have prioritized programs the way they have and how data has been interpreted.

It does not prevent the exercise of political or administrative authority but does identify that political or administrative authority was used to adjust the priorities of programs to ensure funding support at the margin. The result is that a “forced program” can be valued against the marginal program, which was not funded in order to ensure that the “forced program” was funded.

Question: To what extent does the Value Sieve process provide constructive approaches to multi-player solutions?

Answer: The Value Sieve appears to establish, through the use of peer review and program cooperatives a better understanding of the relationships between programs, within and between organizations.

Question: What are the key barriers to implementation of the Value Sieve.

Answer: The key barriers to implementation are:

- the acceptance that the current practice within the organization can be improved,
- that improvement must be based upon a clear and consistent model of resource allocation with consequential accountability,
- the process can only be implemented as high in the hierarchy as a senior person is able to defend the process,
- a need for participants to act factually and to avoid the generation of additional uncertainty through the use or reference to politics.
- consistency,
- leadership to establish the necessary support and environment,
- the desire for a quick fix instead of a level playing field,
- the belief that a solution does not require the support and effort of the participants,
- the desire for secrecy or the belief that openness must be avoided and
- the desire by those who wish to operate using unrevealed politics to use their power to derail the process.

Question: Are there indications that the Value Sieve may identify errors in judgement which are associated with the psychology/economics of uncertainty?

Answer: Yes, the Value Sieve allows the judgement of program managers to be evaluated from multiple perspective through the openness of the decision making process. So for example, a common problem of subjective probability can be queried by others who may have data, or findings that suggest the subjective probabilities being used must be adjusted.

A concrete example is the problem of sunk costs. Those expenditures which have already been made when placed within the context of forgoing other outputs/outcomes from the most "marginal unfunded program" It becomes clear that the costs associated with the initial error in estimation continue to cost

outputs/outcomes and should reinforce that the choice to continue to invest in/support a sunk cost must be made as though a new program proposal was being received.

Question: Are new patterns detected based upon the need to look for 15% budget reduction and 15% budget increases?

Answer: Yes, the Value Sieve allows program managers and senior administrators to understand the probable consequences associated with reasonably dramatic changes in resources. By facilitating the review of the options given changes at the margin of the funding more appropriate program structures can be developed which protect the organization, the clients and the personnel from sub optimization resulting from changes in the environment.

Question: Does the value support evidence based practice, best practice, quality initiatives and contract reform?

Answer: Yes. The Value Sieve does not constrain the decision making the organization structure or relationships of any participant it simply assist in identifying the impact change may have on priorities and the complex relationships which provide value to the client of the health and social safety systems.

5.6.8 Summary Observations Regarding Value Sieve Design

The purpose of this section is to reframe the research findings to address the basic design elements of the Value Sieve.

5.6.8.1 Regarding Prioritization

- Managers tend to believe that there are important differences between programs in both their specific importance and their impact upon the target population. The use of prioritization is seen to be an appropriate method for ensuring that the most important services are recognized as such.
- Managers felt that the participation in the prioritizing process was beneficial to their knowledge of the organization and their working relationships.

- While smaller percentage parameters (increase/decrease) in the programs budgets work it is clear that, the detailed discussion of priorities of programs are lessened and that it is possible to substitute reductions of smaller spending elements included within a budget. For example, changes in travel, reduction of management support etc.
- In the trials of the Value Sieve, prioritization cost reduction of approximately 5% took place. These efforts used existing information available within the organization.
- Managers become aware of issues that the senior administrator may be trying to manage which in some cases might be invisible to managers on a normal basis. For example, several changes to programs and expense centers within the YMYWCA programs were not possible because they were seen by the Board as important features of the organization. This point is not to suggest these Board level priorities were right or wrong however they clearly have an impact upon the degrees of freedom available to the managers and when placed in context meant that there was no frustration about these constraints as they were imposed and further, it was clear that managers began to support the use of the priorities style of argument to better support the discussion “next time”. In this way, administrators and managers were consistently dealing with the facts of the situation.

5.6.8.2 Regarding Program Design

- Managers are frequently required to design programs which meet the specific expectations of funding bodies. Within this context, managers tend to compartmentalize programs to link with the source of funding and the information required to maintain the funding.
- The programs and their relationships were complex.

5.6.8.3 Regarding Coordination

- Programs rarely considered their impact upon other programs outside of the immediate boundary. In most cases, the boundary was the program itself.

- The members involved in the process of providing support information to the senior managers and directors responded well to the logic of the process and were constructive in the comments they provided. It was not the case that individuals became unreasonably self interested in their own programs. A great many positive and constructive comments were given to other programs in an effort to ensure the important features of the organization were not lost.

5.6.8.4 Regarding Measurement

- Managers are very imaginative and are capable of reframing a program so that it meets the specific expectations of one or more funding organizations. In conversations with managers, it was clear that with a little imagination managers could portray a program from a variety of perspectives. This point is not to suggest that these individuals were being dishonest but instead recognized the broad possibilities and implications of many health, community and social service programs which in turn could be used to promote an existing program or slightly modified existing program.
- Managers seem to know that the senior administrators cannot know the details of the work that is carried out and that in most circumstances the senior administration is unaware of the full implications of different changes to the programs.
- Managers believe that outcome measurement can be accomplished but will likely be extremely difficult for most programs.
- Managers tend to have no measurement design and development experience. The proposals to use measurement are often ill conceived and

5.6.8.5 Regarding Politics

- Trust is an essential characteristic in the relationship between senior administrators and the program managers. If there is not a belief that the senior administrator will fairly mitigate the aftermath associated with prioritization, such as budgets consequences and/or program changes then it is unreasonable to expect managers to risk through exposing themselves or their programs to others.

- Administrators supporting the process become aware of the variety of issues that their managers must deal with and the complexity of the work.
- The process was perceived to manage the politics of resource allocation in that special funding relationships had to be identified and justified if they were special. No manager wanted to be seen as untrustworthy to their peers and no administrator wanted to appear overly biased for one program versus another if it could not be substantiated with the prioritization.
- No manager indicated that they thought politics would be removed from resource allocation. However, they did indicate that in most cases the politics of prioritization would clearly identify those programs and activities that were required for political reasons versus straight program reasons. The consequence would seem to be a reduction in the uncertainty experienced by the managers and the staff.

5.6.8.6 Regarding Competition

- Most managers believe they know where the weaknesses exist in other manager's programs and that they will identify these as necessary to minimize the impact upon their own programs or other programs they believe have a higher priority.
- Most managers believe they know where the weaknesses exist in their own programs and that they will identify these as necessary to minimize the impact upon their own programs or other programs they believe have a higher priority.

5.6.8.7 Regarding Mental Models

- Managers tend to believe that there are important differences between private business and not-for-profit organizations. In general, this can be boiled down to a distrust of profit as an incentive to direct the efforts of individuals. This is extended to suggest that those motivated by profit incentives cannot be trusted to deliver social benefits. There is consequently a strong desire to avoid the use of business references. There is therefore a failure to understand the similarity and differences that underlie these endeavors.

- When discussions included the notion of competing for resources, some managers tended to think that this would eliminate the ability to cooperate. Managers spoke a great deal about cooperation and collaborative efforts. However, rarely did their program information describe any cooperation or collaboration from a resource perspective or from a client management/optimization perspective. In most cases, their actions were clearly competitive for resource with other organizations and in some cases with other programs within their own organizations.
- In considering all the programs and managers there is no clear stated model of behavior which can be consistently matched to the information collected. In other words, there is no apparent “corollary to the profit motive” which is consistently expressed and demonstrated in the behaviors of the organizations. Much of the effort carried out by service providers and programs is more along the lines of interest groups.

5.6.8.8 Regarding Value Sieve Design/Model

- It isn't until the Value Sieve inventory process is provided that managers begin to express concern that they don't have sufficient information to answer the inventory tool easily. Up until the time that the inventory tool is provided most service providers and managers, believe they have a good understanding of their programs and adequate knowledge for management decision making and budgeting. It is not clear whether the requirement to demonstrate their values using the Value Sieve framework is the cause of their concern and so they wish more information to defend their choices, or whether the mental shift caused by the Value Sieve makes the accountable decision-maker realize the discontinuities in their mental models.
- The internal peer review process works well and is not diminished with the inclusion of additional external “peer/cooperative” reviews.
- Timeliness is a major element in controlling the desire of managers to collect additional information. I.e. fixed time frames are important to control the desire of managers from creating better arguments. In the case of the CVI it was clear that considerable effort was directed to the completion of the

inventory documents and that even this effort generated what might, “from a business administrators point of view”, be deemed poor quality information.

- Managers felt the process did create a level playing field where their own best interests and the best interests of the organization could be determined.
- Managers felt that the model provided for change to programs and the organization focus, in a way that they could work within reasonably.
- Managers felt that the process constrained the ability of those “talkers” to get their way through the manipulation of the senior administrator.

5.6.9 Summary Conclusions Regarding Value Sieve Design

5.6.9.1 Decision Making

- The prioritization process establishes the foundation for the identification of poor decision making under conditions of uncertainty.
- It assists in the identification of perverse consequences associated with changes in programs or procedures.

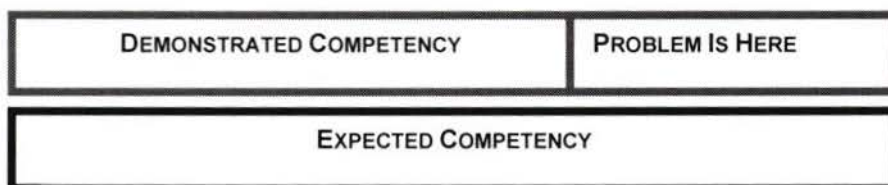
5.6.9.2 Regarding Accountability

- The Value Sieve is a simple and useful tool for the development, implementation, and maintenance of consequential accountability within and between organizations.
- The Value Sieve can be used to provide the benefits of consequential accountability within complex health and social welfare environments.
- The fundamental requirements of consequential accountability (a priori statement of cost, a priori statement of outputs, a priori statement of the relationship between cost and outputs, and a priori statement of measures and what they mean) are not met within the organizations or programs.
- It would be dangerous to let managers “change the subject” from prioritization to what information do you need until the practice of prioritization is implemented/established within the organization. This is dangerous because the search for better information in the health and social

industry will never be completed due to the vastness of the relationships in demonstrated in the determinants of health. Thus while the search for evidence is appropriate and useful it must not be confused with the decision making within organizations which cannot wait for the new evidence.

- Care must be taken in the adoption of ‘professional responsibilities’ by managers who work with professional staff. Professional responsibility for practice is regulated by a profession specific body. Professionals are assumed to be practicing according to the best evidence available. If they are not then this is the evidence that should be incorporated into the decision making process. I.e. the evidence of poor performance should cause a manager to direct resources to programs where results do occur and not to programs where results should occur but do not. (Figure 5.2)

Figure 5.2: Expected versus Demonstrated Competency



5.6.9.3 Measurement

- The Value Sieve accepts that programs with high-perceived value can be supported without linking outputs to outcomes. This allows programs that provide high social value to be identified as important without the burden of being expected to solve an impossible research question.

5.6.9.4 Coordination

- The process showed that managers could include program requirements and political biases within the prioritization structure and that by classifying them “factually” as stipulated requirements or political essentials they were not frustrated by uncertainty associated with those programs that enjoyed these benefits. This supports the importance of the Value Sieve prioritization as an important communicative tool among managers, administrators, and boards. I.e. while power and authority may keep some programs receiving resources their low-level position in the prioritization communicates that they are not

highly valued compared to alternatives available. Further, this may also be seen as a need to communicate/educate more effectively in that senior or junior decision-makers may not understand the importance of a program. An example might be vaccination. In the 50s, 60s, and 70s budgets for vaccination were kept high because the consequence of disease was clear in the minds of parents and health officials. As the diseases the vaccinations protected against became less prevalent, budgets for the vaccination programs have been attacked. This has generated a need for informed debate by public health officials and decision-makers to discuss the relative risks and priorities associated with the funding of vaccination programs.

5.6.9.5 Trust

- The Value Sieve promotes the use of trust to minimize the costs and risks associated with designing, implementing and maintaining valid and reliable monitoring systems.
- While trust to protect the decision-making environment is an important element that needs to be protected, the relationship between the senior individuals within the organization was also tested for trust. Discussions with and observations of decision-makers within organizations show that they have knowledge of imperfections of other programs and will draw on these as required to protect the integrity of their own or others more valued programs.
- The Value Sieve allows the values and the power of administrative and political authority to be integrated within the managers' prioritization. This ability to deal with the factual reality of the situation should minimize the stress associated with differences in power/values which can be masked as differences in the interpretation of the facts.
- The method supports the use of open process and is enhanced with the open process. The technique supports the constructive utilization of external experts and service clients. The technique process would seem to be the most effective method for the management of interest groups through the focus on factual argument and the utilization of priorities.

5.6.9.6 Model

- The Value Sieve technique is easy to understand and is consistent in its application within and between organizations.
- The technique establishes a useful mental model that is constructive and consistent across and among all layers of authority and responsibility within an organization.
- Managers and administrators seem to be in denial that they are already making value based judgements.

5.6.9.7 Costs

- The implementation, training, and maintenance costs of the Value Sieve are minimal and do not interfere with the themes of contract reform and industry restructuring.
- Pareto optimization within a program and coordination (Pareto optimization between) of other programs.
- The process removes pressure on managers to achieve results, which are not possible given the resources provided, or the constraints imposed by labor, local conditions, and the available technology.
- The Value Sieve process would seem to be a process which involves minimal risk to the organization which implements. There are few costs and no expectations of additional information collection. The need for additional information can be controlled through budgeting and priorities placed upon either information systems or research expenditures. Programs well supported by perceived value may not require the intensive level of investment as those programs that have a more questionable benefit to the organization and the population it serves.

5.6.9.8 Information Management

- The Value Sieve provides a methodology for the effective “roll up “ of programs which can be matched to the organizations accounting roll up.

- The process can result in cost compression based upon the prioritization of the managers and administrators of organizations. The statements of the participants indicate that “fat” was removed and that there were no negative consequences associated with the budget reductions.
- Managers of government programs do not fully understand how poor their information behaviors are. In some cases, this may be associated with poor information being available but in most cases, it is associated with poor utilization of information that is available. I.e. in most cases, managers do not seem to have extracted all they can from what they already have.

5.6.9.9 Planning/Preparation

- The Value Sieve causes the administration to “rehearse” the optimization of each program should resource levels change. This rehearsal should minimize the probability of hasty decisions should changes in resources require quick changes in programs.
- Care must be taken to ensure that the Value Sieve process is not embellished to become a “quest for commensurability” which in turn will relieve the decision-makers of the “responsibility” of prioritizing. The essential outcome of the Value Sieve is the development and maintenance consequential accountability.

5.6.9.10 What is the Current Mental Model?

In the review of the program's documentation it is evident that there has been little administrative pressure on programs to match cost information with program outputs. This could most easily have been encouraged by simple incentives like continuation of the service. This has not been the case in the majority of circumstances and leads to the conclusion that resources have been allocated based upon professional standing. I.e. individuals operating the health system are well-trained professionals and their decisions are taken to be correct.

The system is based upon:

- professional judgement;
- rules of inclusion;
- the absence of economic barriers to services and hence constraint is managed through waiting lists; and
- the disentanglement of health professionals from the management of the necessary resources and infrastructure required for care.

This being the case an open system will continue to differentiate and continue to establish approaches which will ensure the flow of negative entropy and where possible increase the access to additional sources of negative entropy.

Given the operating rules of the system the only control point is the imagination of health professionals to determine a service is necessary and the funds to be made available by bureaucrats and politicians. There is no mechanism easily available to the parties that wish to control spending to do so without risking their public futures. Current thinking is attempting to control the expansion of health care services through the use of evidence based practice. The idea is that evidence will be used by health professionals to restrict their choices. To be effective this requires:

- the evidence is available
- the evidence is compelling enough to create clear criteria for use/not use
- the measures for the criteria are clear and reliable for use by the current practitioners
- the evidence is used by the health professional
- the evidence is used by the health service provider
- the evidence satisfies/extinguishes public desire for the service
- all parties involved in the choice are in reasonable agreement

- a negative feedback system is built to regulate/adapt the behaviors of the participants in the system.

5.7 Key Barriers to Implementation of the Value Sieve

The Value Sieve model for resource allocation is easily understood and implemented by managers and their staff. Its major challenge is to get through several significant “mental barriers” which exist.

These barriers are:

5.7.1 A desire to collect more information.

This is an interesting problem because the course of action is counter-intuitive. Getting more information can be, in management circumstances, an approach avoidance behavior. If choices are incommensurable and can only be based upon values applied within the context.

The use of information overload to plead ignorance. There is too much information to go through in too little time. Let’s just leave everything the way it is or make an across the board cut.

There is a notion that at some level of investigation the answer will be found. This suggests that at some point all incommensurables become commensurable with sufficient research. This is the “perspective notion of knowledge”. Like looking down the railway tracks, the tracks converge to a single point on the horizon.

For example to solve a problem of youth hunger may best be solved in the long term by socio-political restructuring of the government financial redistributive system. However, today in the short term it might be best to make some sandwiches and feed the young people. It is critical that funds for sandwiches not be confused with political restructuring. The more amorphous issue will almost certainly win a theoretical dispute over scarce resources.

5.7.2 Wanting to hide the values of the judges by using “technical measures”.

The use of measurement scales is often proposed to assist “judges” in determining the best ranking of proposals. In most cases, I have seen only face valid scales created and used under the rubric of decision aids. However, the failure of these

decision aids is to enable individuals to mask their preferences and values. This is not an argument against well-crafted valid and reliable decision aids. It is an argument against rapidly developed scales that do not validly or reliably aid in understanding. Certainly, it should be the case that measurement tools are developed but they should not be created on an adhoc basis and risk misdirecting the attention of the decision-makers or proposal authors. Impromptu measurement tools increase the probability of measurement dysfunction.

5.7.3 Measuring the relative size of the problem as an indicator of where to invest resources

My problem is bigger than your problem; therefore, my program should get more money than your program. The size of the problem should be a factor in the consideration of where to direct resources however, this must be placed within the context of what can usefully be done. A failure to estimate (a priori) or gauge (a posteriori) the impact of the service provided risks the selection of programs which address a great need but provide little true utility to resolving the problem.

Within a social services and health perspective, allocating organizations investing in determining the size of a problem suggests that either; the agencies requesting resources provide no indication of the problem they are providing a solution for, or the estimate provided by the service provider is not to be trusted and the effort to determine the correction factor to apply to the service providers estimate has some value in either increasing the funding to the program or reducing the funding to the program. Funding to determine the size of a problem should compete with funding to solve problems.

From a determinants of health perspective almost everything is connected to the health of the population. From an open systems perspective it is true that everything is connected and so the definition of a problem can be framed/determined by the boundary that is placed around it. The larger and more complex the problem the more difficult it becomes to determine the impact that a single program will have on the problem. However, the easier it would appear to receive resources without benefit of evidence.

The risk of the approach for funding is that it produces no inherent measurable deliverable. Further, it means that programs which produce and have an impact

upon a target population may not be funded because the problem being addressed is not big enough. For example, there are many children with mild disabilities who could dramatically benefit from therapeutic services. Yet, because those programs compete for resources “against” children with more severe difficulties, (who in many cases have lower expectations for recovery) they frequently do not receive funding.

An important issue can be seen if organizations are given resources not for what they accomplish but for how terrible the problem they wish to address is. Given the lack of information linkage between resources, and outcomes and outputs, there would appear to be little incentive in documenting the impact that services have upon the persons served.

5.7.4 The Benefits Are Self Evident

Professionals carry beliefs. Not all of the beliefs held by a professional have been demonstrated in research settings and in many case it is not clear the extent that research studies adequately reflect the conditions in applied settings. I.e. in some cases a statistically significant finding in the lab may or may not translate into the desired result in the applied environment. The Chocrane collaboration is an excellent example of a dramatic effort being made to identify a basis for evidence based medicine by evaluating research studies and summarizing their appropriate conclusions. It is startling to see the number of “self evident” medical and management practices that are poorly supported by research evidence.

Therefore, in many cases the assumption that the outcome of a procedure is self-evident may be problematic. The assumption must result in a failure to document for there is no other reason that criteria, outputs, and outcomes would not be valued as essential information. I.e. managers and practitioners believing the impact is self-evident may believe that it is too difficult or too expensive to measure using valid and reliable methods.

The essence of raising the profile of evidence based practice for health and social service professionals must be based upon the finding that evidence based practice is not always used by professionals. Conclusions about evidence based practice and its relationship to resource costs is not clear. For example, I am not aware of

any studies that conclude that the use of evidence based practice within the health and social service system will result in cost compression.

5.7.5 It Is Too Complex To Measure

While administrators and politicians believe that they can expect the service providers to measure the impact and the outcomes of their efforts most senior personnel do not have measures which they use to demonstrate their outcomes. In most cases, politicians and administrators use an increase in funding, or a “reorganization” as an indication of doing something. Increases in funding or a reorganization, not based upon a clear and demonstrable a priori statement of what will happen, suggests that there is no way of knowing if the changes which take place within the system have an impact upon the outcomes of those who use the system.

If the argument is true then why do these senior personnel call out for measurement systems? At what point in the system does it stop being too complex to measure?

This is the recipe for “Magical Thinking”

5.7.6 A Good Solution Should Be Easy

It has consistently come as a surprise to me that most managers and administrators expect that the solution to their difficult problems will be quick and easy. There are few incentive systems that support these senior individuals in carrying out the difficult transition work instead of doing something easy which promises to work over night.

Are these people all “Jewish Princesses”?

Further, if the Bavelas experiment is correct then it is probable that the managers will feel less rewarded as the “center men” did.

5.7.7 Cooperation versus Competition.

But that’s a business model! Moreover, we are a not-for-profit group. The only people I have met that don’t seem to realize that not-for-profit organizations

compete for resources are the organizations that allocate resources to the not-for-profit sector.

5.7.8 A Preference for Monopolies

Ignoring transaction costs associated with larger organizations. Transaction costs will tend to increase as trust decreases. Consequences must exist and be seen to exist for individuals who violate the trust of the participants.

5.7.9 Across the Board Cuts

Confronted with the situation that resources are being reduced administrators and program managers must consider how best to comply. This is not to suggest that well reasoned arguments are not made to minimize or negate the resource reduction but within the organization, preparations must be made to manage the problem. Time is usually short and the amount is very often relatively small as a percentage of the total budget.

An across the board cut allows each manager to resolve the problem and to reduce as required within the allotted time period. The impact and coordination of these changes is the managers to resolve however there is a bias to ensure that there is no impact upon persons served.

An across the board cut seems to support both the argument that there is fat within the system and that

5.7.10 Criteria Will Eliminate Choices

All people will make the same choice when the situation is explained to them “rationally” and/or “clearly”.

5.7.11 Monitoring Transactions and Outcomes Is Cost Free

Markets and hierarchies incur transaction costs because people cannot trust each other (Casson 1991). Management strategies, which do not consider the strengths and weaknesses associated with the issues of TRUST, will develop differently than those that do. Within a hierarchy the authority of senior personnel and political participants does not automatically become tied to trust and as such

the loss of trust in the senior personnel is as debilitating as the loss of trust the senior personnel have for the staff and contractors.

Organizations, which implement monitoring systems, must understand the system that needs to be monitored and the costs necessary to reliably measure within an open system and validate those measures. For example, income tax audits only a small percentage of the income tax returns filed because of the cost of audit. They recognize the trade-off that must be found between the cost to prepare a return, the cost to process the return as provided and the cost to audit a return as provided.

These are elements of measurement dysfunction.

Quantitative monitoring tends to bias decisions to short term results which may to some extent represent long term losses. This is particularly the case when finance measures are used without qualitative human factor considerations.

The loss of trust has a very high cost and focusing upon mutual distrust will not improve the situation.

Chapter Six: The Health Environment

"No one wants to hear about the labor pains, they just want to see the baby."

Lou Brock

6.0 An Overview

To fully understand the potency of the Value Sieve decision framework it is necessary to examine the dynamic demands upon a complex organization within a complex environment. While there are many complex organizations in complex industries the domain of interest of this researcher is in the development of decision frameworks within health and social services. Consequently the environment selected is the regional health organization which is one of the most recently developed complex organizations in the health and social service industry in Canada. The Regional Health Organization, or Regional Health Authority (RHA) is charged with the responsibility of providing for the health and health care requirements of a defined geographic region.

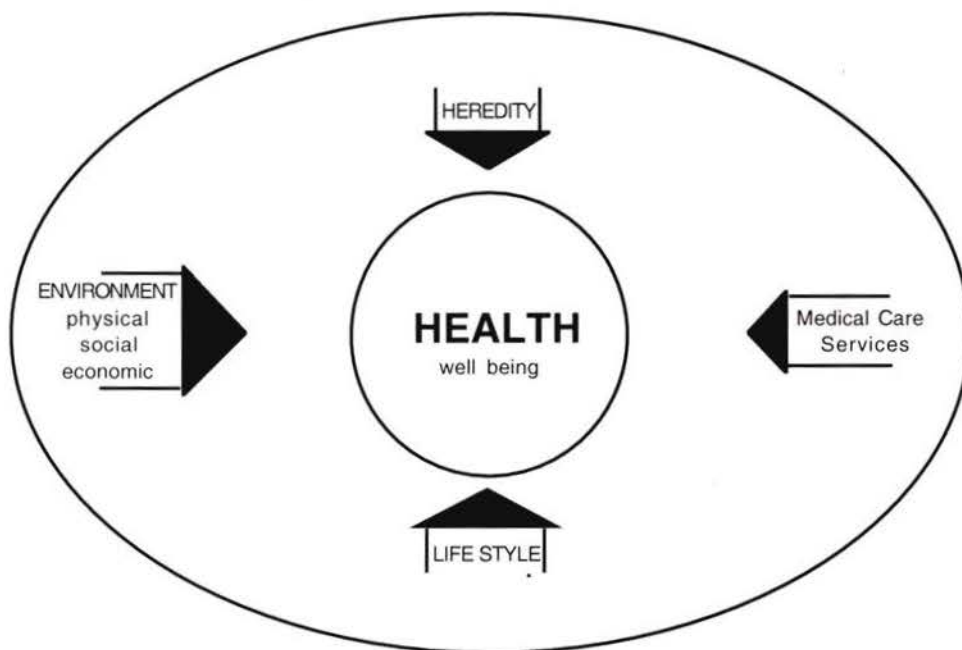
While there are many similarities in the description of the RHAs used throughout Canada, the specific constraints applied by provincial regulation make each province somewhat unique. This chapter is intended to provide a brief insight into the basic complexity, a reader with greater interest is referred to Corbett (1994) (1995), where there is a significant review of the competing forces and pressures on the RHA. These reports include a thorough review of the regulations and requirements of a RHA in 1994 in British Columbia. The environment will have changed slightly since that time however the utility of the documents is to convey the environmental factors involved and the need to build resource allocation decision frameworks which can assist in decision making through the development of appropriate information systems which support constructive organizational adaptation and change.

For the reader with less interest in the specifics of the health industry this chapter intends to simply provide a flavor of the elements for consideration.

6.1 The Definition of Health

The definition of health used for the development of a resource allocation model is a critical key in developing the overall system goals and objectives. While the Seaton Royal Commission would not specify a definition of health, the Korbin Commission (1993) recommends that the government take the 1984 World Health Organization definition of health as the right and proper target for the province. This definition of health is "the extent to which an individual or group is able, on the one hand, to realize aspirations and satisfy needs; and, on the other hand, to change or cope with the environment." An alternative is contained in the 1986 Ottawa charter for Health Promotion which defines health as "a resource for everyday life".

Figure 6.1: Influences on Health



The Figure 6.1 from Rodwin (1984) reflects the breadth of definitions of this kind and demonstrates the argument that only a percentage of health is a result of medical care services.

While the BC Health Authorities Act provides no definition of health, Elizabeth Cull the British Columbia Minister of Health who initiated the Closer to Home process supported the W.H.O. definition for the Ministry of Health. From an operational perspective within an RHA, the breadth of the definition of health and

the variety of factors which implicitly influence health provides no guidance for the administration and management of an organization responsible for the allocation of resources intended to optimize health in the citizens.

These definitions of health cannot be used to limit the focus of the health system and so a working definition of health proposed for the Regional Health Authority might be: "In the decision support system for the allocation of scarce resources used to maximize the health of a population, health is any good or service acquired using those scarce resources by an informed Board of Directors responsible for the health of the citizens, composed of members of the population and appointed by the Minister of Health." It should be noted that this administratively necessary, circuitous definition of health will be the source of frustration for many stakeholders including the staff and trustees of the RHAs.

This definition is required because we do not know what causes health and therefore any hard definition of health creates the risk that it may be used administratively to constrain the proposals or health concepts which a health region is willing to consider. An ill-considered definition might result in the arbitrary elimination of new ideas or different approaches to improve community based health which are unintended by the trustees.

In particular the area of health promotion may be most directly limited because it will include elements of lifestyle, social conditions, economic trends and environment which may not be traditionally linked through the health professions to health.

For example: in the 1840s removing a pump handle on the community water well was not considered to have any relationship to health. However, in the 1850s¹⁴⁴ incidents of cholera were eliminated from some communities by this simple act.

¹⁴⁴ In 1854, John Snow identified a water pump on Broad Street in London as the source of a cholera epidemic. The pump handle was removed and the epidemic stopped. Water suppliers in the area were outraged at the interference that was permitted by the public health agency and working with the College of Physicians were successful in having the General Board of Health eliminated. This reference was included in Rachlis, Kushner. *Strong Medicine*. Collins Publishers. 1994

Thus, given the significance of our ignorance within the context of creating and maintaining health, there is no health definition that can be used which will not potentially constrain the health process within a community. Given the possible health risks associated with constraints of any kind, this responsibility to create constraints must be placed in the hands of the trustees of the RHAs.

An additional practical factor must be considered regarding the desire to define health. To be effective from an administrative perspective a definition of health should provide unambiguous guidance in explaining what services and outcomes would be included as health related as well as what would not be included as health related. Such a definition creates the need to continuously defend and "correct" the proposed health definition with all individuals, organizations, professional groups and parties who would argue interpretation or suggest a necessary "change for the better" of the definition thus creating pressure to ensure that the definition was uniformly applied to all proposals so as to prevent the possible negative outcomes associated with inconsistent interpretation, real or imagined. The potential administrative effort and resource requirement necessary to carryout this activity is expected to exceed the costs associated with reviewing all proposals received and prioritizing them.

Consequently, the Value Sieve process is designed to ensure that all proposals from health service providers are welcome and each will be reviewed and prioritized. Proposals for consideration will only be constrained by requiring the service provider to demonstrate a clear understanding of the resource costs and health outcomes from the service proposed. The structure of the funding proposal, requires the applicant to explain the health outcomes of the proposed project, the research literature supporting the approach and the locations and experiences of those who have applied the approach.

Finally, the RHA priorities of health cannot be predicted until the informed Board of Directors begins to provide priorities to the health service providers and consumers involved in the health system. Given the circumstances, an operational definition of health can only be determined after the Board has decided upon the priority of programs which will receive the available resources. This can only take place after they are informed by the service providers what health can be achieved

at what cost. Consequently, in the future, after a number of Value Sieve resource allocation cycles have been made the priorities and requirements of the RHA will be more clearly understood by all parties based upon the demonstrated historic funding patterns of the RHA.

6.2 The Tasks and Obligations of a Regional Health Authority

The objective of the Regional Health Authority is a summary of the goals which were provided in the recommendations of many Royal Commissions across Canada which were carried out in the early 1990s. These identified the need for change and the essential elements that were to be addressed by the implementers of change in the health care delivery system in British Columbia. These recommendations are properly given an operational context when the Federal Government Health Care principles, the Royal Commission findings, and the Guiding principles of the Regional Health Authority are combined.

6.2.1 Summary of Findings from the BC Royal Commission on Health Care and Costs

- Increased effectiveness is required to ensure that the maximum health benefit is received from the health care resources available.
- Health care funds are limited and it is not reasonable to assume that greater levels of funding will be available in the future.
- Decentralization of the control of health care delivery and decision making must be achieved.
- Communities must be involved in determining health care priorities and therefore must be involved in the resource allocation decisions.
- Accountability is required at all levels of the health care delivery system. Results of all activities must be measurable.
- Health care costs and outcome data must be generally available to the public.

6.2.2 The Federal Government Principles for Funding Health Care¹⁴⁵

- Equity - the quality of being fair or impartial.
- Comprehensiveness - requires the delivery of medically necessary services.
- Accessibility - easy to approach and use.
- Portability - availability of continuous coverage regardless of location in Canada.
- Administration by Non Profit Agencies - no private for profit companies may manage the health care system.

6.2.3 Guiding Principles of A Regional Health Authority¹⁴⁶

- Commitment to change to improve health
- Community empowerment
- Inclusive, participatory process
- Accountable responsive stewardship
- Fairness and equity
- Build on strengths

6.2.4 Key Goals and Objectives of a Regional Health Authority¹⁴⁷

- protect the right of community involvement in the "health" decision making process.

¹⁴⁵ These five key criteria are taken directly from the Canada Health Act (section 7).

¹⁴⁶ These principles are taken directly from the guiding documentation developed and approved by the Capital Health Board. While these will not necessarily reflect the guiding principles of all RHAs they will act as a reasonable basis of developing the criteria to be achieved.

¹⁴⁷ These key goals and objectives were determined by the author after a review of Ministry of Health documentation, interviews with Ministry staff, a review of Capital Health Board documentation and interviews with Capital Health Board staff and trustees.

- protect the right of each citizen to access all information regarding health-related decision-making.
- identify, develop, implement, and maintain services which meet the health goals of the communities of the region.
- optimize the utilization of the health-related resources available to the Region to optimize health for all communities.

6.2.5 The Key Goals Require

- determining all available health resources
- identifying all controllers of health resources
- identifying spending controls in the health system
- monitoring and controlling costs
- prioritizing health services to be delivered
- measuring/monitoring health indicators within the Region
- evaluating services delivered to determine or ensure best practice
- monitoring health outcomes from service providers
- quality assurance/quality improvement
- provide best practice health care to the citizens of the Region
- community council involvement
- developing effective measures for involving the citizens in the process
- a mechanism to provide health information to the public to ensure that they have choice
- creating an environment where innovation is possible and encouraged
- minimizing counter productive obligations between resource controllers

- an effective system for the integration of health related services

6.3 The Canada Health Act and The Regional Health Authority

In addition to the relationship between the RHA and the Province, there is a relationship between the RHA and the Federal Government through the enshrined principles of health care located in the Canada Health Act. The BC Health Authorities Act (Bill 45) refers to the Canada Health Act and requires the Minister of Health and the trustees of the RHAs to ensure that their actions are in keeping with the principles enshrined there. Therefore, these principles are critical to understand because there is a legislated component to each of them in addition to a political consequence.

6.3.1 Equity

Defined as the quality of being fair or impartial, equity must be further defined into an operational or working definition. Is equity met when:

- all citizens within the province have the same amount of money available to be spent on them during their lifetime?
- all citizens with the same disease are allocated the same amount of resources?
- all citizens have a right to live the same amount of time with the same amount of pain?

Regional Implications- if a region is very effective at managing its resources to deliver health to its population can the Ministry of Health "adjust" the funding to the region.

Working Definition - all citizens will be given equal consideration when health needs are prioritized. No citizen will be given preferred treatment or excluded from health care services due to gender, race, religion, income, etc.

6.3.2 Comprehensiveness

Defined as the requirement that all citizens have the right to medically necessary treatment. The focus of this debate is who determines what is medically

necessary. At this time, the working definition would appear to be any treatment, which is recommended by a physician and accepted by a citizen, is deemed appropriate for coverage.

Regional Implications - The Regional Board will approve capital and operating funding to hospitals and other service delivery organizations. Consequently, the Regional Board will run into the fact that they will, through the control of resources, limit the availability of certain technologies and services to the population. "This in effect is a decision about the content of medical practice, since practice always presses against the limits of capacity." (Evans and Law 1991)

How much control will the region have in defining what is medically necessary? Would it be able to constrain the choice of the physician and patient?

Working Definition- The region may be able to take control of the situation by requiring that: 1) The treatment be demonstrably effective; or 2) The treatment is part of an approved and recognized health protocol.

6.3.3 Accessibility

"It is generally agreed that access means, not the provision of all services imaginable, for everyone, but rather services according to need. The political struggle is then over the process by which need will be defined." (Evans and Law 1991)

Does the attempt to moderate or limit the expansion of services represent a rationing of health care? For example, does the reduction in hospital beds, or the limiting of certain pieces of technical equipment or specialists represent rationing?

Regional Implications - The control of spending will cause some problems because many health care service providers will argue that tragedy is around the corner when "cut backs" are implemented. The conflict becomes clear when both sides of the argument to be heard by the Regional Board will be from two camps that have economic self-interest confounding the issue. Professional Autonomy versus Value for Money (Evans and Law 1991)

It must not be forgotten that an unapproved capital expenditure financed by charitable donations can cause problems associated with long term support and "unnecessary utilization".

Working Definition- the Board must use fact, public education, and information to manage the debates.

6.3.4 Portability

The right of access to health care services by any Canadian citizen in any Province no matter their province of origin.

Regional Implications - The availability of a service in one region versus another may cause patients to migrate from region to region acquiring their own preferred grouping of health care services not offered in any one single region. This means that the region providing the service will need to be able to bill the region providing the patient. This does not necessarily pose a serious problem as long as the region providing the service is assured of being able to be paid for the services provided to patients coming from another region. The question does exist about a region which has thoughtfully expended all its resources only to find invoices coming in from other Regions from citizens who did not agree with the choices that the Region or community made.

The possibility exists for an entrepreneurial region to establish services which are not offered in the others. Physicians outside that region could cycle patients through the entrepreneurial region to collect fees. Such an entrepreneurial, region with no control on its ability to bill the "patient provider region" could generate a significant medical business. Given the demand for jobs in different economic areas it is possible that regions would offer additional and more attractive services than provided within their health care budgets with the intent of compensating the region with the additional tax base from the jobs themselves.

Working Definition- a percentage of funds should be held in trust by each region to ensure that their migrating citizens can have their medical care paid for. Only dramatic differences in services offered within one Region compared with another could cause significant shifts in-patients that might cause budget problems. The situation should be monitored to identify any trends or problems. Any debt

exceeding the reserve of the Region should be taken care of by the debtor Regions at the beginning of the next funding cycle before they have an opportunity to allocate their funding.

6.3.5 Administration by Non Profit Agencies

There appears to be very little question about the importance of non-profit administration. There is a question of traditionally being over administered but under managed. However, the shift to Regional and Community control is intended to resolve this issue.

6.4 An Example Problem for a Regional Health Authority

The World Health Organization, (W.H.O.) definition of health provides the possibility of a very broad range of projects to be proposed as health projects. This definition of health will include projects which are presently paid from the budgets of the Ministries of Social Services, the Attorney General or Education. The RHA should expect to see a larger number of project proposals that will request support funding from these Ministries for projects which have a health component.

The nature of this issue can be illustrated by reference to a specific example. A project reviewed within the Region of the Capital Health Board was called Gateway. The project intended to provide shelter to individuals who are intoxicated and whose only alternative shelter is the city jail. A recent¹⁴⁸ city coroner's report indicates that the safety of these intoxicated individuals is questionable in the present police containment facilities. The police department states that it is unable to provide more than a basic jail facility.

The existing Alcohol and Drug Program (ADP) services, by design, cannot accept individuals while they are intoxicated. The Ministry of Social Services acknowledges that these individuals should not be left to sleep on the street and agree that to some extent this problem is a housing problem. The city and businesses within the city agree that for the short term alternatives are not

¹⁴⁸ To the time of the event.

available. They have thus requested that ADP provide short term support funding to ensure short-term housing to homeless, intoxicated individuals, through the Gateway project.

In the debate for short term funding, the regional ADP office was approached because they specifically work with clients troubled by alcohol and drug related problems. As most people acknowledge that alcohol abuse is a health problem, the logic is very clear that they should be involved. However, from a health perspective the individuals requiring assistance are not interested in health related treatment of any kind other than a warm place to sleep. This, they argue is a housing problem and should be resolved by the Ministry of Social Services. Social Services could argue that in reality this is a problem for the Attorney General because it is not lawful to sleep on the street and the police must simply develop a safe location for intoxicated individuals to spend the night.

The looping nature of the argument would not be cause for great concern except that the budgets of all the organizations involved are stretched to the limit. The result is that each organization knows the actual consequences associated with their spending on Gateway. These consequences include the services or benefits their other projects will lose when funds are shifted to finance Gateway. For this reason, each organization wished to force the other to pay for the majority of the Gateway service.

6.5 Complexity of the Health System

Figures 6.2¹⁴⁹ and 6.3 each provide an insight into the forces which influence the decision making and allocation of resources. Figure 6.2 provides an overview diagram of the influences upon the Canadian health and wellness system. Most significant in the diagram is the identification of forces outside the control of the health care system which influence the ability of the health care system to perform.

¹⁴⁹ Figure 6-2 is an adaptation of an original diagram by Denis Protti, Professor of the School of Health Information Science at the University of Victoria. The diagram was embellished by this author to include the regulatory constraints.

Figure 6.3 is an extension of the information figures 4.1, and 4.2 used in Chapter 4 to describe the relationships between negative entropy and negative feedback in for profit and not-for-profit organizations. In Figure 6.3 the purpose is to provide an image that reflects the number of organizations involved in coordinating/constraining the resource allocation of the health care funding which do not directly and clearly answer to the beneficiaries of the health care system. The consequence is that the flow of negative entropy to the "Entity" which provides the services to the beneficiary is not directly linked to the negative feedback which is received from the beneficiary. This increases the probability that the relationship between negative feedback and negative entropy will be misaligned. Further, it indicates that interest groups need not concern themselves with the priorities of all of the beneficiaries in order to attempt to influence health care spending within the regions.

The Value Sieve, through the use of cooperatives, can identify the priorities of the beneficiaries or service and will require those who wish to influence the health system by allocating scarce resources to identify the consequences of the changed priorities by identifying those programs which would be reduced to support another's expansion.

Figure 6.2 - CANADA'S HEALTH CARE DELIVERY AND ILLNESS PREVENTION SYSTEM

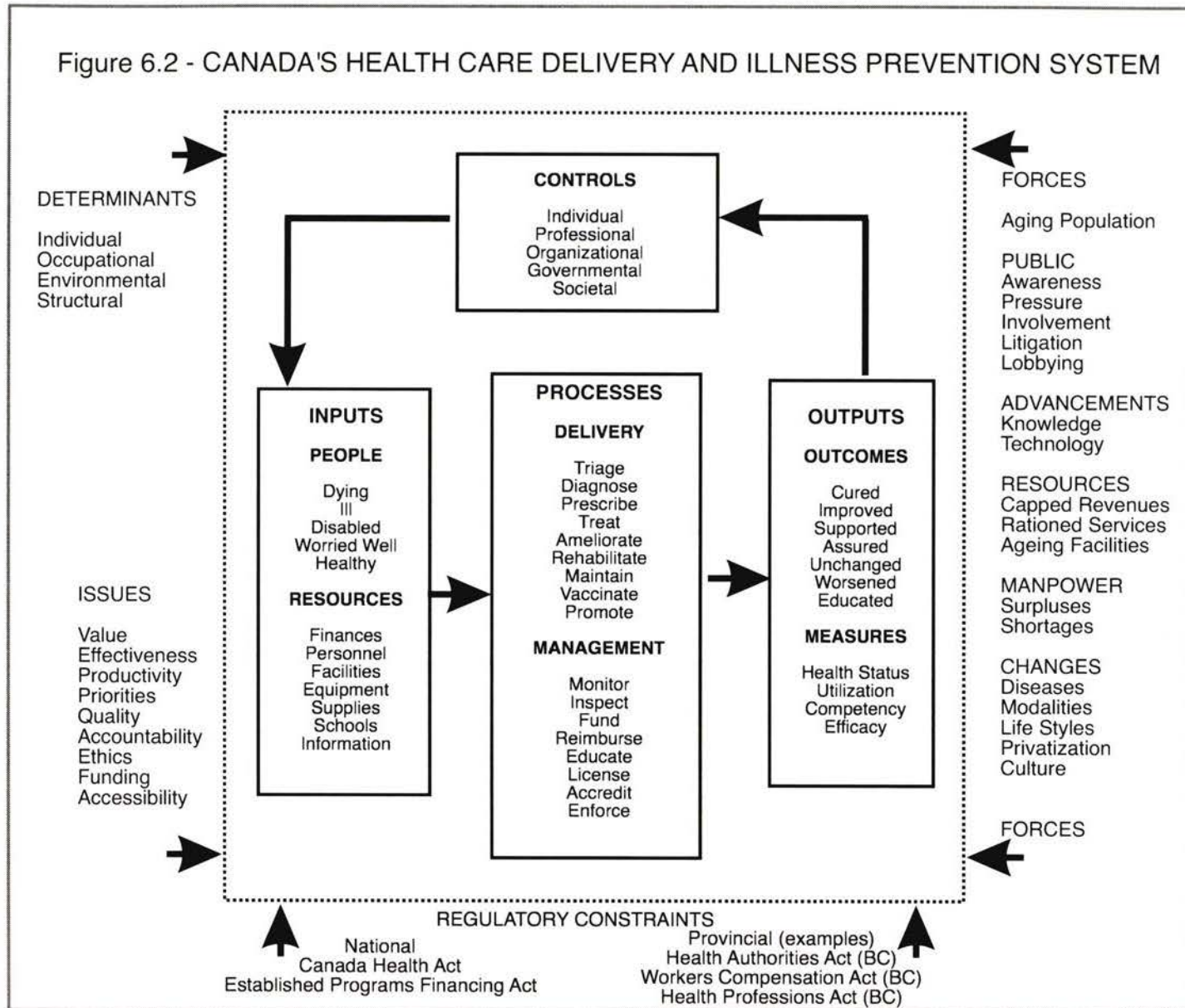
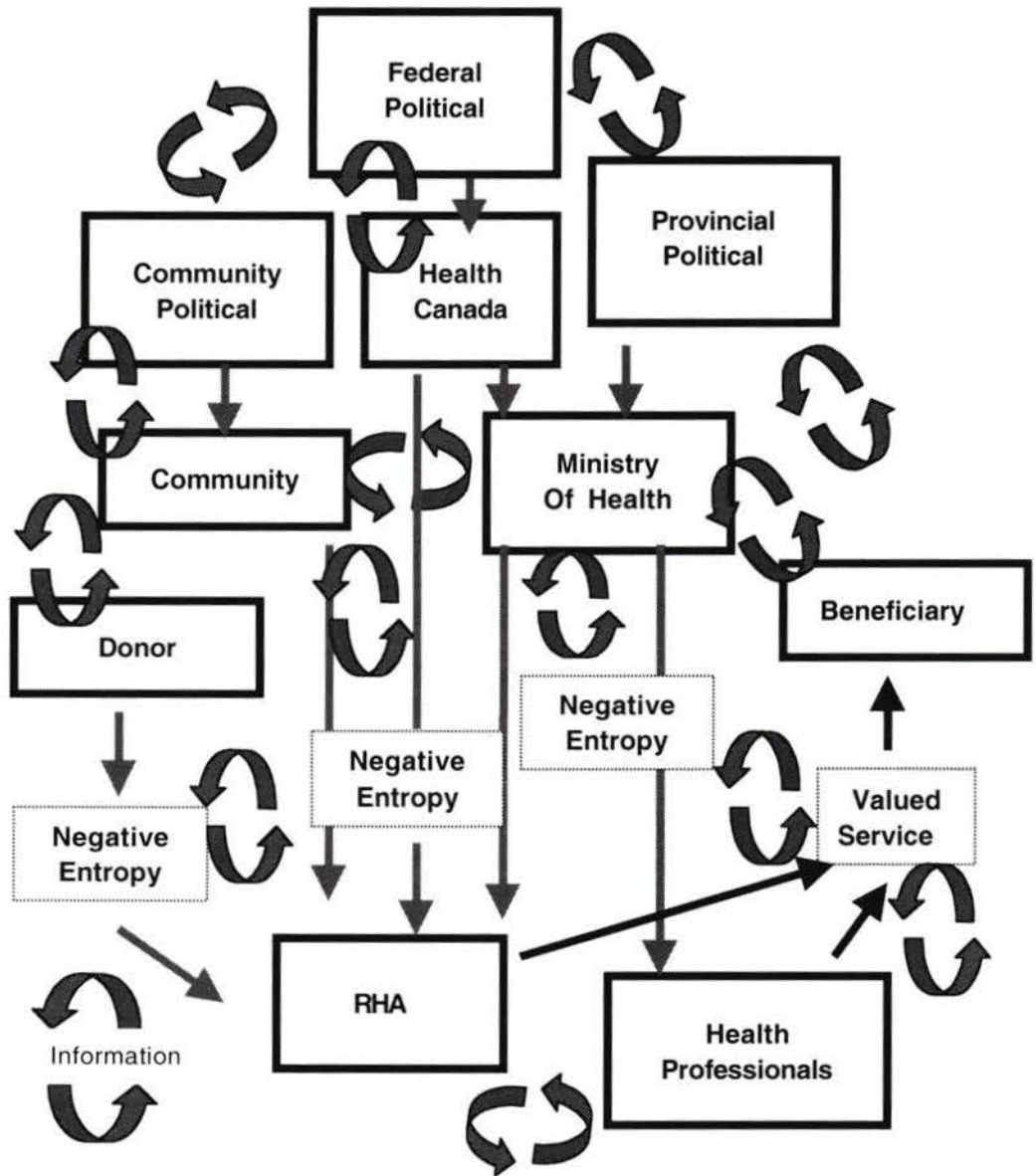


Figure 6.3: RHA Negative Entropy Cycle and Information Loops



Chapter Seven: The Conceptual Model of the Value Sieve in Retrospect

"Show me a guy who's afraid to look bad and I'll show you a guy you can beat every time"

Lou Brock

"I don't know. They had bags over their heads."

(when asked if the fans that ran naked on the field were men or women)

Yogi Berra

7.0 Introduction

Throughout this dissertation, it has been stated that the mental models of the individuals and groups are the most challenging element of managing/making change. This is because of the need to eliminate the old model and replace it with a new model in such a way as to minimize the retention of and/or regression to old model thinking and patterns of behavior. The research with the Value Sieve has tried on various occasions to introduce a mental model of the Value Sieve to individuals and groups. This experience has been frustrating and revealing.

The model/metaphor must be simple and gather most of its elements quickly from the individual's or group's existing experience so that as a framework the additional layers of information can be added to support the decision making needs of the organization but without ever violating the metaphor/model. This chapter outlines the basic conceptual elements that must be integrated within any metaphor to arrive at a suitable conceptual model. In the research to date, the level playing field would seem to be the most appropriate mental model that can be constructed.

In this chapter, the intention is to review the conceptual pieces of the Value Sieve and to allow the reader to place these into the mental model of a level playing field.

7.01 The Goal

The goal of resource allocation is the optimization of a dependent variable through the manipulation of the appropriate independent variables. While this may be said easily, it is very difficult in practice.

A central proposition through the research has been the development and testing of a practical framework for optimization in a complex environment. The Value Sieve decision framework appears to meet this goal of optimization using methods and insights drawn from theory and applied research. It does this by providing a framework which:

- identifies a complete and orderly series of steps for the accountable decision-maker(s) and the participants in the decision,
- organizes the available information for decision making and distinguishes between decision making and problem solving,
- accepts the need to work with incommensurable measures and consequently the values of the accountable decision-makers,
- develops appropriate negative feedback loops to the accountable decision-makers and through the use of cooperatives more closely links negative entropy and negative feedback,
- establishes a mechanism for the development of a coordination system for cooperators in a complex environment,
- creates what can be conceptualized as bounded transparency. That is, the individuals/programs within the system bounded by an agreement to use the sieve will participate in a transparent process.

The Value Sieve works because it recognizes the essential elements of the solution must be coordinated in order to be in concert with one another. This can prevent one-dimensional conceptual views of a multi-dimensional problem and hence one-dimensional solutions which fail when implemented in a multi-dimensional world.

7.1 Optimization

Optimization is the process associated with getting the most of what the accountable decision-maker values within the available choices. There is a relationship between value, quality, quantity, and the resources required. To consider quality without relationship to the resources required is to establish a measure of what is possible when resources are not taken into consideration.

For example, evidence based medicine does not consider the costs associated with treatment and therefore by itself does not resolve the problem associated with allocation of scarce resources. Decision-making must also include the number of individuals who must be served.

When resources are considered then the quantities required to meet an expected level of need (demand) becomes a defining characteristic of the quality which can be achieved. From this perspective, the ability to optimize is constrained by the knowledge of the extent of the demand, the duration or distribution of demand over the time period of interest, the resources available, the evidence which demonstrates the highest quality available to meet the degree of demand within the available resources and/or the amount of demand which can be addressed.

Example continued ...It might be that the budget determines which "best practice" can be selected. In other words, the evidence will support a variety of "best practices" which are different for different levels of per capita investment. The alternative approach is a queuing strategy such as "first come first served". The problem with queuing strategies is the possibility of position jumping and the implication upon the system of care.

Optimization requires commensurable measures and for the most part comprehensive commensurable measures do not exist. It is important to make the distinctions between what is measurable, what could be measured, and what is practical to be measured given the cost. This must be considered in addition to the problems of how these measures would relate to the values of the accountable decision-maker.

In practice, there is a limit to data collection. This may be based upon the cost(s) associated with collecting comprehensive, valid and reliable data or it may be that

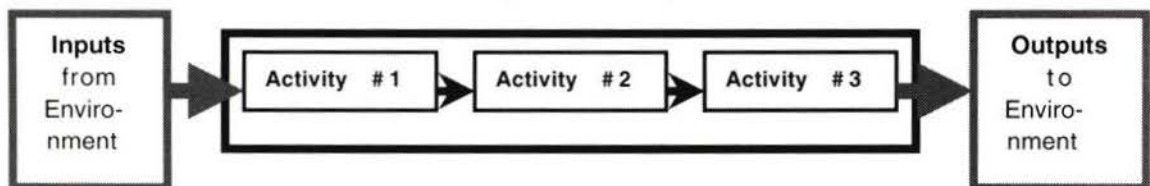
there is a limit to the knowledge and so even if it was desired, sufficient data could not be collected. The weight of a variable or set of variables chosen to represent an objective function may still rely upon other unnamed variables, “values” to select one choice versus another.

Example continued ... The accountable decision-maker considers the evidence and chooses one best practice over another even though the evidence suggests the two practices are equally efficient and effective. The choice is based upon a value that one approach will in practice be better than another will.

Optimization may focus upon the improvement of a single activity or it may focus upon the improvement of a collection of activities. When these activities are separate and distinct i.e. they do not interact or rely upon one another, the optimization is different than when they do interact. The optimization of a chain of activities relies upon the solution of one “bottle neck after another”. These bottlenecks may impede the benefits associated with the improvement to any single activity in the chain.

Thus in a traditional Tayloristic production facility one activity is followed by another. (Figure 7.1) Each activity relates only to the activity that precedes it and follows it. In this regard, production managers work to isolate the production activities from outside influences and to ensure that each activity becomes a link in a standardized process. Standardization comes through the elimination of variability, the elimination and/or control of outside influences and the uniformity of the inputs to each step in the activity chain of production.

Figure 7.1: A Simple Tayloristic System



The effort in a Tayloristic system is associated with the continued development of “better” processes which entails the ongoing development of standards which reduce variability in the production process so that the output to the environment is consistent with the expectations of the consumer. The Tayloristic approach is

predicated upon the assumption that the accountable decision-maker(s) has sufficient control to enforce standards. The enforcement of standards requires a negative feedback loop to the “operator” which identifies the variance from the goal (objective function), identifies the course of action required to reduce the variance, and supports this through the provision of sufficient motivation.

However, when multiple measures are involved optimization must turn to mathematical methods to identify sets of values (independent variables/control variables) which, depending upon the underlying model, provide the best possible solution. For example, a simplex method optimization requires the acknowledgement and inclusion of the assumptions of the technique. These include explicit identification of the control variables and sufficient trails to find the optimum. The optimization process is an orderly movement away from the least favorable towards the most favorable. Optimization is achieved when the objective is reached or when the results cannot be improved further. In this context optimization is systematic and entails an orderly sequence of trials, measuring k control variables, in a relationship with a specified optimization objective.

Consequently, like the simple production system, optimization in a complex environment requires coordination of the activities that participate in the creation of VfM. However, unlike the simple production system the activities may not be easily standardized. This difficulty for standardization is not due to a lack of interest but due to the lack of reasonable control of the system involved. This may be due to the number of nodes that need to be controlled or the fact that there is mixed ownership of the nodes and as a consequence different values associated with the production and coordination of the resources of each node. It may also be difficult to control due to the disparity of knowledge in each node or in the system because as the knowledge necessary to manipulate the production of each node increases it becomes increasingly difficult for principals in the administration of nodes to discern the extent that values and not technical certainty are directing the efforts of the agents within a node.

The traditional solution to the problem of lack of control was:

- Take control of the production node(s) through contract.

- Take control of the production node(s) through acquisition.
- Take control of the production nodes through merger.
- The involved entities would support the development of a new entity/subsidiary/joint venture that would supply the necessary commodity.

The application of optimization techniques for multivariate problems requires the decision-maker(s) to have common perspectives associated with the improvement of a collection of activities or in complex cases, collections of collections.

Techniques to manage this consider the use of fuzzy set theory to define membership functions or desirability functions. In this way aggregates of membership functions may be created.

However, as the number of nodes that participate in the system of production increases so to does the number of possible connections between nodes. When the system of production is sufficiently distributed to encompass a large number of nodes and relationships, there is a combinatorial explosion. The number of connections in the network of relationships increases to the point where control is best managed through a market or quasi-market mechanism.

The Value Sieve approaches optimization from the perspective that accepts that improvements to an activity or a system will be value based and consequently associated with the values of the decision-maker(s) involved. These individual decision-makers will first consider their individual interests within the bounds of their individual motivation, "feedback", and reward systems. At the level of decision-maker reinforcement, each decision-maker's activities may be perceived as separate and distinct i.e. the bounded aspect of the decision making agent is reinforced by the principal to the extent that the agent is rewarded/reinforced for managing the consequence of interactions and the probability they could have been foreseen.

However, individual activity optimization may be a sub-optimal solution when the consequences of activities collide. The optimization of groups of bounded activities relies upon the notion that the parties can quickly identify and learn from experience to create a meta level solution that requires the coordination of

the individual solutions of each decision-maker. In this situation some bounded decision-makers will need to sub-optimize their own activities in order to improve the optimization of the group. This creates problems for the design of reinforcement strategies that permit an individual decision-maker to “sub-optimize”. On what basis can the agent expect the principal and the principal’s principal to have sufficient knowledge to recognize the difference between: poor performance, the intent of which was improvement to the system; and poor performance the intent of which was not an improvement to the system. While intentions may cut to the heart of the emotion of the situation, most environments are sufficiently complex to be unable to reasonably determine the true¹⁵⁰ intent of the participants.

Coordination of activities/programs/organizations becomes an essential feature of optimizing within complex environments. The key resource required for coordination is information regarding the actions of others. Thus principals in complex environments may well find that their task is better described as using their position of oversight to ensure their agents have knowledge of other activities and programs which may have either a positive or a negative impact upon the efforts of the agent.

In a knowledge intensive and/or complex organization and environment this requires systems of information collection and exchange suitable for enabling decision-makers to identify the potential for interrelationships of their activities with the activities of others. This has the potential to be a murky effort given that in many cases the boundedness of perspectives is reinforced by rewards, motivations, attention limitations, professional language, different data, different models, and different priorities as they relate to their individual and collective objective functions.

¹⁵⁰ This line of thinking goes straight to the issue from the perspective of behavioral psychology. Behaviorists, although no longer fashionable, believed that the human mind was a black box and that the only way to study and understand human behavior was to forego the speculation about what could not be tested and accept what could never be known. What was taking place in someone’s mind could not be known directly and all efforts to find the truth of knowing the “mind” of another was considered futile because it could not be properly tested. The only avenue to understand human behavior was through the observation of human behavior.

7.1.1 A Market View¹⁵¹

In a market with business objectives, the participants are expected to be vigilant to consequences that have negative impacts upon their objective function(s). They are liberated for the most part from concern regarding the impact of their actions upon others. In this setting, “money” is a useful commensurable measurement scale that is exchanged among the parties and with which the variety of intentions and acts can be represented in order to create a testable business model. While complex business organizations may find it difficult to ensure that the values applied to the exchange of money for outcomes was the best possible, it is clear that the commensurable measure of money provides some structure to the measure of value in the business setting.

In a market where not-for-profit objectives are pervasive, the participants are expected to be vigilant to the consequences of their actions given the measure of an activity’s impact is most frequently the result of the combined actions (intentional or not) of many programs and many influences. While money is often used to accomplish the outcomes of not-for-profit organizations the worth of the outcomes are often not easily valued in dollar terms except from the perspective of large statistical samples or judicial processes where civil actions are required to be resolved through the determination of “money for value”¹⁵².

In the tradition of munificence, the outcomes of an act of generosity have been determined by the acts worth on a humanistic/social and not commercial basis. Thus, these acts were not based upon contractual obligation from the benefactor to the beneficiary. It was understood that there were insufficient resources and mechanisms available to provide for all. The act, combined with the underlying notion that individuals are responsible for their own not-for-profit activity is often difficult to attribute to a single programs efforts. This is due to the shear number of forces that are at play within an individual, a community, and the uncertainty associated with the outcome of any treatment.

¹⁵¹ While technically a market is a market, I am making the distinction between a market for business purposes and a market with not-for-profit purposes to reinforce the notion that a market is an information device which is separate from the purpose of the individual participating within it.

¹⁵² The court assigns a monetary worth to an event or outcome so that insurance companies can use money to resolve disputes.

Thus, optimization requires that the decision-maker(s) understand what they tried and why they believe a change will make an improvement. To know what was tried requires information at the service delivery level. The most important information being what they thought they were trying to accomplish and how they measured that optimization effort.

7.1.2 Activity and Program Alignment

The use of money in a for profit enterprise provides a commensurable measure of risk, reward and performance within an organization which permits the alignment of the various programs and activities which participate in the production of money related benefits to the bottom line of the enterprise. Thus money is a central organizing purpose and this is communicated throughout the entity. Consequently, principals and agents have a predisposition to understand value for money and the need to align activities to maximize return on investment. Further, there is a clear understanding that this requires the active participation of their customers, who must value the product or service more than the available alternatives.

Even with the clarity which comes from a for profit business model and the commensurable measure of money, alignment of interests in complex environments is difficult. Moral hazard underscores the notion that individuals within complex systems will have mixtures of personal and professional motivations which will be played out. This is significant because the notion of financial incentive is not the only motivator of human behavior, it is however the easiest to detect.

In a government or not-for-profit organization, individuals and their activities and programs must also be aligned to optimize the value for money. However, in many cases financial incentives cannot be fine-tuned to increase the probability of certain actions. Given the inability to use incentive beyond a “regular paycheck” other motivations must be used to coordinate and align participant’s interests and so minimize the probability of moral hazard.

This lack of a coordinating commensurable measure such as return on investment creates a serious problem within government and not-for-profit organizations. The

complexity of the environment, the powerlessness of the clients to choose, and the lack of appropriate commensurable measure(s) increases the number and variety of arguments and values which can be used to justify an action. This increases the opportunity for poorly aligned programs, moral hazard and magnifies the probability of unintended consequences. The result is a higher level of need for scrutinizing the decision making process in government and not-for-profit organizations.

7.1.3 Complexity

The notion of complexity is related to the number and uncertainty of the activities within a relationship. The number of combinations and permutations grows dramatically as the number of activities increases. Given the number of bounded activities which may take place within a complex environment it would seem very challenging to consider the possibility that a single controlling¹⁵³ mind could understand the ramifications of all inter relationships from all perspectives. This is particularly important in the case of not-for-profit organizations which do not have the benefit of independent information brokers who add value through arbitrage of their knowledge of the market place.

The practical consequence of this is the need to determine a method whereby an appropriate level of information can be collected and made available to each of the participants within the system and so minimize the probability and severity of unintended consequences. Like ships traveling at night, programs must be able to determine which other programs present an opportunity for a collision. To accomplish this requires a reasonably small amount of information: such as location, bearing, and speed; transmitted over a common interface. The common participation in this communication system allows individual participants to operate freely unless a possible conflict is identified. Thus, the greatest price is that of vigilance.

¹⁵³ The mention of a controlling mind is intended to reference the notion found in law that an organization must have a controlling mind in order for certain arguments regarding purposeful action to be justified. It must be noted that the absence of a controlling mind is not a defense against corporate responsibility.

Attention must be allocated by each participant within the system to actively attend to the movements of others. This is made easier through the use of ranges that provide reasonable “bounds” to search space and conventions of behavior to ensure that information that reduces uncertainty is provided as required. The requirement for additional clarification is dependent upon the relative position and consequences of each party and this information is made available if it is deemed appropriate by one or more of the parties. In this way, the parties coordinate their movements through the development of information sharing on an as needed basis within the constraints of a family of information rich, behavioral conventions.

Thus, the nature of complexity requires an information system wherein participants may identify each other and coordinate their actions to minimize risk/harm. In situations where conflict is not present within the shared system (environment), then participants are free to function according to their individual values. However, in situations where there is a conflict then the values of those involved, should be brought together within a reasonable decision framework.

The effect of complexity is the need to provide information related to the coordination of activities. Only through coordination, can there be optimization among bounded activities working with a common system. The common purpose of health and social organizations and the common sources of their resources requires that coordination information be made available.

7.1.4 Values

Given the incommensurability of measures, it is only possible to make comparisons using values to guide the optimization process. As indicated in the discussion above the optimization of these types of relationships can only be complete when the objective is reached or the system under consideration cannot be improved. Therefore, these situations require that the accountable decision-makers indicate what they value so that it will be possible to know if the system has or can reach its goal. Further, it is essential to understand whether there has been an improvement. If optimization is moving away from a poorer arrangement of programs, towards a better arrangement then in complex environments what is being evaluated will always be changing. The measurement scale of improvement will be determined based upon the values of the decision-makers.

Values can be stated and professed to but the only measure of values is in their application. Values are demonstrated in the actions and choices of individuals. The impartial appraisal of values requires a transparent process, which would allow an interested party to see the choices available, and the choices made by an accountable decision-maker.

Knowing the choices available and the information associated with the choices is how an external party can create an opinion about the choice process and values used by the accountable decision-maker at the time the choice was made. Making what ultimately is demonstrated to be a good or bad choice should not necessarily result in the conclusion that the accountable individual(s) had appropriate or inappropriate motivations. In ambiguous circumstances, it will be difficult to be conclusive. However, in many circumstances fundamentals may be judged.

Thus values are not necessarily explicit in the choices made by individuals except in the extreme individual cases or when time permits patterns of decisions to emerge which identify a bias or predisposition. This is not because the choices are difficult to distinguish but because the weighting of the available evidence may be based upon a variety of weightings. If this is the case then the individual who will most directly benefit from the experience of weighting the evidence, prioritizing choices and receiving the negative feedback is the accountable decision-maker. This experience will not be shared with others unless the accountable decision-maker commits to the procedures of a quasi experimental approach which at its simplest requires nothing more than would be expected in any reasonable agreement associated with the exchange of money for products or services. In the health and social service professions, this would be considered the information necessary by a health professional association to ensure the informed consent of the beneficiary/client/customer.

7.1.5 Expertise

The application of values to make decisions regarding multivariate and/or incommensurable measures is central to the requirements for the optimization of an activity, a program, or a system. How values are interwoven between knowledge and theory in the training and experience of decision-makers will be a major element in determining what data a decision-maker may feel is necessary to

arrive at a conclusion. In other words, expertise is often a mixture of knowledge and values which support each other. This further highlights the idea, supported by evidence that experts may disagree with the interpretation of the available evidence.

The challenge thus becomes – to what extent is a different interpretation of the evidence due to differences in training and expertise? Further, how would these differences be tested to confirm which is correct or incorrect? Finally, to what extent is the difference in interpretation a factor in determining a choice among available options?

Experts do not always agree with the decisions of other experts. It follows that in each disagreement only one of the experts can be correct. Further, it is possible that both experts are incorrect. In the absence of a second expert opinion the probability the expert is correct does not increase. This results in several questions for any solution that is sought.

- To what extent is there a definitive method of interpretation of data/evidence where the “truth” can be known?
- Do all experts agree on the truth when it is provided?
- What methodology should be used to determine the correct action when experts disagree?
- What is the appropriate level of investment to minimize the probability of an error?
- In a decision making context, when the resources are scarce what is the appropriate level of investment to determine an expert is correct?

Understanding expertise enters into the decision making process the problem of poor outcomes that are the result of errors. These errors may be the result of a variety of circumstances which include poor knowledge of the decision-maker or poor management of decision making under conditions of uncertainty. This distinction is critical to ensure that the resources directed to the improvement of

outcomes are directed towards the actual problem that is causal to the poor outcomes.

7.1.6 A Level Playing Field

The standardization most frequently ignored and most useful is the standardization of the rules of the game. This is because the adoption of the rules of the game is the single most important act of cooperation by each of the participants. By knowing the rules of game individuals understand the consequences associated with different behaviors and can freely choose how they wish to participate.

To be practical the development of rules must take into consideration the ability to enforce the rules and to recruit players. Without players there is no game, and without enforcement there will soon be changes in the game due to the realization by players that the rules do not exist in practice. The introduction of new informal rules set the nature of how parties will participate because informal rule systems, which work, will always overshadow the formal rules that don't work.

The transparent provision of the kernel information among participants employing the Value Sieve throughout the bounded system provides some insight into the values and priorities of the participating decision-makers. Further, it provides for each participant to use the information available to optimize their individual and collective systems. When individual decision-makers find themselves in confrontations the Value Sieve kernels involved provide information about the before and after the negotiated optimization. In this way, abuse of power to achieve sub optimal performance can be observed by the participants. This is important knowledge about the working partners within the bounded system. Thus, the use of the framework captures a decision-making history of the system. Given the goal is optimization, the Value Sieve provides a clear understanding of the optimization efforts and strategies employed by all parties within the system.

In the Value Sieve research to date, participants accepted the decision framework as appropriate and useful. All wished to participate on a level playing field where the rules of the game would be observed. In no case did any players believe they could not compete for resources based upon the quantity and quality of services

they provided to the community. They accepted that a community market for health and social services was sensible and the rules reflected a workable reality. This was stated with the proviso that government funders frequently do not honor any rules and feel free to change agreements on a whim. The challenge all participants felt was not in the control of their own operations but in the lack of control and consistency of operations due to government gerrymandering. This includes the increasing use of political and coercive pressures upon decision-makers further and further down in an organizational hierarchy.

The Value Sieve provides a simple framework that allows for the transparency of resource costs, available choices and associated information and choices selected. Through the envelope kernel(s), it is possible for parties to the process to access the values that are being applied by the decision-makers within each kernel. Further, it is possible to identify changes in priority executed by individuals who are more senior in the prioritization process. In this way, it is possible to identify the optimization and coordination activities of agents and principals. By extension, it is possible to identify the areas of disagreement and how these differences were resolved. As all accountable decision-makers use the same framework it is possible for parties to assess the values applied by each decision-maker to the optimization process as the budget envelopes associated with each kernel are rolled up towards the pinnacle of the organization.

For example – a Ministry of Health indicates that it is putting additional funding into health care to improve the quality of health services. Regional health authorities begin to determine how those additional dollars will be allocated within their current programs and entertain the notion of several new programs. At the same time, the Ministry agrees to increase the compensation to various health workers unions.

The prioritization kernel of the region, which may or may not include compensation issues, is over ridden as the priorities of more senior level decision-makers are imposed. If the effect is that the additional monies provided from the Ministry go for pay increases to the health workers unions, that is a policy decision and is appropriate. However, the representation now clarifies the situation for clients and workers within the health system. Additional funds are

not being provided to expand services but to maintain the existing work force and their compensation requirements. The accountable decision-maker makes explicit the value that the work force compensation is the highest new resource allocation priority within the system.

7.2 Summary

The level playing field mental model of the Value Sieve implies/includes all the other conceptual components but holds them within the context of a singular and easily supported concept which is held by most individuals and groups when they describe the environment they wish to work within. A level playing field does not ask for favors but fairness to the participants and while competition is implicit, it does not raise itself as a bad thing the way it does when a market or quasi-market model is discussed. By using the level playing field mental model, the technical elements of the Value Sieve were supported and the single most important aspect of the implementation becomes the ability of the senior administrators who control the allocation of resources to be consistent with the rules of the game that are established. This is the bedrock of the model; it requires individuals who participate to be truthful. Truthfulness should not be confused with always being correct; mistakes are part of the game; not always winning, for losing is part of the game; not always getting what you want, for cooperation is part of team work.

Chapter Eight: A Synopsis of the Value of the Value Sieve

"The will to win is not nearly as important as the will to prepare to win."

Bobby Knight

"Experience is not what happens to a man. It's what a man does with what happens to him."

Aldous Huxley

8.0 Introduction

The focus of these efforts is upon the improvement of decision making in complex environments. This is done through the development of a methodology, which makes the decision-making process more informative for both the accountable decision-maker and those who experience consequence of those decisions. The elements of the Value Sieve take place in the mental model of creating a level playing field.

8.0.1 So What?

So what is the summary of knowledge gained, why is it useful, and where will this work lead in the future?

8.1 A Synopsis of Knowledge Gained

8.1.1 Decision Making in Complex Environments – Health and Social Services

Most decision-makers in the health and social service industry must work under conditions of uncertainty. The consequence of this is to require decision-makers to apply their values to the choices they must make. From this perspective there are only wicked problems (McNaught, 1991). If this is the case then moral hazard may result from a broader array of motivations than simple financial incentive.

Moral hazard may result from motivations grounded upon political correctness, ideology, religious conviction, power, or coercion. It is important to separate these motivations from those best associated with ignorance or plain stupidity. This is because it is the assumption of the Value Sieve framework that all participants wish to have identified, opportunities to learn from their mistakes and to take pride in the improvement of their capacity to deliver value. Therefore, the

opportunity for the identification of errors through the provision of negative feedback is central to the accountable decision-makers.

8.1.2 Humans are Model Builders

Humans build mental models as a mechanism to reduce the attention that must be paid the large amount of information we must take in every day. A mental model is an information-processing tool. It instructs the user to attend to certain data, ignore other data, and draw from appropriate conclusions. Knowledge may be considered a collection of models which allow attention to be directed towards the essential variables of interest and so more accurately predict/access the utility of additional information to making a decision. In which case, as in bounded rationality, our models may blind or distract us from the full consequences of our activities.

An important aspect of this perspective is that it is possible to accept this view of models and the difficulty of selecting, stabilizing, testing, sharing and developing models without including the burden of suggesting unintended or perverse consequences are the result of evil intent. The Value Sieve separates “intent from event” and in so doing shines light on the challenges of the decision-maker and places an obligation on those who would criticize the decision making to propose an alternative which produces the same level of VfM and identifies those current practices which are lower in VfM.

By making politics explicit through the prioritization of the available alternatives individuals recommending alternatives must acknowledge either an existing option preference or a new option and supporting information as a better choice. This is useful because the linkage of consequences and intent is an extremely time consuming task and should only be engaged when absolutely necessary. Further, the development of a management process, which minimizes human behavior or defensiveness, may also be laid to rest.

8.1.3 The Value Sieve Is A Model of Accountable Decision Making

The Value Sieve is a model that provides a framework for decision making. It focuses upon decision making alone and does not burden this task with unnecessary activities. It allows the accountable decision-maker to determine the

extent that information is distributed and transparent. The Value Sieve can be an aid for a single accountable decision-maker, or a group of accountable decision-makers in a complex environment.

The consequence of this is that the accountable decision-maker stipulates the use of the Value Sieve to aid in his/her own decision making. The model accepts other accountable decision-makers may do the same but does not require all decision-makers to use the Value Sieve in order to achieve an improvement to decision making.

The logic of the Value Sieve is to provide each accountable decision-maker the ability to improve his/her delivery towards an objective function in a complex decision making environment. This is done through ensuring the availability of negative feedback associated with the choices made, and the linkage of outputs to the flow of negative entropy.

8.1.4 Values of A Decision-maker Are Best Expressed Through Choices

Decision-makers, organizations, and clients are better served when the values of the decision-makers are represented as actions on choices and not words. In particular this protects politicians and administrators who wish to use scarce resources to serve the public by providing value for money.

8.1.4.1 Accountable Decision-makers

The Value Sieve decision model includes the following steps for the accountable decision-maker.

1. What is my objective function?
 - How is it measured?
 - How do I know when this is accomplished?
2. What are my choices?
 - How much information is available to clarify the deliverables of each activity?

- How much information is required to clarify the deliverables of each activity?
3. What are my constraints?
- Resources.
 - Complementary activities.
 - Other agreements.
 - Demand for service(s).
 - Political (philosophical) preference(s).
4. What are my priorities?
- Are my priorities as reflected by my resource allocation choices?
 - How are these prioritized choices influenced by an increase or decrease in resources?
5. To whom am I accountable?
- How widely should I broadcast my decision process?
 - How widely should I permit feedback to my process?

These steps are incorporated into the components of Value Sieve framework which requires the decision-makers to stipulate a priori the expected utility associated with the choices available and communicate within their bounded systems their intention to direct resources to the selected prioritized outcomes. The bounded transparency of the process recruits negative feedback prior to committing the resources and so reduces the probability of unintended consequences. It does this through its ability to coordinate the actions of participants within the bounded transparent system.

8.2 Components Of The Value Sieve

- The Level Playing Field, mental model.
- The Rules - create a level playing field. This incorporates the values of accountable decision-makers to ensure negative feedback and optimization within a bounded system.
- The Data Buffet - is an independent information repository that employs bounded transparency. This feature is intended to reinforce the transparent process for all participants within the bounded system and so provides them a valuable advantage over non-participants in meeting their individual and collective objective functions.
- The Inventory – a comprehensive program portrait/description.
- The Kernel - a value based decision process.
- The Data Buffet and Community Radar System.
- The Use of Beneficiary and Provider Cooperatives (closed)
- The Use of Beneficiary and Provider Cooperatives (open)

8.3 Why Is This Useful?

The Value Sieve provides a structure for the optimization, cooperation, and coordination of programs within complex systems. It does this through an information and communication framework for entities performing in a complex environment. As an information and communication system, it is designed to reduce uncertainty for accountable decision-makers with scarce resources without expecting the use of commensurable measures. It does this through the clarity which comes from establishing priorities as they relate to objective functions, available resources and available choices. The method directs all attention to the appropriate accountable decision-maker(s).

The framework is robust and does not require all activities, programs, and entities to participate or cooperate. For this reason, the methodology does not require full compliance of all decision-makers within an organization. It avoids the necessity

of a large master plan but does not exclude it. It expects individuals to have different motivations and that those who can avoid accountability will do so for as long as possible. It is built to work with mistakes in fact it expects to aid in providing improvements in the future through the provision of negative feedback to the accountable decision-maker. The identification of failure is seen as a positive and not a negative aspect however clearly consequences will be contextual. As an optimization system, it focuses on the minimization of unintended consequences within the collection of individuals and groups who have chosen to use the framework to coordinate their efforts.

The creation of a quasi market for the provision of improvements to objective functions directs resources to those accountable decision-makers that stipulate what they believe they can accomplish in exchange for a resource bundle provided to their program. This ensures the a priori stipulation of an agreement which links resources to outputs/outcomes provides the basis for negative feedback and consequently learning. Further, the information provided by the kernel allows for the optimization through coordination of effort and priorities within higher level (macro) objective functions.

In addition to cost compression, this approach provides the ultimate flexibility in determining how best to optimize given the available resources and the available choices. By accepting the notion of equifinality, alternatives may be developed within a complex organization to work around barriers and bottle necks. A quasi market model allows a decision-maker within an organization to give resources to the group that offers the greatest expected utility, the greatest VfM.

The framework provides an inexpensive method which links performance to resources and identifies those new activities which deliver greater VfM than other new methods or established programs. It accepts and permits the use of the materials, knowledge, and information currently available to the decision-maker. The methodology accepts documented a priori assumptions and does not require that the accountable decision-maker participate in the problem solving activities associated with the various options. The decision making is based upon best knowledge, a framework for negative feedback and an understanding that more

information will be available for decision making during the next iteration in the decision making cycle.

8.3.1 A Robust Implementable Decision Making Framework

In a traditional model of governance the controlling senior decision-makers determine a policy and expect all participants to follow their instructions and guidelines. In the case of a large complex organization such as a government entity, the senior decision-makers would expect to identify the Value Sieve as the method of resource allocation and implement it widely. This would traditionally require a large and effective control system that supervised the actions of the controlling decision-maker's agents throughout the organization. It might include a large and technical information system that would be developed to manage the information exchanged and coordinate it.

8.4 What Decision-makers Need Is A Balderdash Detector

The weaving of the human mind and its ability to rationalize is wondrous. If the optimization of decisions could be resolved by good intentions, professional training, and intuition then it should be clear that there would be no opportunity for improvement in complex environments. However, in the face of the evidence it is clear that these traits have only taken us part way to solving our problems and now it is necessary for complex organizations to take on frameworks and methodologies which reach beyond what can be accomplished with good intentions, professional, and intuition alone. To generate improvements to any complex system in equilibrium requires an orderly and consistent approach which recognizes the issues associated with individual and group dynamics as they relate to judgement and decision making.

It would be fair to say that I have listened to hundreds of leaders of health and social service organizations, large and small who have explained that what their organizations do is complicated and difficult if not impossible to measure. However, I have also listened while these same decision-makers explain that with a little more resource, or perhaps some funds for restructuring, they could do it better. Sometimes these arguments are successful in gaining resources and in this

way we see a history of budget creep combined with mission creep¹⁵⁴. Do I believe they are sincere? Yes. Do I think they have real evidence? Sometimes. Do I think that smooth talkers/presenters do better in gaining access to resources? Of course. Do I think the arguments change over time based upon whatever is a convenient argument? Yes. Do I suspect this runs up and down through complex systems? Yes, in fact the more complex the system the less likely evidence will be available which indicates something will not work, the more compelling the argument may be and the more difficult the motivations will be to reveal. What was needed was a balderdash detector. While a box with a light would be best, an investigation for such a device proved fruitless. As an information scientist, my task was to build one. A device which harnesses the best of human intelligence and the best of machine memory and communications capability. This affiliation of machine and human is the Value Sieve.

In the best tradition of information science research, the prototype device was built using pencil and paper, and human beings to replicate the working components. This was followed by the development and testing of an Internet based "alpha" prototype that showed great promise in its ability to inexpensively provide the benefits of the framework. At this time the next generation of the World Wide Web version of the Value Sieve is in development and should be ready for implementation and testing in the next few months. The goal will be to identify an organization, operating within a complex environment, willing to implement and test the next generation of decision-making frameworks for complex environments.

¹⁵⁴ Mission creep is term coined by the USA military and describes a circumstance where the objective of the mission is so poorly defined that alteration to the mission "creep" can be permitted without a conscious decision to expand the terms of reference of the mission. In this way, mission creep increases the opportunity for an investment of resources to fail or more importantly to permit the accountable military decision-makers to keep control of their project.

8.5 How Might The Value Sieve Be Used In The Future?

8.5.1 Quality Control

The use of beneficiary cooperatives in health and social services would permit a collection of interested beneficiaries within the same category to review and optimize the resources allocated for the provision of services to their “cause”. For example, individuals with prostate cancer may collectively review the available treatment strategies within a health region. In this effort they might choose to recommend to the regional health decision-makers responsible for prostate health changes to the prioritization of program spending. There may also be complete agreement regarding the priorities of care.

The result of this review would however, focus the attention of all parties upon the evidence, the current strategies, and the limitations if any, associated with the resources available. In this regard, it is my feeling that expectations could be better managed by an informed understanding of the situation. Further, the harnessing of individuals with such a clear motivation to identify and support the quality of treatment could create a body of useful information for other prostate health beneficiaries and health professionals.

Finally, the prioritization would enable accountable decision-makers within the healthcare system to understand the priorities of the beneficiaries themselves. If budgets are to be reduced what would they rather go without. If budgets were to be increased what service would they wish to add.

The use of a professional cooperative would operate in the same way as it concerns a specific disease categorization.

8.5.2 Service Coordination

The use of cooperatives will assist in the coordination of activities and resources to minimize the creation of unintended consequences. Or in a worst case to identify the source of the consequences.

For example, the following was relayed to me regarding the unintended consequences associated with the adjustment of funds and budgets as they relate to several Ministries within a health region. A Provincial Ministry of Health

program determined that it would no longer provide the resource to the region's schools for the distribution of shampoo for head lice. This was expected to save the Provincial Health program approximately \$20 per treated child. The Schools of the region, now without the resource to meet the immediate need of the child, send the child home with the instruction that they may not come back to school until they are treated. The Ministry for Children and Families gets involved in order to meet the needs of the child who should be in school and personnel and forms are brought forward at great expense so the child's parent can get the money necessary to buy the medicated shampoo and treat the child. However, the Ministry for Children and Families realize that it is easier to simply tell the parent that the shampoo is available at no cost through the emergency room of the local regional hospital. Now when head lice is detected at the school the child is sent home with a note to go to emergency to get the free shampoo. In this way the Ministry of Health program saved \$20 and moved the cost to the regional health organization which now experiences the cost of an emergency room visit in addition to the cost of the shampoo.

8.5.3 Resource Sufficiency and the Second Tier

If money isn't a problem then don't talk to the public about money. If it is a problem then face it squarely and establish mechanisms which can best optimize the use of resources. Most importantly, be clear about what services and levels of service should be expected from the system and what should not be expected. This clarity will liberate those individuals from waiting for something that will not happen and permit actions which are frustrated when there is uncertainty.

The use of the kernel for a program or an organization creates a line that identifies what will be provided and what will not and the priorities within a specific funding level. Frequently the consideration of what should be provided by a government organization is based upon what they believe they should be responsible for and their ease of controlling the services that are provided and not what resources they have available and consequently what they can legitimately offer. This approach has led to situations where the promise of government is not achieved and the failure to acknowledge the problem has left individuals adversely affected.

When government managers are required to offer a program but have not been given sufficient funding to meet the demand they are trapped in an unconstructive paradox. Yes there is a program, but no you can't be served. These "brochure only programs" can only be justified within the most shallow of motivations and are destructive of the over all trust in government that is essential for public confidence. From the public perspective, the substance of the claim is what must be tested.

In the case of health care, most resource cuts, or cost compressions have been levied as percentage cuts across the board within health and social service organizations. This implies that all programs and activities are equally "fat", and/or equally valuable and/or that all services are linear in their ability to translate resources into outputs/outcomes. The consequence of this is likely to be the production of "brochure services", or reasonable variations of the same thing. In health care an example would be the service provided to children used to ensure a level of intensity and quality of service to maximize the opportunity of the child. As funding reductions occur, the services move towards assessment and diagnosis. The actual treatment is now the responsibility of the parent(s) of the child who contract health professionals in the private sector to provide therapy.

The Value Sieve kernel allows individuals to know what can be provided and what is simply a brochure service. Consequently, the individual regains some control of what they believe they should do without the confusion of promises of what should be. Further and most importantly, these lines on the Kernel for each program define the second tier of the health care system. By having it defined other organizations and individuals can begin to determine how to best meet these additional needs of the population.

From an information perspective the identification of choices that cannot be funded is extremely informative and will reduce uncertainty for the population. Consequently, it is important that government health and social service funders acknowledge those needs will not be met by the public system. This is because the promise of something that might happen in the future is sufficient to eliminate/marginalize the ability of a community, an organization or a group of organizations from collecting and investing to resolve an issue themselves. It is

inappropriate for government to indicate that it will provide services and then indicate it is not liable when these services are not provided in a timely manner. The Value Sieve kernel intensifies the clarity of communications among the parties.

8.5.4 Optimization of Government Provided Resources

An important opportunity will also become known through the use of the Value Sieve. This is best explained by acknowledging that there are many organizations and individuals that have traditionally provided resources and energy to their community. These community organizations fill niches where needs are identified and government funded programs are short. It may be the case that in the network of programs there are programs funded by government that could be better funded and delivered from community organizations. The funds saved by government could be redirected to other government-funded programs.

For example, if a hospital funds a full time Minister to meet the religious needs of the individuals and families attending the hospital. The cooperative group of Churches within the community might be pleased to provide these services on an organized basis if they knew that the service was being withdrawn by the government funded program so the funds could be redirected to other hospital programs.

In such situations the provision of priority services funded by government might be extended through cooperative efforts within the community. The kernel provides the basis for the identification and discussion of how the community and government might cooperate. The agreements must be identified and framed as binding agreements for defined periods of time so that a withdrawal of service or a failure to meet expectations can be addressed.

For example, an agreement with a community agency to provide services for children using community and not government funding may require the hospital to specify how the liberated funds will be used. This is to ensure that communities, which work to generate funds for the benefit of their citizens, do not have resources withdrawn by the government and sent to another community.

8.5.5 Clarity of Utilization

The Kernel provides a clear understanding of the use of additional resources. Therefore, an essential dialogue can take place that addresses the use of resources and clarifies the nature and motivations of special interest groups. This is because the context for all discussions associated with the Value Sieve are predicated upon the notion that resources are scarce and should be directed to maximize the expected utility. A suggestion for the spending of \$500,000,000 on a new business venture must be placed within the context of how that will generate more VFM than another venture and if the resources are scarce, the current venture is being given up in exchange for the new venture.

8.5.6 Privatization of Health Care Services

The Value Sieve allows a comparable market cost to be calculated for any service that it provides. This does not in any way suggest that the service must be provided by an outside service provider but it does indicate the cost variation and in some cases the most appropriate family of services to privatize.

8.5.7 The Community Based Information Resource

Complex environments require the combined actions of many parties. The determinants of health highlight a broad spectrum on influences that have an impact upon the health of the population. The ability to construct such an optimization process for a community is inherent in the Value Sieve and is embodied in the demonstration project the Community Based Information Resource¹⁵⁵ which was the first internet based system of its kind.

Social capital research indicates that individuals should be encouraged to participate in their communities and that such participation/investment provides significant health benefits. The CBIR/Value Sieve demonstrated that the technical implementation of a community based information resource could be accomplished inexpensively. It would be worthwhile to test the extension of this idea to determine the ability of the Value Sieve to begin to link community information and objective functions together and so improve the expected utility of the community.

8.5.8 The Frustration of Large and Small Politics

I have now been working with government and not-for-profit organizations for eight years. This work has been primarily focused upon problems of decision making in large complex environments. During this time I have observed the attempts by persons who wish to do the right thing for the population thwarted by those who are willing to say anything to get ahead. The civil service, which used to rely upon the character of administrative professionals to guide policy and so protect the public from unintended consequences has become more willing to supply short-term success at the cost of long-term objectives.

The Value Sieve framework attempts to ensure that the parties, which come to the table to make decisions, are held accountable for those decisions. The Value Sieve creates a fair record to prevent abuse of accountable decision-makers by identifying the information brought forward and used by each party in the decision making process. In so doing, politicians are protected from administrators who manipulate choice by providing inadequate analysis. Also civil servants are protected from unreasonable political pressure by allowing agents to identify their priorities to achieve an objective function to principals who have the power to re-prioritize based upon their power, position and greater understanding of the programs which must be coordinated to optimize.

The respective statements of priority for decision-making provide a record that can be learned from by all parties. This record is not intended to facilitate a serious investigation in all cases where outcomes are not achieved, for all decision-makers will, from time to time, make mistakes in judging under conditions of uncertainty. However patterns of error and significant deviations from recommendations can be identified and studied. The Value Sieve creates a record of accountability that is desperately needed in order to establish the fundamental basis for a healthy organizational culture.

8.6 Conclusion

The Value Sieve is a decision-making framework that establishes a foundation for the ongoing optimization of the objective function of an accountable decision-

¹⁵⁵ Corbett (1998) A copy of this article is in Appendix I: Bridging Solitudes Article.

maker. The framework is neutral and does not prescribe more than an orderly and complete decision process because that is the responsibility of the decision-maker and his/her principal. Thus the decision-maker or system of decision-makers can adopt ethical or professional frameworks and integrate into the Value Sieve process easily without changing the Value Sieve framework or procedures. In this way the neutrality of the mechanism shines and reinforces its stability.

The neutrality also offers a stability of administrative process. This is particularly important in complex environments where the structure of the Value Sieve supports change of an incremental or paradigmatic order.

The Value Sieve implementation is frugal, calls for no specific information technology investment, and consequently is not hampered by a requirement for large capital budgets. In fact, the work to date has demonstrated significant gains for the organizations where trials took place without any significant technology investment. The demonstration of the CBIR prototype web based system for the implementation of the Value Sieve was constructed by me in less than six months. The second generation of the web based Value Sieve system is now under construction.

The action research and theoretical underpinnings of the Value Sieve decision framework show a robust management/administrative framework (algorithm) for the optimization of a bounded system.

The Value Sieve methodology would benefit from additional testing in different settings with ranges in complexity. This would include the use of the system in for profit and not-for-profit systems. This testing would be enhanced by long term commitments by the participating organizations.

The revolutionary aspect of the Value Sieve is that it does not require the compliance of any party other than the accountable decision-maker(s). From that isolated effort, the framework ripples out from the decision-maker to the limits of the boundary they permit. If others do not respond, the accountable decision-maker has established a process for optimization within their own sphere and maximized the improvement they may create within the bounds of their position and influence.

Glossary

Algorithm

A method of solving a problem by completing a finite series of steps.

Arrow's Impossibility Theorem

In a democratic setting, majority rule by voting is frequently used as the preferred method for aggregating individual preferences. Arrow's impossibility theorem suggests that the characteristics of an ideal system: time rational; decisive; and egalitarian are in fact incompatible. A method of voting may avoid arbitrariness, deadlock, or inequality of power but it cannot escape all three.

Arrow's Impossibility Theorem requires that:

- social choices must be transitive. (If X is preferred to Y and Y to Z then Z cannot be preferred to X)
- social choices must not respond in an opposite direction to changes in individual choice. If individuals come to like a choice more it cannot have the social choice mechanism move it in a negative direction.
- social choice must make no one a dictator. It must not be possible for one individual to prevail no matter how other participants feel.
- social preference between two alternatives must depend only upon the feelings people have regarding those two alternatives and not on their opinion of other alternatives.

Arrow's theorem casts doubt upon any notions that explicitly or implicitly attribute preferences to society that are comparable to preferences for an individual. Consequently, it should be clear that any mechanism proposed will not satisfy all the axioms of Arrow's Impossibility Theorem.

Mansfield E. *Microeconomics: theory and applications*. WW Norton and Company. 1979: 465-466

Commensurable

From Euclid's Elements Book X Definitions: Those magnitudes are said to be *commensurable* which are measured by the same measure, and those *incommensurable* which cannot have any common measure.

Example: Two magnitudes A and B of the same kind are *commensurable* if there is another magnitude C of the same kind such that both are multiples of C , that is, there are numbers m and n such that $mC = A$ and $nC = B$. If they're not commensurable, then they're *incommensurable*.

Source <http://aleph0.clarku.edu/~djoyce/java/elements/bookX/defX.1.html>

Commensurable, a. [L. *commensurabilis*; pref. *com-* + *mensurable*. See *Commensurate*, and cf. *Commeasurable*.] Having a common measure; capable of being exactly measured by the same number, quantity, or measure. --
Com*men"su*ra*ble*ness, n.

Commensurable numbers or quantities (Math.), those that can be exactly expressed by some common unit; thus a foot and yard are commensurable, since both can be expressed in terms of an inch, one being 12 inches, the other 36 inches.

Commensurable adj : able to be measured by a common standard; "hours and minutes are commensurable"

Source: *Webster's Revised Unabridged Dictionary*, © 1996, 1998 MICRA, Inc

Commensurate

1. Of the same size, extent, or duration as another.
 2. Corresponding in size or degree; proportionate: *a salary commensurate with my performance*.
- Measurable by a common standard; commensurable.

Contingency Models¹⁵⁶

1. Current thinking is that there is no single "best way."
 - The effectiveness of a particular management depends on the industry.
2. Systems Theory
 - (a) The central principle of systems theory is that the whole is more than the sum of its parts. Each part is considered as it interacts with changes, and is changed by every other part within the system. The parts are interdependent and it is through communication that interdependence is facilitated.
 - (b) Organizations are open systems.
 - 1) Boundaries are flexible and allow comm to flow in and out of the system.
 - 2) People who maintain communication with outsiders are "boundary spanners."
 - 3) Boundary spanners:
 - Provide info about changes in consumer tastes, technical data, technology of other industries, etc.
 - Act as gatekeepers who control, store, summarize, interpret, or ignore info.
 - Protect people inside the org from outsiders who would like to influence their behavior (Gatekeeper).
 - Attempt to assure outsiders that the org is striving to meet their needs.
 - 4) Strengths of systems theory:
 1. Recognizes interdependence of all parts of org.

¹⁵⁶ http://web.utk.edu/~gwynne/management_theory.html

2. Acknowledges both formal and informal comm as contributing to success of org.
3. Job duty, chain of command, span of control, and decision making are equal in importance to questions of attitude, morale, behavior, etc.

Contingency Theory

1. No one type of organizational structure or leadership style is most appropriate for all situations.
2. Which management style is most effective depends on the degree to which the group situation enables the manager to exert influence.
3. Managers must be trained to modify their roles to fit the situation.

- Criticisms of the Systems/Contingency Organizations
- Still too new for evaluation.
- Current Implementation of the Contingency Model

1. Theory Z

- Successful organizations are ones that have a culture that reflects the values of the employees.
- In the past American workers valued individual decision making and responsibility, employee specialization, rapid promotions, etc., and did not get social satisfaction from the job. Instead the church, community, family, etc., provided social needs.
 - A. Theory X worked then.
 - B. Mobility of Americans has changed people's social needs so that Theory Z, which combines best of X and Y is needed.
 - C. Characteristics: (Japanese)
 - a. individual advancement and achievement, but more cooperation.

- b. collective decision making with ultimate responsibility lying with one person.
 - c. close personal relationships.
 - d. trust
 - e. emphasis on interpersonal skills.
 - f. respect and value of employees
 - g. long-term employment
 - h. community feeling at work.
2. Criticism
- A. American culture not homogeneous.
 - B. Where X style is appropriate, Z won't work.

Heuristic

Denoting a method for solving a problem for which no algorithm exists. It involves trial and error, as in iteration of successive approximations until a solution is achieved.

Kaldor Criterion

A change is an improvement if the people who gain from the change evaluate their gains at a higher dollar figure than the dollar figure the losers attach to their losses.

Model

A model is composed of a number of assumptions from which conclusions or predictions can be deduced. The purpose of a model is to assist in the development of an improved understanding of a specific problem. A model is not necessarily intended to accurately reflect all aspects of the problem it is intended to study. In many cases, the real problem is too complex to allow an accurate detailing of all variables and therefore simplification and abstraction are often seen as common failings.

The value of a model is in its ability to assist in the development of a better understanding of a problem and or the development of a better solution.

Monopsony

A market situation in which there is a single buyer or a group of buyers making joint decisions. This is the buying side equivalent to a monopoly which represents a sellers side.

Open Systems Theory Overview

This is intended to provide the reader with a brief overview of the primary concepts associated with an open systems approach to organization analysis and design. Systems theory is concerned with the relationships of structure and interdependence rather than the constant attributes of objects. Consequently, it deals with the dynamics of temporal as well as spatial patterns. Social organizations depend upon their external environment and so they must be conceived of as open systems.

An open systems approach requires that the system be considered within the context of it's operating environment and that the design consider the ways each subsystem will react with others through provision of inputs and outputs. This is intended to avoid the problems many individuals create when they mistake their organizations as closed systems and so invest their efforts in determining a detailed internal structure without considering the external environmental forces and the "natural" features which open systems demonstrate.

An example in health care is the failure by many health planners to link programs so that integrated planning and resource allocation can take place.¹⁵⁷

The design of the decision support system for resource allocation was done using an open systems perspective which by intent includes the inputs and outputs associated with other organizations directly and indirectly included in the delivery of health to the citizens of the region. When combined, these organizations describe the existing structure of the health care system within which the Regional Health Authority must work to achieve its objectives.

The primary rules for the design of an effective system are:

- 1) understand the goal(s)
- 2) ensure the system is self-correcting to optimize the goal
- 3) ensure the elements of the system can communicate so the entire system is self-correcting and goal directed
- 4) preserve parsimony

Many of the open systems concepts¹⁵⁸ will be familiar as they are by necessity contained in many popular organization and management approaches.

- Importation of Energy - systems take in energy from their environment
- Throughput - systems transform the energy available
- The output - systems export some product back to the environment
- Systems as cycles of events - the outputs of the system furnish new energy to the system.
- Negative entropy - to survive, systems must move to arrest the entropic process; they must acquire negative entropy.
- Information input, negative feedback, and the coding process. - Information comes into the system to advise it how to adapt to the environment. Negative feedback allows a system to correct deviations from the course. When negative feedback disappears or discontinues the system steady state vanishes, and at the same time it's boundary disappears and the system terminates. Reception of inputs is selective in that systems are selective about what kind of energy and or information they can utilize. A system uses coding to recognize and translate signals from the environment.

¹⁵⁷Rodwin VG. *The Health Planning Predicament: France, Quebec, England, and The United States.* University of California Press, 1984

¹⁵⁸Katz, Kahn. *Organizations and the System Concept. The Social Psychology of Organizations.* John Wiley & Sons Inc. 1966

- The steady state and dynamic homeostasis - this is not a true equilibrium but a state of dynamic balance between the energy coming in from the environment and the outputs to the environment. Systems tend to work to preserve their character. A system will tend to return to the steady state or a position closest to the steady state possible. I.e. an effort to change the system will be counteracted by other elements within the system to maintain the steady state. Thus, any changes that are made are minimized by the system. In preserving the character of the system the structure will tend to import more energy than is necessary for its output so as to build a negative entropy store. In adapting to their environment, systems will attempt to cope with external forces by ingesting them or acquiring control over them. Social systems will move towards incorporating within their boundaries the external resources essential to survival. Systems will preserve the character of the system through growth and expansion.

- Differentiation - systems move in the direction of differentiation and elaboration.

- Equifinality - a system can reach the same final state from differing initial conditions and by a variety of paths. As systems move towards regulatory mechanisms to control their operations the amount of equifinality may be reduced.

Pareto Optimization

Based upon the Pareto criteria that states, "a change that harms no one and improves the lot of some people (in their own eyes) is an improvement". Pareto optimization is therefore the process of identifying and implementing any changes which improve the situation for some without creating harm for others. When all such changes have been carried out the situation is termed Pareto-optimal or Pareto-efficient.

Mansfield E. *Microeconomics: theory and applications*. WW Norton and Company. 1979. 443-444

Pareto Rankable

In game theory, pareto rankable¹⁵⁹ references the equilibrium point that is best for multiple players. The equilibrium reached is not necessarily the pareto optimum.

Project versus Program

The term "project" is selected to represent the smallest "rational" self contained health service delivery activity which can be funded by the RHA.

The term project was selected instead of the commonly used term program. This is because the term program is frequently used administratively to represent a variety of organizational activities. For example: in the health care industry the term program may be associated with general organizational functions as in Hospital Programs, or Medical Services Programs; the type of health issue involved, as in Cancer Programs or Alcohol and Drug Programs; the goal of the activities as in health promotion programs, or activation programs; or the age of the client as in Infant Development Programs, or Geriatric Programs. Programs frequently receive resources that are intended to be used to contract a variety of autonomous service providers who each carry out activities intended to achieve a specified goal. For example, Alcohol and Drug Programs (ADP) contracts with a variety of independent agencies who each provides services to a target population. Each independent agency may fulfill a number of functions and could in theory carryout a number of projects under contract to ADP.

In the case of ADP the complementary outcomes from a number of autonomous service providers achieves the goals as funded by a manager coordinator of the program. Each planned; separately funded activity carried out by a service provider is a project. Indeed, from the perspective of the DSSAR process the administrative activities carried out by the ADP administration would be considered a separate project for funding.

The term program will therefore be used to represent a collection of projects which share administration, management and or goals and objectives. However,

¹⁵⁹ Camerer, C. and Knez, M. Coordination in Organizations: A game-theoretic perspective. (1997) In Organizational Decision Making Edited by Shapira

the basic funding unit to be used by the DSSAR will be the project. Each project will have specified outcomes and resource requirements that must be maintained.

Quasi Market

To define a quasi market it is first necessary to define a market. Although the term market is used in many different ways, the central concept is a group of firms and individuals in communication in order to buy and sell some product or service. The critical requirements of a market are that all of the participants within the market have: an understanding of the buying and selling practices within the market; an effective knowledge of the goods or services being bought and sold; and resources available for distribution.

When it is the case that all of the conditions for the participants are not met a perfect economic market does not exist. What may remain however is an environment where many aspects of a market are present. The result is a quasi market. A quasi market may share many of the dynamics and predictive capabilities of a perfect market but it is technically different than a perfect economic market because the customers within the market do not have complete knowledge of the available options nor do they have direct control over the resources being allocated.

In the case of health care, many citizens do not understand the health care services and products that are available and although health insurance improves the resource distribution dramatically, there is not an equitable distribution of resources amongst all participants. Consequently, the conditions for a "perfect" economic market do not exist. The market for health care is therefore a quasi market and the conditions can be constructed to create a situation in which the benefits of market forces can be preserved

Mansfield E. *Microeconomics: theory and applications*. WW Norton and Company. 1979: 19-40

Re-engineering

In 1993, the term reengineering was popularized in the business press by Hammer and Champy. The concept of reengineering refers to the redesign and subsequent development of an organization as though you were building a new organization

entirely and not trying to fix an existing organization. Thus a reengineering process begins with a clean slate, looks at the objectives of the organization, and determines the most effective and efficient method of achieving those goals by designing key processes. Implementation requires the marrying of the present systems to the new systems in order to achieve the expected benefits.

Re-engineering is a subset of what is known as "Process Innovation" which considers the envisioning of new work strategies, the actual process design activity, and the implementation of the change in all its complex technological, human, and organizational dimensions.

Hammer M, Champy J. *Reengineering The Corporation*. HarperCollins Publishers 1993.

Davenport TH. *Process Innovation Reengineering Work through Information Technology*. Harvard Business School Press, 1993

Scitovsky Criterion

Supports the Kaldor criterion that a change is an improvement if the people who gain from the change evaluate their gains at a higher dollar figure than the dollar figure the losers attach to their losses, but adds the requirement that a change should not be made if after having made it the Kaldor criteria would recommend that the change be undone.

Theory of the Second Best

This theory states that it is not true that a situation in which more but not all of the optimum conditions are fulfilled is necessarily, or even likely to be, superior to a situation in which fewer are fulfilled. The point is that piecemeal attempts to force fulfillment of conditions can easily be a mistake.

Utility and Objective Functions

It is expected that incommensurable measures will be interpreted by a decision-maker within the context of an objective function. In social services, an example of an objective function could be "reducing juvenile violence". Thus, each available alternative program addressing juvenile violence could be considered within the context of its ability to, in new or complementary ways, to contribute to the reduction in juvenile violence. The integrated measure (in the mind of the

decision-maker) being the VfM of an alternative in addressing the objective function.

If only a single program alternative was available then it would, by virtue of it being the only choice, be the best choice available and would thus have the highest VfM measure of the objective function. If two program alternatives were available and the organization could afford only one, then the program which offered the highest VfM on the objective function, from the perspective of the decision-maker, would be the program selected. The pattern should be clear that through the use of comparison of one programs VfM towards the objective function with another a series of programs could be compared which would demonstrate an ordinal measurement system of the VfM of the available choices towards the objective function of interest.

Thus, a cheese sandwich given to a young person would rank higher in VfM addressing the objective function of youth hunger than would a cheese sandwich given to a senior citizen. The utility of the same item can be different when considering it in relation to the objective function of interest. Extending this notion, it can be seen that in comparing a cheese sandwich to a ham sandwich in an attempt to address the objective function, "youth hunger" commensurable measures may have incommensurate units. I.e., the cost of a ham sandwich may be more than the cost of a cheese sandwich, or the impact of a higher protein sandwich may increase the outcome measure of meeting Canadian nutritional guidelines, or the output measure of sandwiches consumed may be higher if variety is provided.

From this discussion it can be seen that a program's VfM and subsequent contribution towards an objective function can only be determined when it is placed within the context of the available alternative programs and the total resources available which can be applied to the objective function by the decision-maker. When an organization has the resources to fund one or more programs towards the goal of an objective function, the collection of programs, which maximize the VfM towards the objective function, will be chosen.

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- Cochrane Collaboration Web Site**
- Note: the web address has changed and these references are being checked for availability on the new web site.
- <http://hiru.ca/cochrane/revabstr/ab000259.htm>

Appendices

Appendix A: The Whistleblower Bill of Rights recommended by the Commission on Research Integrity¹⁶⁰

Recommendations includes the right to:

- open communication; the measure establishes boundaries for legally-protected speech as expansive as those in the Whistleblower Protection Act of 1989 for federal employees;
- protection from retaliation, covering both relief from reprisal and accountability for those who retaliate;
- fair procedures, giving whistleblowers the chance to present witnesses and confront their harassers;
- freedom from partiality, barring conflicts of interest and giving whistleblowers the right to challenge the objectivity of those deciding their cases, without incurring further retaliation;
- access to information, including comments on the accuracy and completeness of institutional responses to their charges of research misconduct;
- timely processes, because "[w]hen cases drag out for years, the issue becomes the dispute rather than its resolution;" and
- acknowledgment of whistleblowers' actions, by requiring that those who are vindicated be appropriately credited for their contributions.

¹⁶⁰ <http://ori.dhhs.gov/guidelin.htm>

Appendix B: Best Evidence and Research Summary

The technical sections in this best evidence summary are described in the following short overview of each of the three sections in this appendix.

Section I: Behavioral Overview

The use of the findings from behavioral decision theory, measurement dysfunction, and organizational decision theory to understand decision-making. Includes the implications from basic research and theory regarding decision making, and how groups solve problems. Health and social service examples are used wherever possible.

- *Purpose of a Decision Support System*
- *Individual Behavioral Decision Making Findings*
- *A Brief Review Of Behavioral Decision Theory Findings and The Rational Actor Model*
- *Measurement Dysfunction an Example of using a Poor Model of Human Behavior in an Applied Setting*
- *Organizational/ Group Behavioral Decision Making Findings*
- *Model Z - A Model for Understanding Uncertainty*

Section II - Management Tools and Evidence

The use of the findings from management and organizational development studies to support the organizational and management requirements. Addresses the evidence associated with several common management practices and their attendant assumptions. The objective of this section is to demonstrate the basic management principles which must also be taken into consideration when a resource allocation process is developed for complex organizations.

Current research in management practices is reviewed to understand the general evidence which can provide guidance to the development of a decision support system for resource allocation. While there are many topics three have been selected as most useful.

- *Planning In Complex and Dynamic Systems*
- *Issues of Organization Change*
- *Transaction Based Economics*

Section III - Health Specific Evidence

The unique elements of health management and health economics which further inform the requirements of the solution of the technical chapter addresses the specific tools of health and social service management. The evidence regarding the health system is considered in addition to the basic practical constraints.

- *Evidenced Based Medicine and Clinical Guidelines*
- *Health Economics & Health **Utility***
- *Privacy and Confidentiality*
- *Choice The Instrument Which Drives Resource Allocation*
- *The Internet*
- *Coordinating Information, Content and Opinion*

Appendix B: Section I

B.1 Behavioral Overview

This part reviews the psychological, economic and organizational decision making literature to identify behaviors which have an impact upon the design and implementation of a decision support system for the resource allocation process.

Human decision making is modeled in economics and psychology and is applied within administrative and management practices. It is common in management to use simplified economic models of human and group performance which are based upon rational and incentive maximizing individuals and groups. However, these simplified models are not supported by the research findings of both psychology and economics. An evidence based approach to constructing a resource allocation process requires that individual, group and organizational behaviors be reviewed so that, where possible, a decision model is developed which can accommodate the actual behaviors of human and groups of human decision-makers.

B.1.1 Purpose of a Decision Support System

The purpose of a decision support system is to assist an individual or group of individuals to make a decision. However, management decision systems are frequently designed based upon a model of the human decision making behavior which is incorrect (Eltin, Martin, Scott, Rubenstein, 1999; Kahneman, Knetsch, & Thaler, 1987). The consequence is the development of a decision system which cannot efficiently achieve its goal(s).

Making decisions is difficult. Decision-makers often operate under the perception that there is only one correct decision possible. However the open systems¹⁶¹ concept of equifinality states¹⁶² that there are many pathways which can lead to the same final result. Therefore it is possible for many to arrive at the same decision outcome but each use a different pathway. This is an important concept

¹⁶¹ The glossary includes a description of the principles of open systems theory.

¹⁶² In organization theory, this is identified as contingency theory.

because the belief that there is only one right way to solve a problem¹⁶³ even when there is incomplete information uncertainty and risk, causes decision-makers to invest unreasonably large amounts into problem solving efforts which will not deliver a decision.

Decision-making is to choose among the available choices using the information that is available. Problem solving tends to embrace the search for the one way to solve the problem (Simon, 1957). Problem solving behavior under condition of incomplete information, uncertainty and risk is often used as a method to avoid coming to terms with the fact that a decision must be made. "Methods of avoidance include: procrastination, endless pursuit of better information, reliance on habit or tradition, and deferral to aids even when there is no particular reason to think they can do better." (Fischhoff & Johnson, 1997).

B.1.1.1 A General Context for the Design of A Decision Support System

A decision support system for resource allocation must efficiently and effectively aid managers and organizations in deciding/choosing (within a specific time frame) how to optimize their resources to achieve goals within their available budget. The decision system must operate in an open system where complex inter-relationships will be managed by knowledge workers; i.e. other programs inside and outside the organizational entity control (enhance/suppress) the programs ability to achieving its desired outcomes. In most of these circumstances the work within each program tends to require specialized knowledge. In the other portions of this paper health and social service organizations have been targeted as excellent examples of these types of situations.

A key requirement of the design is that it must be robust enough to operate in the most difficult organization conditions of high complexity and high knowledge specialization and still operate in simple organizations with minimal knowledge specialization. This is essential because it is believed that the current methodologies used by simple organizations contain design flaws which can be overcome in small/simple organizations but which tend to have more significant

¹⁶³ This notion was supported as part of Taylorism and springs from the early period of industrial management. It is commonly phrased more clearly as my way or the highway.

negative consequences as the organizations develop and take on more complex structures. Knowledge based industries require the development of management techniques which can bridge a single organization to a more complex internal knowledge based structure operating in a system of other organizations.

The development of regional health and social service organizations has created larger and more complex knowledge intensive service delivery organizations than have operated in the past. These are made more complicated because the public funding structure and knowledge disparity of the participants makes performance verification more difficult. A further weakness exists because the corrective actions which are possible and expected in a normal market do not occur here. This is because the person served does not participate as a customer by making payment and so valuing choices and alternatives. In this case the person served is not necessarily fully informed of the choices available nor do they have the information/knowledge to determine the quality of service received.

B.1.1.2 Two Basic Models of Decision Making

A model of decision making is an assumption of how the decision-maker proceeds to make a decision including the extent and type of information available and the circumstances associated with the decision process. For example, two basic types of decision models are perfect rationality and bounded rationality.

Economic Man/Rational Actor - A model where the decision-maker is completely informed, perfectly logical and oriented toward economic gain. As the name states this basis for making decisions involves a perfect environment.

Bounded Rationality: A model where the decision-maker relies on limited information and that reflects time constraints and political considerations.

Administrative and management decision support systems are often designed with the assumption that there will be perfect rationality. The consequence of this is that the data collected and available for use in a decision systems may actually increase the probability of error associated with the decision. Decision systems

required to operate in settings where bounded rationality is the rule¹⁶⁴ will need to be designed differently to better meet the conditions of bounded rationality such as decision making under conditions of complexity, risk, uncertainty and ambiguity. It would seem clear that a system designed to manage within the human limits of bounded rationality can easily incorporate decision elements or organizational components that are perfectly rational, if and when they appear, however the reverse is not true.

B.1.1.3 Models, Measures and Behaviors

The three technical areas which provide the most significant insights into the design of decision support systems are Behavioral Decision Theory, Organizational Behavioral Decision Theory and Measurement Dysfunction.

Behavioral decision theory is the result of economists and psychologists working to understand the nature of how individuals do make decisions. Organizational Behavioral Decision Theory attempts to understand how groups process information and make decisions. These considerations are important elements in the design of information systems because they identify how the implementation of information/measurement systems can cause dysfunction within the organizations they intend to aid. Management and management information systems are applied disciplines that borrow from different academic fields. Consequently to build better management systems it is important to understand the underpinnings of the different disciplines involved and the basic assumptions that are used.

In economics, the majority of effort is invested in developing theories about what individuals should do in certain defined circumstances. Psychologists tend to develop theories which explain what people in certain defined circumstances will

¹⁶⁴ For example in many government ministries, structures known as "stove pipes" exist. A stovepipe is a narrowly defined vertically integrated function. Each stovepipe is bounded within the rationality of its own purpose and this narrowness may result in actions which improve the function of one stovepipe at the cost of another. For example in British Columbia, the government collects revenue from taxes associated with tobacco sales. The government also operates health services which address the health problems of smoking. In the process of maximizing revenues, the taxation group might increase the costs to the Ministry of Health.

do. Engineers and physical scientists develop theories about what materials do in certain defined circumstances. The significant difference between the physical scientists (closed systems) and the social scientists (open systems) is that the subject of study in the physical sciences does not react differently when you repeat a study. A material does not learn from experience or speculate what your intentions are and then respond accordingly. Thus there is a fundamental difference when processes work with physical materials that have no volition versus humans that do. While this may seem obvious, the practical responsibilities of operating an organization may “blind” administrators, policy developers, information systems developers and managers to the risks involved in measuring human behaviors (Austin, 1996).

B.1.1.4 Applying Measurement Models to Information Systems

There is an underlying assumption inherently guiding the development of information systems. This is that there should be no difference in the design when we create an information system which measures things which have no volition versus things which have volition. This notion can be refined to suggest that when measurements are tied to incentives (motivations) there is an increased risk that the measures will be subject to human induced variation and thus will likely become less meaningful (or change their meaning) over time. The endurance of a technically useful measurement system is dependent upon:

- the stability of the categories and measures themselves within the knowledge practices of the parties using the information;
- the users current degree of agreement regarding the categories and hence the probability the categories or their definitions may change in the future;
- the ease with which the original intention of the measurement system can be warped; and
- the ease of the parties involved to independently verify the measures and hence unequivocally detect the warp.

Thus key features of an information system required to estimate its long-term utility are:

- the inexpensive independent verifiability of a measurement system; and
- the long term stability of the categories being measured to the users of the system.
- redundancy of the measures in other systems.

Human induced variation can come from:

- the conditions preceding the measurement process;
- the measurement process;
- the categorization and definition process; and
- the interpretation process.

For example: The measurement of student achievement is deemed to be an important factor in determining whether schools and their teachers are performing correctly. In New York recent reports suggest that teachers are giving answers to students in order to frustrate the intention of the examinations. The speculation is that this is done for several reasons; to help students pass exams; to allow teachers to look more competent; and to cause schools to look better to parents and politicians.

The consequence of this observation is that the investment in the infrastructure of information systems must appreciate the developmental stages which exist in the creation of information and knowledge. A large investment in the development of an information system which will support an evolving knowledge base may not be the most appropriate strategy. It may be more appropriate to develop inexpensive information systems which meet short-term needs and goals and are expected to be "thrown away" within a relatively short period of time. This might reduce the costs associated with verifiability.

Like bad policy, bad information systems can constrain/distort the ability of an organization in achieving its goals. (Mintzberg, 1994). The failure of management systems could be seen as based upon a misunderstanding of what they can provide different organizations. The purpose of information systems is to reduce

uncertainty for the people operating within the system. To reduce the noise and increase the signal of communications so that uncertainty is reduced requires that the design and management of the system takes into consideration the true working parameters of the components to be used (Shannon, 1948).

From a principal's perspective this means understanding the behavior of individuals and groups of individuals in conditions of uncertainty and when they are confronted by measurement systems. Based upon this knowledge the principal would choose to design a system that was optimized for the behaviors of real agents versus the behaviors of agents who exist in theory alone.

Questions of interest should be:

- To what extent is individual behavior subject to breaks from theoretically rational behavior?
- To what extent is group behavior subject to breaks from theoretically rational behavior?
- To what extent can distortion be induced by measurement systems?
- To what extent are the methods associated with evidence based practice and practice guidelines capable of meeting the systemic goals of the health system.
- What evidence is provided by the health economics literature.
- What do we understand about the nature of knowledge work and how knowledge work is organized?
- To what extent will professional and regulatory requirements constrain the options associated with the development of an information infrastructure?
- What are the economics of information?

B.1.2 Individual Behavioral Decision Making Findings

A Brief Review of Measurement In Psychology

The fields within Psychology invest their efforts in the study of humans in a variety of situations. The scientific study of individuals requires the collection of measures and observations in the field or in the laboratory. Over the years the body of work clearly demonstrates that when human subjects are aware that they are or may be observed/measured, they change their behavior. The consequence of this is to make valid and reliable measurement, and interpretation more difficult.

HAWTHORNE EFFECT¹⁶⁵: in an industrial plant changes in physical environment (improvements in lighting) were thought to be the cause of an increase in productivity on the shop floor. An enterprising researcher (Elton Mayo) demonstrated that a decrease in lighting produced the same productivity increase. The result, known as the Hawthorne effect, suggested that the personnel were responding favorably to the notion that management was concerned about them, the lumens were not the experimental variable, and the indication of concern was. It was also a conclusion that workers were strongly influenced by their informal social networks and would control their work product in such a way as to produce what the workers felt was fair and not necessarily what their supervisors believed could be accomplished.

PLACEBO EFFECT: in medical treatment experiments it was discovered that subjects would show a treatment effect even when the treatment they received had no scientific merit (e.g. a sugar pill). The placebo¹⁶⁶ effect showed that some subjects, given the opportunity to show signs of an effect would "imagine" the

¹⁶⁵ Elton Mayo, an Australian researcher who spent most of his working life at Harvard University studied the Hawthorne works of the Western Electric Company in Chicago for five years. He is considered one of the founders of the Human Relations Movement and a founder of industrial sociology. There was a variety of additional experiments done in the Hawthorne Works. A key element of these studies point to the notion that informal social structures are important components of work and that workers, who are part of an informal social network will disregard management in order to cooperate with their informal group. This was shown to include controlling workflow to a pace and standard that the worker felt was appropriate. Up until this time, the greatest influence in industrial management was coming from Taylor who, in general, wished to manage workers as programmable components of the shop floor.

¹⁶⁶ As a point of interest, most medical ethicists believe that it is unethical to use the placebo effect as a medical treatment.

effect. Further, if subjects were aware of, or suspected the nature of the research, they would often react accordingly and so bias the results.

FEEDBACK AND REINFORCEMENT¹⁶⁷ - These are two central concepts in learning. Feedback involves providing individuals with information about their responses while reinforcement influences the tendency to make a particular response again. Feedback can be positive, negative or neutral; reinforcement is either positive (increases the response) or negative (decreases the response). Feedback is almost always considered external while reinforcement can be external or intrinsic (i.e., generated by the individual).

MOTIVATION - A motivating situation has both a subjective and an objective aspect (Maier, 1973). The subjective side is a condition in the individual which is called a need, a drive, a motive or a desire. The objective side is an object outside the individual which may be called the reward¹⁶⁸ or goal. When the natures of the need and of the reward are such that obtaining the reward satisfies and therefore removes the need, the situation is motivating. Consequently human beings work because it provides rewards which satisfy their practical and emotional needs.

We become especially conscious of the need satisfying behavior under two conditions: 1) when two or more possible behaviors lead to different rewards, sometimes satisfying different needs; and 2) when an obstacle blocks or prevents the learner behavior from being expressed. The first is a choice situation and requires a decision; the second is a problem situation and requires a solution.

LEARNING EFFECT: people learn from their experiences. Repeated testing using the same tool will show a learning bias. The t_1 response will tend to have an impact upon the t_n response. i.e. responses to tests or questionnaires or subjective

¹⁶⁷ This definition is based upon information taken from George Washington University's Theory Into Practice, Explorations of Learning Into Practice Database (<http://www.gwu.edu/~tip/>)

¹⁶⁸ Some care needs to be taken here. I have used the word reward to distinguish a broad reinforcement that could include financial reward. In general, economists require the reward to be financial in nature. Psychologists would not assume that an incentive had to be financial in nature. Perhaps psychologists go out with different kinds of rewards than economists.

measures will be affected by prior experience with the tool. Consequently, the more familiar the subject is with the tool the more likely the measure may not reflect its original measurement intent. For example, given the same IQ test every week for a month a subject could reasonably be expected to show an improvement in IQ. The importance of this point is that learning is something individuals do and whether it is good or bad depends on the context of what you are trying to study. Learning results from feedback from the system being effected by the individual doing the learning. Mal-adaptation is a function of the feedback from the system and the ability of the individual to interpret the feedback.

From the brief overview of psychological findings the difference between measuring the performance of humans is difficult because a “subject” can adjust themselves and may do so based upon their own motivations. An individual’s motivations may or may not coincide with the motivations of the person doing the measurement or the organization which wishes to have the measurement done. In the collection of measurement data the researcher is also subject to similar biasing influences and so the experimental method for measures of relationship endeavor to manage the influences of bias in both subjects (agents) and researchers (principals).

B.1.2.1 Human Measurement Conclusions

The psychological literature supports the significance of the difference between measuring humans versus objects. While measuring objects can be extremely difficult their behavior is consistent and free of guile. Further, the object being measured does not learn and/or adapt from the experience of being measured. This cannot be said for the measurement of humans. Therefore human performance measurement systems designed to manage objects and not people will tend to frustrate the design intentions of the decision support and management systems.

The data interpreter is part of the human measurement process. An analyst is involved in the outcomes associated with a human performance measurement program as a consequence steps must be taken to minimize/manage the bias that can be inserted by the analyst of the human performance measures.

B.1.3 A Brief Review Of Behavioral Decision Theory Findings and The Rational Actor Model

Behavioral decision theory is the focus of psychologists and experimental economists to develop a theory which explains the decision making of humans. While the theoretical models are still competing to best explain the experimental results the evidence clearly indicates the economic model of the rational actor/economic man cannot be supported. The rational actor model of human behavior is frequently used in the design of performance management systems. The use of this model of individual decision making behavior falsely represents human decision making capabilities. The consequence of implementing a model of human decision making which is not supported by the evidence should/does result in systems of decision making which react in ways that are inconsistent with expectations.

There are several principal conditions required of a rational actor and expected utility theory¹⁶⁹. They are: transitivity; invariance, the conjunctive rule, and the calculation of probability. This section is intended to provide a brief example of each property along with an experimental test of the property. Where possible experiments have been selected which used doctors or professionally trained persons as the experimental subjects. This was important to ensure that there is no possibility for confusion regarding the fact that professionals experience the same behavioral decision making errors as do other individuals. It is the case that professional training does not eliminate these problems and so health care organizations must concern themselves with these decision issues.

B.1.3.1 Transitivity

Transitivity: if you prefer A to B and B to C then you must prefer A to C. If this is not true then transitivity is not met and this would be a failure for a rational actor. The requirement of transitivity is central to expected utility theory.

Allais was the first to propose and test a paradox which showed that transitivity could be shown to fail in the laboratory.

¹⁶⁹ A rational actor might be best reflected as a person who models expected utility theory or subjective expected utility theory or Prospect Theory.

B.1.3.2 Allais' Paradox

The subject chooses between A1 and A2, where:

- A1 = 1,000,000 francs
- A2 = 10% chance of 5,000,000 francs, 89% chance of 1,000,000 francs, and a 1% chance of 0 francs.

The subject chooses between B1 and B2, where:

- B1 = 11% chance of 1,000,000 francs and 89% chance of 0 francs
- B2 = 10% chance of 5,000,000 francs and 90% chance of 0 francs

Subjects in the experiment frequently choose A1 over A2 and B2 over B1 which violates expected utility. Note this requires some calculation which is not included in the paper. This finding was supported by MacCrimmon (1965), 40% expected utility violations. Morrison (1967) 30% expected utility violations. Slovik and Tversky (1974) 60% expected utility violations.

Loomes, Starmer, and Sugden (1991) provide a full demonstration of the violation of transitivity when in their experiment subjects chose (.6, 8 pounds sterling) over (.3, 18 pounds sterling) and (1, 4 pounds sterling) over (.6, 8 pounds sterling) but also chose (.3, 18 pounds sterling) over (1, 4 pounds sterling). This cycle occurred for about 17% of the patterns resulting from the three pair wise comparisons.

If transitivity is not found then there exists the possibility of a “money pump”. A money pump works this way. If you prefer A to B and if you prefer B to C and if you prefer C to A (this is the break in transitivity) then through a series of exchanges where I can extract a small fee to convert your choices I have an endless loop of exchanges. The result is that my modest fee pumps money to me because your choices violate transitivity¹⁷⁰.

¹⁷⁰ This problem is similar to the Dutch Book where gamblers could take advantage of a betting house that did not balance its odds properly. The Dutch Book lets a thoughtful gambler place a series of bets on a race that because of the discrepancy in the odds would allow him/her to profit from each transaction.

B.1.3.3 Invariance

Invariance requires that an individual will make the same choice *ceteris paribus*¹⁷¹. The two crucial types of invariance are, descriptive invariance and procedural invariance.

- description invariance - different representations of the same choice should not result in different preferences.

For example - money illusion - if we double all wages and all expenses no one should feel better off.

- procedure invariance - different elicitation procedures should result in the same preference.

For example, consider two lotteries: A = (50%, \$50) and B = (80%, \$150; 20%, -\$10)

- asked which lottery they would prefer if they had neither, 75% of subjects selected B = (80%, \$150; 20%, -\$10)
- asked which lottery they would give up if they had both, 50% of subjects selected. B = (80%, \$150; 20%, -\$10)

The results clearly indicate that all humans are not rational actors¹⁷². Both principles are sometimes violated which provides the strongest indications that preferences are constructed from procedural rules (Tversky, & Kahneman, 1986).

B.1.3.4 Conjunctive Rule

Given two single events, Event A and Event B, the probability of Event A is larger than the probability of both Event A and Event B occurring. Individuals who believe that the probability of Event A and Event B occurring is greater than Event A are demonstrating conjunctive fallacy.

¹⁷¹ All other things held constant.

¹⁷² The explanation is that the second gamble is "enriched". If people choose gambles with more positive features, and reject gambles with more negative features, then enriched gambles with both kinds of features will both be chosen and rejected more often. (Shafir 1991)

For example, The Feminist Bank Teller Problem

Linda is 31 years old, single, outspoken, and very bright. She majored in philosophy. As a student, she was deeply concerned with issues of discrimination and social justice, and also participated in anti-nuclear demonstrations.

The subjects are asked to rank several statements about Linda by their probability:

- A. Linda is a teacher in elementary school.
- B. Linda works in a bookstore and takes yoga classes.
- C. Linda is active in the feminist movement (A)
- D. Linda is a psychiatric social worker.
- E. Linda is a member of the League of Women Voters
- F. Linda is a bank teller (B)
- G. Linda is an insurance salesperson.
- H. Linda is a bank teller and is active in the feminist movement (A&B)

Any ranking should satisfy the conjunction law: Linda is less likely to be (A&B) than (B) or (A) since (A&B) is a conjunction of the events (A) and (B). In fact about 90% of subjects exhibit conjunction fallacy ranking the event (A&B) as more likely than one or both of the events (A) and (B) usually (B) (in a sample of Stanford Ph.D. decision science students 85% made the same mistake)¹⁷³

B.1.3.5 The Use of Probability

In most applied settings it is assumed that well trained professionals will be able to use the information available to calculate probabilities. While the ability to calculate a probability is not the prime concern here it is important to note that even well trained individuals do not demonstrate proficiency. This is demonstrated in the following research study:

¹⁷³ Thinking this may be a linguistic problem it has been tested in several ways and found resistant to change based upon alternative (clearer) presentations.

“If a test to detect a disease whose prevalence is 1 in 1000 has a sensitivity of 100% and a specificity of 95%, what is the chance that a person found to have a positive test has the disease, assuming you know nothing else about the patient.”

This question was asked of doctors at four Harvard Medical School teaching hospitals. 11 of the 60 doctors got the answer right. The answer is about a 2% chance the person has the disease (Cassells, Schoenberger, Graboys, 1978).

B.1.3.6 Framing

Framing is a concept which tries to explain the research findings associated with invariance (Tversky & Kahneman, 1981, 1986). The central notion of framing is that individuals frame a problem and then make decisions based upon the frame. In normal terms this might be considered a specific view of the information. This could relate to both the actual presentation of information but may also be impacted by the perception, experience, beliefs and memory of the individual.

The framing¹⁷⁴ of data can have a strong impact on the interpretation of medical information. Researchers gave American doctors and medical students, and Israeli medical and science students data on survival rates after treatment for lung cancer (McNeil, Pauker, and Tversky, 1988). This was organized by radiation therapy and by surgery. The same information was framed two ways:

- A. as survival rate (the percentage of patients surviving a given length of time) and
- B. as mortality rates (percentage of patients who died before a given length of time).

The study provided the data to three groups. One group got the survival frame data, the second received the mortality data and the third received both frames of data.

¹⁷⁴ Framing is a technical term developed by Kahneman and Tversky and is part of prospect theory. The central notion is that individuals frame a problem and then make decisions based upon the frame. In normal terms, this might be considered a specific view of the information. This could relate to both the actual presentation of information but may also be impacted by the perception, experience, beliefs, and memory of the individual.

	Survival Frame (% alive)	Mortality Frame (% dead)	Both Frames	
	Radiation Surgery	Radiation Surgery	Provided Radiation Surgery	
After Treatment	100	90	0	10
After 1 year	77	68	23	32
After 5 years	22	34	78	66

	Survival Frame (% alive)	Mortality Frame (% dead)	Both Frames			
	Radiation Surgery	Radiation Surgery	Provided Radiation Surgery			
Percentage choosing each:						
American doctors and medical students	16% (87 subjects)	84%	50%	50%	44% (223 subjects)	56%
Israeli medical and science students	20% (126 subjects)	80%	45%	56%	34% (144 subjects)	66%

Subjects given the survival data: From a frame perspective it was argued that since surgery only reduces immediate survival from 100 to 90 percent and keeps more patients alive in the long run, surgical intervention was preferred. Only 16 to 20 percent favored radiation therapy.

Subjects given the mortality data: From a frame perspective the 10 percent death rate after surgery looms large. Given this frame nearly half-favored radiation.

Subjects given both frames of data: From a frame perspective the results indicate the mortality frame is more forceful.

The difference of opinion based only upon how the data was presented is what is striking me about this study. When this frame based shift in decision is related to the establishment of subjective probability it is possible to develop an immediate

affinity for the frequentist argument¹⁷⁵ that probabilities must come from sample data.

This clearly indicates the high probability that medical personnel, no matter how well trained, can and do make different decisions based upon their own unique assessment of the data provided.

B.1.3.7 Judgement and Measurement

The frequentist view is supported by work in cognitive science and the development of systems based upon the heuristics of experts. Expert diagnosticians do not know how to explain their decision-making and often explain it inaccurately (Musen, and van der Lei, 1989; Corbett 1987). This is a common problem to knowledge engineering and is a frequent issue as well as inter rater reliability. The problem is brought clearly into focus by the following example provided by Leaper, Horrocks, Staniland, deDombal, (1972) in their explanation of deDomba's expert system experience.

A computer program was developed for the diagnosis of abdominal pain. The program was developed using past records as data, and performed at about 91.8% accuracy. This was based upon a sample of 304 patients. This was compared to physician accuracy of 79.6%.

In the interests of improving the software the computer program was modified to include knowledge from experienced physicians instead of past cases. The diagnostic ability fell to 82.2%.

B.1.3.8 Behavioral Decision Theory and Rational Actor Conclusions

It is inappropriate to design a decision support system on the belief that all participants can be modeled as rational actors. Decisions making will most

¹⁷⁵ frequentists believe that the truth is in the data collected and that it must be the source of decision making. It is easy to see why they can be disregarded by the more attractive proposition that experts have within them the knowledge to determine appropriate probabilities for decision making. Moreover, that while we might agree that access to data could be included with great benefit to the decision model it is not absolutely necessary.

certainly include decision errors. From the experimental literature errors can include but are not limited to:

- judgment errors based upon a decision-makers insensitivity to sample size and the validity of the data ;
- estimation errors due to anchoring. In this situation an initial estimate biases further estimates (Piattelli 1994).
- memory biases caused by a decision-maker's memory. This is where recent and more memorable instances are retrieved more readily and consequently are inferred to be more numerous than they are;
- estimation errors by a decision-maker. In these cases estimates of probability and estimates of confidence intervals have substantial error rates. In addition estimates are poorly adjusted when new information is provided.
- predictability in hindsight bias (Fischhoff, 1975). In these cases people consistently exaggerate what could have been anticipated by the people involved in advance of the situation. Thus people consistently believe what happened was inevitable and they believe that it should have been seen to be inevitable to the participants in foresight. This is combined with the evidence that individuals miss remember their own predictions so as to exaggerate in hindsight what they knew in foresight. Further, the issues of hindsight do not seem to be mitigated by a professional education or severe consequence due to error (Fischhoff, 1982).
- escalation¹⁷⁶ and sunk cost¹⁷⁷ effects. Individuals will expend substantial amounts of time and money to achieve a receding or elusive goal. There are several important points that follow from this: 1) Those responsible for a bad business decision are more likely to invest more than decision-makers not involved (Staw 1976); 2) The more money a person has spent on a project the

¹⁷⁶ Escalation – when losses have been suffered and there is a choice to go on or stop, and there continues to be uncertainty about the outcome, an escalation choice is one where the decision-maker acts to proceed.

more likely he will stick with the venture until it is completed; and 3) Information presented to an individual before committing resources has a significant influence on behavior while the same information after making the decision has no effect (Arkes, & Blumer, 1985). The theme of the escalation effect focuses upon the degree of uncertainty in the situation. The research suggests that when the uncertainty is eliminated the escalation effect tends to be eliminated. Conversely, the increase of uncertainty tends to increase the effect (Staw, 1997).

- improper confidence judgements. Individuals tend to be consistently overconfident in what they know. Some of the most extreme over confidence has been observed with tasks for which respondents have no knowledge or expertise (Fischhoff, 1982).

B.1.3.9 Individual Psychological Evidence Summary

Humans react to measurement and are driven by motivations that may not be apparent to those interpreting the data. Data interpreters are also human and should be expected to respond to what they wish to prove as well as the performance measurement system which evaluated their behavior.

It is unreasonable to assume that individuals are rational actors. When organizations design processes which are founded upon a rational actor model of decision-making they will fail to develop the requisite variety needed for the adequate control of the system. Simply put there will be more variety in the responses produced by the actual actors than the organization has predicted and is therefore capable of controlling. When processes are designed to be operated by rational actors they will tend to fail for inexplicable reasons.

In economic models these outside sources of variation are called externalities and do not effect the value of the model for economic theory. For senior decision-makers in the health industry these externalities represent cost over runs, lawsuits, disciplinary hearings and the loss of public confidence. An effective decision

¹⁷⁷ Sunk cost is a phrase used by economists who wish to make the distinction that a prior investment should not influence a further investment decision. A rational decision-maker does not allow sunk costs to influence their further action.

making architecture must build processes which recruit, incorporate and manage the “externalities” because only in theory are they not intimately involved in the day to day operations of an organization.

B.1.4 Measurement Dysfunction an Example of using a Poor Model of Human Behavior in an Applied Setting

It isn't that they can't see the solution. It is that they can't see the problem.

-- Grover Cleveland

B.1.4.1 Introduction

In hospitals and regional health authorities, performance measurement is increasingly the prescription provided to healthcare managers who are under pressure to justify, demonstrate, defend, or improve their performance. The utilization of a performance management approach is seen to address the problems of improving healthcare while managing budgetary cuts, client anxiety and growing staffing problems. In practice however, very little additional funding is being made available to develop and implement new evidence based performance measurement systems. Consequently most performance measurement strategies are developed on a program by program basis under the supervision of existing healthcare managers¹⁷⁸ who have little if any training about the challenges associated with the development of human performance measurement systems.

There are two primary elements associated with performance measurement that the technical portion of this paper wishes to identify. The first is the problem of commensurability – once measures are taken of different programs the results, in the majority of cases do not have a common basis for comparison. This was developed in the earlier section. The second is measurement dysfunction – incomplete measurement systems can skew the performance of the personnel and their interpretation of the performance measurement system.

¹⁷⁸ It is often the case that managers are guided or supported by management information systems personnel or consultants who have little if any knowledge of the issues associated with performance analysis let alone human performance measurement.

Performance measurement systems that are not well considered can distort the ability of managers to correctly understand their performance to maximize the client benefits created from their resources. A result of distortion is the possible dysfunctional delivery of services. Measurement induced dysfunction may not be detected for some time because the measured indicators of performance indicate progress is satisfactory or improving, while the true performance of the program is dropping (Austin 1996).

An example of measurement dysfunction within an organization is provided by Blau (1963) an organizational psychologist, who in the early 1960s studied an employment office in New York. The performance measurement system in place recorded the number of individuals who arrived at the office and were interviewed for possible employment. The performance measurement system did not record the number of individuals who were subsequently employed or the number of prospective employers who were interviewed to identify employment opportunities. The distortion was anchored by the measurement of only one activity in a job which required staff to perform several activities to be successful within the mission of the office. The dysfunctional response was that employment counselors spent the majority of their time interviewing individuals who wanted work and almost no time placing those individuals into work situations.

The example demonstrates that when an incomplete performance model is used to measure human performance the effect may be to distort the behaviors of the persons measured and result in organizational dysfunction. Further, the measurement system may mask the organizational dysfunction by directing ongoing management attention to the activities measured and not the overall organizational system.

To develop a resource allocation process that minimizes the negative consequences associated with dysfunctional measurement it is best to begin by understanding how humans respond to their environment and performance measurement. This requires a very quick review of the essential underpinnings of human measurement considerations. It is essential because these basic issues are at the heart of determining how best to develop motivating, performance enhancing environments within organizations.

From this view it must be apparent that there is no certainty that data provided by humans can in and of itself be considered “informative” until we understand the context of the data collection, its methodology and the possible motivations of the principals, agents and organizations involved.

Analyzing data without regard to the circumstances of its collection is a common practice of analysts. In cases where the measures cannot be manipulated such as large macro scale economic measures this is unlikely to be a problem. However, in cases where it is possible for humans to manipulate the measurement system for their own motivation caution is required.

For example: A performance measure used by many organizations is “sick time”. This category is expected to be limited to those people who were too sick to come to work. However, it is suspected by many organizations that employees who are not sick but want a day off with pay often use sick time¹⁷⁹. Therefore an appropriate interpretation of this data might be “those individuals who used illness as a reason not to come to work”. This category could include individuals who were indeed sick and individuals who were not sick but used an illness excuse so that they would not be required to come to work. Given the different sub categories within the category “sick time” there is now uncertainty about the extent of illness in the organization.

B.1.4.2 Performance Measurement in Organizations

The purpose of performance measurement systems is to provide feedback to the participants of a “system” so that they may adjust their behavior. How the information received by the subject is responded to depends upon the choice(s) that the subject believes they have and their motivations. Research findings show that adaptation to a measurement system takes place even when there is a desire by the researcher that the measurement system will not intrude in such a way as to influence the behavior of the person whose behavior is being measured.

From the evidence based findings above it can be seen that humans will “participate” by adjusting their performance/behavior in unanticipated ways when

¹⁷⁹ This is a breach of the intent of the sick policy or it is likely that the sick days and holidays would be combined into one category called “paid time off”.

measurements are taken (Haycox, Bagust, Walley, 1999). Consequently it is essential to consider the variety of responses that an agent may produce to a given measurement system, the consequences of the adaptive responses, the possible interpretation of these responses by other parties, and the mechanisms which may be used to minimize undesired responses.

The motivations for altering performance extend beyond the traditional financial incentives assumed to be required in most economic theory derived performance models¹⁸⁰. However an absence of financial incentive does not mean that there is an absence of motivation from a psychological perspective¹⁸¹. For example praise from a teacher for good performance is seen as a strong motivator even though the student will see no immediate financial reward. Peer pressure can cause individuals to react in a way that is consistent with their peers. In practice an "economic centric" view can constrain the ability to direct (motivate) human performance (behaviors) and but also limit the ability to correctly interpret human performance.

To minimize unintended participation (bias) by the subject a human subjects researcher will use proper experimental techniques which minimize the probability of researcher induced error. In the experimental process, the researcher ensures that measurements are demonstrably reliable¹⁸² and valid¹⁸³ and that the purpose/ hypothesis and intended analytic process is stated a priori the data collection process. The preferred data collection method used is a double blind technique. This technique requires that neither the researcher nor the subjects know which subjects receive the experimental or control treatments. This rigorous method allows statistic techniques to be used to infer/generalize the outcomes from the experimental setting to the larger population of interest. The approach

¹⁸⁰ This is an important point because a central argument that exists between psychologists and economists revolves around the need for incentives to induce a desired behavior. Many economists believe that financial incentives are the only family of motivations that will work.

¹⁸¹ Maslow Hierarchy

¹⁸² Reliability - the consistency of scores obtained by the same persons when reexamined with the same test on different occasions.

¹⁸³ Validity - what the measures actually measure and how well it does so. Content validity - does the test represent a representative sample of the behavior domain to be measured.

encourages replication by others to confirm findings to demonstrate the finding was not anomalous. In other words, experimental process itself expects that the data and the theoretic interpretation of the data by one researcher may differ among researchers and that through this ongoing process better understanding and testing is possible.

B.1.4.3 Basic Assumptions of Measuring and Interpreting Measures Related to Humans

The primary purpose of experimental procedure is to minimize the unintended consequences associated with measurement and so allow an interpretation based upon a statement of how the variables collected relate to each other and/or to the dimensions of interest. The study of individuals or groups all pose similar obstacles that must be managed to minimize the probability of error. The concerns associated with the experimental performance of individuals are the same concerns as those that exist for the measurement of individuals working within a program. Campbell and Stanley (1963) indicate obstacles that must be considered include:

- humans react to their environment and learn to respond in ways that are behaviorally rewarding.
- subjects given the opportunity will bias the results based upon their best guess of the expected results.
- subjects do not require a reward to introduce bias but it usually helps.
- measurement collectors and interpreters are subject to the same biasing influences.
- data must be captured in a way to minimize bias or ensure that bias is random (Double blind is best.)

The main point to be made is that the evidence indicates that the measurement of human performance is extremely complex and if not approached with reasonable care will result in data that cannot be properly interpreted. Further that bias can be introduced by the subject of the observation as well as the interpreter of the observation.

B.1.4.4 Measurement Dysfunction

Measurement dysfunction is an unintended consequence of measurement. The consequence/severity of the dysfunction depends upon the context of the performance measurement system. Factors will include:

- the resources (including time) it takes to detect the dysfunctional consequences,
- the rewards and penalties distributed by the dysfunctional performance measurement system,
- the resources (including time) it takes to get agreement to correct the dysfunctional elements of the system,
- the resources (including time) it takes to develop an acceptable alternative model of performance and
- the resources (including time) it takes to implement a functional performance measurement system.

For example¹⁸⁴ - professors are rewarded in the University environment for the production and publication of learned papers. A dysfunction response to this requirement by the university administration has developed over the years. The response is called "Salami Slicing". The professor "slices" a full paper into a number of papers and publishes them individually. Thus stretching a single publication into many. This represents the dysfunction use of the variable "papers published" as a measure of "quality of professor". In this example the professors determine a way to use the variable being measured by taking advantage of the fixed definition of the category "papers published".

However, to change the dysfunctional model of performance measurement, requires that a new model be created and implemented. It is possible that the comparative performance measurement system in place cannot be changed because it has become a true or defacto standard within an industry. Continuing

¹⁸⁴ This is a simplified hypothetical example and is not intended to inform about university policy or the methods to correct the problems.

with the simplistic example of salami slicing it might be the case that the use of papers published has been adopted by administrations and professors from so many different locations in so many universities and countries that to adopt a different performance measure that facilitates comparison is difficult/unlikely. The administration and the professors must use the measure and the technique because everyone else is doing it and or because there are motivations incorporated within the system of comparison that would be lessened with a changed system.

Performance measurement systems, once adopted on a large scale, will be difficult to change. The dysfunctional aspects of the performance measurement system will result in the frustration of those measured and induce them to adopt the dysfunctional performance. Dysfunctional responses to performance measurement are identified in many different working contexts (Bud-Frierman 1997)

Campbell's Law of Corruption of Measurement Indicators

"The more any quantitative social indicator is used for social decision-making, the more subject it will be to corruption pressures and the more apt it will be to distort and corrupt the social processes it is intended to monitor." (Campbell 1979)

B.1 4.4.1 Measuring Self Adaptive Systems

Human systems (open systems) are adaptive in ways that mechanical and biological systems (closed systems) are not because humans have individual and collective motivations which are not transparent and are not easily controlled. Individual differences exist within, individuals and organizations, which are based upon knowledge, experience, working structure, and how they perceive their goals and objectives. Consequently, humans generate a great deal of variety which can only be minimized through the processes of variety reduction i.e. standardization. Standardization becomes problematic in complex and knowledge intensive areas because new techniques and approaches to problem solving will not have a language or knowledge categorization system well enough defined and thus stable enough to meet the needs of the knowledge workers.

When we apply the closed system techniques and models of measurement developed for mechanical, physical and biological systems to human adaptive systems we increase the probability of dysfunctional measurement. Closed systems do not change of their own volition. The forces in operation within a closed system are consistent and predictable. For example $PV = nRT$ ¹⁸⁵ or $F = MA$ ¹⁸⁶.

However, in open systems this is not the case. For example, health professionals who were concerned about the future reduction of services to individuals categorized as having “mild health problems” within the community could begin to categorize their clients as more severely involved in order to ensure their continued access to programs perceived by the professional as beneficial. Thus a categorization system established to organize an understanding of the health of the population can become dysfunctional when the categorization system is linked to a motivation system and a performance measurement system.

The consistent finding of human bias in performance measurement systems requires that one more issue be identified. Organizations who are given responsibility to collect data for information purposes must be insulated from those who wish to use the data for performance purposes. This is because of the ubiquitous biasing of interpretation of data to support opinions unsustainable by research findings. In this regard the data collection organizations might learn from Rawls' (1971) concept of the "veil of ignorance"¹⁸⁷, which would say that in order to prevent bias in the data collection process the agents for the entity must not know the uses for which the data will be applied. The intention is to ensure that data collected, which may be used in the future for performance measurement, is collected as scientifically as possible to minimize bias induced by knowledge of performance purpose.

¹⁸⁵ Standard formula relating pressure and volume to temperature.

¹⁸⁶ Standard formula relating Force to Mass and Acceleration.

¹⁸⁷ This point was made by Rod Dobell in a discussion with me regarding the issues of performance measurement.

B.1.4.4.2 Performance Measurement of Object¹⁸⁸ Based Systems

Performance measurement error from objects or machines which are not self adjusting to mission or reward, are related to the measurement tools and the capacity of those tool systems to be adjusted to improve performance, where performance is based upon some objective criteria. When changes are made to one element in such a system it is reasonable to assume that all other elements within the system are held constant.

Standardization and specialization are popular methods that attempt to objectify human labor components so that they may be controlled in a fashion similar to a machine. Standardization and specialization require a complete knowledge of the system to be controlled and a method of providing feedback in some way, so that the measured system may be controlled for error.

B.1.4.4.3 A Model of Program Performance Measurement

The developing trend in healthcare is towards outcome-based measures, change management and evidence-based decision-making. In general these can be thought of as performance measurement systems. Performance measurement is based upon the notion that specific activities, when carried out in a specific way and at specific frequencies result in a specific product or service. Performance measurement systems assume that changes in the level of specified activities or the substitution of one or more activities or the addition of one or more activities will have an impact upon the dependent variable.

For example:

Townsend deprivation score = unemployment + occupation + automobile owned
or

employment office productivity = job candidates interviewed + employer candidates contacted + job placements

¹⁸⁸ These are called object-based systems because there is no other way to clearly distinguish them in a way that conveys their ultimate goal. It is not intended to denigrate these systems but to clearly indicate that the components within the systems can be treated as objects which can be manipulated and the impact of

or

professor quality = papers published + external research grants

These simple examples can all be seen to be cases where there is believed to be a relationship between several independent variables and a single dependent variable. The independent variables predict or explain the dependent variable.

B.1.4.4.4 Simple Economic Model of Measurement Dysfunction

Austin (1996) uses an economic perspective to explain the creation of dysfunction induced by performance measurement. Austin uses figures to graphically demonstrate measurement dysfunction between a principal and agent and the incentives inherent in an incomplete performance measurement system. While the figures are Austin's the simple description is not.

Suppose that we have a work environment where the agent carries out two activities, activity X and activity Y. The principal of the organization is responsible for supervising the agent and the agent is responsible for meeting the value needs of the client. The value a customer receives is based upon the combination of activity X and activity Y. It should be clear that the customer could value different combinations of activity X and activity Y the same. Further that more value would be associated with other combinations of activity X and activity Y. Figure B.1 shows the shape of the customer preferences. The value to the customer increases as you move away from the origin and cross the combinations of activity allocations which can be made by the agent which have increasingly greater value to the customer. In this situation the agent and customer cooperatively manage the relationship and mix of activities and value.

The agent is limited in terms of effort that can be expended by the resources provided by the customer. In Figure B.2 the effort capacity of the agent is provided at different levels of resource provided the agent. I.e. as the resource to the agent increases so to does the agent's effort capacity. As more resources are

that manipulation can be well understood within the context of the production/service provision process.

provided a best mix path is created which matches the agents effort capacity and the value curve of the customer.

At this point the principal determines that a performance measurement system is in order. The goal of the principal is to cause the agent to use the same resources provided by the customer but to increase the level of value to the customer by moving a little further away from the origin on the best mix path. The principal implements a measurement system that captures the performance of activity X

This now changes the dynamic of the relationship between customer and agent because the agent must now optimize the relationship between themselves and the principal. Figure B.3 shows that with the introduction of performance measurement on activity X the agent begins to direct his/her energy to produce more activity X and less activity Y. As the shift away from Y and towards X occurs a small increase in customer value may temporarily take place as the agent effort diverges from the best mix path of the client towards the performance measured preference of the principal. Over time the agent begins to direct more and more of his/her effort to the principal's performance measurement model and away from the customer value.

Figure B.4 shows how the dysfunction unfolds as time passes by distinguishing between the true performance of the agent as perceived by the true value the client receives versus the measured performance the principal receives. Thus the principal used the performance measurement system to participate in the relationship between the client and the agent. It should be clear that the desire of the principal was to improve the value received by the client. However, over time the performance measurement system induced dysfunction from the perspective of the value received by the client. Given the performance measurement system is incomplete (does not measure all the activities associated with the production of value) the reduction in value would not be detected by the performance measurement system created by the principal.

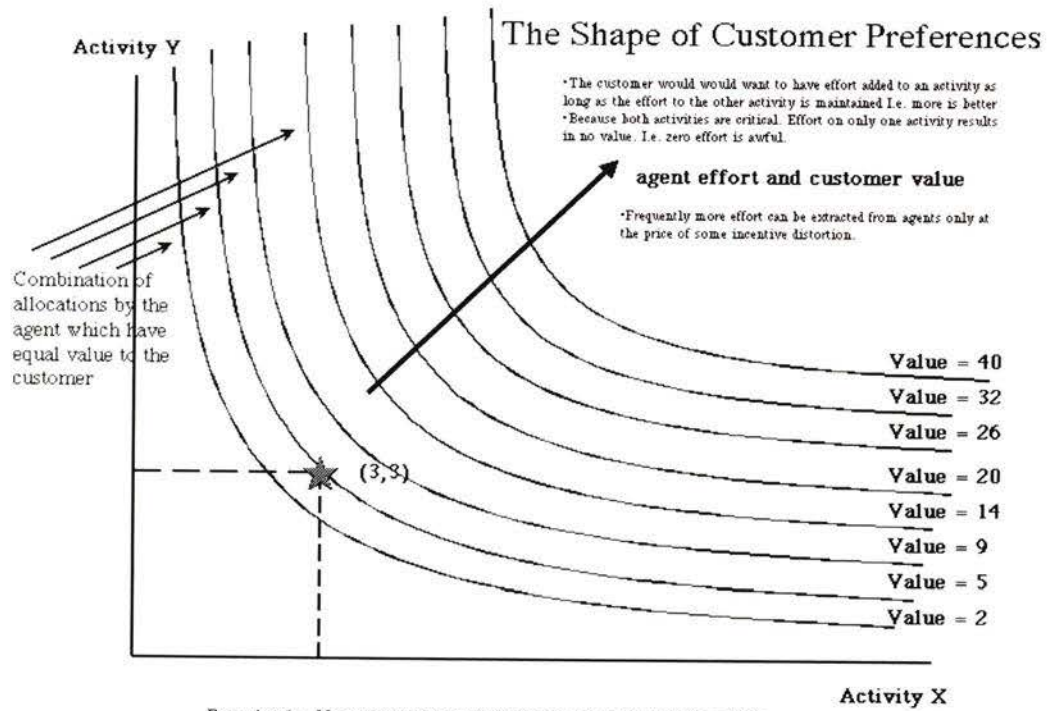
From an economic perspective the example demonstrates the difficulty which can occur when a performance measurement system provides an incentive to an agent to divert from the best mix path of the customer. Further it demonstrates that the tool used to improve the value received by the customer may become the

instrument of its reduction. Moreover the method of data collection and measurement generate opportunities to betray the intentions of the measurement system. For example - an organization concerned about education quality implements a system of standardized examinations with which to discern the general knowledge of students taught within the system. The teachers involved in the system begin to teach to the measures and standards of the examination. Consequently the examination stops being an independent evaluation of the education system but is transformed into the purpose of the education system. The performance measure changes from an indicator of the systems performance to the purpose of the system.

In this example there are several ways to resolve the situation. Such as:

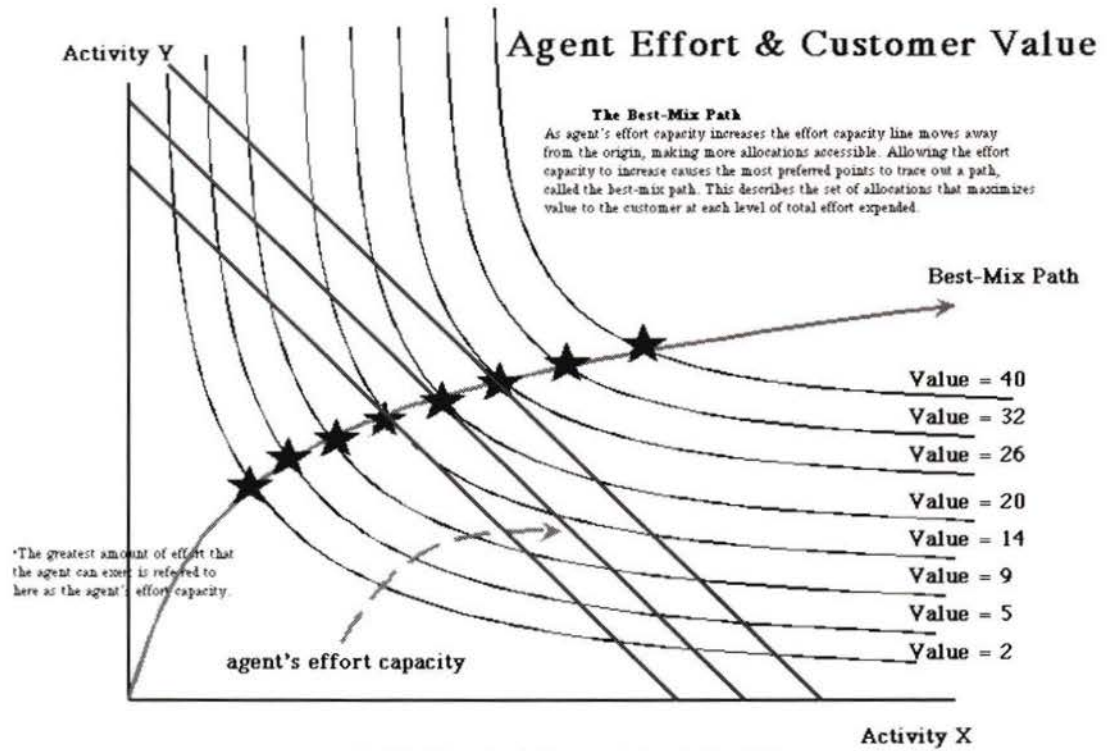
- make the content of the examination and the specific measurement results are unknown to those who could bias the measurements; or
- define the examination so broadly and deeply that the examination does reflect the full and complete goal of the education system.

Figure B.1: The Shape of Customer Preferences



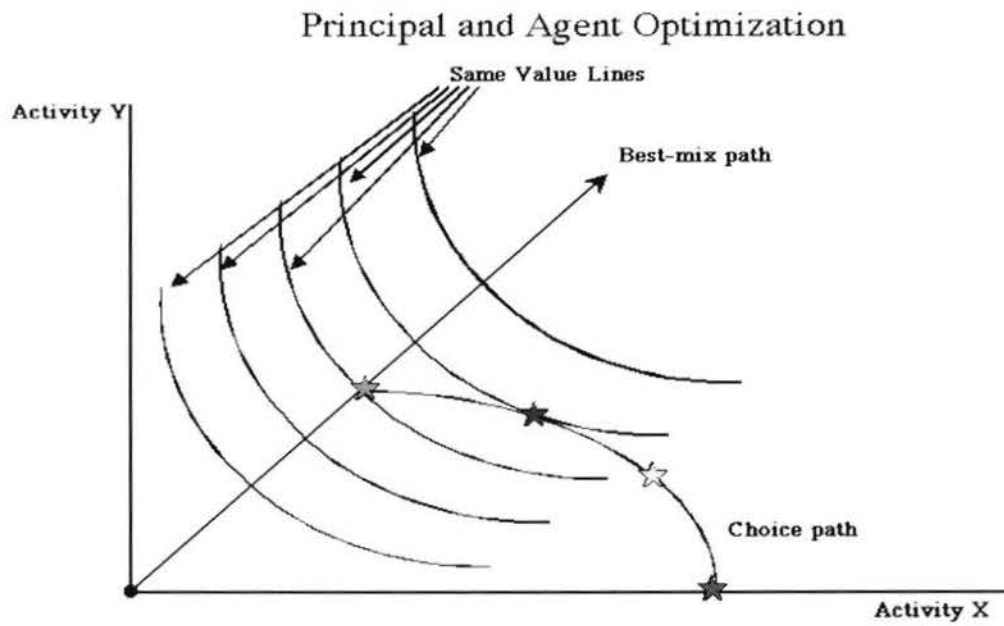
From Austin - Measuring and Managing Performance in Organizations 1996

Figure B.2: Agent Effort and Customer Satisfaction



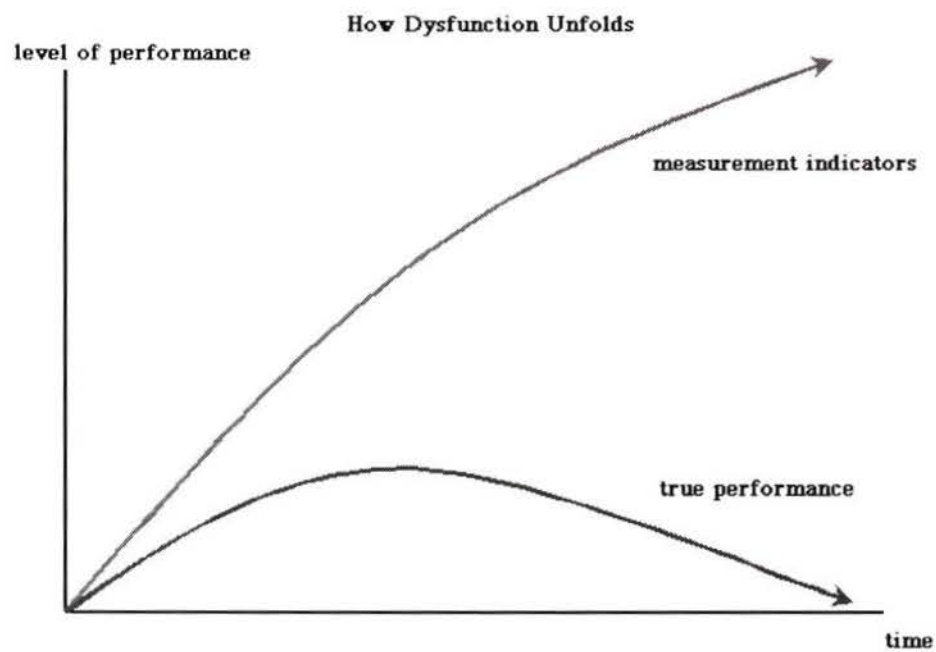
From Austin - Measuring and Managing Performance in Organizations 1996

Figure B.3: Principal and Agent Optimization



From Austin - Measuring and Managing Performance in Organizations 1996

Figure B.4: How Dysfunction Unfolds



From Austin - Measuring and Managing Performance in Organizations 1996

B.1.4.4.5 Measurement Dysfunction Conclusion

The measure of self-adaptive systems is different than systems of objects.

All jobs are composed of a variety of activities. In many cases the knowledge and complexity of a job does not allow it to be broken down into constituent elements/activities. When the model of the activities used to represent an individual's "job" is incomplete, that model's use as a model for performance measurement must be questioned carefully. Incomplete performance measurement systems risk skewing the desired behaviors of the human who performance is being measured towards those activities and variables that are measured. Because the measurement model is incomplete it may be difficult to detect those activities which are diminished in order to increase those activities that are measured.

The principal in the performance measurement system may be influenced in the selection of the activities/variables of the performance measurement system by personal motivations. These motivations may, through moral hazard result in a performance measurement system that tends to improve the perception of the principal's performance at a cost to the organization and the customer.

Evidence in the planning evaluation literature suggests that planners may induce measurement dysfunction through the selection of planning variables.

B.1.5 Organizational/ Group Behavioral Decision Making Findings

"It's not what you don't know that will hurt you. It's what you think you know that just ain't so."

Satchel Paige

The integration of behavioral decision theory findings with organizational decision making has not yet taken place¹⁸⁹ (Connolly, and Koput, 1997). In some cases this may be due to the earliest work by researchers which tended to support the perception that individual decision-makers represented the core of the problem

¹⁸⁹ Note that naturalistic is the term Connolly and Koput use to describe "the loose grouping of nonstandard models of individual decision making".

which needed to be addressed¹⁹⁰. It was argued that the major difference between individuals and organizations was the significant problems of resolving goal conflict in organizations (Simon, 1972). The result has been that economic and psychological theorists are continuing to develop research on behavioral decision theory and separately expanding the work of how organizations arrive at decisions (Kleindorffer, Kunreuther, & Schoemaker, 1993), (Pondy, 1982)

Knowing that individuals do not conform to the rational actor model and that the “brain of the firm” (Beer 1972) (as represented by a collection of individuals) does not operate in a perfectly rational manner (Payne, 1997) requires that decision related patterns of behavior be investigated to determine how best to establish decision and information architectures within the health industry. Therefore the objective of this section of the paper is to define the primary mechanisms of coordination in organizations and then outline the research findings associated with individuals working within organizations and how decision making inside these purposeful systems is shaped. This will act as an important foundation for the Value Sieve methodology and provide the linkages to the planning section of the dissertation that indicates the Value Sieve methodology represents an improved planning and strategic planning archetype.

B.1.5.1 Organizational Strategies

There are two basic methods for controlling the activities of an organization (system); one method is hierarchy and the other is market (Williamson, 1975, 1981) Hierarchy is more expensive and time consuming because it requires a great deal of effort in communicating and coordinating the various activities of the individuals involved. A market is less expensive, almost cost-less to manage and distributes the efforts and the costs of activities to the participating cost centers themselves. The rule of thumb should be to use a market whenever possible and only use hierarchy if it is clear that a market will fail. A quasi market is a hybrid of hierarchy and market (Corbett 1994). The quasi-market carries the benefits and

¹⁹⁰ It was argued from the view that an entity and its rational behavior could be taken macroscopically to show the firm as an individual entrepreneur or microscopically as concerned with the organization of an individual at a cellular level.

weaknesses of both approaches¹⁹¹. Determining the mix of hierarchy and market depends specifically upon the situation/context and purpose of the organization

The utilization of a hierarchy is a standard method of organization in large firms. The limitations of human information processing capacity and the mathematics of information processing networks requires that large organizations decentralize their decision-making (Radner, 1997). The middle managers inside these entities are the information processors and decision-makers for many of the organizations¹⁹². The inherent complexity that requires the decision-making to move downward in the organizational hierarchy is required by the complexity of the tasks associated with knowledge work within an open system.

These factors underscore the usefulness of the concept of bounded rationality¹⁹³. Bounded rationality (also called subjective rationality (Simon 1964)) accepts that decision-makers may not conform to rational (economic model) predictions because of the limited applied environments that conform to the assumptions of economic rationality. Bounded rationality allows for the conditions of risk and uncertainty and assumes that decision-makers do not have complete information about alternatives. Within the bounded frame of the situation the decision-maker may behave in a 'locally rational' way.

B.1.5.2 Control

The goal of management mechanisms that are put in place to direct attention and resources is to achieve outcomes. The possible choices available for the development of the mechanisms are guided by the goal to ensure that the production of the service or product meets the needs of the client. Choices

¹⁹¹ In this context, a quasi-market could also be called a quasi-hierarchy. The term simply references the types of organizational systems that can occur between the two fixed points of hierarchy and market.

¹⁹² In health care the pressure to eliminate these managers as an unnecessary layer of bureaucracy will require extensive information management and decision support infrastructure development. Decision making will need to be distributed to upper and lower levels within the organization and methods of consolidating and coordinating their decisions and information will be necessary in order to ensure that senior administrators within the organization have sufficient information to direct their organization towards meeting the needs of the population.

available to the client from different providers encourages organizations to find more efficient and effective means of providing the product or service and in differentiating the preferences of the client population.

Thus, the rules of an organization (management mechanisms) guide the responses of the individual decision-makers within the organization. Rules can best be seen as instances where the decision-maker can avoid processing the information in any way other than determining which rules to follow. In this case, the decision-maker tends to determine the rule/category the situation best matches and then proceed with that course of action. Research evidence supports this view of decision-making.

This being the case then organizations which have developed rule structures to assist in production and/or service provision will tend to have individuals who do not carryout a full inquiry/investigation with each decision but instead work to match the situation to the appropriate rule. This tends to develop processes that are stable, uniform, and whose goal is to minimize variety. The result of a rule-based approach is that individuals working within the system are not motivated to identify costs savings¹⁹⁴ because this process increases the amount of decision making in each circumstance.

The expectation of this finding is that organizations that are rule based will have great difficulty in identifying savings opportunities by analyzing the individual differences in their client stream rules based systems.

¹⁹³ The notion of bounded rationality was the work of Herb Simon and resulted in his receiving the Nobel Prize in Economics in 1979.

¹⁹⁴ It should be noted that cost is an essential element of quality and enterprises which are structured in such a way as to find difficulty in identifying cost savings may find it difficult to manage quality.

B.1.5.3 Aligning the Interests of Participants

The desire of any owner¹⁹⁵ of a firm is to ensure that the firm's personnel carry out the wishes of the owner. When the owner knows all aspects of the business and the firm is small this is possible. However, as the firm grows large the owner must begin to develop mechanisms that direct or constrain the choices of the personnel. The decentralization of decision making requires the transfer of power from the senior person (owner/principal) to the staff decision-maker (staff/agent). This issue is dealt with in the principal agent literature and the focus of this work is on models that determine how to control the agent¹⁹⁶. Control of the agent is proposed through mechanisms that create an alignment of the agent's motivation with the principal's motivation.

Therefore, if the size of the firm and the complexity of the decision making environment requires that decision making be decentralized there will be, by necessity, some freedom allocated to the decision-makers. Therefore in determining what information and what conditions should be considered some mechanism¹⁹⁷ must be designed to ensure that the freedom provided to the decision-maker does not allow a misalignment between the goals and objectives of the staff/agent and the goals and objectives of the owner/principal. The way the tasks of information processing and decision making are defined and distributed among the members of the firm can be called the architecture of decision in the firm (Radner 1997)

A clear focus of mechanism design is for the principal to ensure that the agent does not use the available discretionary power to further his or her own interests at the principal's expense. As has been shown in the measurement dysfunction section the method used by principals to control the actions of agents through the use of measurement systems must be carefully considered because of the risk of

¹⁹⁵ Most of the principal agent literature talks about private sector firms. While the ideas can be generalized to a public sector enterprise like health in Canada, it is important to note the limitations. These limitations include the lack of consistency that is provided by the single vision of an owner, or board of directors. Nor does it benefit from a board of directors who have experience in the industry or a service that directly relates the clear outcome of a service to a knowledgeable client.

¹⁹⁶ See the section on measurement dysfunction for a more fulsome discussion of principal and agent theory.

inducing dysfunction. The study of efficient architectures for the decentralization of information is the subject of the theory of teams (Radner 1997)

In summary, the decentralization of decision making challenges the notion of a hierarchy where senior executives make all the decisions within an organization. Consequently the architecture of information flows, individual decision-maker motivation and decision outcome alignment must be carefully developed to deliver the outcomes desired by the firm. To do this the decision making processes of groups must be discussed.

B.1.5.4 Coordination of Choice

The classical economic theory of the firm tended to view the firm as an entrepreneur with perfect knowledge of all market conditions and emphasized profit maximization as the goal (Lipsey, Sparks, & Steiner, 1979). The model did not make allowance for incomplete knowledge, uncertainty, risk or ambiguity. Further, this view did not see the firm as an organization of individuals and groups (Cyert, & March, 1963). A significant distinction between individuals making a choice using their own preferences (expected utility function) and a group of individuals making a choice is the need for members of a team to determine and coordinate their group preference (Pondy, 1982). There is an opportunity for conflict when the individuals do not have matching preferences. While this may be managed within the context of a sufficiently strong supra goal for a firm (like maximize profit) there is significant argument that suggests that decision-makers do not maximize profits but work to obtain an acceptable level of return in order to maintain a reasonable degree of freedom from the owner/shareholders (March, 1994; Radner, 1997). Therefore, while supra goals may assist to direct the choices of some decision-makers in a general way, behavioral measures would not support this statement as it is represented in the economic theory of the firm.

¹⁹⁷ Usually these mechanisms are developed as organization specific rules and procedures.

To study the choices made in and between groups, game theory provides a useful family of experimental conditions. Game theory¹⁹⁸ is the study of multi person decision problems where “players” may represent individuals, small aggregations of individuals, companies, or consortiums (Gibbons, 1992). In all cases players have different objectives but act on the same system or share the same resources. A coordination game¹⁹⁹ focuses the attention of the players upon on a joint decision-making problem. The structure of the game requires each participant to identify their choice(s) (strategy) and the consequence of the individual choices is an equilibrium (Nash Equilibrium) where the actions of players stabilize. In equilibrium, the player’s expectations are aligned with their actions.

Example 1 - A Quick Example of A Nash equilibrium

In the following example assume that Low and High refer to the effort invested by the each player and that the numbers which fill the cells represent their respective rewards which are based upon their actions. The value 10 is worth more than 5 while 0 reflects no payoff at all.

Example One		Person 2	
		Low	High
Person 1	Low	5, 5	0, 0
	High	0, 0	10, 10

¹⁹⁸ Game theory provides a mathematical approach to identifying an optimum (rational) strategy (behavior) in competition with an opponent who has his or her own strategy. There are four classes of games: static games of complete information; dynamic games of complete information; static games of incomplete information; and dynamic games of incomplete information. Experimental work considers cooperation, defection, and persistence of conflict. Results have found application in economics, management science, bargaining and conflict resolution.

¹⁹⁹ In Game theory a variety of different types of games are used to elicit responses from subjects and to test their strategies. Prisoner Dilemma is the most commonly known member of game theory but should best be seen as a special case of cooperative games.

In this matching game,²⁰⁰ each individual has an incentive to provide the higher energy level to enjoy the higher value (10,10) equilibrium rather than the lower value (5,5) equilibrium. However, when the players do not match they receive nothing.

Consequently, each player wishes to match the action of the other player. If player 1 believes player 2 will select low energy then player 1 should select low energy. So while there are two Nash equilibrium points in this matching game and one is clearly better than the other, the information available to each player about the other will dictate which equilibrium is selected.

The coordination game highlights the issues of behavioral decision theory and group decision making within the firm because the outcomes and explanations associated with game theory more plainly show the violation of economically rational behavior assumed to be a part of management behavior. It does this without implying negative personality traits that may tend to suggest that the underlying argument for the development of the Value Sieve is based upon sentiment instead of experimental findings. The use of game theory in this paper is intended to demonstrate that the assumptions of rational behavior for individuals and firms is not supported by the experimental findings of experimental psychologists or economists. The argument is not intended to suggest that the mathematics underlying game theory should be used to determine how normally intelligent people do or should behave (Zajac, & Bazerman 1991)

In game theory, it is important to realize that a Nash equilibrium²⁰¹ is not necessarily a Pareto optimal outcome. Pareto rankable is used to reference the equilibrium point that is best for multiple players when a compromise solution is a

²⁰⁰ Note that there are varieties of coordination games and a matching game is only one example. It was selected because it is the easiest to demonstrate the concept of Nash equilibrium.

²⁰¹ Nash Equilibrium - If there is a set of strategies with the property that no player can benefit by changing her strategy while the other players keep their strategies unchanged, then that set of strategies and the corresponding payoffs constitute the Nash Equilibrium. The concept of Nash Equilibrium. Named after Nobel Laureate (in economics) and mathematician John Nash, the Nash Equilibrium conception is probably the most widely used "solution concept" in game theory. <http://www.coba.drexel.edu/economics/mccain/game/IT1.html>

preferable condition to no solution²⁰² (Camerer, and Knez 1997). Therefore, of the multiple Nash Equilibria in an assurance game²⁰³ one equilibrium is better for both players than another. Example 1 above should help illuminate these concepts.

The theme in a coordination game is useful because it allows us to look at the kinds of behavior that can be anticipated when division managers within large organizations must determine their individual and collective best course(s) of action. The theory of the firm would suggest that a division manager maximizes the profit for the firm. Organization decision theory would suggest that a division manager, will more often protect the expected utility for the division unless there are sufficient and credible assurances from other decision-makers that higher levels of benefit can be achieved through coordinated action and as long as this does not put the survival of the firm in jeopardy (Payne 1997). Thus, decision making within the firm can be explored as a problem of coordination of action²⁰⁴ among the participants. “The application of simple coordination games to organizational coordination problems focuses attention on mechanisms that transform expectations rather than mechanism which transform preferences.” (Camerer and Knez 1997)

Camerer and Knez (1997) identify three kinds of impediments to coordination.

1) Matching Problems – the team members share a common group preference but find it difficult to deliver for a variety of reasons;

- Explanation and Example – a hospital recognizes that to minimize confusion for the patients, doctors and staff a specific “discharge time” should be established which will allow patients to know when they are expected to be discharged and leave the hospital after treatment. All parties know that this

²⁰² The easiest example of this is from childhood. When a parent tells two children that if they can't reach an agreement about the television viewing for the evening then the television will not be turned on.

²⁰³ A type of coordination game where players indicate to each other what they intend to do before they act.

²⁰⁴ One way of thinking about the importance of coordination is by considering the managers of a variety of different programs who may be locked in a less than optimal equilibrium because they cannot determine a method to coordinate a multiparty shift to a better equilibrium.

time will act as a coordinating point for a variety of actions, including the admission of new patients. Further, they realize that the failure to coordinate will result in frustration for all parties. As a team, they all desire a stable discharge time.

- Coordination problems for the team are based upon the multiplicity of interactions and the fact that different participants have different information and control different actions. The coordination problem is not getting all parties to agree to what is desired. The problem is to cause all participants to aggregate information, (which both takes time and degrades over time) and carryout actions which must work in harmony in order for there to be success.
- Finally, we must ask whether we believe that the members of the team who are required to commit actions to achieve the goal will do so if they suspect, for whatever reason, the other team members will not be acting as required. In other words, to what extent is it likely that individual team members will go to heroic levels to carry out actions to achieve the goal when they believe the goal will not be reached due to the actions of others?

2) Mixed Motive Bargaining Problems – the participants all have their own individual preferences but without coming to some agreement they cannot proceed;

- Explanation and Example – in a regional health organization new funding has been made available and must be allocated among several existing programs (outcomes). This is a typical bargaining problem where there are a number of possible points of agreement (equilibrium) and a worst case where no agreement results in nothing happening. Therefore, while each manager has a specific preference for how the money should be spent, no manager prefers deadlock and inaction. This is mixed-motive scenario and is a coordination problem because each manager would like to agree on some solution rather than no solution, but must make a choice among a number of possible solutions.

- To resolve the difficulty an organization may develop rules²⁰⁵ or guidelines²⁰⁶ that assist the decision-makers in understanding and coordinating their actions. For example, divide money evenly amongst all participants, or divide all funding on a proportional basis among all participants. In health care, few practical guidelines assist managers in coordinating their choices to maximize²⁰⁷ the equilibrium position of the organization. In fact, the best example of this may be the consistent across the board reduction of funding which is chosen as a solution by managers within organizations which receive funding cutbacks.

3) Assurance Problems - the participants have the same organizational preference but believe that the higher payoff situation are riskier and will only risk when they believe other members are jointly committed to the action.

- Explanation and Example – suppose that the patient of a hospital has a satisfaction level that is disproportionately influenced by the worst circumstance of their hospital stay. I.e. the worst experience during the stay dictates the response on a customer satisfaction questionnaire. So, while all personnel wish to have satisfied patients, each staff member will only expend the additional effort to ensure a high level of patient satisfaction if they believe that the other members of the staff will also provide, on an individual basis, a high quality service for the patient.

²⁰⁵ A rule is a specification of behavior that exists prior to the selection of an action by a decision-maker.

²⁰⁶ The use of guidelines is proposed as a method to clarify the required activities to accomplish a specific objective or complete a specific task. As an example: from a quick review of the BC Office of Health Technology Assessment it would appear that guidelines are developed within a context (frame) and there may be a variety of context regarding the specific focus of interest. Guidelines may not bring the implied level of scientific knowledge that is assumed. Further, guidelines may provide the under pinning of a political or financial agenda which is working to skirt hard ethical issues or the options that should be available to clients if they have free choice. see Appendix D: Health Technology Assessment for a more complete over view of health guidelines.

²⁰⁷ Maximize in this case is to find the highest value Nash equilibrium instead of selecting a lower value Nash equilibrium.

Example 2 - An Extended Example of A Nash equilibrium

Consider a situation where there is a mixed strategy game and each Nash equilibrium is better for one player than another. Thus while agreement is necessary to gain value which equilibrium value has a significant impact upon the fortunes of each player.

Example 2		Person 2	
		Low	High
Person 1	Low	5, 10	0, 0
	High	0, 0	10, 5

Playing 100 times, with each player randomly selecting between Low and High, can result in a Nash equilibrium value for which each player averages a lower average gain than (5,10) or (10,5). I.e. it is possible for the players to cause themselves and the other player to accept an outcome that is worse than the poorest case they were trying to avoid.

Considering the problems of coordination clarifies the difficulties for managers and staff who must select actions (strategies) which render the health outcomes produced by a health organization. While in some case coordination problems may be resolved by causing managers to come to an agreement regarding an overall organizational preference, this does not automatically solve all coordination difficulties. Problems of coordination must include the establishment of procedures which participants know, will trust in, and believe others will act on. In other words, policies (promises of future action) must be available, credible, believed in, and consistently adhered to.

B.1.5.5 Nash Equilibrium Experimental Findings

B.1.5.5.1 Experiment One²⁰⁸ No Communication

Experiment One		Person 2	
		Low	High
Person 1	Low	.80, .80	.80, 0
	High	0, .80	1, 1

1. Players did not know each other, and had no history of other's decisions from previous games. Of 165 subject pairs,
2. 160 played the less efficient equilibrium.
3. 5 pairs played disequilibrium.
4. No pair ever achieved the higher equilibrium.

B.1.5.5.2 Experiment Two²⁰⁹ – One Way and Two Way Communication with Cheap Talk²¹⁰ Allowed

One Way Communication Results (using the same game as above)
Of 165 pairs,

1. 87% of the speakers said they said they would play High.
2. 88 pairs (53%) played the efficient equilibrium High/High.
3. 55 pairs (31%) played disequilibrium outcomes
4. 22 pairs (16%) played the inefficient (Low/Low) outcome.

Therefore

1. (24%) of the 87% of the players who received the High message weren't willing to bet that the message sender would follow through and chose the Low.

²⁰⁸ Cooper, D. DeJong, R. Forsythe and T. Ross, "Communication in Coordination Games", *Quarterly Journal of Economics*, 107, 1992, 739-771.

²⁰⁹ *ibid.* 1994

2. (20%) of those who sent the High message did not choose High but chose Low
3. Therefore, while one way communication increases the probability of efficient equilibrium it only raises it from zero to 50%.

Two Way Communication²¹¹ Results (using the same game as above)

1. 100% of players send High
2. 90% 150 of the 165 did play the High/ High equilibrium.

B.1.5.5.3 Experiment Three – The Weakest Link

The game is played with more choices (1 to 7) between Low (1) and High (7). In this game of choices a group of individuals (3 to 15) in a team who each make a choice, are effected by the lowest quality input of any individual member of the group. The player who selects the lowest value, dictates the low choice payoff all players receive. All players know that the maximum group payoff is when all individuals choose 7, while the best payoff for each individual is associated with 1 if you believe any other member of the team may choose 1.

In an experiment with 15 team members, the game was played 10 times. After each play, the lowest choice was announced to all team players. In all replications, the value 1 was the minimum selected value after 10 turns. Further, the value 1 was the choice of a significant portion of the team by turn 10 (75% to 90%) (Van Huyck, Battalio, & Beil 1990).

Further experimentation by other researchers found that small groups were more likely to be able to find and hold higher Nash Equilibria than larger groups (Knez & Camerer, 1994; Cachon & Carerer, 1996). The success rate of the smaller groups showed that about 20% of them could reach and hold the higher Nash equilibrium of 7. When team members were publicly told that a bonus would be

²¹⁰ Cheap talk means individuals can say what they wish but are not required to follow through with consistent action.

²¹¹ Under two-way communication, both players simultaneously send messages.

given should all members choose 7, then 80% of the groups successfully had all their members choose 7.

When small groups who had reached different equilibria were combined the new equilibrium reached was the lower of the two equilibrium achieved by the teams in earlier play. In other words when a more successful small group was combined with a less successful small group the lowest equilibrium value was then produced. This happened whether or not the teams knew the group's history prior to play or not.

The interesting aspect of the weakest link games is the illumination of the problem of individual expectations within an organization. Decision-makers working to coordinate their actions with others manage their choices based upon their expectation of how others will choose. Lower value Nash equilibrium positions are reached not because the decision-makers disagree with the goal of maximization, but because they do not believe that their choice of a riskier option will be supported by the actions of the other participants. In the above experimental example 20% of the groups whose members were told that there would be a bonus if all the group members chose 7 did not choose 7 when it came time to act. While this may be small from an experimental point of view it is troubling news for individuals who design organization processes or must manage large and complex organizations.

A healthcare example based upon the weakest link game would be a situation where a division of a health region is restructuring and the managers within the division must come to choose which restructuring strategy is best. The choices, option 1, option 2, option 3, option 4, and option 5 all represent different levels of effort and risk to each manager. So while they all want the division to succeed they must individually choose based upon their experience within the organization and their expectations of how the other managers will act. A manager making a risky choice must believe that the other managers will act in the same way and stay the course. If a manager believes that there may be cheap talk by one or more managers, or expects that the organization will not stay the course to achieve the riskier choice, then the manager will choose the lower Nash equilibrium restructuring option.

B.1.5.6 Conclusion

The literature confirms the failure of the rational actor model of individual behavior and the failure of the theory of the firm to model the actual decision behaviors of these entities. It also indicates that there is no consistency among professionals and firms. An individual or firm may be rational on one action and not rational on another. Consequently, it is not possible to construct strategies that rely on sorting which would allow resource savings by allowing the “rational actors” to proceed and those that are not “rational actors” to receive additional training or supervision. Therefore the process of resource allocation cannot rely upon the use of a rational actors and firms for the development of efficiency or effectiveness. The process must assume that in order for resource allocation to be efficient and effective, techniques must be provided which aid in the identification of actions that are not rational and correct these actions to minimize dysfunction.

The underlying assumption that individuals are rational actors and that consequently the course of action will be the same from all participants is naïve. Further, the assumption that all participants who wish to maximize their individual utility will work within the lines defined by the administrative system is unrealistic and will result in different, perhaps better care for those who use professionals who breach or manipulate the arbitrary administrative structure.

The literature would suggest that the most appropriate response is to ensure that multiple individuals have an opportunity to view, consider, and provide comment to a decision. While a second opinion is untenable for all individual cases of care, it is possible for the larger pattern of care associated with specific issues/diseases to be monitored to establish the appropriate interpretation of the available information which may result in the most appropriate action. Further, the opportunity for cooperative scrutiny will result in the identification of motivations and models which have an impact upon the individuals receiving care, the professionals directing care and the organizations providing the resources for care.

Measurement dysfunction stipulates that when measures are tied to motivational systems those being measured may/will adjust their behavior to maximize the representation of events profiled by the limited measures taken. The process of maximization may be at the cost of those activities and behaviors that are not

measured. Further, it can be seen that the use of a measurement system to control access (screen) to resources can and does result in the screening system being manipulated to control the provision of services. This may be done to minimize/optimize resource utilization by a service provider who controls demand through a queue. It may also be done by a health professional who misrepresents the health status of an individual in order to achieve a treatment goal. Finally, it must not be assumed that clients and client populations will not adjust their arguments in order to increase the perceived utility of the services they enjoy.

Given a system which is so vulnerable to “interpretation manipulation” the effort necessary to individually police such a system is enormous and is likely to demand increasingly more and more resources for better information systems and policing as new responses evolve to address the “newest” mal-adaptation to control methods. The research findings would suggest that as participants in the system begin to believe that others will fail to invest their energies to optimize the system, they to will stop investing the energy to “do the right thing”.

Fortunately, the most appropriate method of resolving the problems of measurement dysfunction is the inclusion of additional perspectives that are motivated to ensure the service provided meets the needs of the clients.

A review of the Cochrane Collaboration research abstracts on professional practice and health care outcomes²¹² clearly indicates the difficulty associated with health-related research in applied settings and the challenge associated with changing professional and allied professional behavior.

B.1.6 Model Z - A Model for Understanding Uncertainty

The use or intention to use performance measurement is becoming widespread in all sectors and industries. The importance of the technique is to encourage accountability within an organization and improve its ability to provide value to clients. However, in settings where agents utilize specialized knowledge and/or there is a significant separation between the customer who purchases the

²¹² <http://hiru.ca/cochrane/revabstr/ab000259.htm>

product/service and the client who uses the product/service organizations must proceed with caution.

When the agent has more specialized knowledge than the principal the performance measurement system will distort the production process if it uses the performance model that meets the needs of the principal. The distortion and possible dysfunction are based upon the probable behavioral adjustments which are made by the agent in responding to the pressure of the principal as they reward and punish based upon the performance measurement system.

Healthcare is an excellent example of an industry where the agents tend to have high levels of specialized knowledge and provide services to clients from government funded, non-profit monopolies which do not independently measure the dependent variables of their various performance models. Consequently, there is reason to believe that performance measurement strategies implemented in this sector could have dramatic dysfunctional effects that may not be noted for some time to come.

B.1.6.1 Model Z

Information reduces uncertainty about categorization. In a perfect world all dependent variables would be 100% explained by an explicit set of independent variables and no error. In turn, each independent variable could be explained by an explicit set of independent variables and no error. And so on.

$A = B + C + D$ (This is a model of A)

Where $B = F + G + H + I$ (This is a model of B)

Where $C = J + K$ (This is a model of C)

Where $D = L + M + N + O + P$ (This is a model of D)

In the real world, we know that in most cases there is an error term associated with each model of the dependent variable. Further, it is known that models explaining dependent variables are often changing. Different individuals will have preferences for one model explaining a dependent variable over another explaining the same dependent variable. This preference may be based upon a

variety of conditions which might include motivations such as convenience, complexity, agreement about the definitions of the dependent or independent variables, interpretations of existing research etc.

Thus Model Z of A can be postulated as follows:

$$A^1 = B + C + D + \text{error}$$

Another person's Model Z of A might be:

$$A^2 = B + C + D + W + X + Y + Z + \text{error}$$

While nature's Model Z of A is in reality:

$$A^3 = B + C + D + Q + R + S + T + W + X + Y + Z$$

A Model Z is simply the model an individual uses to provide necessary explanation to a dependent variable. In the above example referring to the dependent variable A, Model Z¹ is different than Model Z² and both are subsets of the true Model Z³ of nature. The differences between Model Zs for the same dependent variable may be for a variety of reasons.

Using this basic representation scheme it could be said that the principal's Model Z for the dependent variable A = B + C + D + error while the agent's Model Z for the dependent variable was A = B + C + D + W + X + Y + Z + error.

This could be written as²¹³:

$$\text{Model Z}^{\text{PRINCIPAL}} A = B + C + D + \text{error}$$

$$\text{Model Z}^{\text{AGENT}} A = B + C + D + W + X + Y + Z + \text{error}$$

$$\text{Model Z}^{\text{NATURE}} A = B + C + D + Q + R + S + T + W + X + Y + Z$$

²¹³ The following notation is based upon the basic ideas of multiple regression however I have left all notations associated with coefficients etc. out in order to ensure simplicity of the argument. It is intended for convenience of describing ideas associated with measurement dysfunction and mental models and is not intended to be used as a mathematical statistical truth.

In this example, assuming the independent variables all account for some of the variance accounted for of the dependent variable A then the following statement would be true:

$$(\text{Model Z}^{\text{PRINCIPAL}} r^2) < (\text{Model Z}^{\text{AGENT}} r^2) < (\text{Model Z}^{\text{NATURE}} r^2)$$

From an information perspective, uncertainty is individual and personal. The same information given to two different individuals does not necessarily reduce their uncertainty equally²¹⁴. The extent that uncertainty is reduced depends upon the information categories (knowledge) of the individual at the time the information is provided. Consequently, specialized knowledge can be represented as an individual with a more extensive set of valid and reliable categories than others. The consequence of this is that information systems need to be developed with an understanding of whose uncertainty is to be reduced.

In knowledge intensive environments it is likely the case that the models of operation of the organization administrator (principal) does not include detailed knowledge of the specialist (agent). Further, it is likely the case that the knowledge of the specialist agent does not include the knowledge of the administrator. For example, administrators would be more aware of the specialized financial and environmental relationships of the organization. From this perspective knowledge intensive organizations have layers of specialized knowledge that may easily become dysfunctional if the performance measurement system is not designed with the information needs of the various participants and how they will be motivated to react to incomplete performance measures.

From an information perspective, a principal may have a very simple model of a knowledge intensive activity carried out by an agent. This is satisfactory as long as the principal does not assume that his/her simplified model of the agent's activity can, in all circumstances, be used to measure or direct the performance of the agent.

In a knowledge intensive environment is also expected that the models explaining dependent variables will change. The time frame for this change is unpredictable

however it would seem that in some fields such as health/medicine and information technology rapid change is taking place. This would suggest that the models of explanation are changing rapidly and that there will be individual differences among individuals working in these fields as new they participate in the testing of current models and the development of new models. The consequence of this is that the independent variables selected to predict the dependent variables are likely changing or their definitions may be changing to better enable the knowledge workers to communicate and think about the problems they wish to solve. In the dynamic environment associated with knowledge development, optimization can only be framed within an instant in time. In other words, the evolution of new information results in no optimization surviving for very long.

B.1.6.2 Performance Measurement and Dysfunction throughout a hierarchy

The development of an appropriate performance measurement system becomes more difficult when multiple levels within the hierarchy of an organization must work with a common set of measures captured by an organizational performance measurement system. This is because the measurement system must meet the needs of other principals within the organizational system. The significance of this can be considered from the conditions that are created when an individual decision-maker is both a principal and an agent within the same hierarchy. An agent and a principal are both motivated to produce the results that provide them with greatest expected utility. The implicit consequence of principals that are also agents to the next higher level in the organization is that each individual within the organization hierarchy, who is both a principal and an agent, can optimize the selection of their program's independent variables to match their superior's independent variables.

To what extent will the performance information needs of the senior administrators constrain the ability of the junior managers? To what extent will more junior managers select measurement variables that play to their strongest

²¹⁴ For this to be true the individuals must have identical Model Zs and be in identical contexts.

suits? What mechanisms will link the value experienced by the customer to the activities of the different parts of the organization?

To achieve the mission of the organization the senior principal must consider the most effective mechanism to link the organization's mission to the resources of the organization and the needs/preferences of the client. A central role will be to minimize the distortions introduced into the performance measurement system at each level within the organization and to minimize the dysfunction that may be induced at each program level by the responses to the organization's various measurement systems.

While the mission of the organization may be apparent for the senior principal and the client, it should be evident from the discussion that an agent, given an incomplete performance measurement system, will be motivated to maximize his/her performance on the variables provided within the performance model.

B.1.6.3 When Knowledge Is Involved

If it is assumed that given reasonable motivating factors it is probable that an agent will select performance variables which support the performance variables selected by their principal. Then in cases where there is a great deal of agent special knowledge within the programs there is a substantial probability that measurement distortion will result in program dysfunction. This will occur due to a desire by principals throughout the hierarchy to organize and standardize the independent variables used in production. The consequence of this will be to reduce the amount of agent special knowledge captured and utilized in the production of the various programs.

Measurement systems for the organization that focus on incomplete performance models do so at their own peril. The consequence of this is to require a CEO of any healthcare organization or system to ensure that measures of the dependent variable are made and comparisons with independent variables are carried out. Further, the need for approaches to the measurement of the dependent variables must utilize techniques which do not allow individuals to manipulate the measures or learn from the experience of being measured the ability to simply manipulate

the representation of independent variables and not the underlying dimension or concept.

The challenge for the client is to identify mechanisms which can provide insight to the senior principal about their preferences. In environments where there is a market the client conveys certain aspects of this information every-time they make a purchasing choice. However, this is not necessarily the case when the client is utilizing the services of a publicly funded organization like the healthcare system or other social welfare organizations. This is because the organization has its attention divided between two clients. The politicians who stand as proxies for the Board of Directors and the citizens who pay the taxes to the government for the services to be provided.

For healthcare solutions to work, the technical approaches developed must operate both within tightly held organizations and between independent organizations. This is key in order to ensure that dependent variable measurement is consistent and cost effective.

B.1.6.4 Considering Complexity

Open systems are by definition complex. This means that elements within the systems have relationships. Changes in one node of the system will have an impact upon other nodes of the system. Changes may have linear or dynamic relationships. The result of this increase in complexity is that there is increased difficulty associated with coordination through the traditional “top down” performance measurement and control strategies.

As the working environment becomes more complex it becomes more difficult for an individual to coordinate and more important for the principal to facilitate the self-adjusting aspects of complex systems. This requires that the principal determine the best way to defer to the Model Z of the agent and/or the Model Z of the customer.

B.1.6.5 Key Performance Measurement Elements

B.1.6.5.1 There Are Essential Differences Between Government and Industry

On this dimension there is a critical distinction between government (including the non-profit sector) and industry. Products and services of industry have a bottom-line need to attract and preserve sales and market share. Purchasing from an organization, which is not a monopoly, is a direct vote of confidence from the customer. For industry government regulations exist to ensure that monopolies are not encouraged so that consumer choice among competing and substitute products and services exists. A customer is making an "informed choice", and competition is used to ensure alternative choices are available. In industry the purchase of the product or service offered is a direct measure of the dependent variable which can be used to confirm the utility of Model Z principal and Model Z agent. The independent arbiter, the customer, ensures that both principal and agent receive relevant dependent variable feedback which directly relates to their Model Zs and duties within the organization.

Government and non-profit organizations in general do not have the benefit of customers who make free choices and in so doing clearly demonstrate the dependent variables in the various principal and agent Model Zs. Consequently there is a lack of independent, valid and reliable confirmation of the dependent variable in these operations. This places greater pressure on government organizations to ensure the careful and independent development of measures of the dependent variable to ensure the clients are well served. The use of internally controlled, incomplete models of performance are subject to distortion and dysfunction. When valid and reliable measures of the dependent variables are not available extreme caution should be used before implementing a measurement system because of its ability to make a program dysfunctional without the organization realizing it.

B.1.6.5.2 The Use Of Performance Measurement in Supervision May Induce Dysfunction

Of particular importance is the possibility that in programs where agents are highly skilled and difficult to supervise because they possess specialized

knowledge, performance measurement systems may more dramatically distort measures of production²¹⁵ (Austin 1996). Consequently, the situation will result in programs which can take a great deal of time to determine if they have become dysfunctional. In cases where the Model Z^{PRINCIPAL} explains significantly less of the variability than Model Z^{AGENT} there are sound arguments to negate any performance measures which are not simply focused upon the dependent variable.

When considering the same dependent variable the fastest way for an agent with a Model Z^{AGENT} to achieve the Model Z^{PRINCIPAL} is to adopt as closely as possible the Model Z^{PRINCIPAL}. The speed of adoption by the agent of the

Model Z^{PRINCIPAL} will be controlled by the extent, and frequency to which the dependent variable is measured, the professional practice requirements of the professional and the extent that professional practice requirements constrain the agent from reducing the use of independent variables in production which are not part of the Model Z^{PRINCIPAL}.

B.1.6.5.3 Current Information Systems May Reduce the Ability of Senior Principals to Direct the Efforts of Agents

The consolidation of information as it flows up through the hierarchy reduces the ability of the senior personnel to adequately direct the specific actions of the agents in the hierarchy. Indeed the more steps the agents are away from the controlling²¹⁶ principal the more likely there will be communication problems. I.e. there will be greater uncertainty associated with the communication. This uncertainty is turned on it head when information is sent from delivery agents to the executive. Rich variety is reduced. Therefore, comments associated with the rich delivery environment will generate uncertainty in the executive. The

²¹⁵ These comments were made by expert software project managers who reflected their concern that measurement strategies could induce performance problems in their most expert programming staff.

²¹⁶ Apologies for the difficulty with the language. Controlling principal is trying to refer to the idea that in some organizations some specifications for performance may be established by individuals more than one step above the agent in the hierarchy. In these circumstances, the agent's principal may not actually have control of the performance measures used to direct the agent. Controlling principal is intended to refer to the principal who has the power and authority to establish the measures.

information flow needs to be able to go through step up/ step down transformers to ensure the correct information is received without confusion. This is what the middle managers used to perform. Now that there are fewer middle managers, there is a greater need for an effective information/communication strategy. To some extent, this is being performed by information technology and information management. It is critical that these efforts be informed by human performance measurement and an understanding of behavioral decision theory.

B 1.6.5.4 Organizations Inducing Standards May Retard Development

Given domains of knowledge that are experiencing rapid change and which experience multiple linkages with other working units within an open system it is going to be the case that the language used and the concepts developed by the working groups will be constantly evolving. The desire to standardize the language requires that the participants stop what they are doing to direct their attention to the desire of senior administrators/managers (principals) and planners/information managers/analysts (technocrats)²¹⁷ to confine themselves to a language which conforms to the planning requirements of the senior elements of the organization. In other words, the desire to cause all participants to use the same Model Zs when discussing and documenting their concepts would be a great convenience to the administrators. The central issue which must be addressed before standardization of Model Zs and their sub category language is who will enforce the standard and what will be the consequences associated with a breach of the standard and who will pay to confirm the standard has been used properly.

If these issues are not addressed then the use of standardized Model Zs is an attempt to constrain the variety of knowledge workers for the convenience of administrators/managers/technocrats instead of supporting the efforts of knowledge workers and acknowledging the difficulty and variety that must be managed by administrators/managers/technocrats.

²¹⁷ In many organizations, the technocracy (planners etc) of the enterprise do not supervise the activities of production personnel. Consequently, a distinction is made between senior principals who have direct line authority over production agents and planners who do not.

The first issue of concern is whether the goal of the principal in question is to manage with an intention to improve the program/organization or manage from the perspective of appearing to improve the program/organization and in so doing bow to the motivations of moral hazard (Mirrlees 1999). Requesting that information be placed in categories which cannot be enforced/authenticated disconnects the Model Z of administration from the Model Z of the people who do the work. An administration that acknowledges the problems of consolidating information will likely tend to accept that reflecting the issues and problems of the variety involved is an issue that requires knowledge. Further, that they accept that to press for variety reduction of measures in applied settings increases the probability of measurement dysfunction. It would seem plausible that the desire to force inappropriate Model Zs is to create an opportunity for false clarity and a break from consequential accountability.

This argument can be posed from the perspective of who is served when a reduced subset (smaller number of independent variables) Model Z is used and to what extent does a reduced subset Model Z induce dysfunction. This can only be answered when we know the relationships between the model Zs being used and what mechanisms are in place to ensure the quality of the data.

Appendix B: Section II

B.2 Management Tools and Evidence

Part II addresses the evidence associated with several common management practices and their attendant assumptions. The objective of this section is to demonstrate the basic management principles that must also be taken into consideration when a resource allocation process is developed for complex organizations.

Current research in management practices is reviewed to understand the general evidence which can provide guidance to the development of a decision support system for resource allocation. While there are many topics, three have been selected as most useful.

- *B.2.1 Planning In Complex and Dynamic Systems*
- *B.2.2 Organizational Change Management*
- *B.2.3 Transaction Based Economics*

B.2.1 Planning In Complex and Dynamic Systems

"A good deal of the corporate planning I have observed is like a ritual rain dance; it has no effect on the weather that follows, but those who engage in it think it does. Moreover, it seems to me that much of the advice and instruction related to corporate planning is directed at improving the dancing, not the weather."

Quinn, J.B.

"What passes for planning is frequently the projection of the familiar into the future."

Kissinger, H.

A central theme of this dissertation is that there is a critical disparity which exists between the models that are built to better understand an event or process and the reality of the event or process. All plans are to some extent theoretical models (Cyert, & March, 1963). A plan is a model of how resources will be brought together in the future to create something. The plan identifies actions that are intended to control a process. When the task is simple, a plan is a set of assembly instructions. When the task is complex or is being executed by individuals who

have not been trained to use the instructions any simple task can become a project²¹⁸.

A project is an event where the resources and individuals have been drawn together for the first time to create something new. This is not to suggest that the project has never been accomplished by another group of individuals before. It is to state that the project has never been accomplished by this team before. From this perspective project planners understand that there is extreme technical risk in their projections and estimates of time and cost.

Research and development and in particular software project planning are excellent examples of the difficulty associated with building a plan around an activity which is complex and essentially intellectual. These characteristics make the work of software engineers difficult to monitor because independent verification of performance measures is to a large extent a specious exercise. The planning and implementation strategies that have been tested and evolved by software project managers are remarkably appropriate for projects which manage complex, knowledge intensive actions for which independent verification is difficult and potentially misleading.

This is because you can't independently verify the quality of a partial solution to a problem. You need the complete solution to carry out an independent verification. I.e. the theory of what will work is the plan. To test the theory (plan) the work must be done. The delivered solution will often be different from the planned solution. The difference between the plan and the deliverable is the negative feedback necessary to learn from the attempt to execute the plan. The quality of the plan is dependent upon a clear understanding of the problem which is to be solved, and breakdown of the problem into component assumptions which must be investigated. A plan that relies upon false assumptions of the behavior of the resources to be used is destined for failure. For example, if an engineer were building a bridge and used incorrect assumptions about the strength of the

²¹⁸ The majority of citizens have instructions about how to program their VCR. The majority of citizens do not know how to follow the instructions provided to successfully accomplish this simple task. The instructions are a model of the task and the model does not seem, from the perspective of the owner, to answer the necessary questions. Working through the instruction is a project.

materials when they were welded it would not be surprising that the project was either more expensive than necessary or that the bridge collapsed under the stress of use. While this example is obvious to most individuals there is a consistent failure by the administrators, managers and designers of organizational systems to recognize the properties of human beings when they construct enterprises which manage complex and knowledge intensive processes.

The desire of an individual or an organization to create a vision of the future and then through a planning process ensure the visions accurate execution is understandable. However planning is an extremely difficult task and is often not possible to the extent desired when the project plan must addresses variables and conditions which are complex and dynamic/unstable. Further, the more a project has to do with the organization of humans and the organization of complex relationships the more variability can be expected. Rationality and motivation cannot be assumed and outwardly rational procedures may produce inconsistent results (Thompson 1968). In the context of public policy, Wildavsky stated that planning "sacrifices the rationality of ends to the rationality of means." (Wildavsky, 1979)

From an evidence-based perspective a review of the strategic planning literature by Mintzberg (1994) states that there is a great deal of evidence that strategic planning does not work. This evidence could be summarized in the experiences of General Electric which made a massive commitment to strategic planning and after years of investment finally shut down the undertaking after efforts proved it extremely difficult to operate an accurate planning process. Mintzberg observes that there is every reason to believe that proponents of strategic planning most clearly tend to be those individuals and organizations who sell/manage strategic planning service(s).

The evidence and circumstance of the failure of strategic planning are helpful in identifying false assumption and constraints in the design of an improved resource allocation process. They do this by reinforcing that systems are complex and those dynamic systems, over time, are not predictable. The failure of strategic planning is an unfortunate but important milestone in the development of management and

information systems that are more likely to provide an organization with a true understanding of control. As an unknown philosopher stated, “shit happens”.

The requirement of most traditional planning processes and asserted by planners is that they need to have control of the enterprise. The consequence of this is that planning is most often centralized within the organization. However, in complex and knowledge based organizations it is unreasonable to believe that the planning department can have sufficient competence in all of the areas where decisions will be made and as a result it is unreasonable to expect a planning department to control the enterprise. However, through the formulation of goals it is suggested that organization planners reinforce the existing power structure of the organization and limit the ability of the organization to develop in ways that are not incremental (Van Gunsteren 1976). Planning departments show a preference for steady incremental changes that translate themselves into preserving status quo perspectives.

The desire to identify measurable variables and to exclude variables that were difficult to quantify was identified by many researchers who concluded that this would tend to direct planning attention to short term economic goals and away from long term goals and goals that were qualitative in nature (Marsh, Barwise, Thomas, & Wensley, 1988; Ackerman, 1975). Thus, evidence that is hard to quantify would likely not be included in planning and planning discussions. These biases in turn support the development and use of quantitative goals which planners assume are easily available and if implemented will not skew the performance of the organization.

The behavioral decision theory literature and measurement dysfunction literatures clearly indicate that incomplete performance measurement systems are likely to produce dysfunction. However, even well known planners seem to disregard the potential damage that might result from their efforts. This is well demonstrated by Ekman in a 1972 speech supporting long range planning.

“There are very few people today who would question the value of long-range planning even though we in fact know rather little about the real contributions of planning and planning technology to the advancement of government, business

and other activities. We know even less of what damage planning has caused, and that might have been considerable.” (Ekman, 1972)

The values of the planner may not be the values of the organization or the values of the specific departments. Differences of opinion and the most appropriate goals and objectives will exist in all types of organizations and may result in disagreements which will be resolved by “political” activities of managers. However, when choices are placed in day to day context abstractions will tend to be resolved in the pragmatics of the getting on with business. When the process of planning requires different parties to agree to items in the abstract, such as goal trade-off rather than choices in context there is the possibility of unnecessary conflict among the participants. This conflict encourages the parties to see sharpened differences between themselves and others. The increased conflict associated with determining abstract goals and objectives is believed to increase the political activity of the participants. Mintzberg (1994) goes on to note that the evidence suggests that it is significantly more important to agree on strategies than on goals²¹⁹. The conclusion is that it is better for managers to be able to direct their attention on how to get things done than on why (the goal) they are doing them.

Mintzberg (1994) argues that strategy can best be developed through the integration of vision, and learning. Vision is used to establish the broad parameters of the strategy leaving the specific details to be determined by the managers so those specific requirements are determined by those who must ensure they work. In the process of developing and implementing the details which conform to the general strategy, managers will fail and consequently adapt by experimenting with new approaches. Adapting the details to comply with the environment in conformance to an overall strategic vision allows the participants to and consequently the organization to learn. This approach is a combination of strategic vision and strategic learning which conforms to the dynamic open systems approach to planning and resource allocation proposed by Corbett (1993).

²¹⁹ A study by Bourgeois (1980) is quoted as finding that in a study of 12 firms those firms that agreed on goals but not strategies exhibited negative performance while those that agree on strategies but not goals had the best performance.

An important barrier to the proper use of planning is the use of the “theoretical model” for promotional purposes. Mintzberg (1994) describes several studies of organizations (governments, universities, and businesses) where “the plan” or “planning process” was used almost exclusively as a public relations tool. This use of the plan directs the energies of the planners and consequently the organization, away from the need to develop a solution to a problem which accurately reflects the problem, assumptions, challenges and costs associated with the stated deliverables.

B.2.1.1 Planning Conclusions

Planning is obsessed with control and instability challenges the ability of planning to produce results of any kind. Planning works best when it extrapolates the present stable structure and it encourages stability and incrementalism within an existing strategic perspective. It deals less well with unstable, unpredictable situations or quantum change in the organization. However in the real world, nothing is always stable and nothing is always turbulent²²⁰. Planning assumes that a centralized agent can control a complex organization through a command and control structure. This simplification of a complex system may be comforting but is unlikely to solve the intended problem.

There is a problem of effecting change when planning consists of integrating the existing unit plans into a comprehensive one, long range plans are built up from the lowest levels, where information exists to make projections. These projections from various parts of the organization are consolidated and in total, becomes the recommended plan. By the time these accumulated and detailed plans reach the top, there is virtually no opportunity for injecting fresh insight about the future” (Tregoe, Zimmerman 1980)

Planning is a modeling activity which must be carefully moderated to ensure that planning efforts are directed towards problems/solutions where the model can realistically be used to represent the system under study. Planning most often assumes a rational actor model in a stable system and therefore when applied to a

²²⁰ Turbulence is change that planning cannot handle. I.e. conditions beyond the comprehension of its procedures. Mintzberg 1994

complex system/ organizations is unable to manage the variety which must be understood and controlled in order for a plan to succeed.

It is possible for planning activities to become an end in themselves. When this takes place the work on a plan disguises the fact that decisions are not made and progress towards a solution is forfeited. I.e. problems are assumed to be solved – not because viable solutions have been found and implemented but because they have been put on paper and approached in systematic ways (Mintzberg 1994)

Through the measurement selection process planning can induce measurement dysfunction within the organization.

B.2.2 Issues of Organization Change

*"The best laid schemes o' mice and men
Gang aft a-gley;
And leave us naught but grief and pain
For promised joy."*

**To a Mouse.
Robert Burns**

"If you want truly to understand something, try to change it."

Kurt Lewin

B.2.2.1 Introduction to Organization Change

An organization is a "specific configuration of goals, boundaries and activities (Aldrich, 1979). It is located within an environment which it shares with other entities"²²¹ Thus an organization is a system within a system. The extreme performance difficulties of strategic planning and forecasting have been associated with the turbulence of the environment within which organizations operate. An environment is turbulent for an organization when there is a great deal of change which is beyond its control. It has been argued that the more turbulent the environment:

²²¹ I am using the legal sense of entity in that an entity might be a corporation, a not-for-profit, or an individual proprietorship.

- the more decentralized a structure is needed for an organization to manage properly (Emery, and Trist 1965) and
- the more administrators are required to rely on informal and individual control through values and norms rather than on hierarchical or administrative control”.

Organizations (systems) produce what they are designed to produce. An individual’s mental model of a system is not the system. Therefore a discrepancy between the intended functioning of a target system and the actual functioning of that system is the result of a failure to understand the properties of the target system and its relationships with internal components of the itself and the environment. Consequently, a system reveals itself through the output of both foreseen and unforeseen consequences.

Organization development is the study of organizations through the discipline of behavioral science and consequently includes the notion of organizational design and the management of change. How we design and manage change depends a great deal upon the mental model we hold of the organization. How well we design and manage change within our organizations depends a great deal upon how well our models reflect the true nature and behavior of organizations within their industry and environment.

Organization change thus depends upon a basic understanding of factors which are developed in the following pages.

- Models Relevant to Organization Change
- Design Factors of Organizations
- Human Factors of Organization Change
- Recommendations for Implementing Change

B.2.2.2 Models Relevant to Organization Change

B.2.2.2.1 Models of Organizations

Organizations are dynamic and complex systems whose boundaries between themselves and other systems are not necessarily as distinct as economic theory would suggest²²² (Starbuck, 1976). Given the complexity of the relationship between the internal systems of an organization and the influences upon them from the external environment, it is understandable that simpler models are created to represent organizations and their motivations and consequently their ability to be changed by executive fiat. The theory of the firm, though clearly incorrect when the evidence is considered, is still frequently used by managers as a model of the organization when discussing the parameters of change. This practice disregards the experience of the majority of managers whom when the need for change is identified fail to accomplish the task successfully²²³.

Organization change can be considered the movement of an organization from one equilibrium to another equilibrium. Change is constantly taking place as the organization adapts to its dynamic environment however all of these “self-regulating adjustments” are taking place in order to preserve their character and so minimize the change in the state of equilibrium.

The concept of change management implies that a purposeful intention can be organized by the enterprise and executed as directed actions that result in the necessary modifications to yield a new desired state of equilibrium. To accomplish this the firm must know what it currently does, what the impact of specific adjustments will be, how long the adjustments will take to have effect, the timing and implications (positive and negative) of the consequences of the change(s) throughout the system, the resources required to execute the change(s) and where they will come from and what the changed system will look like so they can measure their progress towards it, recognize it when they arrive or know

²²² Commented “ Assuming organizations can be sharply distinguished from their environments distorts reality by compressing into one dichotomy a melange of continuously varying phenomena”

²²³ In this section, the assumption will be made that government organizations operate at the same success levels as the private sector. However, value for money is much more difficult to measure than profitability.

if they have failed. Organizations intent on improving must facilitate their ability to both learn and change. The principal mechanism for change is adjustment to our processes (models) resulting from negative feedback from the system(s) under investigation.

B.2.2.2.2 Managing Change with Bounded Views

A great deal of information and coordination is required to affect a change in an organization. Often it is managed through a bounded view with an assumption that the environment and /or constituencies external to the sub-system being changed will require minimal information and coordination to adjust to the changed sub-system.

A simple example of change would be when, in an orthopedic operating room a new prosthetic hip joint has been selected according to new guidelines as the preferred unit for hip replacements of individuals over 40 but under 65. It is assumed that the impact of this change will be adjusted to by the various parties from the surgical team outwards. Those constituencies might include the purchasing department, the orthopedic ward nurses, the rehabilitation staff, community health personnel, and the customer who receives the hip replacement. The adjustments required by the various "external" parties who are touched by a decision to change may be simple such as a change in expectations or complex such as changes to the specific information to capture in order to provide feedback to the surgical team. In most cases, these changes to the external systems take place through informal communications and procedural accommodation.

While this example may not be a traditional example of organization change or change management it was selected because it is an intellectually accessible example of the type of small change that must be managed within organizations and the spectrum of interrelationships which may be involved in simple changes initiated by personnel with the authority to make improvements in a "professional service(s)" delivery system. While a single change such as this may be simple, an organization that must simultaneously manage thousands of changes on an ongoing basis is extremely complex. In a system which manages these thousands of small changes a single instruction from the administration to reduce costs

places pressure upon all elements of the system to change immediately and thus may gridlock the system and reduce the willingness to acknowledge informal communications and make procedural accommodations. Increasing the probability for successful change in such a dynamic environment is the goal of change management.

A metaphor for this situation is the highway system of any major city which allows the individuals who collectively make up the traffic to self-organize themselves in concert with existing rules and regulations such that they can depart from and arrive at locations with reasonable certainty. However, a call to evacuate the city on short notice results in chaos when the system, which was designed for orderly utilization, is confronted with a disorderly demand.

B.2.2.2.3 Changing Mental Models

To replace an existing bad hypothesis, you must provide an alternative “better” hypothesis. Simply disproving the old one does not assure it will be eliminated in the workings of the decision-makers mind. If this idea is generalized to the organization and process models individuals and managers support then a decision-maker might retain a bad model in preference to no model (Dawes 1988). For example, consider the theory of the firm or the rational actor. Several important implications of this are:

- models which are difficult to grasp, may not be usable “as is” in applied settings
- mechanisms of change must be based upon mental models that can readily be adopted/supported by executives, managers, staff, and clients.
- old models, which are not dispelled, may return or be deferred to in times of stress. This is also called regression and is considered an element most often forgotten by managers (Pettigrew, and Whipp 1991)
- models which conflict at different levels within the organizational hierarchy or at different stages in a process will cause confusion and potentially mixed messages

- the stability of the mental model(s) grows in importance as the situation becomes more complex, less certain and carries greater jeopardy
- the creation of cognitive dissonance may cause individuals to change either their attitude or behavior depending upon their greater conviction (Festinger, 1957)
- using pressure from authority figures to adopt a model is considered high risk because it may result in resistance and feigned acceptance.
- depending upon the usability of the model it may require constant reinforcement to maintain its impact within/upon the organization.

B.2.2.2.4 A Model of Change Management

Lewine, (1947) views organizations from a systems perspective²²⁴. Consequently, Lewine discusses the process of organizational change as one which allows the forces within the organization which are at equilibrium to be directed/released in such a way as to allow the entity to move in the desired direction. In his notion of equilibrium there are two type of forces within an organization driving forces and restraining forces. Action is taken by increasing the driving forces (economic imperatives, government and/or legal requirements, competitive tension) or reducing the restraining forces (organizational culture, established practices, employment uncertainty) and so allowing the forces to be altered so that a new equilibrium is achieved. Given two choices for creating a useful imbalance in the equilibrium it would be suggested that a change in restraining forces is more likely to result in a successful change than an increase in drivers. Drivers are expected to result in an increase in restraining forces and thus make a change more difficult. Lewine's model of change requires three steps; an unfreezing of the organization, a change made to the system, and then refreezing the organization.

²²⁴ Lewine was initially trained as a physicist and so his perspective and language is flavored by this training.

Organizational change theory assumes that the change implementers understand the forces at work and can adequately predict the consequences associated with the change initiative. It should be expected that those organizations that fall into the Fortune 1000²²⁵ companies would be capable of successfully implementing change. However, the estimated rate of success is between 20% and 50%.

Organization change it would seem is underestimated in its difficulty by those who would administer it as a management process (Beer, Eisenstat, & Spector 1990)

An important insight into the management and implementation of change is the work of Nutt²²⁶ who suggests that in general 50% of an organizations decisions are either not carried out or fail outright. The Nutt study looked at, small decisions, such as purchasing equipment or determining which product to sell. In these cases, while all tactics fail sometime, managers tended to select implementation tactics which failed more frequently than alternative tactics due to a feeling that they had insufficient time or resources. For example: the tactic least often selected (23%) to implement a decision involved asking for the participation of those who would be affected by the decision; (This approach succeeds 70% of the time) while the tactic most often selected (30%) "issue a directive", succeeded only 36% of the time.

While Nutt feels that his research under estimates the failure of implementing decisions, managers should take note that in the best case approach, 30% of the time a decision fails to be implemented.

B.2.2.3 Structural Factors of Organizational Change

B.2.2.3.1 Contingency Theory

Contingency theory²²⁷ states that there is no one best way to organize and that any way of organizing is not equally effective (Galbraith, 1973). Therefore, the most

²²⁵ The 1000 largest companies identified each year by Fortune Magazine.

²²⁶ Nutt P. Making Tough Decisions Jossey-Bass 1989 Reference based upon Ohio State University research summary <http://www.acs.ohio-state.edu/units/research/archive/baddec.htm>

²²⁷ Contingency theory is similar to the open systems theory principal of equifinality.

appropriate way to organize will depend upon the environment within which the organization must operate. Based upon the findings of Lawrence & Losch (1969) this must further relate to the needs of the individual operating divisions within an organization. The consequence of this is that there will be individual differences within and between organizations within the same industry.

Implicit in the notion of there being no best way to organize is that there will be trade-off, benefits and costs, associated with any organizational approach. Each organization will need to be able to adjust to its environment and those organizations which evolve most effectively will benefit most. This is the basis of an ecological approach.

B.2.2.3.2 Complexity, Uncertainty and Environment Control

The greater the complexity the greater the amount of information that must be collected, processed and provided to the appropriate people to resolve the associated uncertainty (Galbraith, 1977). In most cases, not all uncertainty can be resolved because the necessary information cannot be acquired. This failure may be due to the limits of knowledge in the domain; the limits of resources that can be directed to collect the knowledge; or poor organization where the information exists but the party seeking information does not know it.

Dawson (1986) summarizes eight possible alternative strategies Galbraith (1973) (1977) identified for coping with complexity and uncertainty in organizations.

They are:

- Rules and programs
- Hierarchy
- Planning
- Creation of self-contained units with reduced numbers of specialist departments and reduced economies of scale.
- Slack Resources – e.g. buffer inventories, backlogs, time delays, and generally reduced standards.

- Environmental management e.g. public relations and promotion co-operating with competitors vertical integration
- Greater Use of the vertical system e.g. through more administrative and clerical assistants, more planning staff, and more computer-based information systems.
- Increase extent and strength of lateral relations e.g. through direct contact, liaison, task forces, integrator, integrating departments, matrix organization.

These strategies for managing complexity and uncertainty are activities which share much in common with the development of environment control strategies. This reveals the underlying open systems principles of dynamic homeostasis and the collection and storage of negative entropy that drives an entity/system to increase control over its environment. While collecting information about an external organization is one way of managing uncertainty an alternative is the consumption of the external organization. Within a business context, the argument may well be that it is less expensive to acquire the entity and its information than it is to independently acquire the information²²⁸.

These “systems principles” are acting upon all government and private organizations however; the majority of organizational writing tends to be directed towards firms operating within a private sector market place. As a consequence it is assumed that there is natural “sober second thought” to expansion which is the inhibiting competitive pressure created by a market of knowledgeable individuals who will consider the price, quantity and quality of the goods and services and choose the firms goods or services over alternatives. In the case of government systems, and in particular government monopoly, the open systems desire to maintain dynamic homeostasis and where possible increase negative entropy fixes the question of how to manage a government organization’s desire to control the environment through expansion. This is especially important when the mission for

²²⁸ This was the justification provided by Time Warner when it announced its intention to merge with American Online in January 2000.

dominance and control of the environment can be rationalized as a desire to collect information to manage complexity and reduce uncertainty.

Dawson (1986) identifies ways organizations achieve greater dominance and control of the environment. They are:

A. Secure greater influence in a particular set of relationships

1. Personal informal interactions
2. Co-option/incorporation of individuals, groups and organizations. E.g. appointing MPs and merchant bankers to the board; appointing ex-factory inspectors as corporate safety advisers; buying up suppliers or customers (vertical integration); buying up competitors (horizontal integration)
3. Bargaining (exchange of valued scarce resources) e.g. property company gives local authority "planning gain" of a new swimming pool in return for planning permission for new office block
4. Coalition e.g. cartel of competitors to achieve high price stability
5. Contractual arrangement e.g. with suppliers to ensure delivery dates or with employees over "ownership" of ideas developed within the company.
6. Technological advance e.g. product or process innovation.

B. Achieve greater influence generally within particular environmental sectors

e.g. use of advertising and publicity generally to promote activities and image

C. Alter internal operations to "buffer" against unpredictabilities of environment

e.g. large inventories of finished goods, preventative maintenance, systematic training, and recruitment program.

D. Adjust internal structures to make it more sensitive to the environment and geared towards information gathering, control and influence.

From this perspective organizational change is the outcome of a family of competing organizational, departmental, special interests and individual efforts

associated with an entity working to collect and process sufficient information to reduce its uncertainty as it operates within a complex environment.

B.2.2.3.3 Differentiation and Integration

Different amounts of diversity exist within different industries and this results in different levels of uncertainty for the different industries. This can be generalized to the working units within a single firm (Lawrence, & Lorsch, 1969). For example the degree and frequency of technical change that must be mastered within a software R&D group for an aerospace company is very different than the degree and frequency of technical change for “Macdonald’s” Restaurant service team. The consequence of these differences recommends that different managerial styles, strategies and tactics should be used by different managers within the same organization (Lawrence, & Lorsch, 1969). This is the concept of “differentiation” which includes both cognitive and emotional differences. Further the structure of the organization and its relationships within the environment have an impact upon the type of differentiation that is possible and this in turn creates the need for “integration”. Integration is defined as “ the quality of the state of collaboration which exists among departments which are required to achieve unity of effort by the demands of the environment.” (Lawrence, & Lorsch, 1969). Finally, the properties of differentiation and integration are complementary in that as differentiation increases, the need for integration also increases.

To manage this, programs must identify individual strategies and structures and at the same time create specific mechanisms for integration with other programs. In this way, the ability to coordinate the activity of the firm is retained. Without a specific context, there is no specific best balance to differentiation and integration. Slow changing industries may require less differentiation and as a consequence require less integrative strategies while fast changing industries with high differentiation will require extensive integrative strategies in order to succeed. Poor performers are those which do not match their strategy with the environment they operate within.

B.2.2.3.4 Theory of the Second Best²²⁹

If it was the case that only 20% of organizational change projects were successful in leaving Equilibrium A and moving to Equilibrium B, then 80% of the change attempts result in finding a different Equilibrium X which is neither Equilibrium A nor Equilibrium B. This is because it is unrealistic to assume that a failure to reach Equilibrium B results in a default back to Equilibrium A. In the simplest context even if the procedures in Equilibrium X were identical, the staff will perceive the executive as incapable of executing a desired change. From a psychological perspective, this will tend to make future change more difficult.

The theory of the second best comments that Equilibrium X points that are reached in an attempt to reach Equilibrium B cannot be assumed to be better than Equilibrium A. It is not necessarily an improvement to the organization to move closer to a goal on several but not all measures which were deemed important. Therefore it is essential to understand whether or not the executed change is achieved and if not be capable of assessing whether the new Equilibrium X is an improvement over prior equilibrium state.

From a precautionary perspective, it also suggests that change managers consider the possible Equilibrium X points that might be achieved instead of Equilibrium B and determine the risk reward of the proposed organizational change.

B.2.2.4 Human Factors Relevant to Organization Change

B.2.2.4.1 Staff and Executive Perspectives of Change

An important aspect of the failure to execute successful change is the disparity of opinion between the executive of the organization and the staff of the organization regarding the intended change(s). While all parties would agree that change is necessary to operate within a competitive environment and is an important capability, there may be a distinction between the staff and executive in how they experience change. An executive's future may be based upon how well the

²²⁹ This theory states that it is not true that a situation in which more but not all of the optimum conditions are fulfilled is necessarily, or even likely to be, superior to a situation in which fewer are fulfilled. The point is that piecemeal attempts to force fulfillment of conditions can easily be a mistake.

organization can adapt and optimize its situation and therefore change is associated with positive motivations. However to staff, change is disruptive and filled with uncertainty and may be filled with negative motivations based upon current or prior experiences (Strebel, 1996)

In most cases of organizational change, sufficient information is not available to eliminate uncertainty, or the cost to collect and validate the necessary information to reduce uncertainty is very high. In these cases, the economic method of managing uncertainty is trust. Consequently during change, trust is the most vital ingredient that must exist between the parties. Trust in these circumstances is based upon two essential elements: predictability and capability. The personnel must believe that there is an unambiguous pathway which will be followed and which will have clear, fair and positive results. Further the staff must believe that the change implementers can deliver what they promise (Duck, 1993)

B.2.2.4.2 The Downside of Learning

Staff learn from experience and this is not limited to what the executive wish the staff to learn. Staffs learn if there is no consequence to those who do not expend the effort to change. Staff learn if those who take risks are rewarded or punished and staff learn if the necessary resources will be provided to ensure the change can be done properly. For example, how many failed attempts at change should an organization be permitted before the staff loose their willingness to attempt to support change because they have learned that failure is "always" the outcome. Using the Fortune 1000 success and failure percentages suggest that in the best case an individual who goes through two organizational changes has only a 4% to 25% probability of both changes having gone well.

Therefore in organizations which have experienced many failed attempts to change it is reasonable to believe that the staff cannot be approached in the same way as they may be in an organization which has always been successful in its management of change. The history of an organization, from the staff

perspective²³⁰, is an important context which must be weighed in the development of change management strategies.

Expectancy Theory (Vroom, 1995)

Generally speaking this theory predicts that individuals will adjust their behavior and make choices based upon their experience and expectations of what acts lead to what outcomes and the desirability of the outcome to the individual. Thus, individual differences will cause individuals to

Vroom defines motivation as a process governing choices among alternative forms of voluntary activity (Ivancevich & Matteson, 1993). Hampton (1982) states "that the expectancy theory is the principal process theory of motivation"

The elements are:

- Expectancy - a belief about what action leads to what outcome or result.
- Valence - the strength of the desire for a particular outcome.
- Instrumentality - the degree to which one outcome serves as a means of obtaining another outcome.
- Subjective Probability - personal estimates of the likelihood that effort will lead to an intended outcome, or that outcome, in turn will lead to another outcome

Equity Theory (Adams, Berkowitz, & Walster, 1976).

An employee compares her/his job's inputs-outcomes ratio with that of referents. If the employee perceives inequity, she/he will act to correct the inequity: This can be accomplished through: lower productivity; reduced quality; increased absenteeism; and voluntary resignation.

²³⁰ Many organizations declare success as part of their public relations effort to manage the public and investors. The review of the documents produced by the PR department or communications branch will likely vary from the experience of the staff involved. Whether correct or not, the staff will have a perspective of the success or failure of change management within the organization.

B.2.2.4.3 Professionals

Professional groups have traditionally been defined by their training in a distinct body of knowledge and for the control of that knowledge. This is done by restricting entry into the profession, requiring standards of behavior and ethical comportment. This is maintained through the use of peer evaluation procedures frequently triggered by client complaint. A professional group benefits from models of practice as do their clients who, through the requirement of informed consent, are confident of the best efforts of the professional. It should be clear however that membership in a profession does not eliminate individual differences and so individual professionals will have differences of opinion, as will groups of different professionals.

Models of behavior and decision making should recognize the effects of cognitive dissonance given that findings support the expectation that an individual experiencing dissonance will adjust their perspective to minimize cognitive discomfort and direct their efforts in what they believe to be the most appropriate direction(s) (Festinger, 1957). A study of chartered accountants placed in positions where their performance was judged by non accountants suggested that they were likely to place less emphasis on professional standards which conflicted with the policies and practices of their managers or supervisors (Hastings and Hinings, 1970)

B.2.2.4.4 Standardization and Control of Professionals

Management control of accounting and engineering professionals is performed by the use of: simplification and routinization of the work tasks, the implementation of systems of accountability and performance measurement to limit discretion; and the separation of planning and decision making from the execution of the work tasks (Oppenheimer, 1973)

These trends are more likely to take place when at least one of the following conditions is found.

Table B.1: Conditions for the Proletarianization of a Profession	
(Dawson, 1986)	
1	if an occupational group is seeking higher status and trying to establish a foothold in the professional domain
2	if technological developments, particularly in information technology, facilitate the simplification and fragmentation of tasks
3	If senior people consider cutting costs and saving money to be of paramount importance

In the context of health care, physicians tend to operate as private businesses. As consultants to their clients they will tend to have the greatest degrees of freedom in their participation within the decision making process. Consequently, professional controls and the market place mechanisms tend to control private practitioners.

B.2.2.4.5 Leadership

Leaders and organizations have a reciprocal relationship. The notion of “fitting” a leader to an organization will fall down if it is agreed that the environment and consequently the organization must certainly change. Further, the idea that a new leader is the source of energy for organizational change has also failed to be supported (Pettigrew & Whipp, 1991 pp291). The traditional notions of leadership which have been modeled upon the ability of a single person to manage a simple organization is giving way to the view that leadership in complex organizations must spend more time facilitating the various teams within the organization and less time trying to make decisions for them (Bennis 1999). Thus, change may ultimately require a number of leaders operating at different levels within an organization (Pettigrew & Whipp 1991 pp145). This is necessary given the enormous complexities of organizations and the increasing use of specialized knowledge to solve problems (Corbett, 1994). In many cases this has been translated into a role for leadership which is to establish a “vision” of what should be accomplished and then:

The leader/change agent, concerned with the implementation of constructive change is well advised to consider the challenge to their organization within the context of what can succeed. In addition to structural issues prior learning by organization personnel will be a fundamental problem in initiating and maintaining change. Individuals learn to assess the probability of successful

change from prior experience and then react/invest themselves accordingly. Complex organizations must know that the odds are the prior experience of the personnel was not successful.

Table B.2: From Bennis (1999) Traits of the New Leadership	
	Understand the Power of Appreciation, by supporting talent
	Remind People of What is Important
	Generate and Sustain Trust
	Create a staff of Intimate Allies

The issues of organization change and the evidence of failure has resulted in the development of the Theory of Regression towards the Second Best.

B.2.2.5 Summary of Implementing Change

Organizations are composed of purposeful, bounded, interacting components (projects/activities/programs) which in turn interact with each other and the environment (Corbett 1994). The first purpose of an organization is to maintain control of itself within the environment and this is managed through the collective interactions of many physical and mental purposeful actions. The principal of dynamic homeostasis²³¹ suggests that the organization in a steady state will adjust itself to minimize change. What is implicit in this, which is most often ignored, is that the system of interacting activities within an organization will act without malicious intention to frustrate the desired system change. This implies that significant amounts of coordinating effort/information will be required to move an organization from one equilibrium to a desired equilibrium. However, there are large failure rates in executing change even in the case of the smallest decisions and the issues are identified in the theory of Regression Towards the Second Best.

The consequence of a dynamic environment is that the organization and its components are in a constant state of flux as they work to maintain their individual and collective purpose(s)²³². The principals of equifinality and contingency theory support the belief that there is no one correct way to combine the resource of an organization to achieve a goal and consequently it should be

²³¹ See Glossary – Open systems theory.

anticipated that the individuals participating within the organization will see different ways to achieve their goals. Thus, the first model, which must be challenged of leadership, is the view of a “Tayloristic”, deterministic world where only one pathway is the best pathway.

The implications for organizational change management is that the direction of the organization (purpose) may be framed within a the vision/general direction of the leadership however given the complexity it is necessary for the organization to develop program managers who are capable of fine tuning their programs specific activities towards their assigned purposeful, bounded, goals. Given the complexity of the environment, the organization, and the internal and external relationships, this is the only reasonable method that the appropriate specialized knowledge can be applied to the specific programs.

Organization change requires that the organization/program be changed from one equilibrium point to a new equilibrium point. This requires both a change in the physical process(es) of the enterprise and the programs and a change in the mental models of the programs and the workings of the program. This will include adjusting the physical (process) and mental (models) of the relationships of all the programs within the organization, the organization and the environment. Because, mental models are reinforced by beliefs, norms, and values the leadership and the management must consistently demonstrate and reinforce the desired mental models so that “regression towards the second best” is difficult.

B.2.2.6 Theory of Regression towards the Second Best

Attempts to change an organization from Equilibrium A to Equilibrium B will result in the organization shifting from the initial equilibrium to a new uninvestigated/unintended “second best” Equilibrium C.

B.2.2.6.1 Objective Characteristics

- The greater the complexity of the system the greater the probability that change from one equilibrium to an intended target equilibrium will be

²³² Open systems theory – dynamic homeostasis.

unsuccessful. I.e. the greater the complexity of the system the greater the likelihood of RTSB.

- The greater the uncertainty within the system the greater the probability that change from one equilibrium to an intended target equilibrium will be unsuccessful. I.e. greater the uncertainty within the system the greater the likelihood of RTSB.
- The more consequential the change/ difference (in complexity and uncertainty) between the initial equilibrium and the target equilibrium the greater the likelihood of RTSB.
- Fundamental change is easier to accomplish in a new organization because participants are selected for conformance to a new mental model or family of mental models.

B.2.2.6.2 Subjective Views

- The greater the variety of operative mental models sustained within an organization the greater the probability that organizational change will result in RTSB.
- The greater the change in the system required to reach the target equilibrium the more important the need to shift the mental models of all participants within the system towards a common mental model. E.g., a paradigm shift.

B.2.2.6.3 Organization Design

- The magnitude of the increments of successful organizational change are dictated by the ability of the organization to effectively coordinate the components that are responsible for maintaining the new equilibrium so as to prevent RTSB.
- The greater the complexity and uncertainty of the system the lower the probability that a single controlling mind (leader) can effectively know the details of the decision making within the organization and so prevent RTSB.

- The greater the complexity and uncertainty in the system/organization the greater the need to build management processes which minimize hierarchical control mechanisms and maximize market control mechanisms.

B.2.2.6.4 Information Systems Issues

- The information requirements of complex systems must be based upon the ability to coordinate the related components of the sub-system/system through the management of their collective and individual uncertainty associated with the desired goal to be achieved by the sub-system/system.
- Information systems that attend to the relationship of a complex organization to the environment will not provide sufficient detail to determine the specific appropriate actions of each activity/program (sub-system) within the organization.
- Information systems, in large complex organizations, that support the decision-making needs of specific programs may not significantly contribute to the information needs of the organization. Therefore the smaller the organization the more likely a specific program will share more of the overall organizations information requirements.
- Bad models will strengthen their utilization in the decision-making processes within the organization.

The Value Sieve incorporates both a design mechanism and the information system which can over come the problems identified with change and increase the probability of successful movement from one equilibrium to a desired equilibrium.

B.2.2.6.5 Implications for Implementing Change Based upon the Theory of Regression Towards the Second Best

The distinction between fundamental change and incremental change is that fundamental change requires a complete reengineering of the organization within the context of its overall purpose. While fundamental change imagines the strength of a green start organization, only the most extreme circumstances could

suggest that fundamental change as described in the literature is possible for large organizations. Incremental change, often looked upon as “change lite”, is the practice which can be used by large organizations to adapt themselves. The most effective mechanism for accomplishing this is to recognize that these organizations have the power to construct a quasi market which will facilitate the development of solutions which more effectively meet the needs of the environment.

A framework for the utilization of incremental change in large and complex organizations must recognize:

- the implications of regression towards the second best;
- the need to provide a common mental model of the purpose of the organization and ongoing change process,
- accept that the process must be robust enough to work within a normal organizational environment which includes: cynical staff; risk aversion; and the normal set backs associated with failures to implement decisions
- the establishment of management parameters which encourage the alignment of programs with the needs of the client and the organization; and
- the structural requirements which increase the probability that good programs are rewarded.

The utilization of both fundamental change can be incorporated into a large and complex organization by assuming that the organization either acquires other organizations which carry out the new desired functions and discards the pieces which no longer provide value, or it may grow a new independent enterprise which takes on the new functions and as it shows capability discard the old functions. The image that this creates is the movement of a primitive creature like an amoebae which progresses towards its targets by extending pseudopodia which then draw the remainder of the creature forward.

The challenge is to determine the ability of the organization (financial, technical and legal constraints) and its culture to manufacture and protect the seeds of

innovation and reward those risk takers who are capable of seeing new approaches by assisting/protecting them in working with the main stream stability producers within the organization who will wish to consume the new enterprise/idea/program or minimize the change in equilibrium.

From this perspective a large complex organization may produce change through a continuum which stretches from the emulation and incorporation of ideas by existing internal staff through to the acquisition of working programs and ideas through the acquisition of other entities. In a free market programs may be copied or consumed depending upon the willingness and preferences of the organization(s) in question. In a public monopoly, the organization is most often constrained to emulate or contract out to service providers who demonstrate capability. In rare cases, not-for-profit organizations and their assets have simply been consumed by government agencies without regard to the investment made by the not-for-profit members.

B.2.3 Transactions Cost Economics

Cost is a measure of the work required to accomplish a purpose. Low cost cannot be inspected into a system, it must be designed in the system (Dean, 2000)

It is theorized that firms exist because they use trust to reduce the costs associated with internal versus external transactions. If this were the case then firms that increase the costs of internal transactions beyond the costs that would exist in a market, must fail. This would not be the situation in cases where monopolies of specific resources prevented the effect of normal market forces.

Transaction costs can be considered as those costs of collecting and interpreting information, planning, agreement discussion, and negotiation, policing the agreement and maintaining the agreement. Most often they are not seen in the line item budget and are instead buried within the overheads associated with management and administration.

Transaction cost economics incorporates the costs associated with decision-makers in bounded rational circumstances who will because of their imperfect knowledge direct resources to reduce their uncertainty or incur additional costs due to the inefficiency (compared with the rational actor) of acting with less than

perfect information (Pitelis, 1993). These costs will include those associated with moral hazard/opportunistic behavior.

The important benefit of transaction costs economics is that it brings to the surface those costs associated with uncertainty and moral hazard/opportunism. Therefore, it is expected that as trust diminishes the transaction costs will increase. It is suggested that the economic justification for a firm is that it reduces transaction costs because it reduces uncertainty associated with the management of complex relationships.

It follows then that the transaction costs associated with complex relationships where there is no trust will increase as managers work to purchase uncertainty-reducing information.

Appendix B: Section III

B.3 Health Specific Evidence

Overview

It is reasonable to believe that both doctors, patients and administrators experience the difficulties identified within the study of behavioral decision making. To what extent are the medical service models driven by an underlying rational actor model? I.e. policies and procedures assume that client and professionals will behave as rational actors.

To what extent are the models for the client, the professional, and the administration different? To what extent are the motivations for the client, the professional, and the administration different? From this perspective to what extent is the administration driven by a statistical view of the situation while the professional must balance the statistical and the individual view of the client and the client has not true statistical concerns at all. The client wants whatever is possible that will increase their expected utility.

Assuming that the client has reached the age of majority, there is a requirement that they be given sufficient information about treatment options to ensure they can provide informed consent. The options available must include having no treatment. The freedom to choose allows a client to determine the circumstances of their life and the risks they are prepared to take.

From this perspective to what extent can the service provider organizations restrict the provision of services, if it is assumed that the number of choices can be reduced through the application of professional knowledge/opinion? For example, individuals with cancer may not receive "laetrile". To what extent can the choices available be limited using best evidence?

What systemic forces must be in play for the system currently in operation to allow the use of practices which are not supported by best evidence? Why wouldn't professionals already be using practices supported by best evidence?

What is the probability associated with success that we round down to zero. Further given a probability of success of 1/1,000,000 do we allow the client to determine that they are the 1 for whom the probability is 100%?

Section III of this chapter addresses the specific tools of health and social service management. The evidence regarding the health system is considered in addition to the basic practical constraints.

- *Evidenced Based Medicine and Clinical Guidelines*
- *Health Economics & Health Utility*
- *Privacy and Confidentiality*
- *Choice The Instrument Which Drives Resource Allocation*
- *The Internet*
- *Coordinating Information, Content and Opinion*

B.3.1 Evidenced Based Medicine and Clinical Guidelines

Many parties wish to assist in the development of better health and health care programs. In this regard evidence based medicine and clinical guidelines aim to promote “best practices” that improve the outcomes of treatment (West & Newton 1997). A great deal of energy and resource is being directed to develop and ensure that the clinical practice, programs and services provided are evidence based²³³. In the USA the American Medical Association listed 2200 practice guidelines in 1997 (Weingarten & Scott, 1977). However, from the perspective of developing a decision support system in an applied setting, great care must be taken to clarify the assumptions of what is considered by professional researchers and/or guideline developers to be appropriate.

There is value judgement and assumption (for example cost and/or quality of life are not necessarily considered) within a clinical guideline and what can be

²³³ A short description produced by McMasters University Health Sciences Group is in Appendix E: Evidence Based Care Commentary By McMaster Health Sciences

accomplished within an applied setting through the implementation of evidence based medicine and/or clinical guidelines (Fletcher and Fletcher 1998). In 1997, two government sponsored groups produced opposing guidelines on screening for mammography for women in their 40s (National Institutes of Health Consensus Development Panel, 1997; Eastman, 1997)

A review of the Cochrane Collaboration²³⁴ abstracts identifies a surprising volume of poor quality published research²³⁵. It should be clear that each author would argue they have provided evidence and each journal that they have provided evidence for a variety of health related procedures.

The new evidence based medicine approach has yet to be tested by its own techniques. This was stated more generally by the McMaster Health Sciences unit as ²³⁶ “there is little or no evidence that the paradigm of evidence based medicine is an improvement to the healthcare system and significant levels of study remain to best determine its strengths and weaknesses.” Therefore, while an evidence based approach certainly seems like a competent idea, it is important that this not become the only focus associated with the restructuring of the health care, health, and social service systems. Further, the development and utilization of clinical practice guidelines must be considered within a context of the values of the clinical guideline developer²³⁷ that may be different from the client. This is because clinical practice guidelines are defined as any statements developed to assist practitioner and patient decisions about appropriate health care for specific clinical circumstances (Field, Lohr, 1990). This includes recommendations arising from systematic reviews and meta-analysis of primary data. Generally, editorials

²³⁴ The Cochrane Collaboration is a world wide research effort to review medical practice research literature and summarize it from the perspective of research reports which meet appropriate research guidelines.

²³⁵ This is based upon a review of the web-based abstracts that indicate the number of papers reviewed and those that were determined acceptable.

²³⁶ A short description produced by McMasters University Health Sciences Group is in Appendix E - Evidence Based Care Commentary By McMaster Health Sciences

²³⁷ An example of this problem is included within Appendix D: BC Health Technology Assessment. The executive summary of the report, SUPPORTING CLINICAL PRACTICE GUIDELINES DEVELOPMENT: An appraisal of existing cholesterol testing guidelines, BCOHTA 97:12D, BC Office of Health Technology Assessment Centre for Health Services and Policy Research, August 1997, clearly demonstrates the potential problems of freely accepting clinical guidelines.

and opinion statements not endorsed by a major organization as the appropriate practice are not recognized as practice guidelines²³⁸.

Therefore, for the development of a decision support system for resource allocation a variety of cautions and concerns exist.

Organizations could justify that there is no need to change the current system of delivery until clear, unequivocal research proven evidence is available. More likely will be the use of evidence based arguments to direct attention to “problems solving” which can be used to distract an organization from the need to make decisions.

The greatest current pressure is resulting from the scarcity of resources. There is no evidence that the procedures and processes that are supported by better evidence will be less expensive than those procedures and processes they replace. Thus pursuit of evidence based care with a belief that it will result in cost savings is inappropriate.

Evidence based research is not easy and there is a high probability that resources directed towards the development of evidence based research in applied settings will not provide the level of findings required. The consequence of this is that the additional resources directed to the local development of evidence based practices could increase the costs of operations with no benefit to the operation. Greater risk would be associated with the introduction of false conclusions.

Given most evidence based changes will be evaluated with externalities²³⁹ it will be essential to ensure that the full consequences throughout the system of services is understood. The activity which is to be replaced or adjusted due to the evidence-based findings will be operating within an open system of related services. To repair or replace an existing program requires that the organizational

²³⁸ SUPPORTING CLINICAL PRACTICE GUIDELINES DEVELOPMENT: An appraisal of existing cholesterol testing guidelines, BCOHTA 97:12D, BC Office of Health Technology Assessment Centre for Health Services and Policy Research, August 1997

²³⁹ Externalities – Third party effects. Effects, either good or bad, on parties not directly involved in the production or use of a commodity. (From - Lipsey Sparks, 1979)

structure and the personnel are capable of incorporating changes and the consequences of changes (Sheldon, 1998).

Much of evidence based research does not result in clear “winners and losers” in terms of what should happen. To understand evidence based care it is critical to recognize that the relationship between cost, quality and quantity must be compared to another program or activity via a value judgement.

Evidence does not necessarily change clinician or client behavior. According to the evidence, the methods that have been expected to result in changes of behavior have not been found to work as effectively as expected²⁴⁰.

An estimated 2,000,000 articles²⁴¹ are published in medicine each year and while this number may be increasing it is not the case that evidence has not been used in the past. A central question must be asked which addresses the structure of a health care system for which the provision of service does not require evidence and that there would appear to be little effective motivation/incentive in the use of evidence for clinical practice. This must be concluded from the facts that evidence about care is not new, it has always been available in the past, and yet health professionals would seem to have missed its utility in a surprising large number of situations. This would suggest that there is a structural systems problem associated with the failure to cause health professionals to work with evidence. This could be interpreted, as there is insufficient motivation within the current delivery system for using evidence-based care.

What has not been discussed is the logic that should be applied to the utilization of evidence as it relates to resource allocation and decision making. How does evidence guide our choices and what is the mechanism through which these choices are made and enforced within the health care system. The resource allocation system must be capable of integrating evidence-based arguments with the existing system based arguments. These might be considered arguments which fall within the externalities of the evidence based comparison study.

²⁴⁰ Cochrane Collaboration web site information.

²⁴¹ Cochrane Collaboration web site information.

For example, Disease A is treated by a drug or by surgery. All aspects of the ultimate health impact upon the client are commensurable with the exception of the cost. The drug, which must be consumed each day for a year is less expensive than surgery by 10%. In this example, surgery might be replaced if it was felt that there was no benefit in providing choice to the client. However, the notion of commensurable²⁴² may quickly come apart in an applied setting where there was excess surgical capacity in the regional system. In this case, the surgical approach might be less costly. Alternatively, perhaps if it was the case that surgeons needed to maintain reasonably high workloads to maintain their critical skills, it might be argued that surgery has benefits to the system beyond the specific disease treatment program. Or it might be the case that the evidence is only true when the drug is taken each day without fail and that the experimental infrastructure that ensured the client takes the drug without fail cannot be practically replicated in an applied setting.

The interpretation of evidence is value based and consequently does not result in a decision except when the choices are commensurable. Commensurability in the laboratory is less difficult than in an applied setting.

B.3.1.1 Evidence Based Clinical Practice Guidelines

Commensurability in the applied setting can best be understood within the context of Evidence Based Clinical Practice Guidelines and a study carried out by the BC Health Technology Assessment Group in August of 1997.

B.3.1.1.1 Defining "evidence-based" clinical practice guidelines²⁴³

While there is reasonable agreement in the literature on the definition of clinical practice guidelines, there is much less consensus on the definition of "evidence-based" clinical practice guidelines.

²⁴² The definitions of two or more things are precisely the same. For a complete definition see glossary.

²⁴³ SUPPORTING CLINICAL PRACTICE GUIDELINES DEVELOPMENT: An appraisal of existing cholesterol testing guidelines, BCOHTA 97:12D, BC Office of Health Technology Assessment Centre for Health Services and Policy Research, August 1997

Most often, as in this report, clinical practice guidelines are defined as any statements developed to assist practitioner and patient decisions about appropriate health care for specific clinical circumstances (Field & Lohr, 1990). This includes recommendations arising from systematic reviews and meta-analysis of primary data. Generally, editorials and opinion statements not endorsed by a major organization as the appropriate practice are not recognized as practice guidelines.

In order to prevent misunderstandings arising from the use of the expression “evidence-based”, we arbitrarily opted to define evidence-based guidelines as guidelines that:

- a) are based on a systematic search of the literature with defined key words, time frame, sources and inclusion/exclusion criteria; and,
- b) were based on an appraisal of the included research evidence with examination of the internal validity, hypothesis, statistical methods and external validity of each included study; and,
- c) considered research evidence to meet all of the testing guidelines prerequisites; and,
- d) linked the research evidence and the recommendations.

Research evidence refers to valid and reliable evidence arising from clinical studies.

B.3.1.2 Evidence Based Systems and Privacy

The conceptual underpinnings of an evidence-based system for health require that data be available for decision making. While the issues of privacy and evidence based medicine are not often discussed the following quote is an important indication of design issues ahead.

“While we cannot assess the claimed superiority of evidence-based medicine, we can say that adopting an evidence-based system is potentially one of the most significant privacy issues of the decade for Canadians. It represents a revolution in the way health information is collected, disseminated and used because it relies on state-of-the-art information technology to integrate information from all health

sectors for example, doctors, hospitals and pharmacists. It also envisages amalgamating health information with socio-economic data such as education and income. Moreover, it recommends that not just health care providers, but all health administrators and policy makers have access to the information to make decisions about health care. Information about specific individuals, not aggregate data, is one of the key requirements for developing such a system."²⁴⁴

The long term implications of this is that the expected utility of health data will be argued in a variety of contexts by a variety of public administrators who each feel confident that the addition of health data will improve the quality of their decision making and the utility produced by their activities and programs. It is inappropriate to engage in the argument as to whether these arguments will be true but it is appropriate to note historic trends of governments and arms of government in their desire to gain access to information records which they know to exist.

There is and will continue to be a hunger for data and there is no limit to the imagination of what may spring from access to data. For example, data mining software techniques are specifically developed to find patterns and relationships that were unknown to the owners of the data. If there is no cost for an additional party to acquire the data²⁴⁵ then proponents of data sharing will have no incentive to spend scarce resources on the development of alternative data sets²⁴⁶. To balance these arguments there must be true consequences associated with intentional and unintentional errors in the use and release of data. If there is no consequential penalty associated with the accidental release of confidential information then the steps required to protect the data will not be implemented and maintained.

²⁴⁴ The Privacy Commissioner of Canada, Annual Report, 1996-97 <http://infoweb.magi.com/~privcan/> Note the section of the annual report, A National Health database is included in Appendix F: A National Health Data Base.

²⁴⁵ This notion is well supported in the notion of information economics which reinforces the notion that once data exists it can be distributed at almost no cost.

²⁴⁶ This generates an issue that is rarely discussed. The redundancy of data and data systems is useful in that each independent source can be used to validate other sources. As the number of data sources diminishes the ability to detect, invalid/unreliable information also is diminished.

Techniques now exist to deconstruct data sets. These allow individuals given more generic and sanitized data sets to work back to more specific personalized information. The use of confidential data can only reasonably be constrained through regulation with serious criminal and civil penalties for the violator(s)

B.3.2 Health Economics & Health Utility

The Health industry, while similar in many ways to other industries, has a few unique aspects about its products and services which do not respond in fashions which can be predicted using traditional, simple theory based upon an economic man (Rachlis & Kushner, 1989; Wennberg 1984) Consequently, the utilization of economic methods for management purposes must be closely evaluated to ensure that the outcome predicted is supported in the applied health care economic literature.

Further to this, the health field is so broad that any economist or administrator or lobbyist or health professional, given sufficient motivation can find a data set or a study, which demonstrates that any specific "managed" approach to health care cannot work. While this may be true, the alternative non managed approach has been determined by an international series of health studies, national commissions and regional commissions to be less than satisfactory in meeting the health needs of the citizens at a resource cost that is acceptable (Evans, 1992,1993).

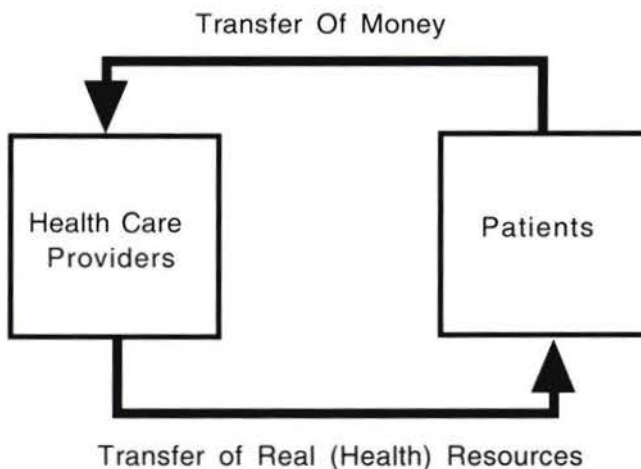
B.3.2.1 The Relationship between Spending on Health and The Health of the Population

There is a relationship between the money spent on health (the top arrow) and the amount of health received by the population (the bottom arrow) shown in Figure B.5

This relationship is frequently used to imply that cuts in funding directly reduce health delivered to the population. For this to be true, it would be necessary that the health care system be already in Pareto optimality. From the literature, it is clear that this is not the case and so the ability of the relationship to predict population health is limited. A note of caution should be taken here in that this does not mean that all programs could have their funding reduced without a

resulting impact upon the quality or quantity of services delivered by that specific program.

Figure B.5: Transfer of Resources



B.3.2.2 A Summary of Health Economic and Management Findings

- Health care is supply driven and consequently the fee for service system does not function in a way which supports the needs of the broader health system (Rodwin, 1984)
- There has been a tendency to fail to link reimbursement of health professionals, with goals of the health care system, or with the health outcomes produced by the system (Rodwin, 1984)
- The objectives of negotiation between health care providers and the government health care buyers have taken the form of rate setting exercises or payment levels and they have hardly embraced the general objectives of the health care system and its management (Rodwin, 1984)
- Analysis of physician induced expenditures in Quebec would suggest that physicians by their decisions either to refer their patients or to provide diagnostic and therapeutic services are responsible for the majority of health care costs. Moreover, studies of physician responsiveness in Quebec indicate that physicians tend to adjust the mix of their clinical procedures to maximize their earnings (Rodwin, 1984)

- Control of health care costs is often portrayed as a struggle between external natural forces pushing up costs while health care professionals and participating organizations struggle to keep costs down. The data does not support this interpretation, the bulk of costs are driven by the health care industry itself (Evans, 1990)
- Control of costs is often more accurately reflected as the struggle to redistribute costs among other members of the society and other organizations. Examples of this can be seen when arguments ensue about who else should be helping to pay the costs instead of arguing about the costs themselves. Redirecting the growing costs to include more or other organizations is not cost control when the total resource funding comes from the same tax payer (Evans 1990)
- A primary function of the resource allocation system is to maximize the health purchased by each "dollar" of resource expended. If the objective is cost control then the only demonstrably effective method is through monopsonistic²⁴⁷ control of the payment process (Evans 1990)
- The relationship between the financial resources made available to the health care sector and the real health care resources that sector makes available to patients is actually quite loose (Reinhardt, 1987)
- 70 to 80 percent of health care expenditures are made by patients who make up 10% of the population (Reinhardt, 1987)
- Wennberg identified remarkably large variations in per capita health care utilization when he studied the surgical procedures used in different regions in the United States. Procedures vary by a factor up to 6 times among regions with no discernable link to health status. The only widely accepted explanation is that it reflects physicians "preferred practice style". (Wennberg 1984)

²⁴⁷ Monopsony is a market situation in which there is a single buyer or a group of buyers making joint decisions. This is the buying side equivalent to a monopoly which represents a sellers side.

- The notion of individual differences in how resources are utilized within the health care industry is not restricted to physicians and should be considered to include most if not all of the health professions (McNaught, 1991)
- The most dangerous assumption in resource planning for health is that medical personnel would not order a procedure if it were not important in the development of a complete, informed diagnosis. Studies that review the habits of physicians indicate that they tend to utilize all resources made available to them and that this results in the generation of information which may or may not meet a fundamental need within the diagnostic process (Rachlis & Kushner, 1989)
- Individual differences among physicians suggest that many routes may be taken to result in a correct diagnosis and successful treatment for a patient. It is not the case that each physician takes the most efficient or economic approach to resolve the problem. (Rachlis & Kushner, 1989)
- Only an estimated 20% of all medical procedures have been evaluated (Rachlis & Kushner, 1989)
- Large geographic anomalies which exist in terms of individual physician diagnostic preferences cannot be explained. Yet all the general measures of health used throughout the industrial world indicate similar life spans and health levels of the citizens (Rachlis & Kushner, 1989)

B.3.2.3 Health Utility

Service providers will maintain upward pressure on health care costs. Regional resource budget optimization will rely upon competitive pressure between service providers to encourage cost compression through process innovation and increases in efficiency and effectiveness. Cost containment ensures that resources can be used to fund the maximum number of health projects. Consequently cost containment should be considered a public good (Evans, 1990)

Pareto-optimization through the ranking of projects within the available funding envelope requires the development of the concept of health utility.

Health Utility is:

- a measure that incorporates both resource cost and health benefits.
- the central concept of any health optimization strategy.
- value based and is therefore dependent upon the individual making the evaluation.

For any health project the service provider will predict the health outcomes which will be provided to the citizens of the Regional Health Authority (RHA) in exchange for the resources received from the RHA. This relationship provides the basic notion of health utility.

$$\text{Health Utility} = \frac{\text{Health Outcomes}}{\text{Health Resources}}$$

Health utility is value based within the individual making the judgement. There is no method of accurately combining the health utilities of a number of individuals to reach a perfect representation of community health utility. This is because there is no voting method which can meet all the requirements of Arrows Impossibility Theorem. For this reason the Value Sieve was developed to allow the rank ordering of project preferences based upon the health values of the trustees.

Even though health utility is trustee value based, the concept can be used to predict or describe potential behaviors of both the trustees, the service providers and the customers. There are only two methods to increase the health utility of any project. They are to decrease the project resource requirements or increase the health outcomes delivered.

B.3.2.4 Defining Health Outcomes

Health outcomes are intended to describe the quantitative and qualitative results of receiving a service from a health service provider. In some cases, there will be multiple types of customers, some who are other medical staff and departments, and others who are in need of health care. For example in the case of a medical imaging department, outcomes might include:

- the measures of the quality of the images captured,

- the need for additional images due to technical problems,
- the number of useful images versus the total number of images,
- the average time required to position a customer and capture an image,
- the level of staff turnover,
- the satisfaction of the users of the images,
- the satisfaction of the customers who have their images taken,
- the unscheduled down time of the equipment,
- the amount of equipment maintenance time and/or
- the ability of the imaging departments to respond to emergency requests for images.

In cases where the service provider is delivering a "softer" type of service to the customer, measures of customer satisfaction as well as measures of changed behavior may be more useful in explaining outcomes. For example if a direct education project were established to provide a nurse to educate new mothers about the benefit of breast feeding their babies, measuring the number of mothers who were given "training" would not necessarily provide an effective understanding of the outcomes. Outcome measures should include the number that decided to breast feed and the number of mothers who continued to breast feed after different elapsed time from the education. This additional outcome information may assist in understanding whether the efforts of direct education provided better responses than providing an educational booklet that covered the topic.

Health outcomes are intended to include measures of performance which provide indications of the quantity and the quality of the service(s) delivered. In determining the outcomes which should be measured an initial guide is what are the priorities of the customer and what are the results which would demonstrate the project is delivering health to the region in an efficient and effective method. It is important to recognize that some providers deliver valuable services that in

some cases will not easily conform to measurement. When this situation occurs it is not intended to result in an inability to request and receive funding for a health project. It is intended to flag an area which requires greater consideration and the possibility of additional resources to determine methods of measuring benefits in the future.

B.3.2.5 Managing Health Outcomes

Projects will work to develop methods which provide the maximum health outcomes possible. Innovation will result in changes of methodology and should cause improvements in both efficiency and effectiveness. Approved projects that do not deliver outcomes desired by the trustees will shift their focus to deliver outcomes that are more strongly preferred.

B.3.2.6 Managing Health Resources

Health resources include all cash, capital, paid labor, non-paid labor (volunteers), charitable contributions and health expenditures made within a project. The calculation of health resources will include all resources regardless of their source. This is intended to ensure that efficient use of resources is always maintained.

B.3.2.7 Phantom Cost Maintenance or Decreases and Mixed Funding Strategies

B.3.2.7.1 Phantom Cost Maintenance

A general possibility exists that the service providers will continue to support any avenue which allows the overall budget available for their project to increase. Resource increases without cost increases can take place by adding volunteers, charitable donations, and funds from other organizations, etc. It is for this reason that charity and volunteers could be the next source of resources which can be added to the total mix to permit increasing resource utilization in health care. I.e. Health providers wishing their personal incomes to continue to increase will trade off the utilization of volunteers and charitable donations to get the job done. This will protect the desired increase in professional incomes but not openly increase the costs of the projects to the regional health budget.

For Example:

$$\text{Health Utility} = \frac{\text{Health Outcomes}}{\text{Health Resources}} = \frac{Z}{X + Y}$$

Where X is the amount of resource provided by the RHA and Y is the amount of resource provided by another organization. The health utility of the project will be different if the outcomes are based upon the use of only X resources versus X plus Y resources. Resources must be fully explained to ensure a fair determination. An organization wishing to continue to increase the resources provided to only a few staff could continue to provide the required outcomes but increase the use of non paid staff on the project.

B.3.2.7.2 Mixed Funding Strategies

It is possible that programs that presently operate on charitable donations will attempt to shift over to use public health funding. The desire to shift from "charitable" sources funding to "health care" sources funds will be based upon the belief that the "health care" source funds will be more stable and consequently more predictable and easily managed by the service delivery organization.

The consequence of this shift will be to challenge the existing "health care" funded service delivery organizations and competition for funds will increase. The outcome will be the development of a number of new service delivery organization funding strategies which combine, volunteerism, "charitable" funding and "health care" funding.

These changes in funding combinations are not assumed to affect the total volume of charitable funds which are provided by citizens in the region. It is only expected to shift the way those funds are distributed to health care service delivery organizations.

The result of the new funding strategies will make it technically possible, however unlikely, that a service delivery organization which does not receive support from charitable sources will find itself sliding down through the levels of prioritization because the health it provides per dollar is, in the mind of the trustees, less than the health provided for the "public tax dollar" when alternative service delivery projects are cheaper because their total cost is offset by charity dollars.

For example:

Project A costs X dollars to operate on an annual basis and the health outcomes from the project are believed by the Regional Health Authority Trustees to be useful and thus should be funded. Let us say that the amount of health outcomes delivered by the project is level Z. If Project A, which has a budget requirement of X dollars were to receive Y dollars of support from another agency/organization then presumably the trustees would be pleased to fund project A knowing that the saved dollars, Y, could be used to fund additional lower priority health projects.

From an economic perspective, this would be true for Y amounts of \$1 or any other larger amount. Presumably, the Trustees would be increasingly motivated to fund the project as Y approached X in value.

$$\text{Health Utility Of Project A} = \frac{\text{Health Outcomes}}{\text{Health Resources}} = \frac{Z}{(X - Y)}$$

Project B has a budget (X) and a health outcome (Z) identical to Project A. However, Project B has no charitable funding support. In a comparison intended to select the project of highest prioritization, the economically rational Trustee will select the project that delivers the most health utility. Consequently, for the economically rational Trustee, Project A will be prioritized first over Project B if project A receives any charitable funding.

Project C has a budget (X) and a health utility outcome of (Z-1) in addition project C has significant charitable funding Y. Project C could be prioritized ahead of Project B by the trustees because it is possible for a project to raise it's utility by increasing the charitable support. Thus, a project which has outcomes of lesser value than another (Z-1 versus Z) could receive a higher prioritization position from trustees.

In a process intended to select the project of highest prioritization the economically rational Trustee will select the project which delivers the most health outcomes for the least money. Consequently, the rational Trustee will prioritize a project that delivers the higher health utility. The "individual value calculus" of utility will place cost containment pressures on high outcome projects

that will be at risk to lower outcome projects in terms of prioritization. The impact of this will primarily be of concern to those projects that operate at or near the funding cut off point for the RHA.

B.3.2.8 Managing the Use of Volunteers and Charity

Given that effective volunteer support changes the health utility of a project in the same way that charitable donations do then it is possible for service delivery organizations to gain advantage in the prioritization process by using any combination of volunteers and charitable donations. Consequently, motivated, community based service providers, who use volunteers and charitable donations to assist their health utility ratio could develop programs in such a way as to disproportionately utilize monies in the Regional Health envelope. I.e. an active community promoting financial and volunteer involvement of it's citizens could dramatically improve the probability that service delivery projects in its community would receive funding for the benefit of its citizens.

B.3.2.8.1 Competition for Health Resources

Presently health service providers actively work in collecting resources from a variety of funding sources. This will continue as long as all health service providers believe combinations of funding which provide the Trustees with a sense that they are getting additional health resources at no cost to the RHA budget will improve their health utility rating. While technically true from an accounting point of view this will not be true in the community sense. The resources that will be identified and redirected could, due to the psychology of the situation, be less effectively applied to provide health utility for the citizens. To be certain that there is no net loss in health to the community some effort should be made to monitor those programs which will no longer be funded due to the restructuring of the health resources.

The support of this approach to health resource collection by the Regional Health Authority is the most likely method that the region can use to create a true

monopsonistic²⁴⁸ presence. The RHA, by creating a prioritization bias to provide resources which need to be matched in kind from other non Ministry of Health organizations, could over time take effective control of a larger percentage of the total health resources available. Some caution is necessary because it is also possible that the seductive perception of "free" resources could cause the RHA to lose control of health in the region.

Broader access to resources will potentially cause shifts for organizations that cannot easily change due to organizational limitations. For example, a large enterprise like a hospital, given union restrictions limiting volunteer support²⁴⁹ could, under certain circumstances, find it difficult to compete for project funding with smaller niche organizations who are not constrained to operate under the same union obligations. The hospital however may find it easier to attract attention for charitable donations and in so doing counter balance the situation to its advantage.

The true benefit of the quasi market²⁵⁰ is that it allows the service providers to innovate in the development of new strategies which deliver the most health

²⁴⁸A market situation in which there is a single buyer or a group of buyers making joint decisions. This is the buying side equivalent to a monopoly which represents a sellers side.

²⁴⁹In a conversation with a health administrator I was informed that the employees union had registered a compliant that volunteer(s) family members were allowed to turn hamburgers on an outdoor barbecue during summer "picnics" for their loved ones living long term within the facility.

²⁵⁰To define a quasi market it is first necessary to define a market. Although the term market is used in many different ways, the central concept is a group of firms and individuals in communication in order to buy and sell some product or service. The critical requirements of a market are that all of the participants within the market have: an understanding of the buying and selling practices within the market; an effective knowledge of the goods or services being bought and sold; and an equitable distribution of resources.

When it is the case that all of the conditions for the participants are not met a perfect economic market does not exist. What may remain however is an environment where many aspects of a market are present. The result is a quasi market. A quasi market may share many of the dynamics and predictive capabilities of a market but it is technically different from a perfect economic market.

utility to the region while the Regional Health Authority works to manage the market by prioritizing projects.

B.3.2.8.2 Community Competition for Health Resources

Health utility of a project is based upon the values of the individual considering the options available. This indicates health utility will vary depending upon the community. Therefore, it is expected that trustees will focus upon their differences in determining the health utility of projects.

The Value Sieve is a process which sorts projects on the dimension of health utility and funds that grouping of health projects which collectively (at the time of judging) offer Pareto optimality²⁵¹ to the combined regional and community trustees. There is some concern that this method will not ensure that health resources are distributed among the communities in a fashion that results in a distribution of resources to meet their individual community priorities.

It is true that disproportionate distribution is the outcome of a great many resource allocation processes within which the participants are satisfied that they have developed a practical and reasonable resolution. However, it is not reasonable to believe the larger player is always the one who receives more than a "fair" allocation.

For example:

In the case of health care, many citizens do not understand the health care services and products that are available and although health insurance improves the resource distribution dramatically, there is not an equitable distribution of resources amongst all participants. Consequently, the conditions for a perfect economic market do not exist. The market for health care is therefore a quasi market and the conditions can be constructed to create a situation in which the benefits of market forces can be preserved (Mansfield E. *Microeconomics: theory and applications*. WW Norton and Company. 1979:19-40)

²⁵¹Based upon the Pareto criterion that states, "a change that harms no one and improves the lot of some people (in their own eyes) is an improvement". Pareto optimization is therefore the process of identifying and implementing any changes which improve the situation for some without creating harm for others. When all such changes have been carried out the situation is termed Pareto-optimal or Pareto-efficient.

Although a single community may pay the capital costs associated with the construction of a health facility all citizens from all communities have access to the facility. This creates the possibility of benefit without cost. How should this be calculated when fair distribution of resources is considered? Should the community that uses the facility be expected to pay for use? Should the community have to pay a fee regardless of use in consideration of a standby fee?

Game theory demonstrates that participants in a negotiation will work with the tools available to optimize their outcomes (Axelrod, 1984). One tool is cooperation, which will occur in circumstances where it is clearly in the interests of the parties. Fairness is a value that has a tangible economic presence and that does cause participants to make less than rational economic decisions in order to ensure the perception of "fair treatment". (Kahneman, Knetsch, Thaler, & 1987). All parties in a negotiation have the ability to abuse the other participants. Attention to principled negotiations and the mechanism of preference voting should resolve most difficulties.

B.3.3 Privacy and Confidentiality

B.3.3.1 Introduction

David Flaherty wrote: "Privacy is like freedom; we do not realize its importance until it is taken away." (Flaherty, 1991) The more our privacy erodes, the more high-tech surveillance permeates every facet of our daily lives, the more we come to prize our right to privacy and to understand that, indeed, it is a fundamental human right. Unfortunately, the more privacy we give up, the more we also come to realize the truth in Bruce Phillips' admonition that "privacy is not a renewable resource, once lost it cannot be recaptured"²⁵².

To use health data requires that we identify the owner of the data and from this basis of protecting their rights, and the obligations of others (professionals) who participate in the data collection, determine the constraints which will exist within

²⁵² "Privacy: Where do we draw the line?" The Standing Committee on Human Rights and the Status of Persons with Disabilities Chairman, Sheila Finestone, In accordance with Standing Order 108(3), a study of Privacy Rights and New Technologies (See Minutes of Proceedings of June 13, 1996, Issue No. 2).

the information system. In some cases the information technology is sufficiently new that information system design questions will require answers from the courts, professional regulatory bodies, politicians and public policy administrators who all shape policies.

To determine the best uses for the Internet in health applications a clear understanding of the strengths and weaknesses of the current system must be understood. Further, to a reasonable extent these sources of the strengths and weaknesses must be identified so that an appropriate collection of goals and objectives can be defined and the development of an implementation plan for health information systems.

An information system developer has an obligation to create a system that minimizes the probability of error. In considering the creation of information management procedures a look at the ability of the current participants to properly manage information is key to constructing a safe and effective system. I.e. you should not build an information system that requires an information culture and behaviors the users do not have^{253,254}.

For example, confidentiality in health care records. Individual confidential paper records are relatively easy to gain access to and breaches of confidentiality are not easily controlled. On an individual basis, encrypted/protected records on a computer can reduce the number of individuals who could gain casual access to an individual's record. On an individual basis, the encrypted electronic records can be declared "safer" than a paper record as it is currently handled. However, as a data base, where the target is not a specific individuals record but all the records, paper because of its characteristics which we are trying to solve from an

²⁵³ As part of this dissertation, approximately 150 programs were reviewed in a Ministry for Children and Families regional administration. The consequence was to learn that many/most records confirming the contracted services (representing approximately sixty million dollars) were not to be found. The Ministry could not find the majority of contracts which documented the purchase of services for children in the area.

²⁵⁴ In February of 2000, the Canadian Federal Minister of the Department of Human Resources released a report that indicated the documentation of the Department, which controlled approximately one billion dollars of spending was inadequate. This meant that documents could not be found to verify the transactions and agreements of the Department with its clients all over Canada.

administrative point of view, lack of order, dispersion and sheer bulk, is a safer system. The benefit cost of potential breach of privacy versus potential health benefits cannot be calculated without a value being placed on personal privacy.

B.3.3.2 Information Culture

The drive to develop and utilize the information economy is international in scope. A primary engine is electronic commerce²⁵⁵ and its need for security, confidentiality, and public confidence. The pressure to ensure these features has been dramatically increased through the increasing profile and public use of the Internet and electronic banking. Canadian politicians, bureaucrats, and the private sector are all acting to represent their interests and responsibilities in a new information economy.

"We will make the information and knowledge infrastructure accessible to all Canadians by the year 2000, thereby making Canada the most connected nation in the world.....A connected nation is more than wires, cables and computers. It is a nation in which citizens have access to the skills and knowledge they need to benefit from Canada's rapidly changing knowledge and information infrastructure. It is also a nation whose people are connected to each other."²⁵⁶

Electronic commerce relates to the movement and security of well defined financial/commercial transaction information. This use of computers has at its heart a history of stability in definitions, record keeping, computerized record keeping. Networked computer transactions is a further incremental step. The technological changes have had an impact upon the speed of transactions, the volume of information that may be moved cheaply, and the ability of an individual or business entity to interact with a commercial enterprise. I.e. the underlying knowledge and basic requirements that take advantage of electronic commerce are well understood. Further, the cost of errors in the development of the new technology will be borne by the enterprises that work to gain financially from the new information infrastructure. For example, an individual using their

²⁵⁵ A Cryptography Policy Framework for Electronic Commerce Building Canada's Information Economy and Society Task Force on Electronic Commerce, Industry Canada February 1998 Government of Canada

²⁵⁶ Speech from the Throne, September 23, 1997

VISA credit card for a transaction is limited to a \$50 maximum financial exposure (Masland, 1999). AMAZON.com an Internet bookseller guarantees that it will pay for all financial errors which result from using its electronic commerce interface. The commercial industry supporting the development of the information economy is, largely, indemnifying those who will use it. Thus, while there are problems to be resolved to minimize risk the industry that intends to gain from the Internet recognizes that its financial interests are tied to its customer's financial interests. Finally, the government is able to regulate transactions and courts are available and able to resolve cases where damages occur.

However, the activities and services of the health and social welfare system are not based upon a long-standing foundation of well-defined and developed transactions. The consequence of this lack of accord is that a great deal of effort is required to ensure that the impact of the advantages of using networked computers does not result in perverse consequences. In addition, consideration must be given as to who will indemnify the injured parties from the errors that result and are likely to be measured in human suffering²⁵⁷. Therefore in addition to the technical challenges, the issues that exist for the development of an information infrastructure several social issues must also be addressed. Where are the advantages for the various parties and how will those advantages be harnessed to develop the system? Who will indemnify the individuals harmed by the information infrastructure developed for health and social services? Who will negotiate the important trade off between those who may be harmed and those who will gain? Who will police the agreement and ensure that fair compensation is metered out to those who are harmed?

B.3.3.2.1 The Current Provincial Health Information System

The current interest in management information systems in health appears to have been driven by the desire to become more efficient and effective. Reports were generated which suggested that there was a significant amount (usual estimates

are 10%) of budget slack (waste) in the health system and that the waste, if identified and removed, would free wasted resources which could be redirect and so result in a health care system in Canada which required "no additional funding" to meet the goals and objectives of the Canada Health Act, the Federal Government or the Provincial government.

To indicate that there is sufficient resource in the health care system but poor management of its allocation to the most appropriate health activities requires the presence of budget slack²⁵⁸. If we believe that the administrators and managers of the system would not willfully waste the health resources of the public. Then we are required to conclude that the information systems did not exist which could reasonably direct the attention of management to enable them to address the issue of resource waste. However, this conclusion further draws into question the specific information which was used to draw the finding that there is sufficient resource in the system.

The fact that most health care organizations have not developed contract management, performance measurement, or population health information systems suggests that much investment will be required to minimize the probability of errors and identify policy options which are implementable. The current state for most complex health organizations is that each must manage a group of disparate databases that do not necessarily communicate with each other. Further, given the infusion of additional tools within the broader determinants of health infrastructure, the ability to develop a compelling argument for feasible near term integration (the next 5 - 10 years) is unrealistic given current skill and funding levels.

²⁵⁷ In Canada, a recent review of the Human Resources Department of the Federal Government would indicate that even the most basic expectations of record keeping are not met. This is not to point a finger at any one party but to indicate that the system developed, managed and serviced by the Department was, in the kindest of terms, unacceptable.

²⁵⁸ Budget slack is the surplus of funds in a system.

B.3.3.2.2 The Current Regional Health Information System

Social service and health organizations have a history of bounded health record keeping and a lack of experience with integrated computerized or data driven systems. In the Canadian case, this has likely been based upon the business separation between physicians, hospitals, and government. Further, the payment methods/mechanisms associated with the provision of health services provide no incentives on the part of the various business participants to invest in the development and maintenance of computerized systems. In other words, all the available money has been spent on wages and medical equipment and so the immediate costs associated with the computerization of a practice, a hospital or a government ministry or department seems to require the funds to be taken from existing operations. Consequently, there seems to be no immediate upside to the provision of accurate information for the management of these organizations and no link between the long-term health of the physician's patients and the hospital or the Ministry of Health²⁵⁹.

B.3.3.3 Current Legal Status of the Information Infrastructure

B.3.3.3.1 Legal System

"Policy development in regard to privacy, confidentiality and security issues in health informatics/telematics is a critical challenge to the development of a Canadian Health Infostructure. The privacy issue refers to the extent of authorized access to personal health information. The subject of confidentiality is the extent of permissible distribution of available personal health information. Security refers to the set of standards in and around information systems that protect access to the system and the information it contains."²⁶⁰

Current legal protection of privacy represents a "patchwork" of various laws, policies, regulations and voluntary "codes of practice". On the federal level, the

²⁵⁹ This breach in the information linkages is not the case in all other countries. For example, the UK does not suffer from this same information problem. Personal communication with Professor Denis Protti, University of Victoria February 2000. Professor Protti was an external reviewer of the UK health information policy strategy.

²⁶⁰ [Health Canada - Santé Canada, [Office of Health and the Information Highway website

Privacy Act (1983) applies to the protection of privacy in the public sector. The patient-identifiable health information collected by Statistics Canada is protected under the federal Statistics Act (1985). In October 1998, Industry Canada and Justice Canada introduced new legislation in the House of Commons. Bill C-54, the Personal Information Protection and Electronic Documents Act, proposes measures to protect personal information in the private sector, while allowing for the information exchange that is essential to Canada's ability to compete in a global economy. "

The risk and difficulty associated with patchworks of laws is their inability to send a clear message which uniformly directs the practice of information systems designers and the administrators and users of health information. Once released, information can never be taken back. The consequence of poor information policy and legal enforcement is the weakening of the protections that are expected and promised to the population. The failure to manage the problem to date suggests that policy makers do not understand the nature of the issue or the speed with which technology is establishing opportunities to take advantage of gaps and loopholes in the system.

A significant benefit that would adjust the situation quickly would be to make the government and private sector organizations financially/legally liable for individual damages which result from the breach of confidential information. I.e. in suing the government for damages, it should not be necessary to show that a breach of confidentiality was done with malicious intent.

B.3.3.3.2 Copyright in Canada

Copyright law was established to ensure that the creators of information, both authors and publishers, received any benefits associated with the production and distribution of a work. Thus, the courts in Canada (1992) have held that the ownership of a health record is based upon the legal entity that caused the creation of the file. This means that doctors own their patient's files and the hospital owns its patient's files. While access is guaranteed to the patient for who the report refers, the ownership of the file rests with the creators.

B.3.3.3.3 Legal Efforts to Protect Movement of Information

Some indications of the future ability to move data come from the courts in Canada (Macinerny 1992) and Great Britain²⁶¹ where the issues of ownership of health records and the information they contain is being tested. The notion of data control, ownership and the rights to provide data aggregates are being questioned. Further, the issue of health information has been addressed by reports and guidelines developed or in draft form by USA²⁶², Canada, and Britain.

In a May 1999 ruling by the High Court of Justice found "that anonymisation (with or without aggregation) does not, in our view, remove the duty of confidence towards the patients who are the subject of the data. Apart from the risk of identification of a patient despite anonymisation, the patient would not have entrusted the information to the GP or the pharmacist for it to be provided to the data company. The patient would not be aware of or have consented to the information being given to the data company, but would have given it to be used in connection with his care and treatment and wider NHS purposes.

²⁶¹ Source Informatics Ltd. v. Department of Health, May 28, 1999

²⁶² National Academy of Sciences, For The Record Protecting Electronic Health Information Committee on Maintaining Privacy and Security in Health Care Applications of the National Information Infrastructure, Computer Science and Telecommunications Board, Commission on Physical Sciences, Mathematics and Applications, National Research Council, NATIONAL ACADEMY PRESS Washington, D.C., 1997

Note: The project that is the subject of this report was approved by the Governing Board of the National Research Council, whose members are drawn from the councils of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine. The members of the committee responsible for the report were chosen for their special competencies and with regard for appropriate balance. This report was reviewed by a group other than the authors according to procedures approved by a Report Review Committee consisting of members of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine.

Anonymisation of the data (with or without aggregation) would not obviate a breach of confidence."²⁶³

B.3.3.3.4 Professional Regulatory Obligations and Information Constraints

Confidentiality is a frequent concern represented by health professionals. The central theme is based upon the argument that a trust relationship must exist between health professional and client. This is a prerequisite to maximize the probability that the client provides a complete representation of symptoms, Using a physician model the argument for confidentiality can be understood from the Canadian Medical Association Health Information Privacy Code.

A Summary of the Code's Principles (Yeo and Lucock 1998)

The principles espoused in the *Code* follow from the traditional understanding of the relationship between doctors and their patients and seek to preserve this relationship in the face of increasing encroachment by third parties.

The *Code* articulates 10 main principles, and numerous sub-principles, for protecting the privacy of patients, the confidentiality and security of their health information and the trust and integrity of the patient-physician relationship.

1. The Right of Privacy

This principle includes the patient's right to determine with whom information will be shared and to exercise control over such information.

The *Code* puts privacy first by placing the onus on those who would infringe upon privacy to justify this infringement with compelling argument.

²⁶³ It should be noted that this case was granted an appeal to a higher court. One justification used to take the question to a higher court was that little case law existed to provide a foundation for guidance by the courts. In other words, the judges and lawyers noted that there was little case law or defining cases that dealt with the notion of anonymization of confidential information and whether or not there was a need to prove detriment as an integral part of an action or whether detriment was to be taken into consideration after finding a breach in confidential and then only for the penalty phase.

2. Special Nature of Health Information

This principle emphasizes the circumstances of vulnerability and trust under which health information is confided and collected. It specifies that rules for health information must be developed in recognition of the importance of maintaining this trust.

Although these features of health information are obvious to physicians, they have not been duly considered in contemporary discussions and initiatives concerning the protection of health information.

3. Constraints on Purposes and Limitation on Collection, Use, Disclosure and Access

This principle asserts that the principal purpose for collecting health information is to benefit the patient and confines secondary use to “limited circumstances under strict conditions.” The *Code* requires a thorough review of secondary uses of health information. Such a review would not rubber-stamp a secondary use merely because it is customary or permitted by law; rather, all existing and proposed secondary purposes for which the need or right to access health information is claimed should be scrutinized with reference to stringent justification criteria, which include the following:

- due consideration of the potential impact on the patient’s right to privacy; the patient-physician relationship and on the patient’s willingness to disclose health information;
- adequate provisions for patient knowledge and consent;
- limitation of scope of collection to legitimate purposes; and
- use of information in the least intrusive form possible.

In addition, any secondary purpose not requiring consent clearly violates the right of privacy and must only occur under explicit legislative or court permission or requirement. The *Code* requires that legislation permitting or requiring nonconsensual collection meet the following test: the purposes could not be met adequately if patient consent were required, and the importance of the purpose

justifies the infringement of the patient's right to privacy in a free and democratic society.

4. Knowledge and Specification of Purpose, Collection, Use, Disclosure and Access

The gist of this principle is that patients should know what can happen to their health information before they confide it. It requires that patients be provided by reasonable means with explicit information about any non-therapeutic use of the health information they provide or confide. To satisfy this requirement, it would be sufficient to convey information in generic form (e.g., a brochure) unless there is specific reason to believe that a particular patient wants or needs information that is more detailed.

5. Consent

This principle recognizes the patient's right to decide with whom health information may be shared and requires the patient to be informed about the potential for nonconsensual use. Its provisions include:

- except for very limited conditions, consent is required for health information collection, use, disclosure or access for any purpose;
- consent for therapeutic purposes may be implied;
- consent in emergency situations is deemed to have been given to the extent necessary to allay the emergency;
- consent shall not be obtained by coercion, deception, or manipulation.

6. Individual Access

This principle addresses the patient's right to access his or her health information. In rare and limited circumstances, health information may be withheld if there is a significant likelihood of a substantial adverse affect on the physical, mental or emotional health of the patient or substantial harm to a third party.

7. Accurate Recording

This principle emphasizes the importance of accurately recording information. It also provides that patients may suggest corrections if they believe their information has not been accurately recorded and have their amendments appended to their records.

8. Security

This principle addresses security safeguards necessary to ensure that only authorized collection, use, disclosure, or access occurs. This principle recognizes the varying levels of sensitivity of health information and contains provisions limiting access to the health information, or parts of the information, on a 'need-to-know' basis.

9. Accountability

This principle stresses that accountability is owed primarily to the patient and that policies and practices must be in place to safeguard the confidentiality of patient information. It requires that administrative and technical support staff receive authorization to access health information only as necessary to fulfill authorized purposes. It also stipulates that a qualified person be designated responsible and accountable for monitoring and ensuring compliance with the Code.

Transfer of information to third parties must only occur if they have adopted the Code or are bound by similar provisions.

10. Transparency and Openness

This principle directs that information practices be made known to patients and open to scrutiny. It requires that policies, procedures and practices be as explicit

as possible to ensure that patients are aware of any considerations relevant to determining what information they elect to freely confide or consent to be collected, used, disclosed or accessed.

B.3.3.3.5 Privacy Best Principles²⁶⁴

The following best practice principles were developed by the Health Privacy Project of Georgetown University's Institute for Health Care Research and Policy.

- For all uses and disclosures of health information, health care organizations should remove personal identifiers to the fullest extent possible, consistent with maintaining the usefulness of the information.
- Privacy protections should follow the data.
- An individual should have the right to access his or her own health information and the right to supplement such information.
- Individuals should be given notice about the use and disclosure of their health information and their rights with regard to that information.
- Health care organizations should implement security safeguards for the storage, use, and disclosure of health information.
- Personally identifiable health information should not be disclosed without patient authorization, except in limited circumstances. Health care organizations should provide patients with certain choices about the use and disclosure of their health information.
- Health care organizations should establish policies and review procedures regarding the collection, use, and disclosure of health information.

²⁶⁴ HEALTH PRIVACY WORKING GROUP - BEST PRINCIPLES FOR HEALTH PRIVACY, Health Privacy Project of Georgetown University's Institute for Health Care Research and Policy. The Working Group is funded through a generous grant from the Robert Wood Johnson Foundation. © Health Privacy Project, July 1999

- Health care organizations should use an objective and balanced process to review the use and disclosure of personally identifiable health information for research.
- Health care organizations should not disclose personally identifiable health information to law enforcement officials, absent a compulsory legal process, such as a warrant or court order.
- Health privacy protections should be implemented in such a way as to enhance existing laws prohibiting discrimination.
- Strong and effective remedies for violations of privacy protections should be established.

B.3.4 Choice: The Instrument Which Drives Resource Allocation

Enshrined in the Canada Health Act is the notion of choice. The client in the system must be allowed the opportunity to make an informed choice their treatment. The Act does not specify that the choice taken must be the most appropriate within the opinions of either the government service providers or the client's physicians. Consequently, the client is a variety generator within the system of health care. To what extent is it appropriate for government to constrain the choices available by using resource availability to edit the menu of options for treatment from which the client may select. Currently the regulations indicate that the variety of the health care system is driven by the informed choices of the clients who are to receive services. Cost containment, it could be argued may eliminate legitimate treatment choices and thus move choice from the client to the health care administration.

The ability to choose is a central element of any market system. The individual who makes the choice to receive a good or a service is the customer. Suppliers choose what goods and service they will sell based upon the quantity customers will buy at what price. Based upon the simple notion of supply and demand the variety in the market is managed by the collective actions of many individuals and firms each operating in order to maximize their subjective utility. This is the famous invisible hand.

Inherent in the notion of a market is that suppliers see enough demand for the service they wish to provide to believe that there is an appropriate risk/reward relationship with the customers for the service. When suppliers enter into a “market” trade-off becomes inevitable. This is because the variety of demands from customers will in most cases be constrained to a set of deliverables that can economically be delivered to the customers by the service providers. Resource optimization places the burden on each decision-maker in the market to determine what best meets their needs given their resource limits.

In a free health market the customers and the health suppliers, through the invisible guiding force of the market place determine the variety of services available and their costs. Further, each participant determines the evidence necessary to make an informed decision. In these transactions the courts are frequently the dispute resolution mechanism that determines the reasonable expectations of the individuals and agreements regarding the exchange of consideration for services provided. Variety is thus controlled by the perceived risk associated with legal liability, being maintained in good standing within the health professional requirements, the cost of service, the probability of success and the probability of corollary negative consequences.

Thus in a free market individuals have the right (within the law) to purchase whatever treatments at whatever probability of success with whatever additional consequences they are willing to accept. An expensive treatment with an infinitesimal probability of success is the choice of the customer. This may be chosen over a less expensive higher probability of success treatment. The definitions of health, cost, and acceptable risk, are left to an informed discussion between a health service provider and the customer.

In establishing health administrative organizations HAO²⁶⁵, (public or private) funds are collected and administered for the provision of health services according to the agreement made when the funds were collected from the taxed/insured customer. HAOs all work to manage the variety of services demanded by the customers and the variety of services offered by the health professionals. In this circumstance, the HAO replaces the market as the mechanism that manages the variety between the customers and the service providers. In so doing, the HAO takes on many of the obligations that used to be managed by the invisible forces of the market place. At a minimum, this requires the collection and distribution of information so that buyers and sellers can find each other.

Given any broad definition of health, an extremely large variety of services could be expected by the customers of the system. Given scarce resources it is unreasonable to expect all service to be available in the quantity and quality that could be imagined as beneficial in the minds of the health service provider and the customer. The variety management system, if it is not a market, must establish an approach to constraining variety which is acceptable to the customers who pay for the administration and management of the system. This construction of the mechanism that will reduce the variety available to the customer requires the informed consent of the customer. Further, it must seek the informed consent of the professional health providers to ensure that the variety constraints to the provision of services do not violate the professional conduct requirements of the health professions.

If there were no scarcity of resources there would be no need for the HAO to reduce the variety of services available except in cases where protection of the public (policing and court) was necessary. In the situation where there was no resource scarcity the HAO would collect the additional resources from the

²⁶⁵Health Administrative Organization - **HAO** - This term invented to try to avoid using any existing abbreviation and so avoid any preconceived notions of what these organizations do well or don't do well. The term represents organization, public or private, who receive money to manage the health services of a specific group of people. In the USA, this would include HMOs etc and in Canada, this would include the Ministry of Health of each province. In some cases it might include RHAs however it is not clear the extent that RHAs have the freedom to choose their actions without political and administrative interference from the Ministry of Health or the Canadian Department of Health.

customers according to whatever contribution methodology was agreeable or in force between the HAO and the customer. New demands for service would result in new charges to the customer base and the HAO would simply process the claims, collect, and disperse the resources.

Given the HAO must work with scarcity then variety reduction requires that the agency manage the variety of services such that the maximum benefits are provided to the customers in accord with the payment agreement. However, because health utility is subjective and based upon personal values it is unreasonable for the HAO to assume that its values are the values of the customer. Therefore, the resource allocation methodology that manages the variety of the HAO system must allow the customers and the health professionals to participate in the variety reduction process. This will ensure that the variety reduction, which must include the issues of cost, quality and quantity that an acceptable balance is reached. Having struck the balance between cost, quantity and quality the HAO can provide the definition of the services included within the payment agreement so that customers may choose appropriate strategies²⁶⁶ to meet their needs which are not covered by the HAO.

If this level of transparency and participation is not available then there exists the risk that the values of the HAO will intrude into the decision making which has traditionally existed between the customer and the health professional. I.e. in the process of managing scarce resources the HAO will determine what quantity and quality of services (choices) may be provided to the customers.

In Canada, the notion of informed choice is essential in determining a resource allocation process which matches the values of the customer and their health professionals. This is particularly true because legislated health monopolies constrain the choices available to citizens and protect the monopolies from the consequences of poor decision making by providing protection from litigation. In this context the legal system cannot properly regulate (provide feedback) the contract between the service provider and the customer. Therefore the need for

²⁶⁶ These strategies could include anything from living a healthier lifestyle to purchasing additional insurance.

transparency is greater in systems where penalties to service providers are not practicable.

B.3.5 The Internet

*"Public policy must not be transfixed by technology, but it must be informed by it and might be transformed by it."*²⁶⁷

House of Commons Select Committee on Culture

Results from the CMA's 1999 Physician Resource Questionnaire (PRQ) point to a notable increase in the number of physicians who use the Internet, with the proportion rising from 56% in 1998 to 66% in 1999. Of those who do not yet log on, 42% indicated that they plan to do so in the coming year. ²⁶⁸

It is currently estimated that there are 800 million pages available²⁶⁹. The accelerating use of the Internet by individuals and organizations in general, the evolution of web based technology, and the growing number of pages available makes it unreasonable to discuss the Internet as a static technology. In general the growing use of the Internet by the public and health professions will likely result in several distinct areas of impact for the health system in general.

- Demands for a variety of service(s) not offered.
- The ability of clients to see the level of care provided by other service providers in their community and other communities and countries.
- Pressure for health professionals to be able to answer questions derived from appropriate and inappropriate web based information services.
- The use of web based chat groups to provide individuals and their families with information, guidance, and support.

²⁶⁷ House of Commons Select Committee on Culture, "The Multi-Media Revolution - Volume I", London: HMSO, 21 May 1998, Media and Sport Fourth Report, HC 520-I. <http://www.parliament.the-stationery-office.co.uk/pa/cm199798/cmselect/cmcmds/520-vol1/52002.htm>.

²⁶⁸ LOGGING ON IN RECORD NUMBERS, CMAJ: Canadian Medical Association Journal; Section: News and analysis Pulse November 30, 1999

²⁶⁹ Nature Magazine July 8, 1999.

- The use of web based information centers, which will assist health professionals in their searching and identification of treatment plans and current information. These will include traditional literature search capabilities, FAQs and "chat"
- The volume of health related web sites will grow dramatically.
- The volume of technical materials made available over the Internet by legitimate health information providers will grow.

Mittman and Cain (1999) estimated that in the USA by the year 2005 55 to 60% of households will have individuals within who have sufficient income to expect stronger consumer choice in health services, have computers to connect to the Internet and have at least one year of university education²⁷⁰. The implications of this population becoming a majority is that not only will these individuals have access to a variety of web based information resources they will have more sophisticated training and analytic capabilities with which to assess their situation and the services of their health provider.

Conclusion

The conclusion of this section is that significant demand will exist to use the Internet to facilitate the communication of information from and between professionals and between professionals and clients. However, the limiting factors associated with the development of useful health information management systems are primarily associated with the need to develop information management models and practice guidelines which have consequences to those individuals or organizations who would breach them. Consequential accountability for the protection of private information is essential. It is unreasonable to believe that health organizations will build privacy protection systems if there is no negative financial consequence to the individuals or the organization.

²⁷⁰ Changing population - "new consumers" there is a growing number of individuals and households which have the income the technical/analytic sophistication (education) and the access to computer/web based information. In the USA this population is expected to become the majority soon after the year 2000. Thus, there will be a distribution of traditional clients versus "new consumers".

B.3.6 Coordinating Information, Content and Opinion

"We have something for everyone."

P.T. Barnum

"Eighty-five percent of medical students think it is improper for politicians to accept gifts from lobbyists. Only 46 percent think it's improper for physicians to accept gifts from drug companies."

Dr. Ashley Wazana JAMA Vol. 283 No. 3, January 19, 2000

B.3.6.1 Introduction

Consistent with information economics, the consequence of information cost reduction is increased information availability. In addition, the short-term benefits of producing invalid and unreliable information increase. Consequently, there is a need to create mechanisms that manage the information and aid in directing it. The need to create information management frameworks for health and social service knowledge will intensify.

This increase of information will demand an organizational/systems structure which can process information more effectively and dynamically to changes in volume and content. I.e. not only will there be more messages the messages will require changes in behavior in order to optimize the benefits to be derived. Further, where a traditional market leaves the customer to acquire the necessary information needed to purchase a service and the market to offer services it believes clients desire, government operated health service systems will require a mechanism which incorporates the client, the health professional, the health service provider, and the government entity responsible. This is a more complex relationship than a traditional market because all persons who participate in the choosing within this system are subject to the politics²⁷¹ of scarcity and the mechanisms of human motivation. The consequence of this is the need to ensure that the mechanism of choosing is made clear to the participants and that those who choose are accountable for their contribution.

²⁷¹ The use of the term politics is not intended to refer exclusively to the science of government.

B.3.6.2 Public Access to Content²⁷²

The potential of new Internet and web technology greatly increases the pressure on decision-maker(s) “attention” because as the cost of communication and information drops the number of voices and the amount they have to say has dramatically increased. The open access to the Internet and web based pages will dramatically increase the availability of content – legitimate and illegitimate health and social “wellness” sources of information, opinion, misinformation, and misrepresentation. The access will increasingly provide passage to content with different perspectives which reveals the heterogeneity of the social milieu.

From an information perspective, the behavioral norms, which exist in different locations in the province, country, and world, provide local convention as a mechanism to support standards of behavior where information has been too expensive to acquire. Opening borders will add to the variety in terms of the heterogeneity of opinion provided in the content. For example, cultural bias might not be made clear in the opinions of the authors. Will a web based information gatherer in Prince George, British Columbia know that in Japan there is a cultural bias against organ transplants? Writing by Japanese authors will not likely provide the reader a sufficient cultural context to understand that in the recommendation of choices, the transplant choice would not be selected as often.

The flow of content to the public and the health professionals will increase the pressure upon the individual choice mechanism central to the informed consent provision of most health and social service professions. The extent that clients see the choices placed before them as arbitrary and less effective the greater the probability that there will be dissatisfaction with the system of services. At a time when cost control is seen through the vehicle of standardization, the problem of requisite variety will become central to the debate. How much variety must be maintained within the health system to satisfy the variety generated by the choices/beliefs of clients? To what extent is the system of services provided, prepared to disregard some of the variety desired by clients as “not appropriate”.

²⁷² The use of the word content is intended to convey volume without reference to quality. This is similar to the satellite/cable television statement 500 channels and nothing on worth watching.

This results in the famous question “What is an appropriate mechanism to address the tragedy of the commons?” (Hardin, 1968).

B.3.6.3 Attention and Information Standards

The volume and variety of information sources and opinion will grow. A sub set of this phenomenon is the actual growth in new health and determinants of health related research which is creating a tremendous pressure on the thoroughness/attention of health professionals. Managing the available information and developing approaches which accept the need that today’s practice standards will need to be able to be replaced quickly by tomorrow’s practice standards suggests a dynamic state which will require a different practice model for health information management. This new model must be designed to accept rapid changes in the “best practice” associated with new information or better integration of information for different disease/treatment categorizations. While cyclic patterns of change and stability will be taking place within each “domain/specialization/program/service”, the system will be filled with different domains/specialization/programs/services proceeding through their change cycles at different rates. This process will be made more difficult due to the interaction within and between the different domains/specialization/programs/services in the system and domains with the environment.

This will result in calls for standardization which can be used to consolidate the variety of references with a view of standardizing the information contained in data collection and reporting structures in an attempt to improve the quality of communication. Most attempts at such standardization fail as the true nature of the political preferences for different interpretations become revealed through the negotiation process. While benefits exist in finding an agreement to a common standard and these benefits can be cited by all parties, the allocation of costs and benefits associated with a specific standard are not equally distributed. While the possibility for winners and losers exists the machinations associated with the definition of standards will perpetuate the process.

B.3.6.4 The Standardization Paradox

The technical success of the establishment of standard classification for performance measurement is dependent upon the extent those involved can share

the same mental model with the initial codifiers and subsequent users of the data. It is essential to understand that once “fixed as the standard” the codifiers and users of the data will begin to adapt their interpretations to yield the most favorable consequences possible. Favorable can represent a variety of personal and organizational motivations. In the most desirable consequence codifiers struggle to better represent the problem they are working on, in the least desirable consequence the illustrative data is a fulcrum with which to leverage and thereby advance a special bias.

Performance measurement standards developed to better understand and document phenomena can be used to pervert its representation. This is most likely when independent verification is costly and motivations stretch beyond understanding the phenomena. Tragically, analysts process the numbers anyway because it is all they have to work with. See strategic planning.

B.3.6.5 Good Intentions and Decision Making

The evidence would suggest that individuals will vary in their ability to make decisions. It cannot be assumed that specialized training in specific fields of knowledge reduce the probability that decision making errors due to uncertainty, will be reduced. Further, it cannot be assumed that good intentions are the most appropriate guide to determine the quality of planning and execution delivered by an organization. The folk wisdom contained in the statement “The road to hell is paved with good intentions” is a reminder that there is a difference between what you wished would happen and what does happen. While the correlation of good intention and good outcomes has not been experimentally tested it is likely, given the number of planning failures we see, to assume a r^2 closer to 0 than to 1. This is the expectation of the Theory of Regression towards the Second Best.

If we assume good intentions to be a constant in the helping professions associated with health and social service then it may be safely eliminated from consideration²⁷³. What we have left is a statement of what will be accomplished by a program, the cost to achieve the stated accomplishments the assumptions

²⁷³ If this assumption is not supported then good intentions should be purchased separately.

associated with the endeavor and the measures which will confirm the accomplishments were delivered as agreed. At this point it is key to note the distinction between the information necessary to confirm delivery of the accomplishment to the buyer and the information needed by the contractor to control their process(es) and ensure negative feedback for quality control and future improvements.

B.3.6.6 Negative Feedback

The evidence would suggest that there is currently a great deal of variety in the practices and procedures used by programs. This finding would be consistent with contingency theory/equifinality. In some cases there is evidence of variety of accomplishments in outputs and outcomes from the different programs which intend to accomplish the same things. However, the performance measures used, the bounded relationships and differences between programs and their environments cannot necessarily assure us that the variety produced is not a function of other variables or the environment.

Much of the variety will include error. Difficulty in detecting patterns in behaviors and data are signal noise problems. How much variability is normal and how much is the result of a systemic fault. Can it be repaired without generating additional downstream ripples? The evidence indicates how difficult it is to minimize error in complex organizations and that errors can be generated by organizations that fail to identify and deliver the requisite variety.

Questions under a current system:

- What information should be available to minimize errors?
- What organizational/working conditions must be present to minimize errors?
- What skills and techniques must be employed to trap errors before they occur or in after they occur so that a negative feedback loop can be created for learning to minimize errors in the future?
- What model(s) of behavior must be present to allow the provision of service(s) without important negative feedback loops?

The evidence shows that within the medical system errors are made. It is also shown that most healthcare systems do a very poor job of identifying adverse events (Brennan 1991). If we assume that these errors are not intentional by any of the parties involved then understanding current practice in the identification of errors and their minimization through negative feedback is strategic.

B.3.6.7 Current (in place) Models of Decision Making

The current information status within an organization and its programs provide important insights about the management and decision models used within the organization. The data tracked and information used for decision making within an organization aids in the identification of decision points and persons responsible and accountable for decisions in the model in place. If information is not available within the current organization(s) this is also informative. For example, if information is not available to identify decision errors then these errors will not be detected. It is reasonable to believe that an organization that does not detect errors will not be able to adjust its behavior to minimize the consequences of those errors. Policy mechanisms of don't ask don't tell result in intentional organizational blindness and eliminate the ability to take corrective action.

To what extent will there be reason to trust the statements regarding the outcomes and outputs of any program if effective information procedures have not been established to identify "adverse events"? In complex environments how should incomplete representations of outputs and outcomes be interpreted?

For example, in 1991 the Harvard Medical Practice Study looked at adverse events resulting from medical management errors (Brennan 1991). The study was one of the first of its kind to estimate frequency of adverse events in the USA. There is no evidence of such study ever taking place in Canada. The finding was that of 2,671,863 patients discharged from the hospital there were 98,609 adverse events and 27,179 adverse events involving negligence. The adverse events due to negligence were markedly higher among the elderly. The general conclusion was that there is a substantial amount of injury to patients from medical management, and many of the injuries are the result of substandard care. Generalized to the population of the USA this would become approximately 180,000 USA citizens

dying each year from adverse events. If this death rate were the result of airline crashes the numbers would exceed one crash of a jumbo jet per day.

Possible conclusions when the current status of information and hence the management model of the organization is incomplete:

- The necessary information cannot be collected because sufficient knowledge does not exist to reduce uncertainty within pragmatic levels.
- The necessary information cannot be collected because sufficient resources do not exist to reduce uncertainty within pragmatic levels.
- Other constraints within the system eliminate the ability to use the information to take advantage of the reduction in uncertainty.
- The parties collecting/using the information misunderstand the actual impact of the data on the quality of decision making.
- The current information systems were established for alternative purposes and were never intended to be used for health related decision making. For example, systems were developed for accounting purposes so that billing to the insurance provider was effective and efficient. The accounting system was never intended to be used for feedback related to the quality of medical decision making.
- The current data collected and information produced makes current practices defensible and in the face of no other available data/information makes it unlikely that alternative interpretations using the available data are possible.

B.3.6.8 Investing in Information

The collection of information for appropriate feedback is constrained by the cost of information collection, validation, and interpretation. Information collection, validation, and interpretation compete for resources within the same environment that chooses between higher wages for staff, new medical equipment, and new services. The choice to collect information must be based upon the degree the information can improve the decision making by reducing uncertainty for the decision-maker to an extent where the reduction in uncertainty generates a

measurable and “important” performance improvement. Data is not necessarily information. The presence of data may confuse and misdirect the unsophisticated decision-maker. This identifies the slippery slope of performance measurement induced dysfunction.

Data collected must reduce uncertainty associated with a specified decision²⁷⁴ and be organized in such a way as to minimize or eliminate ad hoc excuses. This is because of the ability of data to be interpreted to reinforce selective²⁷⁵, biased²⁷⁶ and wishful²⁷⁷ thinking. Consequently, when budgets do not exist for the collection of valid and reliable data, and procedures do not exist for the use of that data to reduce decision-maker uncertainty in a way that is pragmatically useful then data should not be captured. Data collection, analysis and information management must be considered a program cost element that competes with other activities.

In the determination of benefits and costs of information, the long-term viability of the information and its infrastructure must be considered. For example, in an environment where rapid change in knowledge is taking place, the language used to describe events and observations and their underlying concepts is also changing. Investing in information systems that attempt to standardize the language will tend to fail until the knowledge development stabilizes. Information systems require the individuals that make the observations, analyze and interpret the data recorded to have a clear agreement about what the terms mean and that the definitions do not change.

The result of this notion is to develop an information investment strategy consistent with the expected return on the value added by the information to the accomplishment of the purpose of the program and/or organization. Large infrastructure investments which assume information is valid, reliable and stable have resulted in some painful learning experiences in the business sector where

²⁷⁴ This specification includes sample interpretations of the anticipated data that will be collected. These interpretations must include what data will indicate “good” and what data will indicate “bad”.

²⁷⁵ The process whereby an interpreter selects only favorable interpretations.

²⁷⁶ Intentional misinterpretation due to a preference for a specific interpretation.

data warehouses, and Enterprise Resource Planning (ERP)²⁷⁸ systems which were expected to be difficult but attainable projects, have resulted in failure in many cases. The failures are difficult to tally given the organizations must in most cases continue the implementation process once they begin. The cost information provided should be considered (weighted) within the complexity of the processes involved, the stability of the knowledge of the working units/programs, the uncertainty which will remain after the information has been provided, and the ability to mechanize (segment) production. The complexity of most large businesses is large, but when this is compared to health and social services the complexity of a billion dollar bakery company seem small in relative terms. The capital investment up front, the losses experienced during the initial working periods, the drop in quality during the first year, and the return on investment beginning after years, makes it difficult to imagine that a publicly funded enterprise could hold steady long enough to complete the experience.

B.3.6.9 Information Processing Capacity

The information issues and limits that are most central to the exegesis of the resource allocation problems in the health and social safety systems are tied to the mechanisms and limits of human decision making capabilities under conditions of uncertainty and the need to coordinate the competing uses of scarce resources. The challenge to address is how we structure our organizations/systems to process available information and hence make decisions as efficiently and effectively as

²⁷⁷ Interpretation according to what one would like to be the case rather than based upon the evidence. This may be unintentional.

²⁷⁸ Meta Group recently did a study looking at the Total Cost of Ownership (TCO) of ERP, including hardware, software, professional services, and internal staff costs. The TCO numbers include getting the software installed and the two years afterward, which is when the real costs of maintaining, upgrading and optimizing the system for your business are felt. Among the 63 companies surveyed—including small, medium and large companies in a range of industries—the average TCO was \$15 million (the highest was \$300 million and lowest was \$400,000). While it's hard to draw a solid number from that kind of a range of companies and ERP efforts, Meta came up with one statistic that proves that ERP is expensive no matter what kind of company is using it. The TCO for a "heads-down" user over that period was a staggering \$53,320. Corbett Note – this means a frequent user. Initial impact suggests the organization expect actual performance losses for the first 6 to 9 months. Benefits are expected after 31 months and average \$5,000,000 per year.

Excerpt from the Web Site of CIO Magazine Feb 2000 The ABCs of ERP
http://www.cio.com/forums/erp/edit/122299_erp.html

possible which satisfies the expectations of the clients and other participants in the system. This requires a mental model which allows the participants in the system to see the system as being responsive to the population, the professionals, the individual and collective client needs.

Appendix C: The Basic Value Sieve Inventory

A) The Service Delivery Organization

- 1) Mission Of Your Organization
- 2) Objectives Of This Project Being Proposed
- 3) Which Client or Patient groups represent the concerns of your clients or patients
- 4) Which Professional Groups and Unions do the project staff belong to?
- 5) Which Other Ministries, Agencies or Service Delivery Organizations Do You Work With
- 6) How many community health council areas do your clients come from?
- 7) What other organizations are providing funding to you for this service?
- 8) What Other projects are you operating at this time?

B) The Health Of The Customer

- 1) Clients or Patients Being Addressed By Project.
 - Types of health problems?
 - Geographic base of clients or patients?
 - What client or patient groups will they belong to?
- 2) Benefits To The Region Resulting From This Program
 - health benefits to the client or patient
 - benefits to the family of the client or patient
 - benefits to other programs
 - benefits to other individuals in the health system
- 3) Customer Selection and Screening Methodology
 - How do clients enter the project
 - What measurements are required to allow a client to enter your program
 - What measurements are taken to ensure that the clients are appropriate for your service
 - What measurements are taken to screen out clients are not appropriate for your service
 - Where are rejected clients sent
 - How do you ensure that your process does not simply "cream" the easiest to treat clients out of the population.

4) Client Service

- What services are provided to the client
- How do you determine this is what the client wants
- How do you determine this is what the client needs
- How do you determine that treatment was successful
- How do you determine treatment was not successful
- How do you determine when to stop treatment
- When you have successfully completed treatment, where does the client go
- If your treatment has been unsuccessful, where does the client go

5) Research Support

- What specific health care literature or research findings support this approach to the client
- Are there specific examples of organizations offering the same service?

6) Health Protocols (Best Practice Protocols)

- Do health protocols exist for this service or treatment?
- Who are the protocols prepared by?
- Do you intend to have prepare your own protocols?

C) Project Outcomes And Measurement

1) Project Outcomes

- How do you suggest the project measure the quantitative and qualitative benefit to the client in the short term and long term.
- What data should be collected to demonstrate your program improves the health of your clients and or patients in the short term and long term.
- How do you suggest the project measure client satisfaction in the short term and long term.
- How do you suggest the project measure the quantitative and qualitative benefit to the community in the short term and long term.

2) Program Evaluation

- show the type of data which would demonstrate your work was successful.
- show the type of data which would demonstrate your work was not successful.
- How do you propose the results of your work to be evaluated.

3) Related Effects

- Within The Context Of Outcomes, how does this project fit in to the other health related projects in the region.

- What positive changes in other projects or other social service organization programs would affect the outcomes of this project.
- What negative changes in other projects or other social service organization programs would affect the outcomes of this project.
- If your program fails to deliver the outcomes you predict what effect will there be on other health delivery organizations.

D) Project Resource Requirements

1) Basic Resources

- What is the project resource requirement required to achieve your predicted results?
- What is the minimum funding necessary to provide services to the first client?
- What is the cost per client served after the first?

2) Resource Level Variations

- If this project was funded at the 85% level how would this affect the project outcomes.
- If this project was funded at the 115% level how would this affect the project outcomes.
- How do you plan to deal with staffing turnover?

3) Training and Education

- To carryout this program do the staff involved require any training

4) Related Considerations

- What other charitable or social service organizations provide direct support to your proposed clients?
- What other projects must be funded to ensure that your project meets or exceeds its predicted outcomes.

E) Staffing Evaluation

1) Direct Program Staff

- How do you propose to evaluate the program staff
- How do you propose the performance of the manager to be evaluated.

2) Indirect Program Staff

- How do you propose we evaluate your experience working with the Regional Health Board and staff?

- How do you propose we evaluate your experience working with the Ministry of Health staff?

F) Related Program Evaluation

- How do you propose we include an ability for you to participate in evaluating other organizations which affect your ability to succeed in providing positive health outcomes for your clients or patients?
- How do you propose we include an ability for others to participate in evaluating your organizations' effect on their ability to succeed in providing positive health outcomes for their clients or patients?

Appendix D: BC Health Technology Assessment: Executive Summary: An appraisal of existing cholesterol testing guidelines²⁷⁹

The Working Agreement between the BC Government, the BC Medical Services Commission (MSC) and the BC Medical Association (BCMA) for 1992-1997 recognized the need to control the MSC Total Claims costs²⁸⁰. It was anticipated that savings of about \$130 million to the fee-for-service budget would be achieved through the development and implementation of clinical practice guidelines. In 1994, the BC Council on Clinical Practice Guidelines was established with the mandate of developing and implementing these practice guidelines. The Council's role was to rely on previous work done throughout the world, not to develop practice guidelines "de novo". The Council commissioned the BC Office of Health Technology Assessment (BCOHTA) to identify and appraise existing clinical practice guidelines (CPGs). One of the topics selected was the appraisal of existing cholesterol testing CPGs for the adult population.

This report presents the results of the appraisal of selected cholesterol testing guidelines provided to the BC Council on Clinical Practice Guidelines in 1995. The aim of the appraisal was to review and evaluate the process used in developing selected cholesterol testing guidelines and to determine the extent to which these existing guidelines were "evidence-based". The results of the appraisal were presented to the Cholesterol Panel of the BC Council on Clinical Practice Guidelines as part of its guidelines development process.

For the purpose of this report, cholesterol testing refers to the broader range of lipid tests that are considered in the current testing guidelines. It therefore includes a discussion of total cholesterol but also of the HDL, LDL, triglycerides, Lp(a), Apo A, Apo B and fibrinogen tests.

²⁷⁹ SUPPORTING CLINICAL PRACTICE GUIDELINES DEVELOPMENT: An appraisal of existing cholesterol testing guidelines, BCOHTA 97:12D, BC Office of Health Technology Assessment Centre for Health Services and Policy Research, August 1997

In order to first identify existing cholesterol testing guidelines, a systematic search of the published and unpublished literature was conducted. Seventeen guidelines from various associations, governments and research bodies were uncovered. The discrepancy among the recommendations formulated by these groups was impressive. The recommendations differed in terms of the populations to be tested, the tests to be used, and the frequency of testing.

For example, the US National Cholesterol Education Programs (NCEP)²⁸¹ recommended that all adults aged 20 to 65 have their total cholesterol and HDL-cholesterol tested every two to five years. The Canadian Task Force on Periodic Health Examination (CTFPE)²⁸² concluded that all men aged 30-59 who present themselves to their physician's office for any reason should have their total cholesterol measured every 5 years. On the other hand, the Effective Health Care Research Team (EHCRT) in the UK²⁸³ concluded that cholesterol screening of the general population should be actively discouraged, as it will not make a contribution to lowering overall mortality.

To understand the origins of these wide discrepancies and to evaluate the extent to which existing cholesterol testing CPGs were evidence-based, BCOHTA used a set of 15 appraisal criteria, pertaining to clinical practice guidelines, derived from

²⁸⁰ British Columbia Medical Services Commission, British Columbia Medical Association. Working Agreement between the Government of British Columbia, the Medical Services Commission and the British Columbia Medical Association. [Vancouver, BC]: [British Columbia Medical Association]; 1993.

²⁸¹ Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults. Summary of the Second report of the National Cholesterol Education Program (NCEP) Expert Treatment Panel II. *Circulation* 1994 Mar; 89(3):1333-1445.

²⁸² Logan AG. Lowering the blood total cholesterol level to prevent coronary heart disease. In: Canadian Task Force on Periodic Health Examination. Canadian guide to preventive health. Ottawa: Canada Communication Group; 1994. p. 651-669.

²⁸³ Nuffield Institute for Health. Cholesterol: screening and treatment. *Effective Health* 1993 June;(6): 2-8.

work done by the Institute of Medicine and the Agency for Health Care Policy and Research.^{284, 285}

The criteria were answered by “Yes/No-Describe” or “Discussed/Not Discussed”. To meet the criteria, the information needed to be clearly provided in the documents. No assumptions or inferences were drawn based on the name, status, or reputation of the authors or supporting organizations.

Two researchers independently appraised each guideline. The researchers had expertise in critical appraisal, epidemiology, medicine, anthropology, and economics. The researchers were not blinded as to authors or organizations. Differences occurring between the researchers were resolved by obtaining additional information from the relevant guidelines development group.

Participants from various guidelines development groups were also asked to review the appraisal of their respective guidelines. The purpose was: i) to ensure the accuracy of the appraisal; and, ii) to ensure that all relevant background information had been considered. BCOHTA concluded that the EHCRT guidelines were the only guidelines in which the recommendations were internally congruent with the research evidence. Problems in linking the research evidence to the recommendations appeared to be a major weakness in the development process of most guidelines, as many of the groups’ recommendations were actually in contradiction to their own conclusions on the evidence.

If strong links had been maintained between the groups’ own conclusions on the evidence and their recommendations, cholesterol testing would have been recommended only in symptomatic men 35 to 69 years of age and symptomatic post-menopausal women. Testing would not have been recommended in asymptomatic men and women, with or without risk factors, nor in symptomatic women.

²⁸⁴ Field MJ, Lohr KN, editors. Clinical practice guidelines: direction for a new program. Washington, DC: Committee to Advise the Public Health Service on Clinical Practice Guidelines, Institute of Medicine, National Academy Press; 1990.

²⁸⁵ Hadorn DC, Baker D. Development of AHCPR-sponsored heart failure guideline: methodologic and procedural issues. *J Qual Improvement* 1994;20(10):539-47.

In comparison, the testing guidelines formulated by the NCEP, CTFPHE, Health Services Utilization and Research Commission (HSURC), and the Canadian Working Group (CWG) recommend that all middle-age men be tested.^{286, 287, 288, 289, 290} HSURC, CWG and NCEP also recommended that all women be tested.^{291, 292, 293} The implications are significant. It was estimated that implementation of the NCEP recommendations in Canada would cost about half a billion dollars annually.²⁹⁴ This did not include the cost of treatment.

The wide discrepancy among the recommendations formulated by the groups seemed also due to differences in the included research evidence, differences in the interpretation of the research evidence in the absence of appraisal, and differences in the scope of the research evidence reviewed.

²⁸⁶ Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults. Summary of the Second report of the National Cholesterol Education Program (NCEP) Expert Treatment Panel II. *Circulation* 1994 Mar; 89(3):1333-1445.

²⁸⁷ Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults. Summary of the Second report of the National Cholesterol Education Program (NCEP) Expert Treatment Panel II. *Circulation* 1994 Mar; 89(3):1333-1445.

²⁸⁸ Nuffield Institute for Health. Cholesterol: screening and treatment. *Effective Health* 1993 June;(6):2-8.

²⁸⁹ Health Services Utilization and Research Commission. Cholesterol Testing and Treatment Guidelines. Saskatoon, SK The Commission, November 1995.

²⁹⁰ The Canadian Working Group on Hypercholesterolemia and Other Dyslipidemias. Detection and management of hypercholesterolemia. Ottawa, ON: University of Ottawa Heart Institute; 1995.

²⁹¹ Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults. Summary of the Second report of the National Cholesterol Education Program (NCEP) Expert Treatment Panel II. *Circulation* 1994 Mar; 89(3):1333-1445.

²⁹² Health Services Utilization and Research Commission. Cholesterol Testing and Treatment Guidelines. Saskatoon, SK The Commission, November 1995.

²⁹³ The Canadian Working Group on Hypercholesterolemia and Other Dyslipidemias. Detection and management of hypercholesterolemia. Ottawa, ON: University of Ottawa Heart Institute; 1995.

²⁹⁴ Grover SA, Coupal L, Fahkry R, Suissa S. Screening for hypercholesterolemia among Canadians: How much will it cost? [published erratum appears in *Can Med Assoc J* 1991;144(5):545]. *Can Med Assoc J* 1991;144(2):161-8.

Overall, the poor validity of existing cholesterol testing guidelines suggests that the decision to endorse and further disseminate existing guidelines should only be made after the internal validity of a guideline has been rigorously assessed.

Appendix E: Evidence Based Care Commentary By McMaster Health Sciences

A new paradigm for medical practice is emerging. Evidence-based medicine de-emphasizes intuition, unsystematic clinical experience, and pathophysiologic rationale as sufficient grounds for clinical decision-making, and stresses the examination of evidence from clinical research. Evidence-based medicine requires new skills of the physician, including efficient literature-searching, and the application of formal rules of evidence in evaluating the clinical literature. The influence of evidence-based medicine on clinical practice and medical education is increasing. McMasters University Faculty of Health Sciences, Evidenced Based Medicine Group public web page (January 22, 1999 – note link is no longer available) <http://hiru.mcmaster.ca/ebm/overview.htm#Contents>

The proof of the pudding of evidence-based medicine lies in whether patients cared for in this fashion enjoy better health. This proof is no more achievable for the new paradigm than it is for the old, for no long-term randomized trials of traditional and evidence-based medical education are likely to be carried out. What we do have are a number of short-term studies which confirm that the skills of evidence-based medicine can be taught to medical students [449] and medical residents [753]. In addition, a study compared the graduates a medical school that operates under the new paradigm (McMaster) to graduates of a traditional school. A random sample of McMaster graduates who had chosen careers in family medicine were more knowledgeable with respect to current therapeutic guidelines in the treatment of hypertension than were the graduates of the traditional school [3841]. These results suggest that the teaching of evidence-based medicine may help graduates stay up to date. Further evaluation of the evidence-based medicine approach is necessary.

Our advocating evidence-based medicine in the absence of definitive evidence of its superiority in improving patient outcomes may appear to be an internal contradiction. As has been pointed out, however, evidence-based medicine does not advocate a rejection of all innovations in the absence of definitive evidence. When definitive evidence is not available, one must fall back on weaker evidence (such as the comparison of graduates of two medical schools which use different

approaches cited above), and on biologic rationale. The rationale in this case is that physicians who are up-to-date as a function of their ability to read the current literature critically, and are able to distinguish strong from weaker evidence are likely to be more judicious in the therapy they recommend. Physicians who understand the properties of diagnostic tests and are able to use a quantitative approach to those tests are likely to make more accurate diagnoses. While this rationale appears compelling to us, compelling rationales have often proved misleading. Until more definitive evidence is adduced, adoption of evidence-based medicine should appropriately be restricted to three groups. One group is those who find the rationale compelling, and thus believe that use of the evidence-based medicine approach is likely to improve clinical care. A second group is those who have the energy, enthusiasm, and resources to test evidence-based medicine in educational trials. A final group include those who, while sceptical of improvements in patient outcome, believe it is very unlikely that deterioration in care results from the evidence-based approach and who find that the practice of medicine in the new paradigm is more exciting and fun. McMasters University Faculty of Health Sciences, Evidenced Based Medicine Group public web page January 22, 1999 <http://hiru.mcmaster.ca/ebm/overview.htm#Contents>

Appendix F: A National Health Data Base²⁹⁵

The National Forum on Health, a panel of health experts, was established by the Prime Minister in 1994 to "involve and inform" Canadians about health care issues. The Forum was also to advise the federal government on ways to improve Canadians' health and the health care system. Among the Forum's recommendations in its 1997 final report, *Canada Health Action: Building on the Legacy*, are several on the need for better information or "appropriate, balanced and high-quality evidence" to improve health care decisions. In the terminology of the profession, this is "evidence-based" medicine.

Specifically, the Forum recommends exploring the role information technology could play in setting up a national health data network. The 1997 federal budget set aside \$50 million for a Canadian Health Information System to include a national health surveillance network, a population health clearinghouse and a First Nations health information system.

The Forum also proposes that provincial and territorial agencies develop and maintain a standardized set of longitudinal data to chart changes in individuals' health status over time.

And, finally, the Forum suggests that collecting and integrating all Canadians' health data is not enough; a person's health is influenced by a number of factors, many of them non-medical. Thus, the forum is interested in studying the relationship between health and social status, and how social and economic factors such as poverty, unemployment and cuts in social support affect individual's health. The Forum advocates linking clinical and administrative health data with such non-medical information as income, employment and educational status. However, it wishes to exempt health research from the normal obligations of privacy laws such as obtaining the patients' consent for use of their

²⁹⁵ The Privacy Commissioner of Canada, Annual Report, 1996-97
<http://infoweb.magi.com/~privcan/>

personal information, destruction of the data on approved schedules, and obtaining the patient's authorization for further disclosures.

In summary, the Forum's recommendations foster an accelerated government drive for access to patient information in the hope of better controlling and managing the delivery of health care services. The recommendations also advance the notion that the research community should have access to the records of the entire Canadian population, yet should be exempt from privacy laws governing access to, and use of, that data. And, finally, in the interests of efficient care and research, it further proposes to computerize all these files to improve the flow of information across all jurisdictions.

While we cannot assess the claimed superiority of evidence-based medicine, we can say that adopting an evidence-based system is potentially one of the most significant privacy issues of the decade for Canadians. It represents a revolution in the way health information is collected, disseminated and used because it relies on state-of-the-art information technology to integrate information from all health sectors for example, doctors, hospitals and pharmacists. It also envisages amalgamating health information with socio-economic data such as education and income. And it recommends that not just health care providers, but all health administrators and policy makers, have access to the information to make decisions about health care. Information about specific individuals, not aggregate data, is one of the key requirements for developing such a system²⁹⁶.

It is hard to argue with any proposal to make better-informed health care decisions. Privacy advocates want effective health care as much the next Canadian. We also recognize that broader research may enhance our understanding of the factors affecting our health and improve delivery of health services.

²⁹⁶ This paragraph was quoted in this dissertation. A larger section of the document is provided here to ensure that the reader can gain full context of the paper.

However, using personal health information to foster an improved health care system is not a purely a win-win scenario. The Forum's proposals pose significant challenges to the privacy of Canadians' medical records the right to protect the confidentiality of that personal information, and the right to be informed of, and consent to, all other uses of that information. The prospect of greatly expanded collection and sharing of personal medical information sets privacy alarms ringing.

Traditionally privacy laws and medical ethics have allowed only those directly involved in patient care to have access to patient medical records. Medical ethics and legal prohibitions exact a high standard of care and protection for the confidentiality of medical records. With few exceptions, the right to control the flow of one's personal medical information rests with the patient, not the physician, nor the hospital, nor the state.

An information network to support evidence-based health care would turn that important centuries-old rule on its head. Medical records, currently accessible to patients and a limited number of others, could no longer be said to be confidential when hundreds of strangers can access them electronically.

The experience south of our border merits mention. American law professors Paul Schwartz and Joel Reidenberg cite an observation in a U.S. medical journal that "medicine is increasingly a spectator sport." Say Schwartz and Reidenberg, "A widening audience of outside observers now watch the performance of doctors, nurses and patients, and personal data plays a critical role in the evaluation of their behaviour."

Canadians may argue that our health care system is different that the strong government component in our health care system makes the information in the system less vulnerable to abuse. We argue that it is precisely because the state has such an important role in delivering health care that there must be mechanisms for the individual to counter that power and exert some control. While Canadians tend to view government as largely benign, that should not mean abdicating individual consent and responsibility.

As well, our system is becoming increasingly privatized; services such as home care, speech pathology and various types of testing are now performed by private companies. And now with the advent of drug plans, pharmacies (which have always been private) deal frequently with private insurance companies and do so increasingly on-line. We will see the same pressures that now exist in the U.S. to use medical information for purposes that have nothing to do with the health of the patient or even the good of society. Personal health information will become an ever more valuable commodity in the data marketplace.

Canada must not seize upon evidence-based health as a medical nirvana without sober reflection on the impact this massive assembly of personal information health and other may have on our privacy and autonomy.

Some Canadians may not object to substantially diminishing the confidentiality of their medical records. But the freedom to decide whether to participate in such a wide-ranging scheme is an essential component of privacy protection and democracy, and must be preserved. To protect those who object, any health network must allow individuals to prevent their medical information from being stored and accessible on this network. And people who choose not to participate should not be penalized by receiving a lesser standard of health care.

It is essential to get a grip on the issues involved in preserving the privacy of health care information. Among the measures we propose are the following:

- Enact complementary federal and provincial legislation to protect the privacy of the full range of personally identifiable health care information. The legislation would incorporate the fair information principles of international data protection agreements. This must be done before the health network develops further.
- Establish clear requirements for obtaining the informed consent of patients to disclosures of personal information. In the absence of informed consent, an individual's right to control the disclosure of personal medical information should be paramount. That right should be overruled only in the face of an overwhelming and compelling public interest (or to provide the patient emergency care).

Conducting research does not always constitute an overwhelming or compelling public interest.

- Establish strict limits and controls on the circumstances under which access to personally-identifiable information is granted to secondary users for research purposes and encourage the conduct of research through the use of aggregate, de-personalized data.
- Establish strong remedies in law for disclosing information without a patient's consent.
- Educate patients about how their records are used and the privacy implications of having their medical records computerized and placed on a national network.
- Develop guidelines to address the privacy and security issues raised by the computerization of patient data, including provisions for full audit and control.
- Establish an independent review mechanism to oversee the privacy of health care information.

If medical records are linked to employment, educational and other socioeconomic databases, they would reveal not just medical information but whole life histories. For the medical community, this may be the point. But, easy as it is to rationalize data gathering as beneficial for the individual and society, the information might not be used for benevolent purposes. The collection of medical data can slide imperceptibly from health care to medical supervision to lifestyle surveillance and, ultimately, to a more generalized form of surveillance by the state.

For this reason, it is critically important that we examine how to prevent further secondary uses of this information, such as by law enforcement agencies, employers and private individuals (such widespread uses are almost the norm in the United States). The purpose of those databases must be limited to advancing health care, and nothing else. They must not be allowed to become a convenient means for government agencies and private businesses to conduct non-medical surveillance of citizens who are simply making use of an essential service.

Of course, there is a balance of interests to be weighed between the two poles of better personal and societal health, and individual autonomy. And we

acknowledge the potential beneficial uses of health information and the importance of research. There are important differences between using personal data and aggregate data, stripped of personal identifiers. But we insist that protecting the privacy and confidentiality of individual health information is also critical to open communication between medical personnel and patient, and patients' trust in the system. Protecting privacy deserves as high a priority as improving health systems.

The Final Report of the National Forum on Health recognizes the importance of privacy in developing a national health information system. And the federal health department intends to address privacy in its planning of such a system and we hope to assist this critical work. But a Canadian health information system could either stand or fall on the extent to which it incorporates privacy, patient autonomy and informed consent. How well privacy fares in the development of this system may well determine whether the public will be willing participants or will mount the barricades to protest against the extraordinary level of surveillance it makes possible.

We look forward to legislative guarantees that the system will protect rather than jeopardize individual health information.

Correction: Last year's annual report expressed concern about the lack of legal protection for data in a national longitudinal health survey being conducted by the Canadian Institute for Health Information. In fact, the survey is being conducted by Statistics Canada under the authority (and protection) of the Statistics Act. We apologize for the error.

Appendix G: Health Resource Allocation Knowledge Requirements

Sufficient Resource	Sufficient Health
<p>If there are sufficient resources and there is sufficient health then nothing must be done. However, given the world is changing, a methodology of knowing how to continue to maintain this perfect balance is necessary. The possibility of disagreement requires that we consider the alternative conditions so that we may know when we are over or under resourced for health. The alternative is also true, we must know when we are too health or unhealthy for the resources that are provided</p>	
Insufficiency of Resource	Sufficiency of Health
<p>This can only happen when a party involved in the delivery of health care believes that they are not being compensated fairly</p>	
<ul style="list-style-type: none"> ▪ What is sufficient compensation for a person working in the health system. 	<p>4. Is it the case that one party is over compensated leaving another under compensated</p>
<ul style="list-style-type: none"> ▪ If there is a relationship between resources and health to what extent does fairness require that health in the population be reduced through the discontinuation of some services so that the remaining persons are fairly compensated? 	<p>5. If there are not sufficient resources to provide sufficient compensation then how will additional resources be identified and acquired</p>
<ul style="list-style-type: none"> ▪ Which individuals deliver the least health for the resources they require? 	<p>6. What are the barriers to removing parties in the health care system?</p>
Sufficiency of Resources	Insufficiency of Health
<p>For this condition to be possible one or more parties are receiving too much resource. Or one or more parties must be using their resources without delivering the full potential of health possible. In the first case this also means that some parties are not receiving sufficient resources to meet the health needs of their clients.</p>	
<ul style="list-style-type: none"> ▪ What is insufficient health? 	<ul style="list-style-type: none"> ▪ Where are the health insufficiencies.?
<ul style="list-style-type: none"> ▪ How will we know when health is sufficient in each area? 	<ul style="list-style-type: none"> ▪ Which health insufficiencies should we address first.?
<ul style="list-style-type: none"> ▪ In an area which is over resourced, how much resource can be removed before there will be insufficient health? 	<ul style="list-style-type: none"> ▪ If needs are not being met, then an area must be over resourced. Where is the over resourced area?
<ul style="list-style-type: none"> ▪ How long should we allow health insufficiencies to stand while over resources are identified and moved. 	<ul style="list-style-type: none"> ▪ What are the barriers to moving resources in the health care system?
Insufficiency of Resource	Insufficiency of Health
<p>For this condition to be possible would require that all resources are allocated properly but there is insufficient resource to meet the health sufficiency requirements. It is possible that some efforts are over resourced and some are under resourced. It is possible that some programs deliver too much health while others deliver too little.</p>	
<ul style="list-style-type: none"> ▪ how do we know there are not sufficient resources 	<ul style="list-style-type: none"> ▪ how do we know there is not sufficient health
<ul style="list-style-type: none"> ▪ if there are not sufficient resources how would additional resources be identified and acquired 	<ul style="list-style-type: none"> ▪ if there are not sufficient health how would additional health opportunities be identified and delivered?
<ul style="list-style-type: none"> ▪ Does the current level of resource buy the most health possible or can more health be acquired by shifting the existing resources. 	<ul style="list-style-type: none"> ▪ Can the small reduction of health in one area result in a larger amount of health in a different area?
<ul style="list-style-type: none"> ▪ on what basis will we determine need? 	<ul style="list-style-type: none"> ▪ how would we define what is fair?
<ul style="list-style-type: none"> ▪ on what basis will we determine one need is greater than another? 	<ul style="list-style-type: none"> ▪ To what extent do we consider the needs of the service providers?
<ul style="list-style-type: none"> ▪ what is the relationship between individual health and population health? 	<ul style="list-style-type: none"> ▪ How much resource do we need to acquire the correct amount of health?

Appendix H: CVIR MCF Version of the Inventory²⁹⁷

Part I - Describe Your Organization

The purpose of this section is to assist us in gaining a better understanding of your organization.

The Organization

- What is the mission of your organization?
- What is the philosophy of your organization?
- How many full-time staff and part time staff work for your organization?
- How many volunteers work for your organization?
- What specific populations/groups does your organization serve?
- Are there independent associations or local interest groups which independently represent the interests and concerns of the persons served by your organization?
- Which Professional Associations and Unions do your staff belong to?
- Which other Ministries, associations, agencies, or other organizations do you work with?
- Which geographic communities does you serve?
- What other organizations are providing funding to your organization?
- Date of Incorporation (if applicable)
- What other services is your organization operating at this time? Please provide the following information on each service.

Contact

Person: _____

Contracting

Organization: _____

²⁹⁷ Corbett, June 1997 Gold Standard Questionnaire CVIR Project

Address:

General Purpose Of Program:

Part II - Service Description

This section is intended to gain information about a specific service, the persons who will be served, and their communities.

(Date of first Contract: _____ / ____ / ____)

Service Name: _____ Contract # _____

Contact Person: _____ Position: _____

Phone: _____ Fax: _____ Email: _____

A) The Service And Its Relationship Within The Region

- What are the objectives of the service ?
- Which other Ministries, associations, agencies, or activity provider organizations does the program team work with?
- What other organizations provide similar services within the region?
- What other organizations provide related services to the persons served?

- What other organizations are providing funding to the organization for this service?
- How does this service relate to other services the organization is operating at this time?

B) The Healthy Development Of The Person Served (client)

1) Persons Being Addressed By The Service.

- Types of problems/issues of the persons served?
- Demographics of the persons served?
- Regional geographic base of the persons served?
- What independent associations or local interest groups represent the interests and concerns of the persons served.?

2) Person Served Selection and Screening Methodology

- How many persons do you estimate are presently in need of the service in the geographic areas you serve?
- How are persons referred?
- What criteria are required to allow a person to enter your service?
- What measurements are taken to ensure that the persons are appropriate?
- What measurements are taken to screen out persons who are not appropriate:?
- Where are rejected persons sent?
- How do you ensure that your selection process does not simply "select" the easiest to serve persons out of the population.?

3) Activities Provided Within The Service

- What activities are provided to the persons served?
- How do you determine this is what the person served wants?
- How do you determine this is what the person served needs?
- How do you determine that an activity was successful?
- How do you determine an activity was not successful?
- How do you determine when to stop providing an activity?

- When you have successfully completed providing activity to a person, what happens next. For example where does the person go?
- If your activity has been unsuccessful, what happens next. For example where does the person go?

4) Activity Protocols (Best Practice Protocols)

- Do protocols exist for the activities?
- (A protocol is a standardized and documented sequences of steps which guide the actions of the staff person as they work through an activity with a person served).
- Who were the protocols prepared by?
- If you have no protocols, do you intend to prepare protocols in the future?

5) Resulting Benefits To The Person, The Family And The Region

- healthy development benefits to the person served?
- benefits to the family of the person served?
- benefits to other individuals in the region?
- benefits to other projects in the region?
- benefits to other organizations and or Ministries?

6) Research Supporting The Program/Service Approach

- What are the foundations of practice and or philosophical underpinnings to the approach being taken?
- Are there specific examples of organizations offering similar services? In Canada, or elsewhere in the world?
- What specific professional literature or research findings support this approach to the person served?

C) Outcomes And Evaluation

1) Current Outcomes Measurement

- How does your service presently demonstrate it's quantitative and qualitative benefits to the persons served and the region?

- How does your service presently measure the satisfaction of the person served?

2) Future Outcomes Measurement

- What additional data could/should you use to demonstrate the quantitative and qualitative benefits to the persons served in the short term and long term?
- What additional data could/should you use to demonstrate the quantitative and qualitative benefits to the community and or region in the short term and long term?
- What do you believe are the key barriers to developing better outcomes measurement and evaluation for your service?

3) Evaluation:

- What data can/will be used to demonstrate your service was successful?
- What data can/will be used to demonstrate your service was not successful?
- How do you propose the results of your service be evaluated?

4) Relationship To Others

- Within the context of outcomes, how does your service fit in to the other social/health related services in the region?
- What changes in other services or other social/health organization services would positively affect your service outcomes?
- What changes in other services or other social/health organizations would negatively affect your service outcomes?
- If your service fails to deliver the outcomes you predict what effect will there be on other social/health delivery services and organizations?

D) Project Resource Requirements

1) Basic Resources

- What resources do you require to achieve your predicted outcomes?

- What is the minimum funding necessary to provide services to the first person served?
- What is the cost per person served after the first?

2) Resource Level Variations

- If your service was funded at the 85% level how would this affect the project outcomes?
- If your service was funded at the 115% level how would this affect the project outcomes?

3) Training, Education and Professional Affiliation

- To carryout your service do the staff involved require specialized training?
- How do you deal with staffing turnover?
- Which professional associations do the project staff belong to?
- Which unions do the staff belong to?

4) Related Considerations

- What other charitable or social organizations provide direct support to your persons served?
- What other services must be funded to ensure that your service meets or exceeds its predicted outcomes?

E) Staffing and Project Support Evaluation

1) Program/Service Staff

How do you evaluate your staff?

How do you evaluate the performance of the manager?

2) Program/Service Support

How do you propose we evaluate your experience working with the Regional office and staff?

How do you propose we evaluate your experience working with the Ministry staff?

F) Related Evaluation

- How do you propose we include an ability for you to participate in evaluating other organizations which have an impact upon the service's ability to succeed in providing positive healthy development outcomes for the persons served?
- How do you propose we include an ability for others to participate in evaluating your organization's impact on their ability to succeed in providing positive healthy development outcomes for the persons served?

G) Addition Comments

- Please provide any additional comments or insights you feel will be helpful in further describing your program/service.

Appendix I: Bridging Solitudes Article

Bridging Solitudes - Implementing A Regional Health Information System Which Supports Strategic Planning and Resource Allocation Within A Determinants of Health Philosophy

Christopher Corbett, Ron Duffell, Denis Protti

University of Victoria

Victoria, BC, Canada

Abstract

The factors that have an impact on the health of a population are commonly referred to as the determinants of health. Regional organizations providing services related to these health determining factors, (such as education, medical care, health promotion, or social support programs) have no information infrastructure to share information across organizational boundaries. Consequently, these organizations prepare and deliver programs based upon an incomplete understanding of the past and current actions of others and the full range of information, which exists. From a regional determinants of health perspective there is a need to develop an information infrastructure, which allows independent organizations to coordinate their efforts within a regional resource allocation and strategic planning cycle.

Our paper describes the implementation strategy, steps and experiences of a regional management team implementing a web based regional information system capable of supporting a resource allocation process integrated with strategic planning and contract reform. The system although initially conceived and spearheaded by a single regional office rapidly gained the cooperation and support of other key government and non-profit organizations concerned with improving the population's health within a geographic region. The result is a reduction of boundaries between independent organizations and the bridging of

former solitudes through the provision of pertinent determinants of health information.

Introduction

In November 1996 the Government of British Columbia created a new Provincial administration known as the Ministry for Children and Families (MCF). The organization was created to address concerns and recommendations relating to the administration, coordination and quality of services provided to children by provincial Ministries. The new Ministry consolidated control of programs for children that had formerly been offered through a number of independent government Ministries. This included programs from the Attorney General, Health, Social Services, and others.

The task for MCF was to "green-start" a new administrative structure which could efficiently and effectively take control of existing independent programs which were being offered by other ministries. Like Frankenstein's Monster the starting point for MCF was as an enterprise constituted from the components of other entities. Instead of stitches, the MCF was held together by a budget and a mission statement. The mission statement of the MCF provides a clear overview of the mandate: " The Ministry for Children and Families must ensure a child centered, integrated approach that promotes and protects the healthy development of children and youth while recognizing their lifelong attachment to family and community. Communities and clients must be an integral part of the work of the Ministry. Quality assurance, accountability and openness are fundamental to its success."

The MCF provincial administration divided the province into twenty Regional Operating Authorities (ROAs) which would administer, coordinate and revise programs and services at the community level. This paper describes the efforts of a single ROA, the Central Vancouver Island Regional Operating Administration, (CVI-ROA) in operationalizing the mission statement.

Influences On Health and Social Service Information Systems

There are four major influences which are having an impact upon the structure of health and social services organizations in Canada. These are: the determinants of health view of population health; the tendency towards regionalization of health and social service organizations to better address the needs of the community; the restructuring of government organizations with a view to controlling expenditures on statutory programs; and evidence based decision making. The practical implications of these must be taken into consideration when planning a regional information system which will support strategic planning and resource allocation.

Determinants of Health

The determinants of health have become widely accepted as a collection of personal and community characteristics which have an impact upon an individual's health and the health of the population. The determinants of health are considered to include: the physical environment; social and economic factors; healthy behavior and skills; biological influences; and health and social services. Implicit in a determinants of health perspective is the belief that improvements in the health of the population may come from resources applied outside the traditional government administration areas of health or social services. Consequently, a government health or social service organization taking a determinants of health perspective may be seen directing resources away from conventional programs to non-traditional programs which are expected to show greater improvements to the healthy development of the population. Further, a health or social service organization should consider monitoring other organizations activities and assisting where possible in developing policies, programs and activities which improve the health of individuals and/or the health of the population.

Controlling Expenditures Of Statutory Programs

Driven by the desire to balance federal, provincial and municipal budgets, the 1990s have been years of government restructuring. Programs, services and activities have been and continue to be re-invented, re-engineered, down-sized,

right-sized, optimized, quantified, qualified, certified, measured and evaluated. Over this time the public and public sector have learned to associate restructuring with budget cutting. In most cases government restructuring has not come with additional resources but the requirement that change take place within the same or a reduced budget.

Regionalization of Health and Social Service Programs

The current movement towards regional authority structures in health and social services has been based upon the central notion that the movement of decision making from provincial authorities to regional authorities will improve the responsiveness of publicly funded service organizations to better meet the needs of their specific populations. The movement towards regional coordination is expected to permit differences between regions in how they respond to their unique populations.

An important consequence of regionalization is the shift in thinking that must come as a result of changes in resourcing. Provincial offices, which are deeply concerned with their responsibility to monitor changes in service delivery to the population, will wish to specify the data that should be collected at the service delivery level of the regional operations. However the region, responsible for the development and management of appropriate services and the cost of collecting the data, will wish to ensure that the data captured meets the regional decision making requirements and that the costs of data collection meet some formal or informal benefit cost calculation.

This establishes two competing needs for data that is collected and the consequent dynamic tension that will exist between the parties. The regional need for data which supports local decision making and the provincial need for data which supports provincial decision making. While the province has the ability to require regions to produce data, they have limited ability to enforce the quality of the data collection process and consequently the utility of the information contained within the data provided by a region.

Evidence Based Decision Making

The growing requirement that all programs and services demonstrate their efficiency and effectiveness through measured outcomes and where possible by comparison to practice or service standards.

An additional consequence of the external demand for data is to identify measures which will focus the attention of service providers on specific activities which produce the data of interest. A service provider will tend to focus upon the production of data which is seen as "required" and refrain from the production of data which are seen as "not required". The consequence of this may be to misdirect the delivery level service providers so that they allocate their limited resources to collect data that is not meaningful to their decision needs. Poorly identified data can result in perverse incentives which do not meet the needs of the service clients, the service managers, the regional authorities or the provincial decision-makers.

Bridging Solitudes

The consequence of implementing a regional health information system which supports strategic planning and resource allocation within a determinants of health approach is that a much broader variety of data must be managed within the decision support infrastructure. To be efficient and effective requires that the regional resource allocation and strategic planning tools are able to deal with a diversity of information and information types, uncertain relationships between variables and an expectation that measures will evolve over-time.

In our case we recognized that each government office kept and managed data that was never made available to other organizations. In most cases this was not because the data was confidential but because no one had thought other organizations would use it. In a determinants of health framework data must be collected and documented from across a broad variety of agencies and organizations.

Implementing A Regional Health Information System

The Central Vancouver Island Regional Operating Administration (CVI-ROA) contains approximately 250,000 individuals. The region includes 10 municipalities, 5 school districts, and 23 electoral areas. The area contains both large and small communities in addition to expansive rural areas. The regional industry tends to be related to natural resources forestry, fishing and mining. The CVI-ROA budget is approximately \$70,000,000 which includes all administration, overhead, program expenditures and approximately 150 contracted services.

The following considerations outline the primary issues identified at the start of the project.

- the population of the region, the CVI-ROA government personnel and the service providers of the region are sensitive/concerned that restructuring means a reduction of services through cost cutting.
- there was insufficient information available to the administration of the CVI-ROA to know what outcomes were being created by which programs.
- there was insufficient information available to confirm whether or not service providers were maximizing the benefits which could be generated from the resources in use.
- there was no clear information infrastructure used by management to monitor and control programs providing services to the population.
- there was minimal information technology in the government offices and the service providers offices.
- there was an expectation that additional resources would not be made available to the CVI-ROA so all changes to administration and programs would need to take place within the existing budget. The majority of this budget was already purchasing personnel and contract services.
- CVI-ROA managers were working to manage their staff and to try to determine the most appropriate way to adjust their operations to meet their new responsibilities.
- there was insufficient information available to suggest a change in the programs and services that were in operation. It was believed that it was possible that there

were worse states the organization could be in and that change for the sake of change would not be constructive to the long-term interests of the organization.

- the Central Vancouver Island Regional Health Board, agreed that they would cooperate with the team's development of a region wide information system that supported strategic planning, regional health programs, activities and services.

The high probability of new information requires the management and the information systems to be capable of adaptation. To adapt to take advantage of new knowledge and new solutions places pressure on all parties within the region. Where possible it is preferred to establish strategies and procedures that pull service providers to optimize instead of pushing them to cut. This requires management and information tools that incorporate and encourage a flexible, open, consistent, development process that can maintain a trust relationship with both service providers, their clients and the community.

Regional Management Tool Kit

In light of the issues and need to ensure an efficient and effective management system for the region, four management tools were brought together. 1) a strategic planning framework; 2) a resource allocation methodology - the Value Sieve; 3) a consensus approach was taken to maintain and build trust; and 4) the data buffet concept was developed.

Strategic Planning Framework

There was a need to develop knowledge about the probable future of the region and its population. A consequence of this knowledge would be the ability to prepare and direct resources to best fulfill the healthy development of the youth within the population. Strategic planning by itself often fails [1]. However, it was our belief that the chosen resource allocation methodology would assist the region by linking the analysis of planners to the action of managers.

The Value Sieve [2], [3]

The Value Sieve is a resource allocation process that integrates a "knowledge management" and "outcomes alignment" model within a program based budgeting process. Utilizing a detailed inventory of programs and services the Value Sieve establishes an organization wide approach for the administration of scarce resources through the prioritization of values and outcomes. The model provides the tools that link the understanding of future demands to the practical delivery of health services and programs by line managers. The model was initially designed to facilitate the regionalization of health care administration but has continued to be developed through theoretical and applied works.

The Value Sieve recommends an open process for public policy issues and is designed to assist administrators and government decision-makers in collecting meaningful feedback from various constituencies within the community. This model matched the existing operating philosophy of the senior management of the CVI-ROA and their concern to establish a clear understanding of the resources, the programs, and the benefits currently being provided to the communities and the population within their region.

Trust and Consensus

A consensus approach means that efforts were taken by management to ensure that there was open and frank dialogue with stakeholders regarding the development of the management plan. The strengths and problems of approaches were reviewed and results were always presented publicly through open meetings. It was strongly believed by management that if trust were not developed between CVI-ROA and its staff, service providers and clients, future cooperation and collaboration would be more difficult to develop. Trust and collaboration are key components of efficient and effective program improvements. [4]

The Data Buffet

A simple web-based version of a data warehouse. An unequivocally neutral place where each individual and/or organization can provide and/or locate data regarding the region, and regional programs and services. Data can be collected

and documented from as many sources as possible and made available under appropriate terms and conditions. From the CVI-ROA perspective, this data would include the detailed inventory that is an integral component of the Value Sieve. In some cases, this would mean that data was kept in secured areas for use by designated individuals and organizations only.

The partnership envisioned in the data buffet allows regional authorities to contribute resources to an office responsible for the collection, organization and distribution of regional determinants of health and other community related data. Further, the notion of working together to create a partnership among additional organizations, recognizes the need to preserve the continuity of the information within the geographic region so that each partner may attend to the responsibilities contained within their own mandates. Through the recruitment of additional data buffet partners, the costs associated with the collection and maintenance of information can be shared and thus reduce individual costs and duplication.

The data buffet metaphor seemed most appropriate in that the function of partnership would be to collect and make available to the partners data which can support measurement, and evaluation within their regional operations. The data made available at the buffet would have clear information regarding its initial intended purpose, definitions, structure, appropriate uses, technical format, and availability. This would support the idea that each partner may use the data most appropriate to their needs. Further, it could serve many individual programs to meet their unique requirements without disrupting the originators of the data. I.e. currently some data generating programs can expect to receive disruptive contacts from many individual programs and administrators interested in understanding a program's data.

The Community Based Information Resource (CBIR)

In application, the data buffet became known as the Community Based Information Resource (CBIR). The purpose of the CBIR is, through the use of communication and information science, to assist organizations to plan, allocate resources and optimize the delivery of services and activities which maximize the

healthy development of the population. While each partner in the determinants of health delivery system has its own specific data requirements in order to meet its own objectives each shares through the CBIR a desire to coordinate data requirements do minimize waste, duplication, and poor decision making.

The CBIR is required to facilitate the exchange of information between non-governmental organizations (for example, for profit and not-for-profit service providers), quasi-governmental organizations (Regional Health Boards) and formal governmental organizations (Regional Operating Authorities, MCF and MOH). To accomplish its purpose the CBIR will need to ensure that it is seen as a neutral enterprise working in cooperation with all partners in the development of a cooperative regional information infrastructure. This will require the CBIR to establish and maintain a critical focus.

CBIR Focus

- Maintain and maximize the trust of all participants and users through neutrality and demonstrated knowledge of information science. The CBIR must not be seen as a captive of any single agency.
 - Act as a central data collection and data distribution center for the region.
 - Maintain standards that support the broadest possible access to the information.
- To achieve the exchange of information the CBIR must develop the capacity as an information hub meeting the varying technical capacities of diverse organizations.
- Minimize the cost of new technology and wherever possible exploit legacy systems.
 - Protect the regional focus of the information and encourage the utilization of the information to benefit the region.
 - Develop and maintain useful knowledge bases which can be shared by participants.
 - Demonstrate the cost effectiveness of the collaborative approach for all partners and the community.

The CBIR demonstration and experimental web site can be found at <http://www.thewebpress.com>. The CBIR demonstration and experimental web-

site is maintained on independent computing resources and all html, database and cgi have been developed and maintained by Corbett.

Findings and Conclusions

- The CBIR is a useful mechanism for demonstrating a management philosophy that supports trust openness and collaboration within the region.
- The CBIR requires information management and information technology expertise to develop, maintain, and operate it. Each participating organization has unique combinations of technology and information requirements.
- A flexible, low cost, low maintenance, technical interface is required to address the variety of requirements of each organization while attending to the larger purpose of the system which is to facilitate the storage and exchange of information across all participants. In particular this means working to resolve technical issues and selecting technical standards that may be different than the standard central government requirements.
- Many organizations were using very limited local data in their decision making processes. CBIR is a useful approach in bringing together individuals and organizations who expect to use regional data to help understand how best to organize. It establishes a cooperative effort to build the health of the community. The CBIR must not be seen as a partisan communications tool. It must become a community resource, supported across and by all sectors in the region.
- The CBIR is an informal regional coordinating system. The fact that it is "informal" is its greatest strength. The CBIR has no power to force change. It provides information to all parties (individual, group, government sector, municipal sector, health sector, business sector, no constraints) from many different sources. Parties reviewing the information learn about what others are doing, why and with what success. Parties determine how to use the information to their individual advantage. We believe that most people and organizations involved in the health of the population and community are truly interested in their contribution to the health of the population and community. Further that given broader information, organizations will adjust their actions to the broader understanding of the needs of the community. The result we believe will be a

better optimized region from a community, resource utilization and population health perspective. [2][4]

- There are significant benefits in coordinating the collection and distribution of data. These benefits include but are not limited to: minimizing the cost of collection; insuring the data sets made available are complete; insuring data is properly sourced and documented, and insuring consistent data is provided to all participants in the region.
- Service providers will work diligently in an environment where change is inevitable if they believe that the change process is open, fair to all parties, and respects their efforts.
- It is not possible to start with a clean slate in a system where all resources are already committed. An effective information strategy and its associated tools, cost effectively implemented, can begin to identify opportunities for constructive change. An information approach that allows individuals and service providers to adjust their plans will facilitate constructive change more rapidly than any other approach.

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"No snowflake in an avalanche ever feels responsible."

Stanislaw Lec

VITA

Surname: Corbett **Given Names:** John Christopher

Place of Birth: Toronto Ontario, Canada

Degrees Awarded

M.P.A. University of Victoria 1994
B.Sc. University of Victoria 1978

Honours and Awards

- Dean's Interdisciplinary Graduate Scholarship
- University of Victoria Fellowship

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Author

John Christopher Corbett

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