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Incorporating a system approach to the decision making process

by

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Abstract

According to Harvard Business Essentials (2006) an organisation is a series of decisions linked by implementation and other activities. Decisions set the pace and direction; the rest is follow through.

Paul Nutt has been studying how decisions are made for more than 20 years and have found that decisions fail half of the time, without realising any benefit for the organisation (Nutt, 2002).

Decision making is an essential part of the management function of an organisation. But why do so many decisions fail? Why does the outcome of decisions sometimes not satisfy the initial problem or support the organisation's goal?

Four decision making processes were analysed for this dissertation, the conclusion was drawn that current decision making processes do not incorporate a clear system approach.

The dissertation shows that a system approach, as defined by systems engineering, satisfies the need for ensuring decisions are made taking into account a holistic picture.

By following a system approach when making a decision, a bigger picture view can be obtained. Having a bigger picture view, will aid the decision maker in identifying whether the decision to make is indeed the right decision to be made, or merely a symptom of another decision or problem. A system approach aids the decision maker to determine where the decision to be taken fits in and what impact it will have on the system.

A system approach to decision making process was designed, incorporating the strengths of the decision making process and system approach methodologies researched.

The system approach methodology can be applied successfully to management decisions. By using this methodology a holistic view is obtained of a decision regarding a problem, resulting in effectively handling and managing the decision or problem.

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Chapter 1: Introduction

"In every success story, you will find someone who has made a courageous decision." - Peter F. Drucker

Chapter 1 gives an introduction to the dissertation, firstly describing the motivation for the dissertation and secondly the research methodology followed. The chapter is concluded by providing a brief overview of the dissertation structure used.

1.1. Motivation

According to Harvard Business Essentials (2006) an organisation is a series of decisions linked by implementation and other activities. Decisions set the pace and direction; the rest is follow through.

It is then self-evident that decision making is an essential part of the management function of an organisation. But why do so many decisions fail? Why does the outcome of decisions sometimes not satisfy or address the initial problem or support the organisation's goal?

According to Paul Nutt (2002) decisions fail half of the time; this dissertation gives an appropriate overview of why decisions fail and how a system approach can be leveraged to avoid making the wrong decision.

1.2. Research Methodology

Inductive theory building was used in the research process of the dissertation, drawing conclusions from a number of processes researched to form a general theory. *Figure 1-1: Research Methodology* illustrates the research methodology used. The figure has been adopted from Carole, et al (2003) and the approach is highlighted by darker blocks.

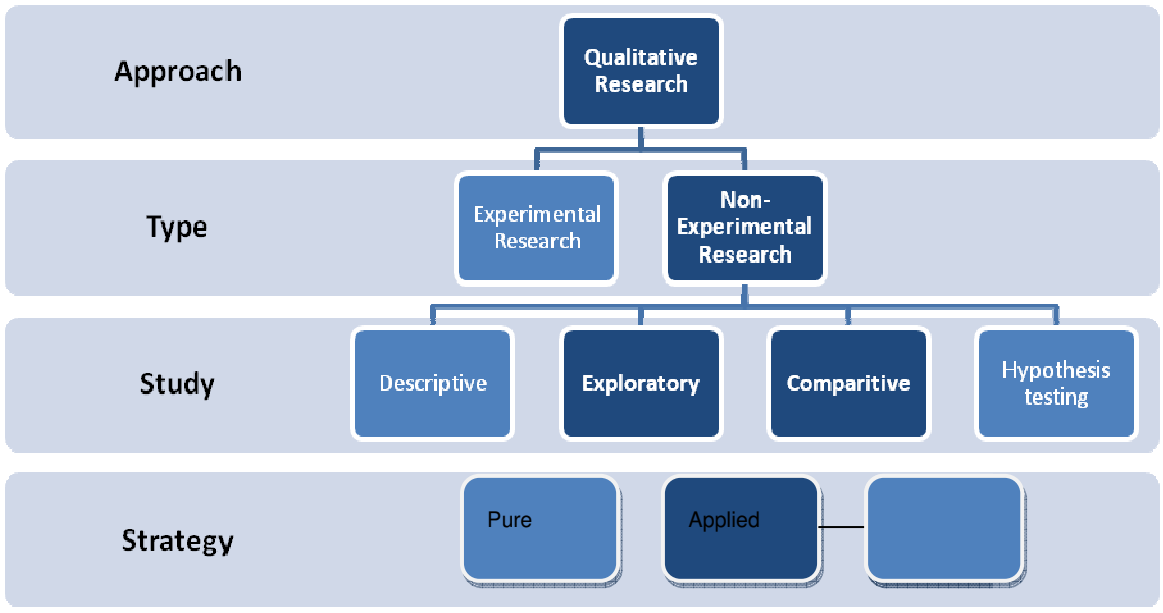

FIGURE 1-1: RESEARCH METHODOLOGY

Adopted from Carole et al (2003)

Although decisions can be split into both qualitative and quantitative decisions, the focus of this dissertation is on qualitative management decisions. Therefore a qualitative decision approach was followed. Based on this fact, non-experimental research (Carole, et al., 2003) was done to focus more on the relations between different processes and not the cause-and-effect.

Two types of studies were used in this dissertation. Firstly, exploratory study: during this study, different processes, both to decision making and system approach, were researched and the patterns and commonalities were identified. Based on the results of the exploratory research study the integrated system approach decision making process was designed.

Through action research the designed integrated system approach process was applied to three real world case studies. Hult (1980) defined action research as an approach which assists in practical problem solving and simultaneously expands scientific knowledge.

A second type of study was completed namely comparative study. During the application of the integrated systems model, this type of study was completed. Different applications of the model were compared with each other under different scenarios.

The research strategy followed for this dissertation is applied research (Carole, et al., 2003); the model developed is specifically focused on supporting decisions to be made on management level in organisations.

Figure 1-2: Research Roadmap illustrates the research methodology used.

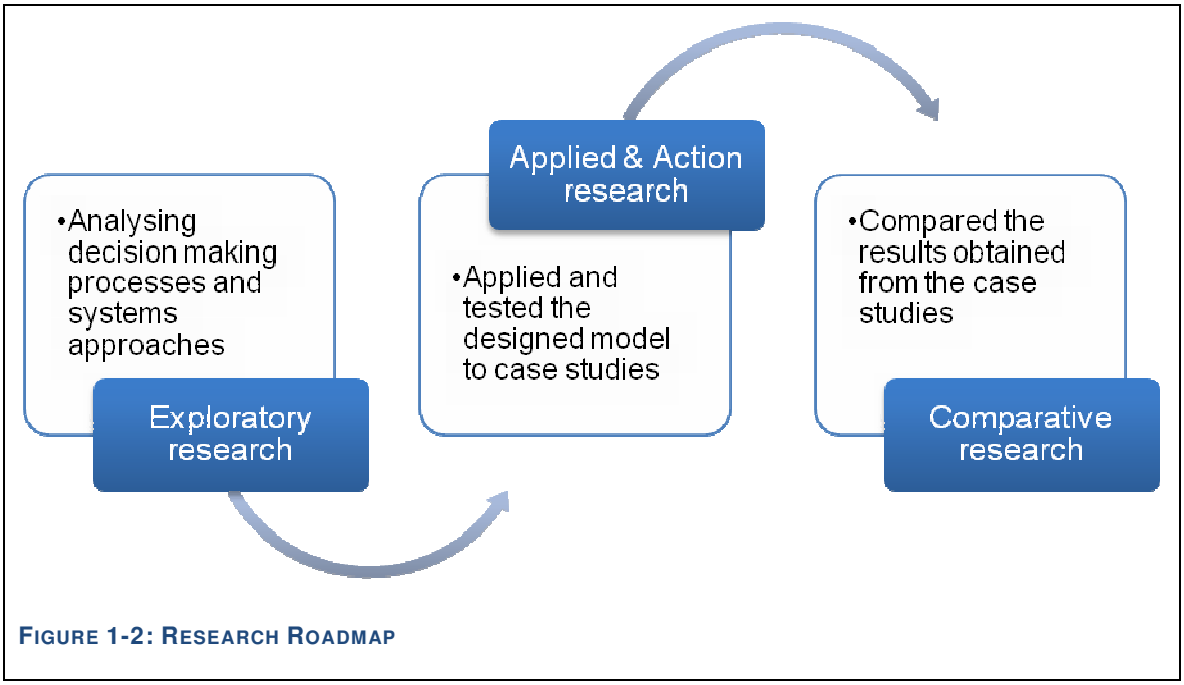

FIGURE 1-2: RESEARCH ROADMAP

The research methodology used can be summarised into one methodology, namely management research. Management research is defined as a specific dimension of business research, where the research is concerned with influences on the work behaviour of people, in this dissertation decision making, how to achieve efficiency, effectiveness and productivity (Carole, et al., 2003).

Management research is research that has a theoretical base, however incorporates within them the potential to take action (Easterby-Smith, et al., 2002). Easterby-Smith

(2002) has noted the distinctive difference between management research and other research approaches.

1. Management is a very diverse function within an organisation, it incorporates multidisciplinary functions for example economics, anthropology and mathematics. Therefore the researcher is at a cross road whether to adapt a single or a transdisciplinary approach.
2. Unless either commercial or personal advantages can be realised through research, managers will not give access to their organisation. This leads to problems getting access to organisations for fieldwork and confidentiality clauses can limit the research as well.
3. Management requires both thought and action. Managers require research that will enable them to take action on the research.

The management research approach was used by designing a model which can be applied across multi disciplinary functions within management. The designed model is based on research conducted on existing approaches and incorporating the approaches to enable managers to practically implement the model in the organisation.

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Locke's (2007) suggested guidelines for the development of inductive theories were also used during the compilation of the dissertation. *Figure 1-3: Inductive Theory Guidelines* illustrates Locke's guidelines graphically.

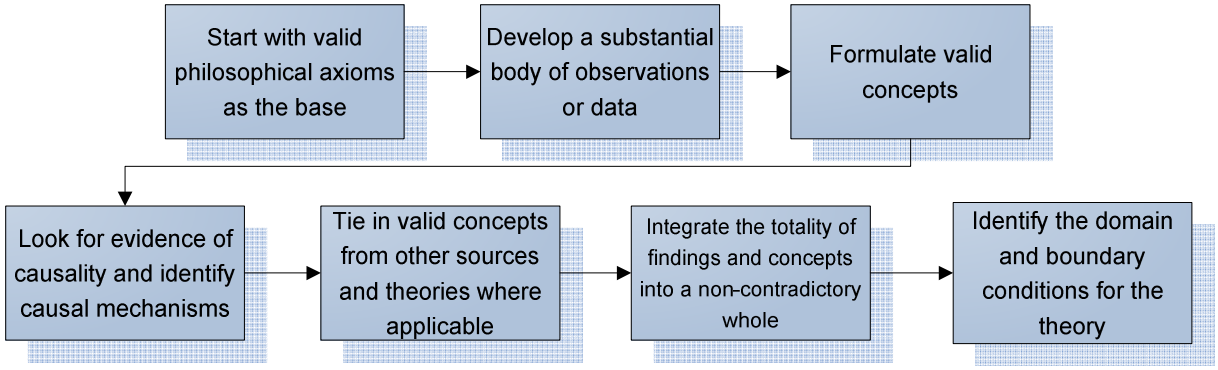

FIGURE 1-3: INDUCTIVE THEORY GUIDELINES

(Locke, 2007)

1. Start with valid philosophical axioms as the base

Locke identifies three primary axioms:

i. Existence

That something is real.

ii. Identity

That something has a specific nature to it.

iii. Consciousness

That awareness exists.

For the dissertation the axiom was identified that decision making and the process followed do rarely realise any benefit for the organisation (Nutt, 2002).

2. Develop a substantial body of observations or data

For the dissertation a variety of decision making processes were analysed to form a conclusion on why decisions made do not realise benefit for the organisation. From the conclusion drawn, two system approaches were identified and analysed for the incorporation into the decision making processes.

3. Formulate valid concepts

The theory formulated for the dissertation was based on management decisions and that a lack of a system approach to these types of decision leads to the decision not always realising the intended benefit for the organisation.

4. Look for evidence of causality and identify causal mechanisms

Concepts are formed inductively, from observing reality (Locke, 2007). The facts discovered from the observed members of a group are generalized to all members within the group, even though not observed.

For the dissertation a group of decision making processes were analysed, however due to the mass majority of available decision making processes, conclusions were drawn based on the selected group and findings were generalized to all decision making processes.

5. Tie in valid concepts from other sources and theories where applicable

The dissertation ties in two concepts, namely, decision making and system approach. The dissertation focuses on how these two concepts can be incorporated to leverage each approach‘s strengths.

6. Integrate the totality of findings and concepts into a non-contradictory whole

The conclusion drawn from the dissertation and the case studies was compared with the initial problem statement identified. Locke (2007) explains in his paper if the expected outcomes are not achieved, the theory was incorrect or the theory should be amended or replaced, alternatively the theory was incorrectly tested.

In retrospect, for this dissertation the conclusions drawn do satisfy the problem statement.

7. Identify the domain and boundary conditions for the theory

For the dissertation a clear scope was defined in section 2.5.5, which stipulates that the research topic was limited to management decisions.

1.3. Dissertation Structure

The dissertation is systematically outlined, firstly an introduction is given motivating why the topic has been chosen to be researched and an overview of the research methodology used is given. Chapter 2 provides an overview as to the meaning of decisions, decision making and processes followed when making a decision. An analysis is done on existing decision making processes, identifying both the strengths and weaknesses of the processes, and this forms the basis of the dissertation.

In Chapter 3 more detail is given around what a system is, the general system approach and two specific system approaches that are followed. In Chapter 4 the two concepts, decision making and system approach, are incorporated into one model.

In Chapter 5 the integrated model is tested by applying the model to three practical case studies.

The dissertation concludes with Chapter 6, describing the benefits of using the integrated system approach decision making model.

The systematic outline of this dissertation is illustrated in *Figure 1-4: Dissertation Structure.*

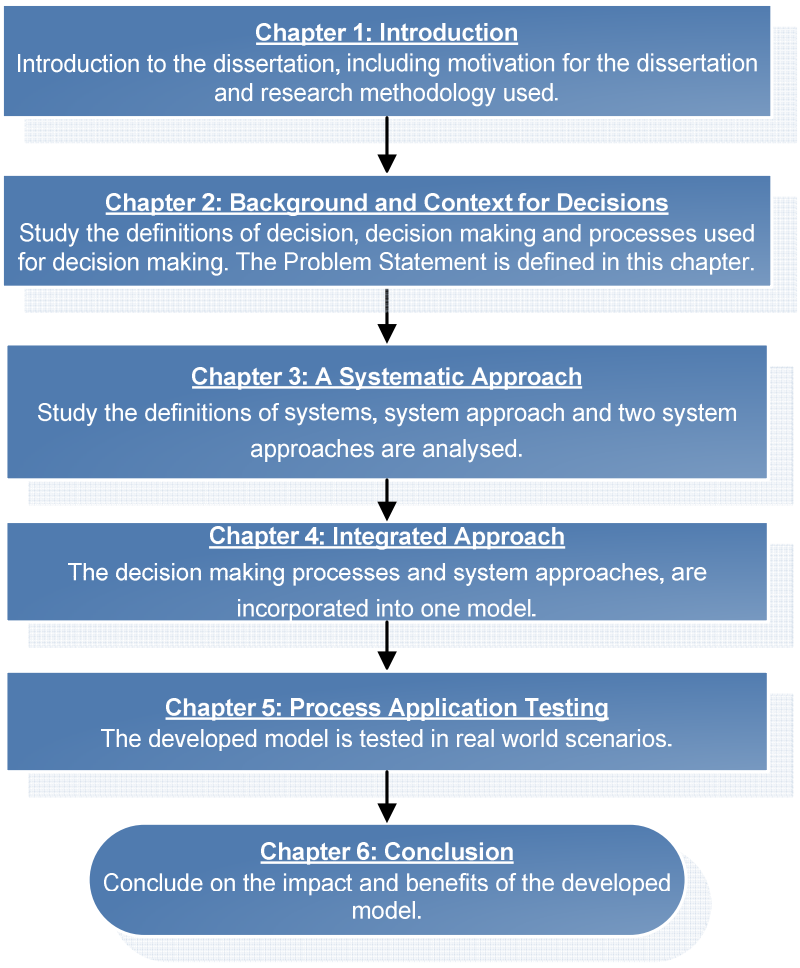

FIGURE 1-4: DISSERTATION STRUCTURE

1.4. Conclusion

Decision making is an essential part of the management function of an organisation, but often fails. Through a management research approach, this dissertation aims to address this statement. The dissertation gives an introduction to decisions, decision making and why decisions fail.

System approach is analysed to determine how the approach can be incorporated with the decision making processes to form an integrated model.

A model is defined, based on the analysis, which will support the management decision making function.

Chapter 2: Background and Context for Decisions

"Indecision is the thief of opportunity" – Jim Rohn, business philosopher.

Chapter 2 gives an overview of decisions, decision making and the processes used during decision making. In this chapter decision making and the strengths and weaknesses of the processes followed are placed in context. The problem statement for the dissertation is stated and elaborated in this chapter.

2.1. Defining Decisions

Peter Drucker defines a decision as a judgement, a choice between alternatives, however rarely a choice between right and wrong. Drucker goes further to describe that it is at best a choice between "almost right" and "probably wrong" – but much more often a choice between two courses of action neither of which is provable more nearly right, than the other (Drucker, 1967).

Managers within organisations, regardless of industry or the size of the organisation, are faced with numerous decisions each day. The types of decisions can vary from determining resource requirements for a department to product strategies to follow.

Decisions can be classified into six groups (Teale, et al., 2003):

1. Structured decisions;

   Decisions that are considered to be clear, unambiguous and easily definable.

2. Unstructured decisions;

   Decisions that are unclear, ambiguous and difficult to define.

3. Programmed;

   Decisions that rely on some form of predetermined organisational apparatus or routine that occurs, e.g. a procedure. Jennings (1994) defined programmed decisions as the extent to which the decision is repetitive, routine or a definite procedure has been established for making the decision.

4. Non-programmed;

   Decisions for which no procedural guidelines exist. Jennings (1994) defined non-programmed decisions as the extent that the decision is novel, unstructured and consequential.

5. Strategic decisions;

   Decisions that involve a fundamental change in ideology and/or authority and therefore the direction of an organisation.

6. Operational decisions.

   Decision that concern the day-to-day running of the organisation.

Due to the nature of decisions managers generally have to make the dissertation will focus mainly on management decisions that can be grouped into the following groups:

- Unstructured decisions;
- Non-programmed; and
- Operational decisions.

These types of decisions, especially unstructured and non-programmed decisions, are the decisions that no guidelines exist for and are difficult to make and manage due to their nature. Therefore this dissertation will focus on defining a model to address these types of decisions.

According to David Langford (Langford, et al., 2001) and Crawford (Crawford, 1997) three types of decision exists in organisations:

1. **Operational Control decisions**

   Operational Control decisions deal with transforming inputs into outputs. The majority of an organisation's time will be spent on operational decisions. These involve making decisions about carrying out the specific tasks set forth by strategic planners and management. Determining which units or individuals in the organisation will carry out the task, establishing criteria of completion and resource utilisation, evaluating outputs - all of these tasks involve decisions about operational control.

2. **Administrative decisions / Management Control decisions**

   Management Control decisions relate to organisational structuring and resource allocation. These decisions are concerned with how efficiently and effectively resources are utilised and how well operational units are performing. Management Control involves close interaction with those who are carrying out the tasks of the organisation; it takes place within the context of broad policies and objectives set out.

3. **Strategic decisions**

   Strategic decisions relate the organisation to its business environment. Their effect is diffused throughout the organisation over time and therefore has an impact on the previous two forms of decisions. Strategic decisions are externally focussed rather than inwardly within the organisation and are to do with deciding what business the company is in currently and what it should be in. This level of decision making is concerned with deciding on the objectives, resources and policies of the organisation.

Figure 2-1: Decision Types illustrates the different types of decisions in an organisation and at which level the decision is to be taken. The figure graphically

illustrates the decision types and levels set out by Langford (2001) and Crawford (1997).

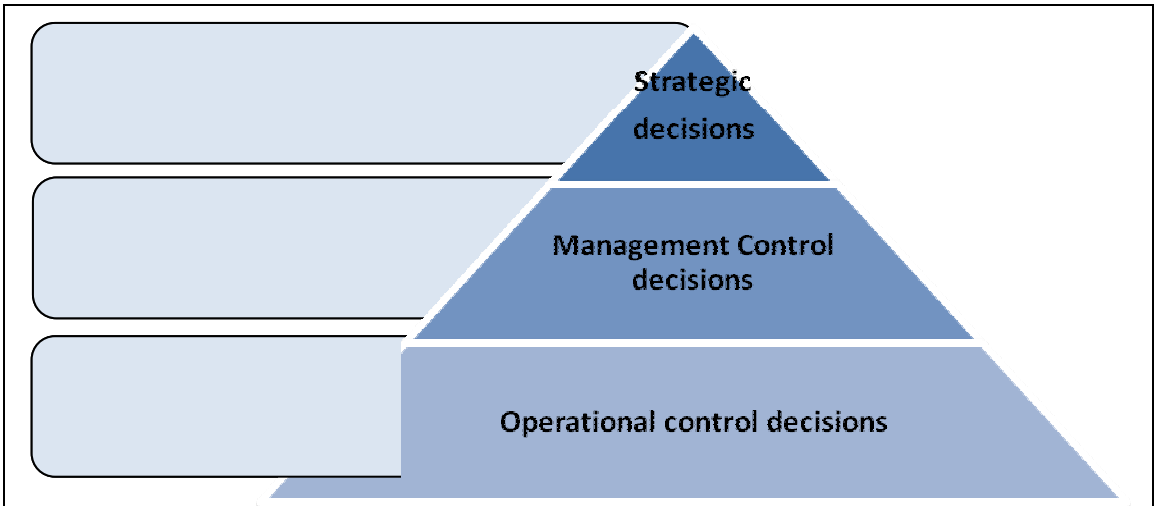

FIGURE 2-1: DECISION TYPES

2.2. Defining Decision Making

It has been said that administration is the critical organisational process, making possible production, procurement and the rest; that leadership is the heart of administration; and that decision making is the key to leadership (Gore, et al., 1964).

Decision making can be defined as follows:

- Acts of choice between alternative courses of action designed to produce a specified result and one made on the review of relevant information guided by explicit criteria (Teale, et al., 2003)
- A conscious and human process involving both individual and social phenomena based upon factual and value premises, which includes a choice of one behavioural activity from one or more alternatives with the intention of moving towards some desired state of affairs (Elliott, et al., 2005)

- A moment, in an ongoing process of evaluating alternatives for meeting an objective, at which expectations about a particular course of action impel the decision-maker to select that course of action most likely to result in attaining the objective (Harrison, 1996).

The conclusion can be drawn, given the definitions above, that decision making is the selection between alternatives to achieve a predetermined state or goal.

2.3. The Importance of Decisions and Decision Making

Why should organisations make decisions? Decisions are made when a change is required or imminent. According to Robert Charette, change is the primary driver for decision making, either one has to make change happen or react to it. With change come decisions (Charette, 1993).

Jennings, et al (1994) identified factors which emphasise the importance of having an effective decision making process (Jennings, et al., 1994), these factors are:

- Scarcity of resources;

  Organisations generally face scarcity of resources and need to effectively utilise the resources available.

- Competition;

  Both the private and public sector are facing an increase in competition.

- Environmental issues.

  Consumer safety, pollution and employment practices, often raise public concern over the degree of social responsibility demonstrated by organisations in their decision making process.

Various decision making processes have been identified over the years; for this dissertation four decision making processes were used to determine what the common thread between these processes are. These processes were randomly selected based on the availability of information about each process. The decision making processes include:

1. Strategic Managerial process;
2. Harvard 5 Step process;
3. 6 Step Problem Solving process; and
4. Decision Making Loop process.

The decision making processes are discussed in more detail in section 2.4.

2.4. Decision Making Processes

The four decision making processes were analysed to determine the common factors, strengths and weaknesses. The four processes are illustrated and a brief description is given in sections 2.4.1 – 2.4.4. In Section 2.4.5 and 2.4.6 the four processes are compared and the common thread between them and their strengths and weaknesses are discussed.

2.4.1. The Strategic Managerial process

The strategic managerial decision making process requires managers to take a more integrated and quantitative approach to decision making by infusing relevant methodologies from the strategic management and six-sigma processes (Friday-Stroud, 2007).

During the strategic managerial decision making process, goals should be set by the relevant managers that align with the organisation's mission. The goals identified should represent the desired end state that is to be achieved. Once a goal has been identified, the manager is to identify problems/issues that might deter the organisation to achieve the goals set out. Metrics are identified prior to the identification of alternative solutions to the problem to ensure that the manager remains unbiased

during the selection of the best alternative to the solution. After the selection of an alternative, the manager is to allocate resources to implement the solution chosen. Following implementation, the solution is evaluated in accordance with the metrics identified. The feedback and results are to be used for future decisions to be taken.

The process is depicted in *Figure 2-2: Strategic Managerial Process,* with brief descriptions of each step in

Table 2-1: Strategic Managerial Process Description.

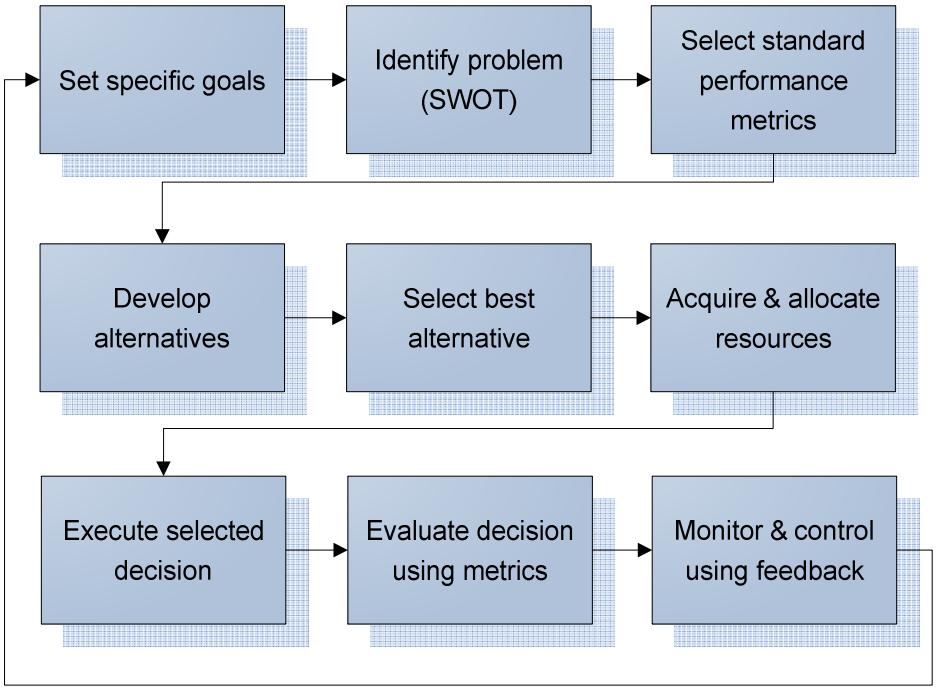

FIGURE 2-2: STRATEGIC MANAGERIAL PROCESS

(Friday-Stroud, et al., 2007)

TABLE 2-1: STRATEGIC MANAGERIAL PROCESS DESCRIPTION

Step		Description
1.	Set specific goals	Set specific, measurable goals that align with the organisation's mission.
2.	Identify problem	Identification of organisational problem/issue based on synthesis of data generated from SWOT and statistical analyses. A problem/issue exists when a gap exists between existing and desired performance.
3.	Select standard performance metrics	Set selection criteria and standardised metrics for performance accountability and evaluation.
4.	Develop alternatives	Develop alternative strategies to address the decision which will close the gap between the existing and desired performance.
5.	Select best alternative	Compare, evaluate and select the best alternative option to the decision.
6.	Acquire and allocate resources	Acquire and allocate the appropriate resources.
7.	Execute selected decision	Execute the selected alternative to the decision.
8.	Evaluate decision using metrics	Evaluate decision based on performance metrics and take corrective action as necessary.
9.	Monitor and control using feedback	Ensure continuous feedback throughout the process.

Although the process does emphasize the importance of aligning identified problems and decisions to the goal of the organisation, the following weaknesses were identified:

The process does not include identifying the root cause of a problem hence this might lead to dealing merely with a symptom of a problem and not the real problem.

The problem or decision is not put into context. The system and subsystem the problem or decision forms part of is not identified, therefore the decision maker might lack understanding of the influences and facets of the problem or decision.

2.4.2. The Harvard 5 Step Process

According to the Harvard Business School (2006), decision making is not essentially different than any other business activity, by following a process, even decision making can be more effective and the quality of outcomes more consistent.

A brief overview of the process is presented:

During the 5 step process the decision maker is to establish a healthy context for the decision to be made. Context refers to the environment in which decisions are to be made, how the decision makers interact with each other, their interpersonal relationships, behaviour and how ideas and data are shared. A healthy context includes having the right people in an appropriate environment, who agree on how decisions will be made and are open for discussion and new ideas.

When the correct context has been established, the decision is to be framed in the correct manner. This will ensure that all the decision makers have a common understanding of the decision at hand, the factors that influence the decision and what the decision will influence. Before selecting a solution, alternative solutions/choices should be generated and evaluated in accordance to each alternatives' feasibility, risks and implications.

The 5 step decision making process is illustrated in *Figure 2-3: Harvard 5 Step Process*; the description of each step is given in *Table 2-2: Harvard 5 Step Process Description*.

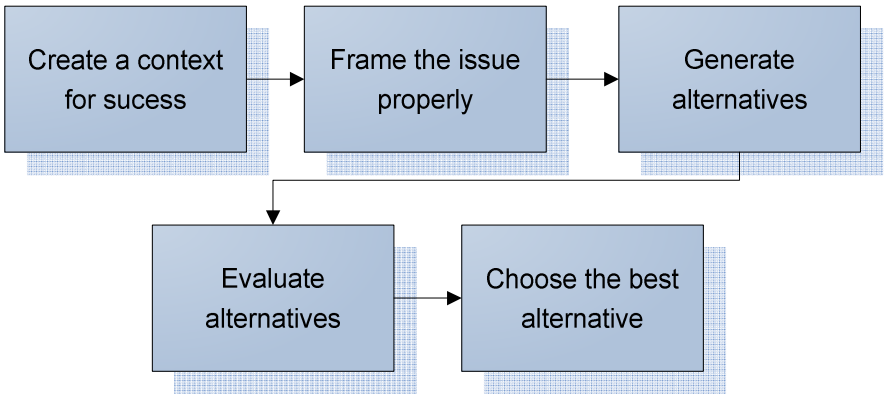

FIGURE 2-3: HARVARD 5 STEP PROCESS

(Harvard Business School, 2006)

TABLE 2-2: HARVARD 5 STEP PROCESS DESCRIPTION

Step		Description
1.	Create a context for success	Create an environment in which effective decisions are possible. This includes getting the right people to participate in the process and creating a decision-friendly context to ensure creative thinking and careful deliberation.
2.	Frame the issue properly	Get a clear understanding of the issues at hand and the ways each affect the objectives of the business.
3.	Generate alternatives	Decision makers must develop alternative choices

Step		Description
4.	Evaluate alternatives	Asses the feasibility, as well as the risk and implications of each possible choice.
5.	Choose the best alternative	Rationally evaluate each alternative and choose the best alternative.

The Harvard 5 Step clearly indicates that a decision should be placed in context, understanding the issues at hand and the effect the decision might have on the organisation's goal, however the following weaknesses were identified:

As with the Strategic Managerial process, the process does not include identifying the root cause of a decision hence this might lead to addressing merely a symptom and not the real decision.

Again, as with the Strategic Managerial process, this process does not cater for identifying the system and subsystem the decision forms part of.

At no stage in the process does the decision maker or manager determine whether the decision at hand hinder the organisation's goal.

Success measures are not identified prior to identifying alternatives to address the decision.

No feedback loop exists within the process to ensure continuous improvement.

2.4.3. The 6 Step Problem Solving Process

Chang (1993) described the 6 step problem solving process as a road map for teams to follow when making decisions.

When a problem is identified the manager should write a concise problem statement as well as define the desired end state that should exist when the problem is solved. The manager is to gather information to determine the root cause of the problem,

once the root cause is identified, alternative solutions can be identified to solve the problem. The alternatives should be evaluated according to set criteria: on selection of an alternative, an action plan is to be developed and implemented, identifying the responsible person, cost, time, etc. required.

The 6 step problem solving process is depicted in *Figure 2-4: 6 Step Problem Solving Process*, with descriptions of each step in **Error! Reference source not found.**.

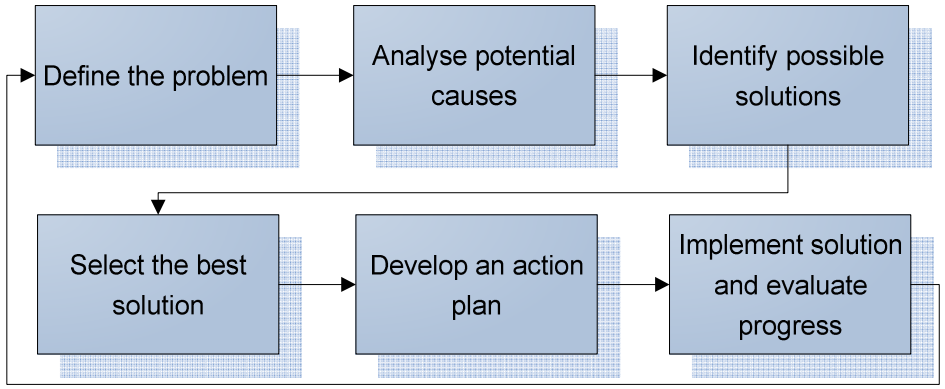

FIGURE 2-4: 6 STEP PROBLEM SOLVING PROCESS

(Chang, et al., 1993)

TABLE 2-3: 6 STEP PROBLEM SOLVING PROCESS DESCRIPTION

Step		Description
1.	Define the problem	Note down a concise problem statement of the problem at hand, as well as a brief summary of the desired end state once the problem has been resolved.
2.	Analyse potential causes	Identify the potential causes and the most likely root causes of the problem.
3.	Identify possible solutions	Without evaluating effectiveness, compile a list of all possible solutions. Narrow the list down to potential solutions.
4.	Select the best solution	Evaluate solutions according to predetermined criteria and select best solution.
5.	Develop an action plan	Compile a detailed plan that lists action steps, responsible person(s), start/end dates, estimated time and cost.
6.	Implement solution and evaluate progress	Follow up using the Action Plan to ensure the action steps are achieved.

Within the 6 Step Problem Solving process the following weaknesses were identified, these weaknesses are similar to the ones identified in the Harvard 5 Step process:

The process does not include identifying the system and subsystem the decision forms part of.

An analysis is not done to determine whether the decision hinders the organisation's goal or whether the decision is the constraint for achieving that goal.

2.4.4. The Decision Making Loop Process

According to Moody (1983) whether decisions are simplistic or complex, or relate to any of the fields of management, all decisions can be guided by the closed-loop process.

The closed-loop process requires management to become conscious that a problem does exist and translate the problem into a clear, understandable problem statement. The problem statement should be agreed upon by the team that is to solve the problem. The team is to identify alternative solutions to the problem with each solution's possible consequences and impacts on the organisation. Once a solution has been agreed upon and implemented, feedback should be given to the team whether the solution did satisfy the problem statement and whether the problem has been resolved.

The decision making loop process is illustrated in *Figure 2-5: Decision Making Loop Process* descriptions of each step given in

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Table 2-4: Decision Making Loop Process Description.

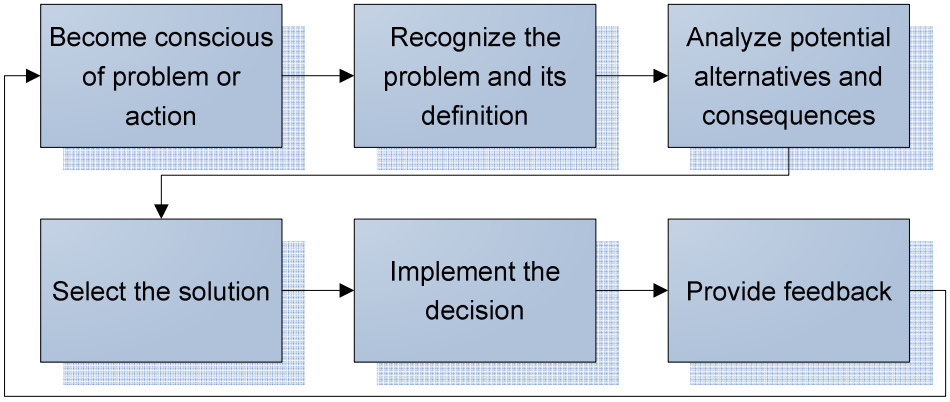

FIGURE 2-5: DECISION MAKING LOOP PROCESS

(Moody, 1983)

TABLE 2-4: DECISION MAKING LOOP PROCESS DESCRIPTION

Step		Description
1.	Become conscious of problem or action	Become aware that a problem does exist.
2.	Recognise the problem and its definition	Define the problem, noting and agreeing with a team on the problem statement.
3.	Analyse the potential alternatives and consequences	List and analyse possible solutions for the problem, noting for each solution possible consequences.
4.	Select the solution	Select the best solution that satisfies the problem statement.
5.	Implement the decision	Implement the solution.
6.	Provide feedback	Provide feedback to the team whether the solution satisfied the problem statement and whether the problem has been resolved.

The following weaknesses were identified in the Decision Making Loop process:

The organisation's goal is not taken into consideration when the problem is identified.

The system and subsystem the problem forms part of is not identified.

It is not determined whether the problem is a constraint for the organisation to achieve its goal.

Success measures are not identified prior to identifying alternative solutions.

2.4.5. The Common Thread

As stated above, numerous decision making processes exist in literature, however the conclusion can be drawn from the sample processes in section 2.4.1-2.4.4 that a common thread does exist throughout the decision making processes.

In *Table 2-5: Decision Making Process Comparison* the four decision making processes are compared. From the comparison the common thread throughout the processes are illustrated and explained in *Table 2-6: Decision Making Processes' Common Thread*.

In each process analysed the problem should be defined, documented and understood by the managers and decision makers involved. The desired end state should be defined, metrics and criteria should be identified to be able to evaluate whether the desired end state has been achieved. Alternatives are to be generated by the manager and/or team and evaluated according to the predetermined criteria. The best alternative should be selected and implemented. During the implementation stage and after, the status of the chosen solution should be tracked and fed back into the decision making process, this is done to ensure that lessons learnt are recorded and can be referenced in the future.

TABLE 2-6: DECISION MAKING PROCESS COMPARISON

	Strategic Managerial	Harvard 5 Step	6 Step Problem Solving	Decision Making Loop
Identify goal	√			
Become conscious of the problem		√		√
Identify problem	√	√	√	√
Analyse potential causes			√	
Identify standard performance metrics	√			
Develop alternatives	√	√	√	
Evaluate alternatives		√		√
Select best solution	√	√	√	√
Develop an action plan	√		√	
Implement solution	√		√	√
Evaluate	√		√	
Provide feedback	√			√

Table 2-7: Decision Making Processes' Common Thread illustrates the common thread that exists.

TABLE 2-7: DECISION MAKING PROCESSES' COMMON THREAD

Step		Description
1.	Define the problem	In each of the processes it is clearly stated that the problem needs to be defined, understood and clearly documented before continuing with the process.
2.	Generate alternatives	To be able to make a decision, alternative solutions should be generated.
3.	Evaluate the alternatives	Alternatives should be evaluated using predetermined criteria.
4.	Select the best alternative	The best alternative should be selected, based on the evaluation criteria.
5.	Implement the solution	The chosen alternative/solution should be implemented by allocating resources to the alternative.
6.	Close the feedback loop	The success of the alternative/solution should be tracked and the outcome should feedback into the process.

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2.4.6. Strengths and Weaknesses

Although the analysed processes indicate that decision making processes are generic and a definite common thread does exist between the processes, the decision making processes are still prone to failure.

The identified strengths and weaknesses of the decision making processes are illustrated in *Table 2-8: Decision Making Processes Strengths and Weaknesses*.

TABLE 2-8: DECISION MAKING PROCESSES STRENGTHS AND WEAKNESSES

Strengths	Weaknesses
The problem is defined in an unambiguous and unbiased manner.	A narrow minded approach is followed, only focussing on the problem at hand.
Criteria are predetermined to measure alternatives.	The decision is not put into context, where the decision lies within the organisation and the impact.
A feedback loop exists to ensure continuous learning from past experience.	The root cause of the decision is not analysed.

2.4.7. Conclusion

From the analysis conducted, the conclusion is drawn that decision making processes do not possess some of the key characteristics one would expect when making a management decision. The decision making processes analysed are narrowly focused, not allowing the decision maker to take the bigger picture view and putting the decision into context. By following such a narrow minded approach, the risk arises that interdependencies are overlooked and the root cause is not addressed appropriately.

2.5. The Problem Statement

2.5.1. Background

Paul Nutt has been studying how decisions are made for more than 20 years and have found that decisions fail half of the time, without realising any benefit for the organisation (Nutt, 2002).

The failures can be attributed to three blunders that entangle decision makers (Nutt, 2002):

THE BLUNDERS

1. **Failure-Prone Practices**

   Two out of three decisions use failure-prone practices (Nutt, 2002). Decision makers do not track whether a decision process or methodology was deemed to be successful or not. By not recording the decision process and methodology used and the outcomes attained, the possibility that the methodology will be used again increases and the same results will be obtained.

2. **Premature Commitments**

   By committing early in the process to a solution, the decision maker will become biased to the solution and will possibly disregard other alternative solutions.

3. **Wrong-Headed Investments**

   Decision makers use their time and money on costly evaluations. These evaluations are done mostly on the preferred solution, trying to prove its feasibility. Time and money are often not invested in investigating the problem to be addressed, setting objectives, searching for new ideas, etc.

In short, decisions fail due to decision makers not using a system approach to decision making. All three the blunders can be avoided by using a system approach to decision making, taking a step back to understand the decision to be taken, how it fits into the bigger picture and evaluating alternatives available.

2.5.2. The Problem Statement Defined

Decision making forms part of most managers' everyday life. Managers have become accustomed to making decisions; however in Nutt's (2002) studies that range over 20 years and 400 decisions, he has proven that such decisions made by managers fail half of the time, not realising any benefit for the organisation.

During the course of the research conducted, no relationship was identified between management and the industry of the organisation. Therefore it is concluded that the function of a manager and the industry of the organisation are mutually exclusive. Gertrude Stein, an American-Jewish writer, said it best, "a manager is a manager, is a manager".

Due to the numerous decisions that need to be taken, usually under stringent time constraints, managers are often forced to make a decision that is less time consuming and not accurate (Diederich, 1997). This might lead to methodologies such as a system approach to decision making being disregarded. Retrospection is often neglected, not going back and analysing the decision that was made. Due to uncertainty, a good decision does not always constitute a good result and vice versa.

The success, or failure, of a decision is a function of both the decision making methodology used and the impact of external factors. It is important to be able to distinguish between the two factors, to be able to determine whether the decision making process was sound and can be used for future decisions to be taken.

To summarise, many decisions fail due to a lack of a system approach that is applied by managers. Retrospection is neglected; therefore an inability exists to determine whether the negative result was obtained from the wrong decision or the unforeseen and uncontrolled uncertainties.

This dissertation focuses on defining a system approach for decision making by managers in an organisation, regardless of industry.

2.5.3. Research Questions

The following research questions are addressed in this dissertation:

- How can a system approach to decision making assist managers in an organisation to make decisions?
- How can the system approach and decision making processes be integrated to form a single system approach to decision making?

2.5.4. Objectives

By answering the research questions, the following research objective will be achieved:

- To develop and evaluate a system approach for decision making that can be utilised by managers in any type of organisation.

A brief overview of the problem statement as discussed in Section 3.2. is given in *Figure 2-6: The Problem Statement Summary*.

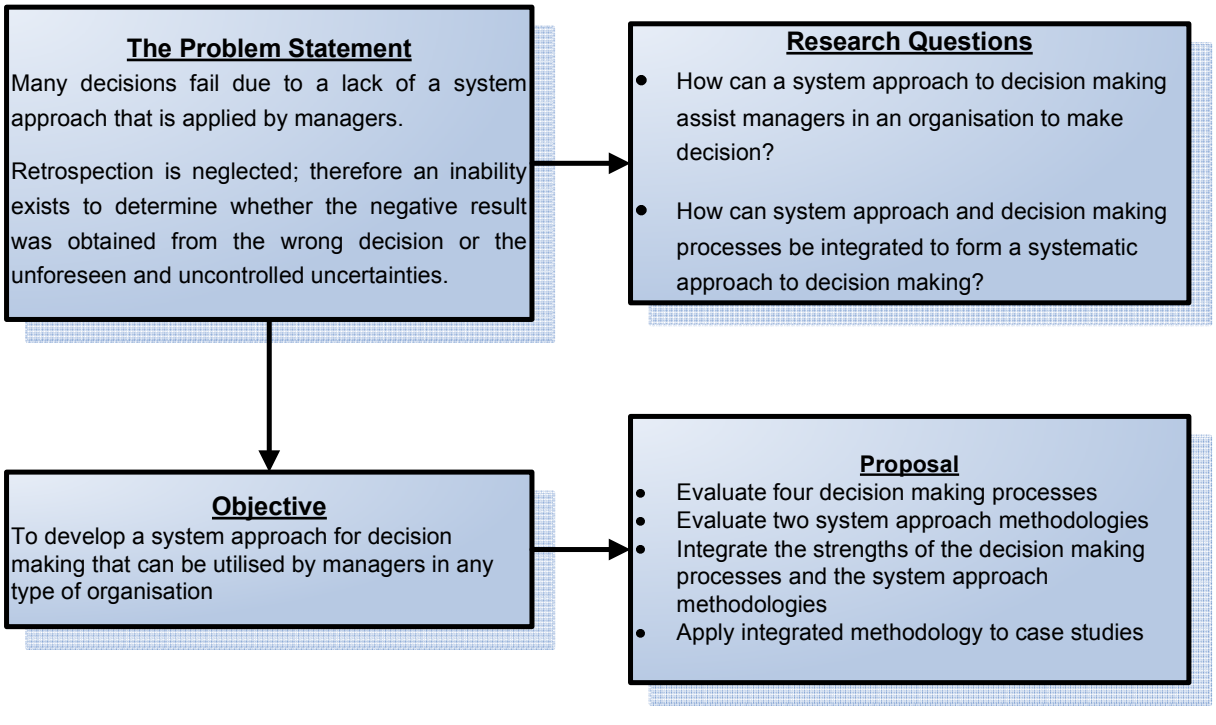


FIGURE 2-6: THE PROBLEM STATEMENT SUMMARY

2.5.5. Limitations and Assumptions

The following limitations apply to this dissertation:

- The focus of this dissertation will be on management decisions in for-profit organisations; and
- This dissertation will focus on the decision making methodology used, not uncertainties that influence a decision or the outcome.

The following assumptions were made for the purposes of this thesis:

- All management decisions will be handled through the same process, irrespective of complexity of the decision.
- Management activities and decisions are similar regardless of the industry of the organisation.

2.6. Conclusion

In Kraut's work (1989) and various other authors, including Drucker (1967), no distinction is made between the role of manager in different industries. The aim of the manager is to enable and assist an organisation to achieve its goal by managing resources through effective decision making (Kraut, et al., 1989).

However, many decisions made by managers are failure prone due to a lack of a system approach to the decision making process. The aim of this dissertation is to develop and evaluate a system approach for decision making that can be utilised by managers in any type of organisation.

Chapter 3: A System Approach

"Everything a manager does, he does through decision making"

- Peter Drucker

The dissertation will show that by applying a system approach to decision making, will enable a manager to make more effective decisions.

Chapter 3 gives an overview of system approach, what a system is and system approaches used.

3.1. Introduction

In Chapter 2 the conclusion was drawn that decision making processes lack a system approach. Therefore the decision maker is not always aware of the factors that impact the decision, the impacts the decision will have and whether the decision to be made is the right decision. This dissertation will focus on how a system approach to decision making may benefit an organisation by taking a step back and analysing the system as a whole and not focus on facets in isolation.

3.2. Defining Systems

According to the cybernetician (Beer, 2004), the purpose of a system is what is does. Systems are as pervasive as the universe in which they exists (Blanchard, et al., 2006). There are systems everywhere, in nature – the ecological system, in public services – the correctional system, in business – organisations, to name but a few. But what is a system?

The following definitions of systems exist:

- An assemblage or combination of elements or parts forming a complex or unitary whole (Blanchard, et al., 2006);
- An assemblage of objects united by some form of regular interaction or interdependence (Robertshaw, et al., 1978)

From the definitions given above, it is apparent that a system consists of different elements that interact and form relationships. Incorporating Beer's (2004) purpose, a

system consists of different elements that interact and form relationships to achieve a common goal or what it is. According to Blanchard (2006) a system consists of three elements, namely:

1. Components

   The operating parts of a system consisting of input, process and output.

2. Attributes

   The properties or discernible manifestations of the components of a system.

3. Relationships

   The links between components and attributes.

Blanchard (2006) classifies systems in four different categories to provide insight into the wide range of systems.

1. Natural and human-made systems

Natural systems are systems that came into being by natural processes. E.g. seasons and the food chain.

Human-made systems are those in which human beings have intervened through components, attributes or relationships.

2. Physical and conceptual systems

Physical systems manifest themselves in physical form. Physical systems are composed of real components, whereas conceptual systems symbols represent the attributes of components. Examples of conceptual systems are ideas, plans or hypotheses.

3. Static and dynamic systems

A static system is a system having structure without activity, e.g. a bridge.

Dynamic systems are a combination of structural components and activities over time, e.g. a building with management and employees, together with computers.

4. Closed and open systems

A closed system does not interact significantly with the environment, its environment only provides context. An example is the chemical equilibrium reached when reactants are mixed together. An open system allows energy, information and matter to cross it boundaries. Open systems interact with the environment, e.g. business organisations.

From the definitions given above, it can be concluded that anything can be seen either as a system or part of a system. Business organisations can be classified as human-made, physical, dynamic open systems. *Figure 3-1: Organisation as a System* illustrates how an organisation can be viewed as a system with sub-systems and elements.

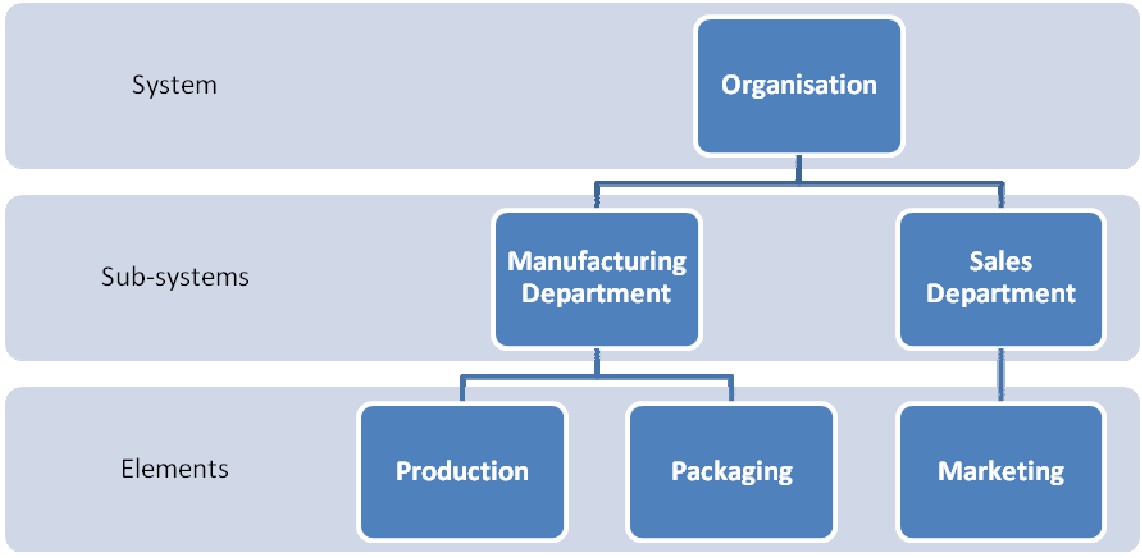


FIGURE 3-1: ORGANISATION AS A SYSTEM

3.3. Defining the System Approach

In Section 3.2 systems are defined, including the different types and classifications of systems. In this section, system approach is defined. System approach has been defined in many ways. Some definitions given to a system approach are:

- A system approach provides a distinctive, holistic, view of a situation and the problems that are associated with that situation (Jennings, et al., 1994).
- In the online Business Dictionary, system approach is defined as: Management thinking that emphasises the interdependence and interactive nature of elements within and external to an organisation.
- The following is the definition for system approach as defined by Blanchard (2006):
    1. A top-down approach that views the system as a whole;
    2. A life-cycle orientation; and
    3. An interdisciplinary or team approach.
- Aronson characterise the system approach as an approach that focuses on interactions between constituents of a system. Instead of isolating smaller and smaller parts of a system, a system approach expands its view to take into account larger and larger numbers of interactions (Aronson, 1999).

The following points are common themes that arise from the various definitions:

- It is a holistic approach – taking into consideration all the elements of the system, their interaction and dependencies on one another; and
- It is a beginning to end approach.

According to Buckley (1990), the system approach can be applied at organisational level in order to focus on the goal of the organisation, whereas systematic approaches are applicable to the daily activities of the organisations.

3.4. The Importance of applying a System Approach

In the definition given by Aronson (1999), in Section 3.3, a system approach does not break a system down into smaller parts, but rather expands its view to take into account larger and larger numbers of interactions. Aronson continues to explain that by doing this, the conclusions obtained from taking a bigger picture view, instead of breaking the problem down, is often noticeably different.

Consider the following example to illustrate this point:

A product developer designs an innovative drinking can that will never spill and keeps drinks cold for four hours. When only looking at the design function of the system, this product seems like a sure winner to go to market with. However, when considering development costs, additional raw materials required, the manufacturing costs and additional packaging requirements, the design is no longer feasible and the costs outweighs the benefits.

To avoid looking at a problem or a situation in isolation, one should take a step back, look at the situation from a bigger picture view and then decide on actions to be taken.

3.5. System Approach Processes

Two system approach processes were analysed in this research. The processes were selected based on the author's familiarity of the processes, which were studied intensely during undergraduate and postgraduate studies. The two processes are illustrated and a brief description is given in sections 3.5.1 and 3.5.2. In Section 3.5.3 the two sample processes are compared and discussed.

3.5.1. The TOC Approach

According to Dettmer (1997), Theory of Constraints (TOC) is a collection of system principles, tools and methods for improving overall system performance. Therefore, it is a system approach.

TOC is a management philosophy that was introduced by Eliyahu Goldratt in 1984. The approach focuses on finding the constraint in a system and optimising the constraint. The TOC philosophy has challenged the thinking that by optimising parts of a system (local optimisation), the system as a whole will be optimised (global optimisation).

Rahman (1998) summarises the concept of TOC in two distinctive points:

1. Every system will have a constraint.

   If no constraint exists, nothing will limit the system or the organisation to exceed its goal, e.g. to make unlimited profits.

2. Constraints equal improvement opportunities.

   Since the output of a system is limited by the constraint (Goldratt, et al., 1992), by elevating the constraint the system can be improved.

In *The Goal*, Goldratt (1984) uses the analogy of an organisation as a chain. A chain is only as strong as its weakest link; by strengthening the links that are not the constraint, the strength of the chain is not improved and the chain remains as strong as its weakest link.

Goldratt has defined five focusing steps to maximise the performance of any value chain (AGI Goldratt Institute, 2001). Dettmer (2007) describes the five focusing steps to be used to concentrate improvement efforts on the constraint of the system, which has the capability of producing the most positive impact on the system. The five steps are listed and described in *Table 3-1: TOC 5 Focusing Steps*.

TABLE 3-1: TOC 5 FOCUSING STEPS

Step		Description
1.	Identify the system's constraints	Identify which part of the system constitutes to the weakest link. Determine whether it is a physical constraint and which policy is driving it.
2.	Decide how to exploit the constraint	Determine what can be done to maximise the performance of the constraint, without committing to potentially expensive changes or upgrades.
3.	Subordinate everything else	Adjust the rest of the system to enable the constraint to perform at maximum effectiveness.
4.	Elevate the constraint	Take whatever action is required to eliminate the constraint.
5.	Go back to Step 1, but beware of "inertia"	Once the constraint has been broken, the process starts from the beginning to identify the new constraint. The caution about inertia is a reminder that one must not become complacent, the cycle never ends.

By using the five focusing steps of TOC, Pretorius (2009) compiled a process flow to depict the TOC approach, as illustrated in *Figure 3-2: TOC 5 focus step flow diagram*. Each of the five steps is depicted in the process flow diagram.

The manager or decision maker should define the goal that is to be achieved and the measurements that will indicate whether the goal is achieved. The constraint should be identified that is hindering the organisation to achieve the defined goal. Constraints can be classified as either physical constraints or policy and behaviour constraints.

A physical constraint should be exploited to perform at maximum effectiveness; the other elements of the system should be adjusted to enable this. If the constraint is not broken, additional capacity should be added to the constraint. If the constraint is not physical, a new policy should be developed or behaviour should be changed. Once the constraint has been broken, a new constraint should be investigated.

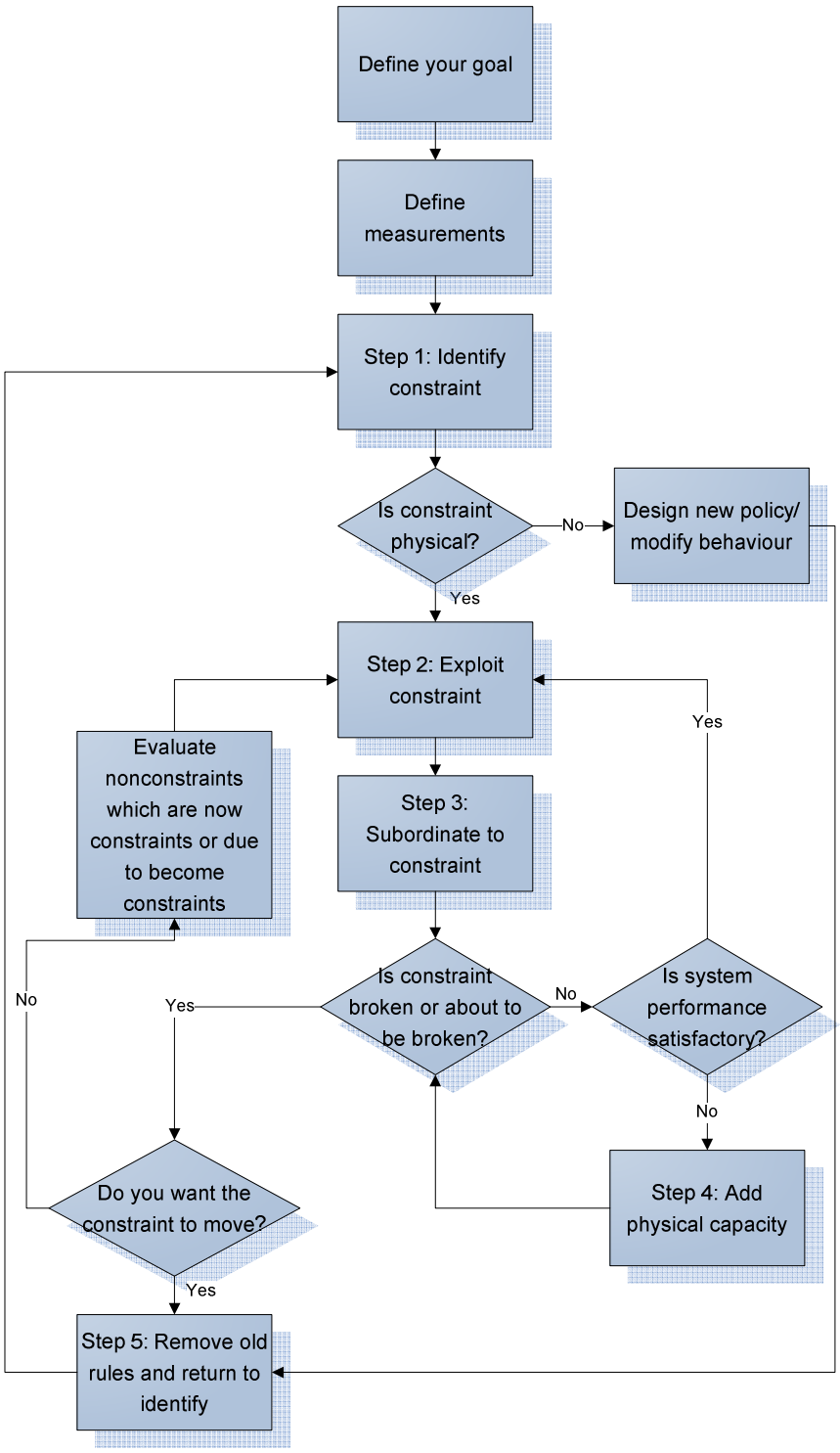


FIGURE 3-2: TOC 5 FOCUS STEP FLOW DIAGRAM

(Pretorius, 2009)

Incorporating a system approach to the decision making process

3.5.2. The Soft System Approach

The soft system approach focuses on implementing a change rather than optimising a system (Checkland, 2000).

According to Ho (1994) the soft system approach emphasises that equally valid perceptions of the reality of a problem exist and that discussions and debates will lead towards some agreed feasible solution that should alleviate the problem situation.

During the soft system approach the identified problem should be expressed and the root definitions of the relevant systems should be identified. The root definitions should be used to construct conceptual models as alternative solutions, which should be evaluated and compared with each other. The conceptual model that best addresses the defined key issues, and the outcomes of the implementation of the model that is most desirable and feasible, should be implemented.

The soft system approach is illustrated in

Figure 3-3: The Soft System Model and described in further detail in

Table 3-2: The Soft System Model Description (Tanji, et al., 2002).

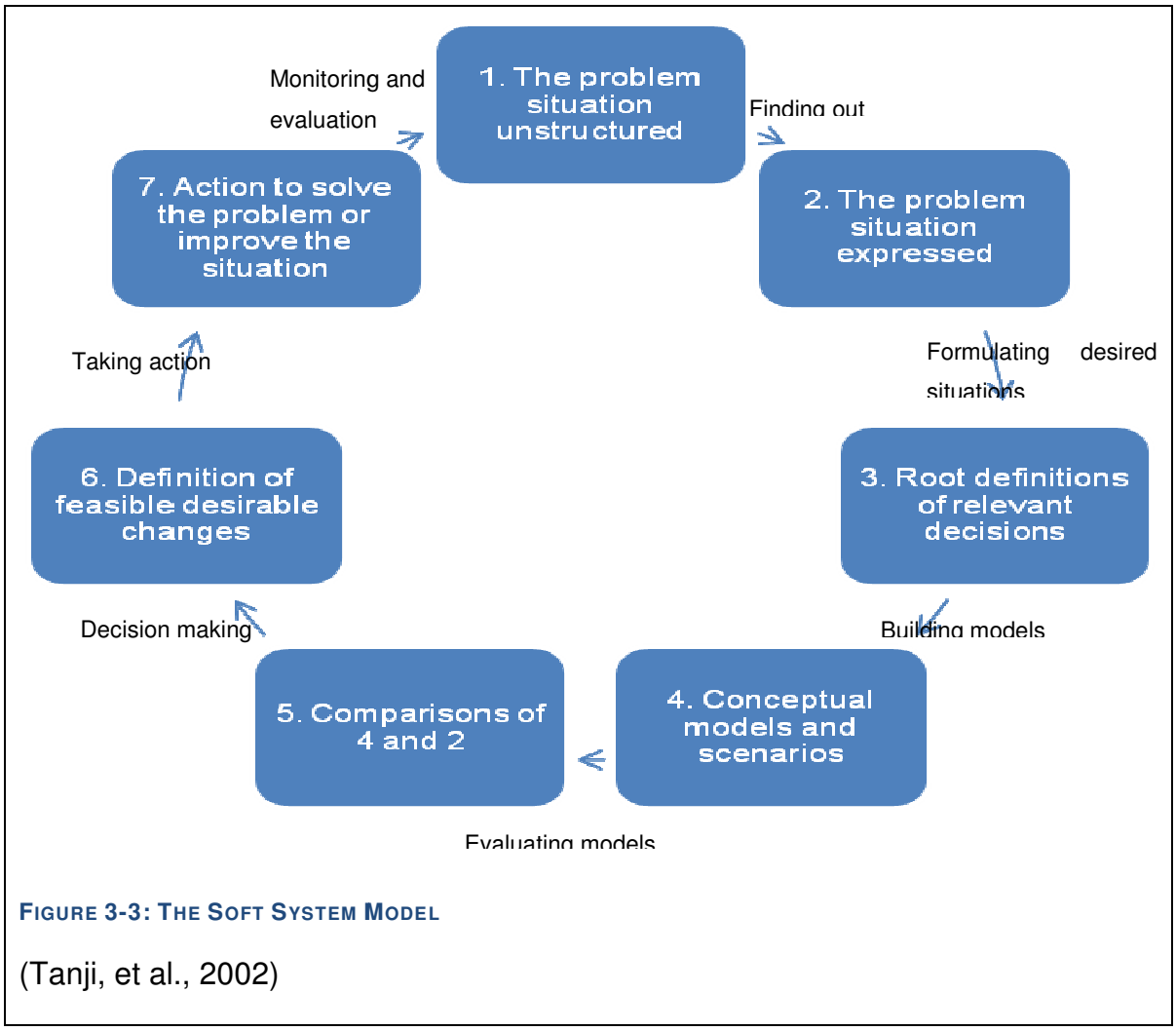


FIGURE 3-3: THE SOFT SYSTEM MODEL

(Tanji, et al., 2002)

TABLE 3-2: THE SOFT SYSTEM MODEL DESCRIPTION

Step		Description
1.	The problem situation: unstructured	An analysis of the problem and the search for solutions initiates where a problem is perceived. At this stage, it might not be possible to define the problem with precision, as different perceptions of what the problem is might exist.
2.	The problem situation: expressed	To formulate the problem, the stakeholders involved should be identified and their relation to the problem. To form what is called the rich picture, all the elements must be included whether they relate to physical, technical, economic, legal, political or administrative considerations along with subjective considerations based on understanding, norms, values and beliefs of the stakeholders involved. It is then necessary to extract areas of conflict or disagreement as well as the key tasks that must be undertaken within the problem situation.
3.	Root definition of relevant systems	Identify the relevant systems and subsystems. These systems can be formal or informal and are those that carry out purposeful activities that will lead to improvement or elimination of the problem situation. For each relevant system, a root definition should be formulated. A root definition is a formulation of the relevant system and the purpose of the system to achieve a situation in which the problem is balanced out or eliminated.

Step		Description
4.	Conceptual models	On the basis of the root definitions, conceptual models are constructed. These models include all the probable activities and measures that the system needs to implement to achieve the root definition. In other words, alternative scenarios need to be formulated.
5.	Comparison of expressed problem situation and conceptual models	The next step is to compare the scenarios or conceptual models with the situation analysis. The idea is to test the scenarios and decide whether the implementation of a scenario would resolve the defined key issues.
6.	Feasible, desirable change	If the implementation of a conceptual model would, it needs to be investigated and there needs to be debate as to whether the changes proposed, resulting from implementation of the scenario, are both desirable and feasible. What is desirable and what is feasible might clash as a result of system objectives, possibilities and constraints.
7.	Action to improve the problem situation	The final step is to define the measures and changes to be implemented.

3.5.3. Interpretations of System Approaches

Both the TOC 5 focus step flow diagram and the soft system model clearly brings to light that a “bigger picture” view should be taken when confronted with any problem.

The TOC model emphasises the importance of always staying true to the organisation’s goal and to only optimise or improve a process/function if it will aid the organisation to achieve its goal (Goldratt, et al., 1992).

The soft system model describes how a perceived problem should be broken down into systems, sub-systems and their elements. This model provides guidelines for the handling of multiple interpretations of the complex and interrelated problems that exist in organisations.

Table 3-3: System Approach Characteristics illustrates how both the TOC and the Soft System approach satisfy the key characteristics of a system approach as defined in Section 3.3.

Incorporating a system approach to the decision making process

TABLE 3-3: SYSTEM APPROACH CHARACTERISTICS

	System Characteristic	TOC	Soft System
1	Holistic	Views the system as a whole in order to identify the system constraint.	A rich picture of the problem situation should be formed, which includes various elements to enable a holistic view.
2	Top down	The organisation is seen as a chain; the weakest link is identified on a high level and further investigated to find the root cause.	The relevant systems and subsystems are identified in order to find the root definition.
3	Interdisciplinary	Each department is seen as a link of the chain; Goldratt (1992) highlights the importance of cross functional collaboration as key to making TOC succeed.	The problem is expressed taking into account multi-disciplines, including legal and technical.
4	Life-cycle orientated	The TOC process is a continuous process which runs across life cycles.	The Soft System approach is a continuous process which runs across life cycles.

By applying a system approach to a problem, it can be determined whether the perceived problem is merely a symptom of another problem or whether is the root cause.

3.6. Conclusion

One is surrounded by systems every single day. Anything can be seen either as a system or part of a system.

By following a system approach when making a decision, a bigger picture view can be obtained. Having a bigger picture view, will aid the manager or decision maker in identifying whether the decision to make is indeed the right decision to be made, or merely a symptom of another decision or problem. A system approach aids the decision maker to determine where the decision to be taken fits in and the impact it will have on the system.

Both the TOC and Soft System approach display the characteristics of a system approach.

In Chapter 4 the strengths of the decision making processes and the elements of system approaches are integrated to form a system approach to decision making.

Chapter 4: Integrated Approach

"Nothing is more difficult and therefore more precious, than to be able to decide"

- Napoleon Bonaparte

Chapter 4 focuses on incorporating the strengths of the decision making processes analysed in Chapter 2 with the characteristics of the system approach processes analysed in Chapter 3. The purpose for doing this is to design a single holistic decision making process that follows a system approach to ensure decisions are dealt with effectively.

4.1. Proposed Methodology: A System Approach to Decision Making

From the analysis of four decision making processes, the conclusion was drawn that the decision making processes do not incorporate a system approach in the process.

By incorporating the aspects of the system approach and the common threads identified in the decision making processes, the process in *Figure 4-1: A System Approach to Decision Making* has been designed. The process is described in more detail in *Table 4-1: A System Approach to Decision Making Process Description.*

PROCESS OVERVIEW

When initiating the decision making process, the decision maker is to ensure that the organisation's goal is kept in mind at all stages of the process. The aim of the process is to support the organisation's goal and therefore only making decisions that will enable, directly or indirectly, the organisation to achieve its goal (Goldratt, et al., 1992).

When a problem is identified, the decision maker and if possible a team, should clearly state and document the problem in an unbiased manner. It must be determined whether the problem hinders the organisation to achieve its goal, directly or indirectly.

Whilst defining the problem, the decision maker should identify the system the decision forms part of, as well as the subsystems involved. The decision maker

together with a team should brainstorm and analyse the problem to determine whether the problem is the root problem, or merely a symptom of another problem.

Once the root problem has been identified, the decision maker is to identify the aspect of the problem which is the system constraint. This aspect or element should be the element that hinders the system to reach its defined goal. At this stage the decision maker should redefine the problem to include the root problem and the system constraint to ensure that everyone understands the problem that should be solved.

The decision maker should identify measurements and criteria that will determine whether the problem has been solved successfully. The measurements and criteria that are defined should be unbiased and unambiguous (Friday-Stroud, et al., 2007).

Alternative solutions should be identified based on preset criteria and the preferred solution should be selected in accordance the measurements defined. Following the implementation of the preferred solution, the decision maker should record the lessons learnt during the process to avoid making the same mistakes and to know what worked well during the process.

The system approach to decision making process is illustrated in *Figure 4-1: A System Approach to Decision Making* and described in further detail is given in *Table 4-1: A System Approach to Decision Making Process Description.*

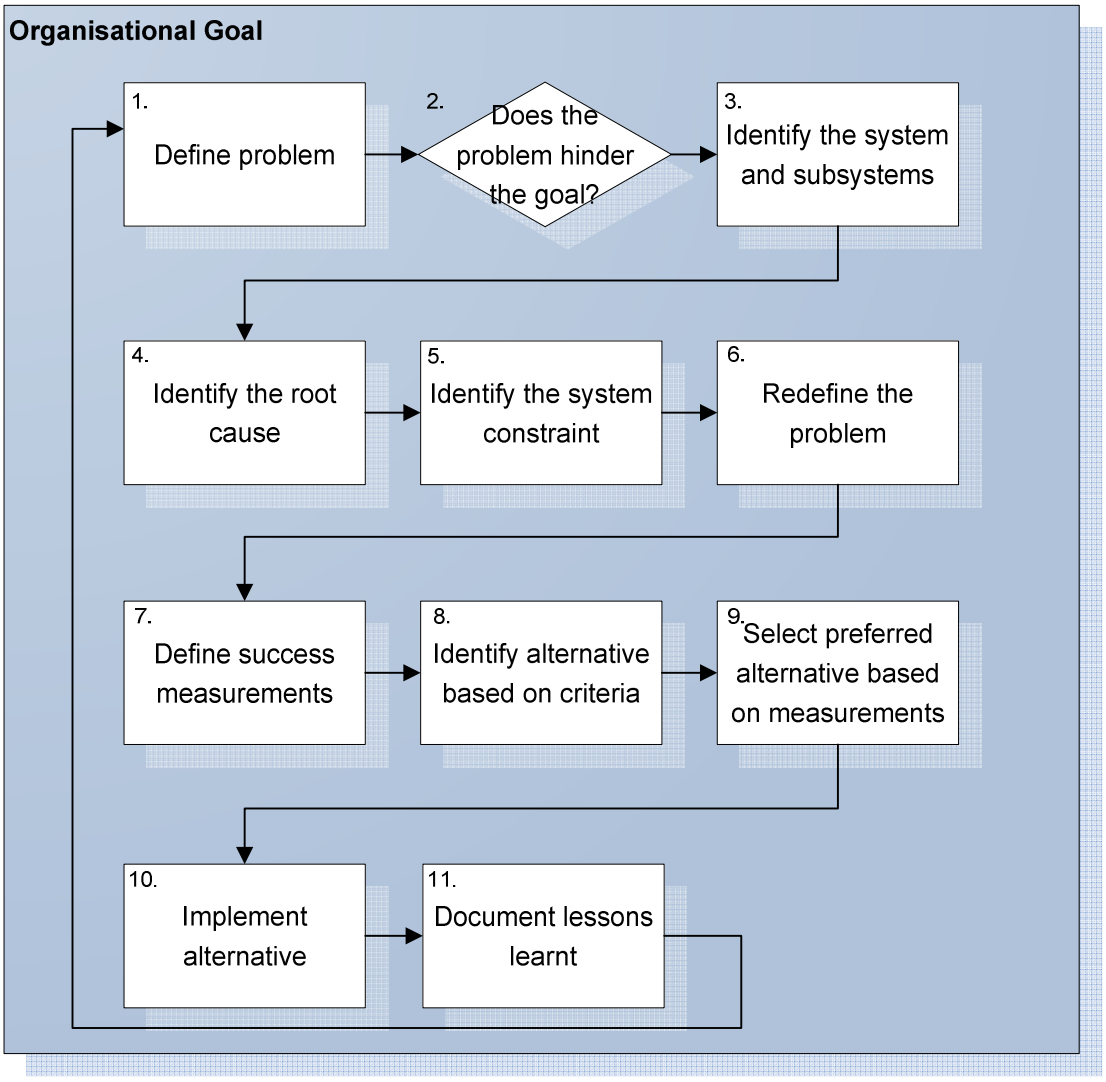
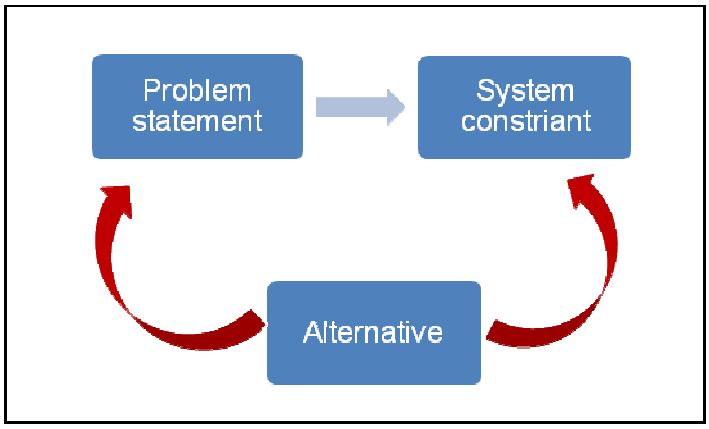


FIGURE 4-1: A SYSTEM APPROACH TO DECISION MAKING

TABLE 4-1: A SYSTEM APPROACH TO DECISION MAKING PROCESS DESCRIPTION

Step		Description
Organisational Goal		According to Goldratt (Goldratt, et al., 1992) the real goal of any for-profit organisation is to make money, now as well as in the future. Other conditions e.g. satisfying market needs, minimising environmental impact, being a responsible company, are merely requirements to achieve this goal. The organisation's goal forms the base for each of the steps of the system approach to decision making process. Having the organisation's goal in mind is of high importance to ensure that all decisions made aspire towards the goal and supports it.
1.	Define problem	The decision or problem should be clearly and factually stated and documented in an unbiased manner.
2.	Does the problem hinder the goal?	Based on the description above for the organisation's goal and problem definition, it should be determined how the problem affects the bottom line of the organisation and the impact. If the problem does not affect the goal of making money or has little impact, a lower priority should be assigned to the problem.
3.	Identify the system and subsystems	The decision maker should identify the system that the decision or the problem plays a role in. The subsystems should also be identified in order for the decision maker to have a holistic view of the influences and facets of the decision or problem.

Step		Description
4.	Identify the root cause	A team should brainstorm whether the perceived problem is truly the problem or just a symptom to another problem. A step should be taken back to ensure that the bigger picture is taken into consideration and that the problem does not only address local optimisation, but takes into consideration global optimisation
5.	Identify the system constraint	Dettmer (2007) defines a constraint as any element of a system or its environment that limits the output of the system. Keeping in mind the analogy used by various authors, including Goldratt (1992) and Dettmer (2007), that a system is like a chain and a chain is only as strong as its weakest link, the conclusion can be drawn that decisions that directly influence/hinders the organisation's ability to achieve its goal, should be assigned a high priority status. Macmillan (2005) describes global/system optimisation vs. local optimisation as follows: if the weakest link of a chain is improved, it will improve the overall strength of the chain; however improving a non-weakest link will add weight, but not strength. Therefore, it is important for the decision maker to identify the constraint within the defined problem.
6.	Redefine the problem	The decision maker should redefine the problem to include the root causes and the system constraint to ensure that the decision or problem is clearly understood and documented.

Step		Description
7.	Define success measurements	The success measurements should be defined to determine whether the decision or the problem was successfully resolved. Measurement definitions should be consistently applied throughout the process and the organisation. All measurements must be unbiased and unambiguous.
8.	Identify alternatives based on criteria	Alternatives should be identified based on the criteria that provision should be made for both the problem and the system constraint defined. Figure 4-2: Selection Criteria illustrates the relationships between the problem statement, system constraint and an alternative identified. Once the problem has been defined, the system constraint can be identified. An alternative can then be identified that should satisfy and address both the problem statement and the system constraint.  Figure 4-2: Selection Criteria

Step		Description
9.	Select the preferred alternative based on the defined measurements	In step 7 success measurements were identified which indicate how successful the problem was resolved. These measurements should be used when the preferred solution is selected.
10.	Implement solution	The preferred solution should be implemented. During this step resources should be allocated to implement the solution and an Action Plan should be documented.
11.	Document lessons learnt	Once the solution has been implemented and the constraint has been eliminated, go back to step 1. Lessons learnt during the process should be documented, as well as the results achieved. From the analogy that an organisation is like a chain, it is concluded that once the weakest link was strengthened, another link will become the weakest link, hence the process will start again at step 1.

4.2. Conclusion

By including a system approach to decision making the following strengths of this approach should prove beneficial to the process:

- The organisation's goal is taken into consideration;
- A "bigger picture" view is taken when defining the problem;
- Problems that are constraints, that have direct or indirect, impact on the organisation's goal are addressed first;
- Only the root problems are addressed, not only the symptom problems;
- Lessons learnt are documented for future use; and
- Focus is on global optimisation, not local optimisation.

The validity of the defined model will be tested in Chapter 5 through applying the model to three identified actual business problems on management level. The validity of the model will be based on the feasibility of implementing each step of the model to the case studies.

Chapter 5: Process Application Testing

"Management means decision making."

- Ross Moore

In Chapter 5 the System approach to decision making, as conceptualised in Chapter 4, is applied to three case studies with the aim of testing the validity of the model. In this chapter it is discussed what the effect of applying the process is on each scenario.

5.1. Approach

A case study is a description of a management situation (Bonoma, 1985). Therefore, for the purpose of this dissertation, the model presented in Chapter 4 will be tested by applying the model to three case studies.

Johnston (1999) reports that using case research is useful when the topic being researched, or in this case model to be tested, cannot be studied outside its natural setting or the results obtained cannot be readily quantified.

The case studies presented are independent studies from which the validity of the model is tested individually.

The aim of the case studies is not to generalise to a sampling universe, but to directly confirm or disconfirm the model. This will be done by trying to replicate the findings or the success of implementing the model under various management conditions (Johnston, et al., 1999).

5.2. Case Study 1: Cost Cutting

A South African steel manufacturing company was hit hard by the recent global recession. Due to the significant reduction in construction projects and decrease of expansion projects in the mining sector, a definite decrease in demand for most of the steel products were experienced by the company. However, one of the products, hereafter referred to as *Product 1*, was not affected. To the contrary, the demand for the product increased. At the moment this product's plant is running at full capacity, producing continuously. However, during the final quality check at the plant, only 60% of the product produced is of acceptable quality that can be sold.

To cope with the decrease in sales of products, with the exception of *Product 1*, the company embarked on a cost cutting exercise throughout the organisation. Listed below are some of the cost cutting initiatives that were identified:

Initiative	Description
Reduce overhead costs	Launch initiatives for energy savings, budget cuts for supporting functions, implementation of compulsory leave
Reduce operating times	Reduce operational time to four days a week, with the exception of the plant manufacturing Product 1, which is to run 24/7

When looking at the problem described above it may be evident that management is not taking a step back and looking at the problem from a bigger picture view.

Although costs will be reduced in certain departments, will the company achieve its goal?

Using a System Approach

By using a system approach to decision making the organisation can focus on the problem on a higher level, resulting in global optimisation and not only local optimisation. Below the system approach to decision making as described in Chapter 4 is followed, by following this approach a holistic view of the problem is obtained and the problem is addressed as a whole.

1. The Organisation's Goal

For this case study, the assumption is made that every for-profit organisation's goal is to make money, now and in the future (Goldratt, et al., 1992).

2. Define problem

The number one problem when looking at this steel manufacturer is that it is making a financial loss.

3. Does the problem hinder the goal?

Since the goal of the organisation is to make money, making a financial loss is a clear contradiction of the goal, hence it does hinder the goal.

4. Identify the system and subsystems

The problem influences the entire organisation; therefore the organisation is the system. Within the organisation numerous departments exist, e.g. manufacturing, procurement. These departments are the subsystems.

5. Identify the root cause

Why is the organisation making a loss? The following root causes are contributing to the problem:

- High cost of raw materials;
- High overhead costs;
- High production costs;
- Low sales for most products; and

- 40% of *Product 1* are defects and cannot be sold.

6. IDENTIFY THE SYSTEM CONSTRAINT

Two constraints exist for this problem. Firstly, since sales of all the products, except *Product 1,* are low, an external market constraint exists.

Secondly, only 60% of *Product 1* manufactured can be sold due to quality constraints. Therefore for *Product 1* an internal constraint exists.

7. REDEFINE THE PROBLEM

By taking the root causes and the identified constraint into consideration, the problem statement can be redefined as follows:

The company is experiencing a financial loss as a whole, factors that are contributing to the loss are:

- High cost of raw materials;
- High overhead costs;
- High production costs;
- Low sales for most products; and
- 40% of Product 1 are defects and cannot be sold.

An external market constraint exists for all the products, except *Product 1*. For *Product 1* an internal constraint has been identified.

8. DEFINE SUCCESS MEASUREMENTS

The success of this problem can be clearly observed by analysing the income statement for the organisation after implementation.

9. IDENTIFY ALTERNATIVES BASED ON CRITERIA

By taking into account the problem statement and the system constraints, the following alternatives were identified:

i. Redefine the organisation's marketing strategy to expand market and market share;

ii. Introduce new products to the product line;

iii. Reduce the number of defects manufactured for *Product 1*; and

iv. Reduce the organisation's overhead costs.

10. SELECT THE PREFERRED ALTERNATIVE BASED ON THE DEFINED MEASUREMENTS

Each of the alternatives identified are measured against the impact the alternative will have on the income statement of the organisation.

i. Redefine the organisation's marketing strategy to expand market and market share.

According to the marketing manager of the organisation, the steel industry is a pull market, the organisation will not greatly benefit from improving the marketing strategy of the organisation. No additional funds are available to endeavour on an extensive marketing campaign.

ii. Introduce new products to the product line.

The effect of introducing new products to the product line can be beneficial. However, at this point in time, the organisation cannot afford additional capital investment for new lines.

iii. Reduce the number of defects manufactured for Product 1.

By reducing the number of defective *Product 1* items, the sales of this product can increase. Since the market demand can be met by reducing the defects to 10% of products produced, production will be able to reduce the number of overtime required for producing *Product 1.*

iv. Reduce the organisation's overhead costs.

Costs can be saved by reducing the organisation's overhead costs. The savings obtained will have an impact immediately on the income statement.

By considering the effectiveness of all the alternatives and how they satisfy both the problem statement and address the system constraint, alternative iii should be selected. Alternative iii will have the lowest cost impact; however will have the most positive impact on the profits of the company.

11. IMPLEMENT SOLUTION

A project should be initiated to determine how the quality issues in the *Product 1* plant can be addressed.

The project will follow the system approach decision making process to determine what alternatives exists to address the quality issues in the plant and which alternatives are feasible.

12. DOCUMENT LESSONS LEARNT

In retrospect the decision maker should analyse the decision taken and the results obtained for future reference and to ensure learning and continuous improvement when applying the decision making process.

Conclusion

The two initiatives the organisation identified to address the problem had little effect on the bottom line of the organisation. By reducing the operating hours of the plants and implementing compulsary leave, the organisation was not able to manufacture the required products for the market. When the decision was made, the effect of the solution on the organisation was not assessed and alternative solutions were only identified within the department and not taking a bigger picture view by incorporating other departments in the decision.

By implementing the System Approach to Decision Making process this would have been avoided. By taking a bigger picture view the problem was broken down into root

causes across departments. Where cost containment was mainly drived from Supply Chain and Finance, Manufacturing would have also been included to identify alternatives.

5.3. Case Study 2: Organisational Design

An organisation has identified an opportunity to leverage its market position and size with its suppliers by using strategic sourcing.

In the supply chain department a new function was established, which will only be focusing on strategic sourcing. The main focus areas will be on identifying cost saving/efficiency opportunities, evaluating potential suppliers, negotiating supplier contracts and starting (and continuously managing) supplier relationships. Initially the new function will only be focusing on four categories. During the first year a target of R15 million should be saved by the team.

A manager was appointed to lead the new function and was allocated a budget of R8 million per annum for resources.

The cost of resources is given in *Table 5-1: Resource Cost.*

TABLE 5-1: RESOURCE COST

Job level	Brief role description	Cost to company per annum
Category lead	To give guidance and manage the category team and manage supplier relationships	R800 000
Category specialist	Conduct negotiation meetings with suppliers, conduct analysis, manage category team	R600 000
Technical specialist	Give technical input and assess suppliers on technical ability	R750 000
Analyst	To conduct analysis, document and track benefits achieved	R400 000

The manager has to determine what his function's organisational design will be to effectively and successfully run the new function.

Using a System Approach

By using a system approach to decision making the manager can embark upon the problem in a systematic manner. Below the system approach is followed, by following this approach a holistic view of the problem is obtained and the problem is addressed as a whole.

1. THE ORGANISATION'S GOAL

The goal of the manager is to establish a strategic sourcing function that will reduce the total cost of materials and services ("external spend") for the organisation while maintaining or increasing quality and service.

2. DEFINE PROBLEM

The problem that the manager is experiencing is to appoint new resources on the correct level and allocate them to a category.

3. Does the problem hinder the goal?

The problem does hinder the goal; if the correct people are not appointed with the correct knowledge base of strategic sourcing the new function will not be successful.

4. Identify the system and subsystems

In this case study the new strategic sourcing function is the system, the function can be broken down into the four categories, which represents the subsystems.

5. Identify the root cause

The root cause of the problem is that a new function is started and the organisation does not have the internal skills to carry out the function of strategic sourcing.

6. Identify the system constraint

The manager has a budget constraint for employing resources for his function. The manager can only appoint new resources with the budget allocated to him by the Head of Department. A market constraint also exists, as only a limited amount of people have relevant experience in strategic sourcing and are currently in the market for a new position.

7. Redefine the problem

By taking the root causes and the identified constraint into consideration, the problem can be redefined as follows:

External resources with prior experience in strategic sourcing should be appointed within the allowed budget. The right combination of resources on the right level should be appointed to ensure that the targets are met.

8. Define success measurements

A target has been set of R15 million for the team. The function will be measured upon whether the target was achieved or not.

9. Identify alternatives based on criteria

By taking into account the problem statement that the manager needs to appoint new resources and the system constraints, namely the allocated budget and experience

levels required, alternatives were identified for appointing the right resources at the right level within allocated budget.

Table 5-2: Resource Alternatives illustrates the alternative resource allocations considered per level.

TABLE 5-2: RESOURCE ALTERNATIVES

Job level	Alternative / Cost	I	II	III	IV
Category lead	R800 000	4	4	2	4
Category specialist	R600 000	4	4	4	2
Technical specialist	R750 000	4	2	2	2
Analyst	R400 000	4	6	6	4
Total cost:		R10.2m	R9.5m	R7.9m	R7.5

10. SELECT THE PREFERRED ALTERNATIVE BASED ON THE DEFINED MEASUREMENTS

Based on the role descriptions provided in

Table 5-1: Resource Cost, it is concluded that the category specialist can act as a category lead if required. Therefore alternative iii should be selected. The two team leads can be assigned two categories each, when the team lead is not available, the category specialist on each team can take the role as the team lead. Since the technical specialists are only required for technical evaluation, two specialist can be appointed or four technical specialist part time. Six analysts should be appointed, that can assist across the categories, to ensure that all analytics are completed.

Incorporating a system approach to the decision making process

11. IMPLEMENT SOLUTION

The manager should initiate the recruitment process to appoint the following resources:

2 category leads;

4 category specialists;

2 technical specialists; and

6 analysts.

12. DOCUMENT LESSONS LEARNT

The manager should assess whether the correct combination of resources have been appointed, these lessons learnt will prove valuable when other categories are to be included in the function and require resources to be appointed.

Incorporating a system approach to the decision making process

5.4. Case Study 3: Training Approach

A South African mining company identified multiple governance issues in the supply chain department. These issues were substantiated by recent performance in audit reports. As a response to the audit report, the company launched a governance assessment project within supply chain; the following results were obtained:

- Lack of documented processes and procedures;
- Misalignment exists between processes and procedures followed at the three different sites; and
- Lack of training on supply chain policies.

A new project was launched within the supply chain function; the objective of the project was to institutionalise a culture of governance within the Supply Chain to mitigate business risk on a sustainable basis, without negatively affecting service levels.

The deliverables of the project included:

- A revised supply chain policy;
- Documented procedures across the Supply Chain process; and
- Development of training material.

For the development of the training material a training approach was to be developed and agreed upon. The system approach to decision making process is used below to analyse the decision that needs to be made regarding the approach to be followed.

Using a System Approach

By using a system approach to decision making the manager can analyse the problem in a systematic manner. Below the system approach is followed, by following this approach a holistic view of the problem is obtained and the problem is addressed as a whole.

Incorporating a system approach to the decision making process

1. The Organisation's Goal

The goal of the manager is to successfully transition the supply chain department to follow the processes and procedures defined by the project team.

2. Define problem

To define a training approach to enable the end user to follow and understand the processes and procedures defined.

3. Does the problem hinder the goal?

To be able to use the processes and procedures, the end users need to know how to use it. The problem does hinder the goal.

4. Identify the system and subsystems

The system is the organisation, since supply chain influences the organisation as whole. The subsystems are supply chain, the departments that are involved in the training, etc.

5. Identify the root cause

Since the project team designed the processes and procedures and took ownership of it, the root cause for needing a training approach is to ensure that knowledge is transferred effectively and efficiently.

6. Identify the system constraint

The system constraints identified include:

- Time constraint for the development of the training material;
- Skill constraint, in terms of development of high technology training material;
- Availability of trainers; and
- Budget constraints.

All the abovementioned constraints are internal to the organisation.

Incorporating a system approach to the decision making process

7. Redefine the problem

An effective approach to transfer knowledge of supply chain processes needs to occur within the following constraints:

- Time constraint for the development of the training material;
- Skill constraint, in terms of development of high technology training material;
- Availability of trainers; and
- Budget constraints.

8. Define success measurements

The success of the training approach will be measured on the acceptance of the end users of the processes and the degree of understanding attained. The number of queries received following the training will be a measurement as well.

9. Identify alternatives based on criteria

Alternative approaches to training were identified via internet based research and approaches that the organisation is familiar with.

The following alternative approaches have been identified, as illustrated in *Table 5-3: Training Approaches*.

Table 5-3: Training Approaches

Method	Instructor-led Classroom Training	Computer-based training
Medium	In-person lecture On-line exercises	On-line lecture On-line exercises
Techniques	Use of training modules on functions based on how the job is conducted, (e.g. how does the	Use of training modules on functions based on how the job is conducted, (e.g. how does the

Method	Instructor-led Classroom Training	Computer-based training
	inventory procedure work) Use of case studies that represent the real work world	inventory procedure work) Use of case studies that represent the real work world
Tools	Workstations, overhead projector, large screen projector, printer	Authoring software, workstations
Aids	Flipchart emphasizing key points, handouts. Power Point slides	Handout providing instructions for accessing and using the course

10. SELECT THE PREFERRED ALTERNATIVE BASED ON THE DEFINED MEASUREMENTS

Considering the defined constraints, the training approach to be used will utilise both approaches identified as alternatives.

Instructor-led classroom training will be used to train the specialists, who will be utilised as training assistants during the training of the other end users during instructor-led sessions.

The training material will be available electronically after each training session to the end users. The end users are to complete a computer-based test to test their understanding and acceptance of the processes and procedures.

11. IMPLEMENT SOLUTION

A training approach is to be developed in terms of the selection of the approach to be followed. In the training approach it has to be defined who, what, when and where the training will be. The training material will also be developed in accordance to the selection.

12. DOCUMENT LESSONS LEARNT

The decision maker should assess the training approach selected after implementation and document whether the approach was successful and accepted by the end users. The lessons learnt will prove valuable when other training approaches need to be developed for future projects.

5.5. Conclusion

Based on the three case studies the validity of applying the system approach to decision making model was tested. During the application of the model to the three independent case studies the success of the implementation of the model was replicated.

However, due to the complexity of the management function, the validity of the proposed model has not been tested fully. Therefore, only limited validity has been established.

Johnston (1999) has identified seven major groups of management tasks, namely:

- Managing individual performance;
- Instructing subordinates;
- Planning and allocating resources;
- Coordinating interdependent groups;
- Managing group performance;
- Monitoring the business environment; and
- Representing one's staff.

The three case studies represented only three of the seven major groups of management tasks. Therefore, only limited validity was established.

However, the three case studies did show that the system approach methodology could be applied successfully to management decisions. By using this methodology a holistic view can be obtained of a problem, resulting in effectively handling and managing problem.

Chapter 6: Conclusion

1. *Anyone can make a decision, given enough facts.*
2. *A good manager can make a decision without enough facts.*
3. *A perfect manager can operate in perfect ignorance.*

- Spencer's Laws of Data

This dissertation focused on determining firstly why decisions fail and secondly conceptualising and evaluating a model which will support the management decision making function.

During the analysis of four decision making processes, it was found that the decision making processes are narrowly focused and do not necessarily put the decision into context. However the processes do emphasise the importance of defining the decision or problem in an unambiguous and unbiased manner, as well as establishing measurements and criteria on which alternatives are evaluated and selected from.

The conclusion was drawn that current decision making processes analysed do not necessarily incorporate a clear system approach. Therefore the decision maker is not always aware of the factors that impact the decision and all the facets the decision will impact. The decision maker is also not aware whether the decision to be made is the right decision, or merely a symptom of another decision.

By incorporating a system approach when making a decision, a bigger picture view can be obtained. Having a bigger picture view, should aid the decision maker in identifying whether the decision to make is indeed the right decision to be made, or merely a symptom of another decision or problem. A system approach aids the decision maker to determine where the decision to be taken fits in and the impact it will have on the system.

A system approach to decision making process was designed, incorporating the strengths of the decision making process and system approach methodologies researched. The following benefits were realised when using the integrated model:

- The organisation's goal was taken into consideration;
- A "bigger picture" view was taken when defining the problem;
- Problems that were constraints, that have direct or indirect, impact on the organisation's goal were addressed first;
- The root/true problems were addressed, not only the symptom problems;
- Lessons learnt were documented for future use; and
- Focus was on global optimisation, not local optimisation.

Based on the three case studies the validity of applying the system approach to decision making model was tested. During the application of the model to the three independent case studies the success of the implementation of the model was replicated.

However, due to the complexity of the management function, the validity of the proposed model has not been tested fully. Therefore, only limited validity has been established.

Future research topics

Since only limited validity has been proven for the proposed model and limitations set out in the dissertation, the following topics are suggested as future research topics:

- The effect the proposed system approach to decision making model would have on non-profit organisations.

  The dissertation is based on the common goal, as defined by Goldratt (1992) that all for-profit organisations goal is to make more money, both now and in the future. Since this does not necessarily ring true for non-profit organisations, it is recommended that a study is done determining whether there is a common goal across multiple non-profit organisations, secondly whether the proposed model could be incorporated successfully into the decision making process followed by such organisations.

- The effect of uncertainties that influence a decision or the outcome.

  Decisions are not made in closed systems where uncertainties and influences do not have an effect on the outcome of a decision. Therefore, it is recommended that further research is done on how the proposed model would react on such uncertainties and influences.

- Theory testing.

  Limited validity of the proposed model has been achieved during this dissertation. It is recommended that the model is to be tested through applying it to more case studies and in practice to prove its validity.

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