Chapter 1

THE SCOPE OF THE RESEARCH

"This is not the end". "It is not even the beginning of the end". "But it is, perhaps, the end of the beginning".
Winston S. Churchill

1.1   INTRODUCTION AND BACKGROUND

The general systems theory was first mooted by Ludwig von Bertalanffy in his book *'General Systems Theory'* [81]. Various permutations of the 'systems approach'[1] is currently embedded in academic literature in various authoritative publications in a multitude of forms and applications and will be analysed as part of the literature reviews contained within the ambit of this thesis. For selected background information on the history and emergence of the systems approach, refer to Chapter 2 and Appendix C of this thesis.

Our world, for a significant part, has changed to one where we have to deal with self-created reality, 'the real world', and its consequences, 'complex phenomena'[2], as opposed to early beings who had to deal primarily with natural phenomena [165]. Furthermore, according to Checkland [29], by 'the real world' is meant the interacting human activity, which makes up the business of living, as opposed to the 'artificial' world of the laboratory experiment, in which the researcher is free to decide what to vary and what to keep constant[3]. Adapted from Checkland [29], the following analogies can be made:

---

[1] The multiplicity of the systems approach is well illustrated by the various names associated thereto such as: General Systems Theory, Systems Science, Systems Thinking, Systems Analysis, Systems Synthesis, Systems Engineering, Operational Research, Cybernetics, etc. These terms refer to various fields of knowledge that either overlap or are completely different. Within the context of this thesis, the author will develop a set of coherent concepts and notions pertaining to the concept 'systems approach', in particular as it pertains to model conceptualisation.

[2] Complex phenomena can be defined as 'unstructured problems'. See the extended definition of this concept within the ambit of Paragraph 1.1 of this chapter.

[3] According to Jackson [80] citing from Checkland (1983), systems viewed as the mental constructs of observers as opposed to entities with an objective existence in the world; where systemicity is transferred from the world to the process of enquiry into the world, is typical of the 'soft' systems methodology, described in detail in Chapter 4.

> ➤ That 'the real world' is in the arena in which a systems approach must prove itself as will emerge from the arguments contained within the ambit of this thesis.

> ➤ By 'complex phenomena' is meant not the puzzle, paradox or conundrum, which exercises the philosopher, but simply any situation in which there is perceived to be a mismatch between 'what is', and 'what might or could or should' be within the context and ambit of the function of executive management[4]. Such phenomena are usually 'unstructured problems', which are novel, non-repetitive challenges that must be solved with creativity, initiative and originality [103]. Furthermore, adding to their complexity, the fact that these problems are societal and organisational based, viewed as 'systems problems' within a particular worldview, or *'Weltanschauung'*[5] and, which require systems-integrated solutions to solve [68].

In this respect, an interesting observation is made by Skyrme [157] citing Davidson [undated reference], who includes the possibility that, "management policy decisions may actually contribute to creating the dynamic problems they are intended to solve". Under the heading of 'management decisions', Kircher and Mason [91], raises the opinion that management makes decisions, which:

> ➤ Establishes the purposes.

> ➤ React to environmental opportunities and constraints.

> ➤ Acquire the resources.

> ➤ Allocate the resources to elements of the organisation.

> ➤ Accept obligations.

> ➤ Plan and control and review the organisation structure and operations.

---

[4] Within the context of this thesis, the term 'executive management' will only pertain to senior executives operating at the top *echelon* of their organisations, typically fulfilling the following roles: Principal, President, Vice-president, Chairman of the Board, Executive Board Member, Operating Executive, Executive Director, Executive General Manager, General Manager, Senior Executive Officer etc. Functions of these executives would typically include: Organisational communication, Executive Decision-making, Strategy formulation, Corporate budgeting, Company vision and mission, Corporate structures, Mergers, Stock Exchange listings, Company results, Organisational/Societal issues, Model conceptualisation, and Complex phenomena, as opposed to senior and middle management who deals with Operational management issues, and lower management who deals with management of daily Functional process issues within the organisation.

[5] As defined in Chapter 2, Paragraph 2.8.

Furthermore, the unstructured complex phenomena associated with 'the real world', could mean phenomena of decisions regarding social systems [102], or the scientist's problem in the laboratory, which can be defined and limited. Ultimately, complexity is the single most important factor determining the outcome of complex phenomena, which is confirmed by Richardson [131], citing Brewer and deLeon (1983), as follows: "Decision making, in complex systems are difficult because of uncertainty, disagreement and complexity".

1.1.1 REALITIES OF REAL WORLD PHENOMENA

Unstructured complex phenomena as defined, very often translates into the harsh realities of 'the real world', which in the extreme, can have far reaching effects on those being impacted. Meadows [104], terms these type of problems, some of which are considered humankind's most persistent problems, the 'systems paradigm'. The following serve as examples:

➢ Poverty stricken countries where the prime objective is to obtain food for daily survival, as opposed to affluent countries where the main aim is focussed upon wealth creation.

➢ Wealth and associated lifestyles, which are pursued creating within itself controversial social behaviour in the form of alcoholism, drug abuse and excessive spending patterns, to name but a select few, most probably as a result of sheer peer pressure and the quest for instant gratification.

➢ War torn countries where the fleeing populace gives up the total of their existence in exchange for the safety of their families.

➢ Unemployment leading to alternative avenues of generating income, most often culminating in new job opportunities being created in the process.

➢ The sudden explosion of networked electronic systems, its associated challenges and dichotomies [11], which started in the 1970's with ever increasing momentum in the Year 2000 and beyond.

➢ Over saturation of the job markets resulting in trained personnel not being placed in the job seat most appropriate to their tertiary education. On the negative side, this situation may be precipitated by mergers, alliances, economic recession, sanctions, world economics, the gold price, price of crude oil, governments in transition and war. On the positive side, the situation may

be precipitated by the requirement for certain specific skills as demanded by global markets or even a perception of the potential skills and ability associated with a specific profession. The classic example which can be cited, being internet web page programming skills becoming the most sought after skills in the technology industry as companies jostle to enter global markets via the internet. Another example is the engineering profession, both locally and abroad, where engineers, irrespective of their expertise and tertiary background, are headhunted by industries totally divorced from the core of the engineering profession, thus crossing academic disciplines and professional boundaries. This trend is most prevalent in the banking, information technology, processing, financial engineering and consulting fields where engineers often form the core of the workforce at every level of the organisation hierarchy. A variety of reasons, can be attributed to this trend, however, one common reason given is the fact that 'engineers are structured problem solvers'[6]. Invariably, these engineers, now employed in positions other than what they were trained for, rapidly climb the corporate hierarchy ladders, ultimately attaining the position of executive management[7], hardly equipped with the multi-faceted management skills required for such a position[8] with respect to model conceptualisation, in particular when dealing with unstructured complex phenomena, specifically when such phenomena are societal and organisational based, viewed as 'systems problems' and require systems-integrated solutions to solve **[68]**[9].

The significance of the engineer is emphasised by Checkland **[29]**, when he cites from Sporn (1964) as follows:

---

[6] This fact was confirmed by 12 of the Executive respondents during the survey interview with the author described in detail in Appendix C.

[7] This fact is in line with the findings of the limited survey contained in Appendix C.

[8] It is acknowledged by the author that it would be certainly naïve to assume as *prima facie* evidence that executive management are the only decision-makers in an organisation. It would also include according to Churchman **[34]**, "those decision makers who produce change in the organisation".

[9] This statement is of particular importance in this thesis. According to Mitroff and Linstone **[108a]**, the professional mind easily becomes the prisoner of a particular way of viewing the world. For this reason, crossing academic disciplines or professional boundaries is a harrowing experience and constitutes a culture shock of the highest order. See also Chapter 5, Paragraph 5.3.

"The engineer is the key figure in the material progress of the world".

"It is his engineering that makes a reality of the potential value of science by translating scientific knowledge into tools, resources, energy and labour to bring them into the service of man . . . the engineer requires the imagination to visualise the needs of society and to appreciate what is possible as well as the technological and hard social understanding to bring his vision to reality".

While this thesis has at its core the objective to introduce the concept of a *structured systems approach to model conceptualisation*[10] into the realm of executive management within a broader context, it is in the view of the author the most suitable structured mechanism specifically aimed at the engineer in the emergent role as the executive decision maker dealing with unstructured complex phenomena in the Twenty First Century. Adding to the roles of executive management, Churchman [35] includes the concept of decision-maker, which he perceives as one who controls the resources and hence creates the future of the organisation, while Beer [22] conceptualises the executive as, *"the brain of the firm"*.

The art of executive management requires special skills, which includes according to Senge [153], the following:

➢ Seeing interrelationships.

➢ Moving beyond blame.

➢ Distinguishing detail complexity from dynamic complexity.

➢ Focusing on areas of high leverage.

➢ Avoiding symptomatic solutions

---

[10] 'Model conceptualisation' within the context of this thesis, refers to a specific sequence of events, which precedes 'model construction' and 'model implementation". These events, which are described in detail in Chapter 5, Paragraph 5.1 include: a) The identification of unstructured complex phenomena. b) The analysis of the identified unstructured complex phenomena. c) The problem solving approach, which is to be followed to solve the identified unstructured complex phenomena.

1.1.2 SOURCES OF POWER

Unstructured complex phenomena pertaining to executive management, are in fact problems associated with the practice of executive management, broadly defined. These problems (unstructured complex phenomena) have as their source, the concept of 'power', which Morgan [114] defines as:

> *"The medium through which conflicts of interest are ultimately resolved". "Power influences who gets what, when and how".*

Morgan [114] lists the following as the most important sources of power[11]:

➢ Formal authority.

➢ Control of scarce resources.

➢ Use of organisational structure, rules, and regulations.

➢ Control of decision processes.

➢ Control of knowledge and information.

➢ Control of boundaries.

➢ Ability to cope with uncertainty.

➢ Control of technology.

➢ Interpersonal alliances, networks, and control of 'informal organisation'.

➢ Control of counter-organisations.

➢ Symbolism and the management of meaning.

➢ Gender and the management of gender relations.

➢ Structural factors that define the stage of action.

➢ The power one already has.

For a more detailed analysis of the 'sources of power' listed above, refer to Appendix A.

The art of executive management employing the listed sources of power in their quest in dealing with unstructured complex phenomena, is aptly encapsulated in the following words of Capra [27] when he makes the observation that:

---

[11] These sources of power provide executive management with a variety of means for enhancing their interests and resolving or perpetuating organisational conflict.

"Power, in the sense of domination over others, is excessive self assertion".

In support of the above, an even more forceful analogy pertaining to the concept 'power' is drawn by Blake and Mouton **[23a]**, who are of the opinion that, "revolutionary changes are more likely to be effected through the exercise of power and authority, which can compel compliance". Consequently, power struggles, regardless of source or location, may enhance or detract from a firm's ability to deal with the environmental or organic threats to its future **[180]**.

1.2   THE RESEARCH PROBLEM

Field research by the author[12] into unstructured complex phenomena associated with executive management, show that such entities are not commonly dealt with in terms of the systems approach **[59a]**, **[90]**, **[152]**, **[105]**, **[126]**. Furthermore, the literature search cited in this thesis and academic readings commonly associated with work of this nature, also did not return a single reference where the systems approach *per se*, specifically addressed model conceptualisation to solve unstructured complex phenomena pertaining to executive management over a spectrum of disciplines in a structured way. This problem is underpinned by the observation of Forrester **[59a]** who is of the opinion that:

"During the last half century a management science has begun to develop but is not yet an efficient basis for dealing with top management problems".

While it would be naïve to generalise, this opinion is also supported by Druker cited by Forrester **[59a]**, who acknowledges that:

"Management science still has not penetrated the inner circle of top management".

---

[12] Results of which are contained in Appendix B.

It is of importance to note that the stated research problem fall within the ambit of Checkland's [29] definition of a 'problem', which he defines as:

> *"A problem relating to real-world manifestations of human activity systems is a condition characterised by a sense of mismatch, which eludes precise definition, between what is perceived to be actuality and what is perceived might become actuality".*

Academics, which led the way in the further development and application of the systems approach, are amongst others:

➢ Beer [22].

➢ Churchman [34].

➢ Ackoff [8].

➢ Checkland [29].

➢ Mitroff and Mason [108].

➢ Jackson [80].

➢ Vickers [174].

➢ Gharajedaghi [64].

➢ Kauffman [84].

➢ Senge [152].

Application of the systems approach, can be found in a diverse number of disciplines as confirmed by Gray [67], who is of the opinion that, "the systems approach has been used in a wide variety of organisations for many decades". This application plethora of the systems approach concept is shown in Table 1.1. While the field of application of the systems approach is multi-diciplinary, as demonstrated in Table 1.1, each of these disciplines ultimately culminate in the process of executive management thereof. Selective examples in support of this statement, are the following:

➢ The medical practitioner appointed to the post of hospital administrator.

➢ The systems programmer being promoted to project manager.

➢ The university professor becoming dean of his faculty.

➢ The physicist becoming team leader of a space program.

➢ The engineer becoming head of an engineering consultancy firm.

➢ The housewife becoming chairperson of the Consumer Council.

➢ The student becoming head student at the university hostel.

➢ The public administrator becoming a foreign representative.

➢ The teacher being promoted to head of a school.

➢ The technologist becoming head of systems and technology development.

➢ The pattern maker becoming head of design.

➢ The economist becoming head of the central reserve.

➢ The corporate banker becoming the senior executive officer of his bank.

From the above examples, it is clear that whatever the discipline, the requirement for executive management for each of the entities, forms an integral part thereof. The logical approach to follow this assumption, is to determine, which methodology is to be followed when faced with executive management issues in respect of an inquiry relating to unstructured complex phenomena pertaining to each of the disciplines. Furthermore, an aspect, which intensifies the inquiry, and the object of the research question of this thesis, is to determine whether the systems approach can be applied to model conceptualisation to solve unstructured complex phenomena from an executive management perspective without reverting to the concept of a 'Grand Theory' [33][13]. The concept of a 'Grand Theory' requires closer scrutiny, which is provided by Checkland [29] citing Mills (1959), the latter who references known theorists in the likes of Talcott Parsons (1951) and Black (1963) in the explanation of the concept, as follows:

> *"The basic cause of grand theory is the initial choice of a level of thinking so general that its practitioners cannot logically get down to observation". "They never, as grand theorists, get down from the higher generalities to problems in their historical and structural context". "This absence of a firm sense of genuine problems, in turn, makes for the unreality so noticeable in their pages".*

---

[13] At this point it is appropriate to acknowledge the work of Chester Barnard entitled: *'The functions of the Executive'*, published in 1938 [80]. The aim of Barnard with his book, was to discover features common to executive functions in all organisations. Barnard's analysis identified three functions the executive must undertake namely:
➢ Organisational communication.
➢ Securing essential services.
➢ Organisational objective formulation.

Application	Authoritative Reference
Organisational behaviour	Scott and Cummings [149]
Psychology	Palazzoli *et al* [122], Simon [155]
Education and Organisational learning	Stata [160], English [51]
Economics	Aoki [14], Hirschman and Lindblom [74]
Nursing	Frey and Sieloff [61]
Mathematics	Rosen [140]
Digital systems/ Systems problems	Motil [115], Athey [18]
Ecology	Odum [118]
Physics	Garrido and Mendes [63]
Geography	Wilson [183]
Social sciences	Mattessich [101]
Anthropology	Sztompha [166]
Technology	Garrido and Mendes [63]
Psychotherapy	Cavalieri [28]
Public policy	Hoos [79]
Planning and design	Dickerson and Robertshaw [45]
International relations	Wettman [182]
Engineering	Unbehauen [171]
Pure and applied mathematics	Feintuch [54]
Management/Management process	Richardson [131][132], Sisk [156]
Research/ Operational research	Ackoff [2], Churchman *et al* [33]
Behavioural science/Goal-seeking behaviour	Argyris [15], Schützenberger [147]
Decision and control	Beer [21]
Project management	Kerzner [86]
Financial product development	Nagel [117]
Problem management	Sanderson [144]
Modeling managerial behaviour	Sterman [163]
Quantitative portfolio simulation	Merten *et al* [106]
Prelaunch forecasting of new automobiles	Urban *et al* [172]
Material requirements planning	Morecroft [110]
Naval ship production	Cooper [41]
Worker burnout	Homer [76]
Software development	Abel-Hamid and Madnick [1]
Multi-echelon inventory system management	Clark *et al* [37]

TABLE 1.1: Application scope of the 'Systems Theory'

To ensure that the *systems approach to model conceptualisation* has a scientific base and fulfil an operational need, the concept should be applied against the background of a systems engineering approach, which Blanchard [24] define as:

> *"the effective application of scientific and engineering efforts to transform an operational need".*

The problem statement will be addressed in terms of the Research Process described in Paragraph 1.4.

1.3   THE RESEARCH QUESTION

The research question, which will form the crux of this thesis, is:

Can the 'systems approach', which is currently embedded in academic literature in various authoritative publications in various forms and permutations, be applied to model conceptualisation to solve unstructured complex phenomena from an executive management perspective?

The research question will not be researched in terms of a 'Grand Theory' as it would be in danger of losing contact with reality, would be highly abstract, and it will be difficult to translate into testable propositions [29]. Furthermore, the researcher will steer a course between the highly abstract and the unduly specific in very much the same way as Boulding cited by Checkland [29] in the following extract:

> *"[General Systems Theory] does not seek, of course, to establish a single, self-contained 'general theory' of practically everything, which will replace all the special theories of particular disciplines". "Such a theory would be almost without content, and all we can say about practically everything is almost nothing". "Somewhere however between the specific that has no meaning and the general that has no content there must be, for each purpose and at each level of abstraction, an optimum degree of generality". "It is the contention of*
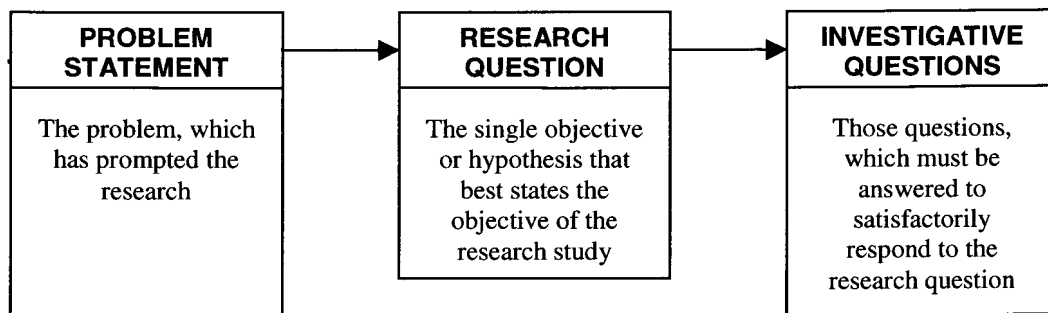
the General Systems Theorists that this optimum degree of generality is not always reached by the particular science".

The ultimate objective is to provide the engineer as emergent executive with a structured mechanism to address model conceptualisation in the quest to solve unstructured complex phenomena.

1.4 THE RESEARCH PROCESS

The problem statement and associated research question is approached in this thesis, using the Question Hierarchy of Emory and Cooper [50], modified by Piquito [124] and further adapted to address the issues in this thesis.

This approach depicted in Figure 1.1 assumes the research problem to be composed of a hierarchy of questions with a descending level of specificity.

PROBLEM STATEMENT	RESEARCH QUESTION	INVESTIGATIVE QUESTIONS
The problem, which has prompted the research	The single objective or hypothesis that best states the objective of the research study	Those questions, which must be answered to satisfactorily respond to the research question

FIGURE 1.1: The Question Hierarchy

The aim of the adapted and modified Question Hierarchy, is to achieve a focus on the research problem as a result of increasingly descriptive questions. In line with the Research Problem presented in Paragraph 1.2 above and the Research Question presented in Paragraph 1.3, the following Problem Statement, Research Question and Investigative Questions are defined in terms of the Question Hierarchy:

➢ **Problem Statement:**

   ➢ The systems approach *per se* does not address model conceptualisation from an executive management perspective to address unstructured complex phenomena in a structured way.

➢ **Research Question:**

    ➢ Can the systems approach, which is currently embedded in academic literature in various authoritative publications in various forms and permutations, be applied to model conceptualisation to solve unstructured complex phenomena from an executive management perspective?

➢ **Investigative Questions:**

    ➢ Can the most pertinent elements and dominant traits of the systems approach as described by revered academics be extracted therefrom to culminate in a new formulated *structured systems approach to model conceptualisation*, from an executive management perspective?

    ➢ Can management philosophies formulated during the Twentieth Century, in any way apply to the technology driven, dynamic and constantly changing management environments of the Twenty First Century?

    ➢ Can the systems dynamics of the formulated *structured systems approach to model conceptualisation* specifically applied to the art of executive management, be used to structure the outcomes of paradigm shifts introduced into organisations as a result of unstructured complex phenomena.

1.5 THE RESEARCH DESIGN AND METHODOLOGY

Galliers and Land **[62]** draw the attention to two tendencies in information systems research. The first relates to the primacy of traditional, empirical research, which is more suited to the natural sciences, while the second relates to the tendency to advocate a particular mode of information systems research, irrespective of the particular mode of information systems research topic being studied. Citing the results of a study of Vogel and Wetherby, where it was found that 85 percent of published information systems research undertaken by leading US institutions are of the traditional kind, Galliers and Land **[62]** are of the opinion, that while such research may be deemed to be academically acceptable and internally consistent, it all too often leads to inconclusive or inapplicable results.

Due to the fact that information systems research has often been viewed as residing within the province of technology according to Galliers and Land [62], the analogy can be drawn that the same norms would be applicable to systems related research as presented in this thesis. The crux of the matter however, lies embedded within the context of an observation made by the authors [62], which reads as follows:

"Increasingly, however, both information systems academics and practitioners have begun to realize it is more appropriate to extend the focus of study to include behavioural and organizational considerations".

This is supported by the wish to place information systems, and for the purpose of this thesis, also systems related research, in a broader category according to Davenport and Stoddard [42], since both entities are according to Galliers and Land [62], impacted upon. The authors [62], substantiate this claim when referring to information systems being impacted by:

"the organization and the people they serve".

Although a plethora of approaches are available for research, there are only a few published accounts of the successful application of newer approaches to information technology related research. One well-documented exception to this rule relates to 'action research' briefly described by Checkland [29] quoting from Checkland and Jenkins. Galliers and Land [62] suggest a taxonomy of research approaches, when dealing with society, organisation groups, individuals, technology and methodology, and for the purpose of this thesis, to also include methodologies pertaining to the concept systems approach. The taxonomy has the objective to ensure that the 'object' on which the research effort is focused and the 'mode' by which the research is carried out is differentiated. The authors [62], further suggest subjective / argumentative and descriptive / interpretative approaches to be applied to the identified entities as part of a broader focus to the concept of information technology related research as opposed to the traditional empirical research.

Subjective / argumentative and descriptive / interpretative approaches require further explanation:

➤ **Subjective / argumentative approach:-** Quoting the research of Vogel, and Wetherbe, this approach is defined by Galliers and Land **[62]** as, "creating management information systems research based more on opinion and speculation than observation".

➤ **Descriptive / interpretative approach:-** Quoting Boland, this approach is defined by Galliers and Land **[62]** as, "being in the tradition of phenomenology" i.e., concerned with description. Emory and Cooper **[50]**, in describing the essence and importance of descriptive research, point out that:

> *"The very essence of description is to name the properties of things:*
> *you may do more, but you cannot do less and still have description".*
> *"The more adequate the description, the greater is the likelihood that*
> *the units derived from the description will be useful in subsequent*
> *theory building".*

The above argument in favour of a taxonomy for information technology related research, illustrates the point that the scientific paradigm is not always the most appropriate basis for research in this field and that a wider interpretation is required to include behavioural and organisational considerations.

1.6   THE DEMAND FOR A QUALITATIVE RESEARCH STRATEGY

While the researcher acknowledges that a number of strategies can be applied in similar research projects, the well-known concepts of practicality, validity, and reliability, inherited from the empirical analytical paradigm have been utilised within the ambit of this research in more or less the traditional way as proposed by Yin **[185]**. This, according to Maso **[99]**, includes new concepts, norms and rules. Quoting Thorndike and Hagen, these concepts are defined by Emory and Cooper **[50]** as follows:

➤   **Practicality:** - Practicality is concerned with a wide range of factors of economy, convenience, and interpretability.

➢ **Validity:** - Validity refers to the extent to which a test measures what we actually wish to measure.

➢ **Reliability:** - Reliability has to do with the accuracy and precision of a measurement procedure.

The concepts of practicality, validity and reliability defined by Emory and Cooper **[50]** quoting Thorndike and Hagen, were impacted adversely by various internal factors associated with organisations *per se*, making the validation of the *structured systems approach to model conceptualisation* in a live environment virtually impractical. The most significant elements attributing to this situation, were precipitated by the following:

➢ That the *structured systems approach to model conceptualisation* as formulated in this thesis, is aimed at the top echelon of management namely executive management. To implement the formulated *structured systems approach to model conceptualisation* on an experimental basis to prove the concept, would be unacceptable to any executive as a matter of principle operating at such a level in an organisation, as it would invariable deviate from company/organisational policy.

➢ Should permission be granted to implement the *structured systems approach to model conceptualisation* in an organisation, it would be most likely that the new management approach would be considered as confidential and part and partial of the organisations Intellectual Property Rights. Making such results public would constitute breach of these rights.

➢ Executives at the top echelon of an organisation normally follow a management approach, which stems from either tradition or from organisation culture, which is by implication a private and confidential matter to the exclusion of third parties. Furthermore, introducing a new approach on an experimental basis into established structures would require board approval and impact executive strategies and decision making[14] and in addition would require the management of change on a broad front.

---

[14] With this statement, the author does not suggest that organisations are totally inflexible to their management approaches, which they follow. As organisations evolve, management and new management approaches are introduced. This statement refers specifically to *ad hoc* experimentation with a new management approach, which in view of the author, would not be permitted at executive level in corporate environments.

➤ An aspect, which Pascale [123] terms 'conservatism', has furthermore a significant impact on the validation potential of the *structured systems approach to model conceptualisation*. Due to the fact that management in the words of Pascale [123] like to, "stick to their knitting" irrespective of the fact that such a great strength would inevitable culminate as the root of weakness, are unwilling to change.

It was therefore, a requirement for the researcher to become aware of all these critical issues identified above, and prepare and equip himself to handle these issues with skill and sensitivity. Furthermore, to guarantee the anonymity of all parties concerned in the quest to establish the validity of the *structured systems approach to model conceptualisation.*

A qualitative investigation of a particularly sensitive nature conducted by Oskowitz and Meulenberg-Buskens [120], qualified the importance of handling mission critical issues as identified above when the authors stated:

> *"Thus any type of qualitative investigation could benefit from the researchers being skilled and prepared, and the sensitive nature of an investigation into a stigmatizing condition made the need for such an undertaking even more imperative in the current study".*

Furthermore, the sensitivity of certain issues and issues identified as impacting the research negatively in the environments being evaluated, not only demanded intimate personal involvement, but also demanded the 'personal and practical experience' of the author[15], a view upheld by Meulenberg-Buskens [107], as being imperative to assure quality in qualitative research being undertaken. Checkland [29] supports this view, however extends the concept and is of the opinion that, "the researcher becomes a participant in the action, and the process of change itself becomes the subject of research".

---

[15] See also the importance of the requirement for the 'personal and practical experience' of the author referred to in Chapter 5, Paragraph 5.3.

To bridge the listed factors whilst still proactively validating the formulated *structured systems approach to model conceptualisation* as a viable alternative management methodology, a limited survey will be conducted, the results of which is contained within the ambit of Appendix B. The purpose of this limited survey will be to ascertain the opinions of executives with regard to the validity of the *structured systems approach to model conceptualisation* as an alternative management mechanism. It is not the intention of the author to conduct a full-scale survey with extensive supporting statistical analysis as used in similar research projects. The objectives of the limited survey undertaken in this thesis is to provide the reader with an appreciation of the applicability of the systems approach as perceived by experienced executives within a spectrum of disciplines and in so doing, reinforce both the uniqueness of this approach as well as the management potential inherent therein. This is further supported by a case study, which depicts the *structured systems approach to model conceptualisation* as an alternative management mechanism.

1.7   AN OVERVIEW OF THE THESIS STRUCTURE

This thesis has been structured in such a way as to ensure adherence to the following concepts:

➢ The concepts presented within the document must flow logically from one part to the next in order to maximise reader comprehension of the various topics presented.

➢ Given the diverse nature of the respective literature review interpretations, the order of presentation must be such that the reader is equipped with a deeper understanding of each review interpretation presented. This is to ensure that the new formulated *structured systems approach to model conceptualisation* is understood, particular the sub-entities thereof as it relates to the various philosophies imbedded therein.

For the reasons listed above, the individual chapters of this thesis have been grouped together in four separate parts namely:

➢ **Part 1:-** Consists of the abstract, the scope of the research and a detailed analysis of the complexities which pertain to the concept 'systems approach'.

➢ **Part 2:-** Consists of literature reviews pertaining to hard and soft systems methodologies.

➢ **Part 3:-** Consists of a detailed analysis of the key elements of the *structured systems approach to model conceptualisation* and the approach functioning as an alternative management mechanism.

➢ **Part 4:-** Consists of the conclusions of the research, identified areas for further research, appendices pertaining to the thesis and the bibliography.

1.7.1   CHAPTER AND CONTENT ANALYSIS

The chapter and content analysis shown in Figure 1.2, which is in line with the research design and methodology (refer Paragraph 1.5) requires closer scrutiny and the following analysis in respect thereof is provided:

➢ **Abstract:-** Provides the reader with a short synopsis of the extent of the research pertaining to the *structured systems approach to model conceptualisation* from an executive management perspective and associated complex phenomena in 'real world' situations.

➢ **Chapter 1 – The scope of the research:-** Sets the scene for the research contained within the ambit of the thesis, starting with a brief introduction and background to the concept systems approach, the history thereof expanded upon in Appendix C. This is followed by an insight into 'real world' phenomena and the mechanisms available to deal with such phenomena, primarily contained in the 'Sources of Power'. The latter concept which is expanded upon in Appendix A. The remainder of the chapter focuses on the Research Problem, the Research Question, the Research Process, the Research Design and Methodology and concluded with an item dealing with the Demand for a Qualitative Research Strategy.

➢ **Chapter 2 – The complexity of the systems approach:-** This chapter contains the key issues, which contribute to the complexities of the systems approach. Furthermore, these issues are considered to be pre-requisites to the

understanding of the reader to ensure that the interrelationships, which these entities have with the systems approach, are understood and viewed in context of the overall research. The concepts, which will be discussed are:

➢ The concept 'system'.

➢ General Systems Theory.

➢ The concept 'systems approach'.

➢ The concept 'cybernetics'.

➢ Closed and open systems.

➢ The role of models.

➢ The notions *'Weltanschauung'* and 'appreciative systems'.

➢ 'Causal loop diagrams' and 'reinforcing and balancing processes'.

➢ Science and Technology impact.

➢ **Chapter 3 – A high level analysis of the hard 'systems approach':-** In this chapter, the major 'hard' systems methodologies, selected especially for their particular applicability to the research in this thesis will be contextually analysed at a high level in terms of literature reviews. The analysis will cover the following 'hard' systems methodologies:

➢ Systems engineering.

➢ Systems analysis.

➢ Operational research.

➢ Management cybernetics.

➢ Systems Dynamics.

Included in this chapter and in lieu of Chapter 4, which will deal with the 'soft' systems approach, 'hard' and 'soft' systems methodologies are compared to add to the conceptual understanding of the reader of the two concepts. Furthermore, to provide a balanced analysis, the hard systems approach is analysed to highlight its major criticisms, positive aspects and features.
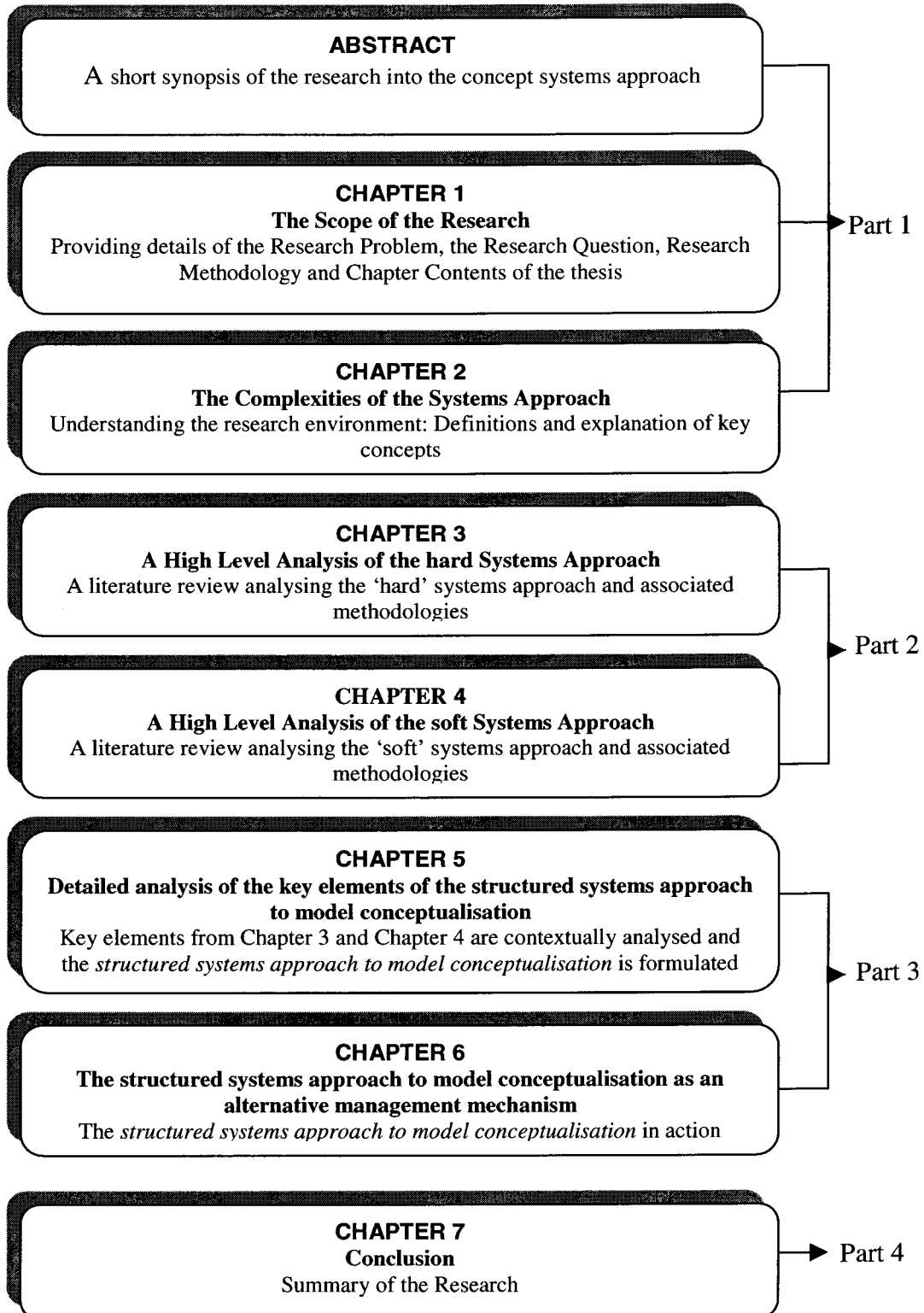
➢ **Chapter 4 – A high level analysis of the soft systems approach:-** In this chapter, the major 'soft' systems methodologies, selected especially for their particular applicability to the research in this thesis will be contextually analysed at a high level in terms of literature reviews. The analysis will cover the following 'soft' systems methodologies:

> The Viable Systems model of Beer (Organisational cybernetics).

> Churchman's Social Systems Design.

> Checkland's Soft Systems Methodology.

> Ackoff's Interactive Planning.

> Mitroff and Mason's Strategic Assumption Surfacing and Testing methodology.

As in the case of Chapter 3 to provide a balanced analysis, the soft systems approach is analysed to highlight its major criticisms, positive aspects and features.

> **Chapter 5 – In depth analysis of the construction elements for the structured systems approach to model conceptualisation:-** Chapter 5, in the opinion of the author, is one of the key chapters in this thesis, as the chapter contents is focused on a detailed analysis of all of the construction elements, which culminates in the formulated *structured systems approach to model conceptualisation*. This chapter also provides impetus to the author's objective with this thesis whereby the approach, which is based on the philosophies formulated by revered academics during the Twentieth Century and, which includes the authors own contribution, can add value to the existing body of knowledge. This with particular reference to the application of a *structured systems approach to model conceptualisation* by executive management of the Twenty First Century, when dealing with unstructured complex phenomena in a formalised and structured way.

> **Chapter 6 – Model conceptualisation as an alternative management mechanism:-** In this chapter the full potential of the *structured systems approach to model conceptualisation* is demonstrated using a case study. The derived benefits are compared to the requirements set in an analysis pertaining to an industry perception of the *structured systems approach to model conceptualisation*, which is contained in Appendix B. Furthermore, the Research Problem and associated Research Questions are compared with the deliverables of the *structured systems approach to model conceptualisation* as an alternative management mechanism.

> **Chapter 7 – Conclusion:-** In this concluding chapter, the research is summarised and evaluated in terms of 'real world' phenomena and the mechanisms available to deal with such phenomena, with particular reference

to the formulated *structured systems approach to model conceptualisation.* The remainder of the chapter focuses on concluding observations pertaining to the research and possible avenues of further research.

ABSTRACT
A short synopsis of the research into the concept systems approach

CHAPTER 1
The Scope of the Research
Providing details of the Research Problem, the Research Question, Research Methodology and Chapter Contents of the thesis

CHAPTER 2
The Complexities of the Systems Approach
Understanding the research environment: Definitions and explanation of key concepts

Part 1

CHAPTER 3
A High Level Analysis of the hard Systems Approach
A literature review analysing the 'hard' systems approach and associated methodologies

CHAPTER 4
A High Level Analysis of the soft Systems Approach
A literature review analysing the 'soft' systems approach and associated methodologies

Part 2

CHAPTER 5
Detailed analysis of the key elements of the structured systems approach to model conceptualisation
Key elements from Chapter 3 and Chapter 4 are contextually analysed and the *structured systems approach to model conceptualisation* is formulated

CHAPTER 6
The structured systems approach to model conceptualisation as an alternative management mechanism
The *structured systems approach to model conceptualisation* in action

Part 3

CHAPTER 7
Conclusion
Summary of the Research

Part 4

FIGURE 1.2: Schematic depiction of thesis structure

1.8   CONCLUSION

The key objectives of the author with this thesis and by implication forming the basis of any research undertaken at doctoral level according to Easterby-Smith, Thorpe and Lowe [47] and Kennedy [85], are:

➢ That the results of the proposed research make a significant contribution (add value) to the existing body of knowledge.

➢ That the results should be of such a nature that it can be applied immediately and effectively in any corporate or commercial business environment to enhance the art of executive management.

This thesis is then about a formulated *structured systems approach to model conceptualisation*, the use of a particular derived set of systems norms to facilitate the art of executive management. Furthermore, the *structured systems approach to model conceptualisation*, makes conscious use of a particular concept of wholeness captured in the word 'system' to order a set of executive management norms.

In this first chapter, the Scope of the Research has been outlined starting with an introduction and background to the systems approach followed by clear definitions of the Research Problem and associated Research Question. The Research Process has been outlined whereby the Research Problem Statement, Research Question, and subsequent Investigative Questions are defined in terms of a formulated Question Hierarchy. This is followed by the Research Design and Methodology, which is complemented with a topic on the Demand for Qualitative Research Strategy. The chapter is concluded with an Overview of the Thesis Structure, which includes a Chapter and Content Analysis.

In Chapter 2, the complexities of the systems approach are introduced to provide the reader with the required insight into the complex issues governing the systems approach and associated problem solving methodologies which will be discussed in Chapter 3 and Chapter 4. More specific, it is the interrelationships which these entities have with 'hard' and 'soft' systems methodologies, which emphasises their importance to virtually become pre-requisites to the understanding the

internal functionality of hard and soft systems approaches. Furthermore, the concepts making up the complexities of the systems approach, cover a range of diverse (and often unrelated) topics, which will only become clear as the research progresses, and the entities surface as integral components of the approach, to address complex phenomena and viewed in context of the overall research.

In final conclusion, this thesis is about both *a structured 'systems approach' to model conceptualisation* and 'systems practice' and the relationship between the two entities, aimed at dealing with unstructured complex phenomena within the ambit of executive management.