

**A THEORY OF THE USE OF
INFORMATION FOR
ENVIRONMENTAL PLANNING: THE
CASE OF BOTSWANA**

BY

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D e c l a r a t i o n

I hereby declare that the work contained in this thesis is entirely the scholarly work of the author. It is original work except where due reference is made. This work has not been submitted, in either whole or part, to any other institution for a similar or any other degree.

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D e d i c a t i o n

I dedicate this work to my:

daughter and spouse (Taboka and Bawani)

and

parents (Botsang Viya and Elijah)

for all the love and support they dedicated to me

University of Cape Town

A b s t r a c t

This study is about the use of information by people in work roles. Although the use of information is a key issue in information systems theory and practice, it has received little attention from information systems researchers. Information systems research has been biased towards technology and its use. Our understanding of the use of information by people in work roles to guide the development of information systems and information management in general, is limited.

The present study addresses this imbalance by investigating the use of information by planners when they grapple with environmental issues in the development process. The study takes a behavioural perspective to develop a Grounded Theory of the use of information for environmental planning. The research emphasises the use of a qualitative research design to understand the use of information in relation to tasks and activities the planners perform in projects.

Semi-structured interviews were conducted in the workplace environment to collect data on the way the respondents have used information in projects that they had done before. Forty-four subjects were selected from five different councils in Botswana. The evidence was corroborated by interviewing ten people outside council who were identified with the help of the respondents in the councils. The data was analysed through a coding process in accordance with the Grounded Theory techniques. The coding took place in multiple iterations, experts confirmed the results, and the respondents validated the theory. The study demonstrates that the use of information by people in work roles can be explored empirically from a behavioural perspective using a qualitative approach – in particular, Grounded Theory.

The study identified the processes, contexts, and behaviours relating to the use of information. The main finding is the Grounded Theory of the use of information for environmental planning. The theory has seven main categories - *dynamic project information context, role context, motivators, experiential knowledge, informational power, strategy for participation and pattern of information use*. The *pattern of information use* is the core category. The *dynamic project information context*,

motivators, experiential knowledge and role context influence the pattern of information use in a variety of ways. The pattern of information use generates the informational power base of the planners. The interpretation of the theory shows that the planners exercise their informational power through the strategy for participation in which they facilitate the environmental planning process for the production of environmental plans.

The study shows that power relations endemic in environmental planning are essential determinants of the kind of information behaviour that planners exhibit. The findings provide a new way of thinking about developing information systems and information management for planners. It is suggested that when developing information systems for planners the developers should focus on systems functions that facilitate and enhance information behaviours that are induced by the power relations experienced by the planners.

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Chapter 1: Introduction

1.1 Overview

The purpose of this study is to investigate how planners in municipal councils (local government) in Botswana use information when considering environmental issues in the development planning process. The study takes a behavioural approach and uses the Grounded Theory method to develop a theory of the use of information for environmental planning. The data of the study was collected using semi-structured interviews and analysed according to Grounded Theory techniques as espoused by Strauss and Corbin (1998).

The Grounded Theory developed in the present study describes the ways in which planners approach and handle information. The theory has seven main categories; *pattern of information use, dynamic project information context, role context, experiential knowledge, motivators, informational power* and *strategy for participation*. The core category is the *pattern of information use* that generates an *informational power* base of the planners.

Power relations experienced by the planners in the environmental planning process determine the ways in which they use information. Power relations are endemic in the environmental planning process and the planners consciously or unconsciously engage in information behaviours that are induced by these power relations.

The findings of this study have profound implications for the way we approach the development of information systems and for information management in general. Assumptions that system developers have held (Kling, 1980; Markus, 1983 and Kling and Iacono, 1984) that power is counterproductive and leads to user resistance and ultimately failures of information systems are flawed. The interpretation of the Grounded Theory developed in this study shows that power can be productive. Therefore, information system developers in environmental planning should develop system functions that facilitate and enhance information behaviours induced by the power relations experienced in the environmental planning process.

This chapter discusses the motivation for the present study. I (referring to the author in the first person) begin by providing a background to the research problem. A presentation of the purpose of the study then follows. The research questions and objectives are presented

next. I also provide a brief discussion of the nature of environmental planning. This is followed by a description of the study area. The significance of the study is then given with highlights of the main findings. The last sections of this chapter cover the limitations of the study, an outline of the thesis and lastly, a summary of the chapter presented

1.2 Background to the problem

The importance of understanding how people use information can never be overemphasised in information systems research. The design of an information system requires an understanding of people who are going to use the system, the work they perform, and how they require, acquire and use information in the course of their work (Choo *et al.*, 2000: 119).

Research on the use of Information Technology (IT) has been at the centre of information systems theory and practice for decades. In general, an underlying assumption has been that information systems, especially management information systems, “are principally a technology phenomena” (Introna, 1997: 7). Inadequate attention has been given to understanding information in relation to the people who are using it (Davenport, 1997 and Mutch, 1997).

Information systems research has produced a number of interesting theoretical models that are based on the technology-biased approach. Examples include The Technology Acceptance Model by Davis (Davis, 1989) and the Delone and Mclean Model of Information Systems Success (Delone and Mclean, 1992). These models led to several initiatives including extended training of the users on how to use the technology, a focus on increasing the reliability of technology and the quality of data produced by the information systems. Today, Information Technology is highly sophisticated and quite reliable.

While the efforts to improve the quality of the technology and its usage are necessary and desirable, they are not in themselves sufficient for the success of an information system. The failure rate of information systems continues to be very high (Ewusi-Mensah and Przasnyski, 1991 and Hugos, 2003). The returns on the use of IT in organisations are not commensurate with the amount of money spent to put the technology in place (Mutch, 1997).

A focus on technology to the exclusion of information and information users is judged deficient by many writers. It leads to an emphasis on “how” people use or should use the

technology rather than “why” people should use the technology. People are interested in information, not technology per se. The technology that we have, regardless of its sophistication and reliability, will not be of any use if people are not interested in the information that it generates (Davenport, 1997 and Taylor, 1991). We can add value to our information systems if we understand how people intend to use the information they (the information systems) produce. This could be achieved by developing those functions of the system that enhance the intended use of information.

1.2.1 Putting people at the centre of the information world

Recent information management models have put people, *not technology*, at the centre of information systems theory and practice (Davenport, 1997 and Marchand *et al.*, 2001). Understanding information in relation to people is essential for successful management of information. Information managers need to understand the ways in which people use information in their work. According to Davenport (1997), such an understanding can be achieved by analysing the information behaviour of people.

Davenport defines information behaviour as

how people approach and handle information. This includes searching for it, using it, modifying it, sharing it, hoarding it, even ignoring it (p.83).

Wilson defines information behaviour as

the totality of human behaviour in relation to sources and channels of information, including both active and passive information seeking, and information use. Thus, it includes face-to-face communication with others, as well as the passive reception of information as in, for example, watching TV advertisements, without any intention to act on the information given (Wilson, 2000: 49).

An analysis of the definitions given above shows that information behaviour is a multifaceted construct and is about people in relation to information or some form of people’s behaviour with respect to information.

The different facets of information behaviour that contribute to our understanding of the construct are the experiencing of information needs, the seeking of information and the using of information (Wilson, 2000, Allen, 1996, and Choo *et al.*, 2000).

A clear understanding of the use of information by people in their work roles is essential in order to comprehend information management fully (Tricker, 1999). However, available literature shows that this is one area that is under-developed (Mutch, 1997). The present study attempts to address this disparity in a particular area by investigating the use of information by environmental planners. I adopt an information behaviour perspective to understand how the planners approach and handle information.

The work of the planners in relation to environmental problems is information-intensive. Imagine a planner in a municipal council (hereafter referred to as council(s)) faced with a project idea of constructing a dam that has been conceived by the community. While pondering the idea, the planner gathers information to analyse the situation, to work out what is desirable in terms of both policy and physical development, explores and evaluates options and devises a course of action (Lang and Amour, 1980). The planner may consult experts for their inputs. He or she continues to gather more information as he or she engages in more debates and discussions with various groups with different interests and interpretations of the idea of the project (Karacapilidis *et al.*, 1997).

The planner further gathers information to make an account of both the short and long term effects of the project. He or she puts up a case for or against the proposed idea. In the process, the planner uses information to determine the fate of the idea. If the idea turns out to be feasible and the project gets approval, the planner continues with the information exercise to ensure that the project lives up to the desired expectations. As the idea develops, different information needs are expressed and these needs are satisfied by gathering, extracting and synthesizing information from a variety of sources.

Notwithstanding the fact that problems are unique, as the planner continues with the development of the idea, he or she may apply or use the information in certain ways that may be characterised by the situation or environmental problem that he or she is dealing with. Such ways of using information can give us an idea about the information behaviour of the planner.

The variations in relation to the interests of the stakeholders, the physical state and the interpretations that are presented with each case make the situations unique so that we may not be able to predict the information behaviour without difficulty.

For instance, the use of information when handling an idea of a dam for one community may not be predicted based on how the information was used previously for a different

community. Each case is unique: the participants, the interests, the interpretations, and the physical environment itself would be different. Depending on the goal of the planner, he or she may require information which is specific and action oriented or, in another instance, education oriented. To fully comprehend the use of information by the planners, it is essential that we develop a framework that describes the ways of using information in a more abstract way.

The planners' ways of dealing with information as discussed above are the ones that motivate the present study. I use the Grounded Theory method to develop a framework for understanding the use of information by the planners when they are considering environmental issues in the development planning process. After discovering the Grounded Theory, I attempt to interpret the theory. In the conclusion, I translate my results into implications for the development of information systems and the management of information.

1.2.2 Benefits of understanding information behaviour

The benefits of understanding information behaviour are manifold. I provide examples of the most salient benefits relevant to information systems theory and practice below.

Firstly, a fuller understanding of the information behaviour of users is a prerequisite for developing and enhancing features and functions of an information system which facilitate and foster desirable information behaviours (Choo *et al.*, 2000:101).

Secondly, information behaviour needs to be managed in organisations. An understanding of information behaviour is necessary for its successful management. There are various benefits that organisations can derive from a proper management of information (Davenport, 1997). For instance, a large percentage of workers in organisations are involved in some form of information work. Such work includes acquiring, using and sharing of information. This makes information behaviour central to the functions of organisations. An understanding of information behaviour can help in influencing the effective use of information by the workers.

Another benefit for managing information behaviour relates to knowledge in the organisation. A proportion of the value of the organisation lies in its knowledge, and to take advantage of the organisation's knowledge requires a change in information behaviour to encourage those behaviours that enhance effective use of information. This can also lead to

control of information cost through encouraging such behaviours as sharing of information in the organisation.

Another incentive for managing information behaviour relates to the fact that information and associated technologies have become critical “organisational resources”. If information has to attain the same level of recognition as other resources in organisations then it stands to reason that the human behaviours that are associated with information also need to be managed as well.

In order to manage information behaviour effectively, we need to understand how people use information in their work roles. Davenport (1997) points out that analysing information behaviour is central to understanding how people approach and handle information in their work.

1.3 Purpose of study

The purpose of the present study is to investigate how environmental planners use information. This study takes a behavioural approach and focuses on the use of information by planners when they address environmental problems in the development planning process. A Grounded Theory of the use of information was developed and interpreted. Conclusions are drawn from the findings of the study, and some implications for the development of information systems are also presented.

1.3.1 Research questions

The current study addresses the following research questions:

- a. What is the environmental planners’ conception of information?
- b. How do environmental planners use information?
- c. What are the critical precursors to environmental planners’ use of information?

1.3.2 Research objectives

The specific objectives of the study are as follows:

- a) To understand the environmental planners’ conception of information.

- b) To understand how the environmental planners use information within their own conceptions.
- c) To identify the critical elements that drive the environmental planners to use information in the ways they do.
- d) To explicate the concept of information use in environmental planning in a consistent, data-sensitive way.
- e) To describe how the elements (mentioned in c and described in d) that affect the use of information in environmental planning (mentioned in b)] are related.
- f) To develop a theoretical model that explains how information use is related to the factors that determine its use.

1.4 The nature of environmental planning

The concept of environmental planning can be understood from a very technical perspective. It can be explained by a variety of models and concepts, some of which are rooted in planning theories and environmental studies. In the present study, I use the term in a generic sense. This study examines the use of information in the context of environmental planning projects. I am interested in understanding events (e.g., communication events) relating to the processes that bring information on board during the environmental planning process. The environmental planning process is selected as an example of an information-intensive area.

Environmental planning refers to the process in which the environmental issues are included or considered in the planning process. It is a trans-disciplinary activity, performed by people with different backgrounds (academic, professional, etc.) and interests. The environmental planning process is characterised by debates and negotiations among various groups with different interests and interpretations of an environmental planning problem (Karacapilidis *et al.*, 1997).

Huse (1995) points out that the environmental planning process aims at improving the quality of decisions on environmental issues. It is concerned with the effects of human activities on the environment, and like other planning activities involves analysing a situation, working out what is desired, exploring and evaluating options and devising a

course of action (Lang and Armour, 1980: 20). An environmental planner's goal is to anticipate how human activities will affect the environment and thereafter work out strategies on how best to make use of the environmental resources without compromising their sustainability (Seffino *et al.*, 1999).

Environmental planners deal with diverse and varied areas of knowledge domains including pollution control (water quality and air quality, noise and the management of solid and hazardous waste), land use planning and environmental impact assessment (Ortolano, 1984).

Environmental problems are usually unstructured and difficult to define (Woodhouse and Nieuwma, 2001: 74), requiring a broad range of information in terms of physical formats, content, presentations, production and the subject matter (Huse, 1995; Ortolano, 1984 and Dorney, 1987). The process requires the synthesis of information from a variety of disciplines. The planners collect, organise and synthesize the information to accomplish the various tasks that lead to the generation of the environmental plans.

The consideration of environmental issues in the development process has become an important aspect of the attempt by countries to achieve development that is sustainable as well as attaining relative success in economic progress. A practical question that an information management professional or researcher needs to ask is, how is the information used by those who attend to environmental issues in the development process? Environmental planning is an attractive area in which to address this question, mainly due to:

- the complexity of the information flows in the processes
- the intra-disciplinary and inter-disciplinary nature of the tasks which generate varied information requirements
- the varied intentions and purposes of the participants, which may result in the use of information in different ways and for different purposes
- the fact that this is a relatively new and evolving area filled with complex decision making processes which make intensive use of information.

Furthermore, addressing the use of information in environmental planning in Botswana at the present moment is very relevant. Although it has started to include the environment in

its development agenda only recently, Botswana has some well-published initiatives in the environmental domain (Botswana Government, 1994). One example of this is the establishment of the National Conservation Strategy Agency. The agency has a mandate to undertake an environmental audit of the National Development Plans (Botswana Government, 1990).

Another example is the ratification of a number of international conventions on environment related issues. Other essential initiatives include the revision of some policies such as the Agricultural Water Development Policy (Botswana Government, 1993). New policies related to environmental issues are being introduced and the existing ones are being reviewed (Gaolathe, 2004).

1.5 The study area

Data for this study was collected in Botswana. Botswana is a landlocked country with a total surface area of approximately 582,000 km². The country shares borders with South Africa, Zimbabwe, Zambia and Namibia. Eighty percent of the land is covered with the sand of the Kalahari Desert. Other parts of the country include the Okavango Delta in the northwest and the Makgadikgadi pans in the centre of the country. The eastern part is adjacent to the Limpopo drainage system with land rising to more than 1200 meters above sea level. Botswana receives an annual rainfall of about 650mm and 250mm in the north east and south west respectively. The rainfall varies erratically from one year to the other. Normally it rains from November through February. During these months there are usually some dry spells between short periods of rainfall. Drought occurs periodically every ten to twelve years (Botswana Government, 1994).

1.5.1 Economic growth

The economy of Botswana rests to a large extent on the exploitation of natural resources. The mining sector is the largest earner of foreign currency. Wildlife attracts most of the tourists that visit the country. The bulk of the population is engaged in subsistence farming and cattle farming, making the most of the agriculturally usable land. Arable land, permanent pastures, forests and woodland are the major land resources.

Botswana is a young country, attaining its independence in 1966. The economy has grown steadily to be one of the leading economies in the region with an average growth rate of

6.7% per year. The national GDP stood at 36.3 billion Botswana Pula (BWP) in the period 2002/2003, increasing at a growth rate of 13.8% (Gaolathe, 2004).

1.5.2 Population and administrative divisions

Botswana has a relatively small population with most of the people living in the eastern part of the country along the railway line that runs from south to north. According to the population census of the year 2001, Botswana has a population of approximately 1.7 million people, with an estimated annual growth rate of 2.4 % (Botswana government, 2002 and Gaolathe, 2004).

Botswana has ten district councils, two town councils, and two city councils. The ten district councils are Central, Ghanzi, Kgalagadi, Kgatleng, Kweneng, Ngamiland, North-East, North-West, South-East and Southern districts. The city councils are Gaborone and Francistown and the town councils are Selibe Phikwe and Lobatse. The districts that cover wide geographical areas are further divided into sub-districts, which also perform the function of an administrative division in areas of their jurisdiction. Together, districts, sub-districts, town and city councils make twenty-three administrative divisions in the country.

These administrative divisions are responsible for planning for local development as well as the implementation of national policies. According to a study by the government, major environmental planning activities are performed at the council level (Botswana Government, 2001a & b).

1.5.3 Planning process in Botswana

The national development planning process in Botswana is based on four objectives: sustainable development, economic diversification, social justice and rapid economic growth. These four objectives provide a framework for planning. Development planning is initiated at the council level. The councils work with representatives from departments that have national sector mandates (such as agriculture, wildlife and water affairs) to develop the district, town or city development plans. The public is involved through meetings with the planning authorities.

The position of the government on environmental issues is promising. For instance, when presenting the budget speech for the financial year 2004/2005, the Minister of Finance and Development Planning pointed out that:

With regard to environmental issues, the Agricultural Resource Conservation Act and Forestry Act will be reviewed. Two bills, one on Environmental Impact Assessment and the other on Environmental Management will be drafted and presented to Parliament during the course of the year. The National Master Plan on Wastewater and Sanitation, the Okavango Management Plan and the National Biodiversity Strategy and Action Plan are some of the key policies and strategies being prepared to address environmental challenges (*Gaolathe, 2004:13*).

Furthermore, there are some other national initiatives to enhance the environmental planning process. For instance, the government, in collaboration with the Danish Co-operation for Environment did a project that was aimed at enhancing sustainable development by establishing an environmental information system to manage and improve the accessibility of environmental information resources in the country.

1.6 Significance of the study

The present study investigates how planners use information when they are considering environmental issues in the development process. While the use of information is often emphasised in information systems research, there is a dearth of knowledge about how it is used from a behavioural perspective, especially when planners are considering environmental issues in the development process. This study contributes to the existing research by developing a Grounded Theory of the use of information for environmental planning from the behavioural perspective.

The study has both practical and theoretical significance. First, to the best of my knowledge there is no other study that has examined information use in environmental planning from an information behaviour perspective. Secondly, this study does not only increase our understanding of how information is used in the environmental planning process, but also makes a significant contribution to our understanding of the information behaviour construct in information management theory. The research also shows the strength of qualitative research methodologies in understanding the information behaviour of people in work roles.

The study adopts a naturalistic approach in examining the behaviour of planners during the consideration of environmental issues in the development planning process. The present

study is a “candidate” for a holistic approach to investigating the planners in their natural settings to develop a Grounded Theory of the use of information in relation to the entire information environment of the planners (cf. Davenport, 1997 and Taylor, 1991).

The subjects of the present research consist of planners in five councils in Botswana. The councils were purposely selected to get diversity in the experiences of the planners with regard to the kind of environmental problems that they address. Data was collected using semi-structured interviews. Forty-four planners were interviewed. The main finding from the analysis of data was the Grounded Theory describing and explaining the use of information by the planners. The theory has seven main categories; *motivators, dynamic project information context, role context, experiential knowledge, pattern of information use, informational power* and *strategy for participation*. The *pattern of information use* is the core category.

The interpretation of the theory shows that power relations endemic in the environmental planning process determine the kind of information behaviours that are exhibited by the planners. Power was found to be endemic in all the categories and accounts for the informational tasks and activities of the planners that are described by the categories.

The findings of the present study translate into implications for developing information systems. They also suggest that power can be productive in the environmental planning process. Changes in power relations experienced by the planners during the environmental planning process induce the information behaviours that they exhibit. The findings of the present study challenge the assumptions implicit in the traditional approach to developing information systems in which power is regarded as counterproductive and often leading to resistances and failure of information systems. The study shows that the power relations that the planners experience are essential for the development of information systems. System developers should identify the information behaviours that are induced by these power relations and develop systems with functions that facilitate and enhance those behaviours.

1.7 Limitations of the study

This study focused on one group of people performing the role of environmental planning in their work roles – local government officers, working in the councils and having the role of planning and delivering development projects that take cognisance of environmental issues.

I used interviews to collect the data, which was analysed in accordance with the Grounded Theory techniques. I also interpreted the theory from a power perspective.

The Grounded Theory developed in this study is based on data collected in one country. The applicability of the theory to different contexts and situations will be limited. A factor that may limit the applicability of the theory to different areas may be the differences in the planning models that are used.

Two other limitations arise from the selection of the data sources and the interpretation to come up with the understanding that I report about the use of information by the planners. The selection of councils could be a biased sample and not necessarily a representative of the population of the environmental planners. The councils were selected based on the notion that they are the major players in the development process and they address projects with environmental concerns. The selection of the five councils from which the respondents were drawn was based on the notion of theoretical sampling. The guiding principle was to have diversity in the environmental problems that are addressed by the respondents. Although the decision was not just made on “gut feeling”, I acknowledge that my own biases may have influenced how I chose the different councils.

A second point that needs to be highlighted is the interpretation. An interpretation is always subjective. Different people interpreting a situation might come up with different results. In reporting the findings, I carefully articulate how I came to the interpretation. For instance, I provide numerous examples of quotations from the interviews to allow the reader to make judgments on how I arrived at the interpretation. When interpreting the Grounded Theory, I also make my position clear and illustrate that with examples from the field.

The credibility of the conclusions I draw from the present study depends on the Grounded Theory that I developed and the interpretation I made. If one takes issue with these (Grounded Theory and the interpretation), then the conclusions would carry far less weight.

1.8 Overview of the Thesis

The thesis has seven chapters. Each chapter is concluded with a list of the information sources cited in the text. At the end of the thesis, there is a list of references, a bibliography and appendices that comprise a detailed presentation of the development of the concepts, categories and their relationships, interview questions, samples of correspondences, consent form and a letter of approval from the ethics committee. Chapter 1 presents an introduction

to the thesis. It also provides a background to the research problem. This is followed by the purpose of the study, the nature of environmental planning, the study area, significance of the study and limitations. Chapter 2 provides a critical review of literature on the main concepts relevant to the present study. The review focuses on the evaluation of the existing literature on information and its use. I also describe three models that take a holistic approach to understanding the use of information.

Chapter 3 presents a discussion of the research methodology for the study. The discussion attempts to locate the study in the interpretive qualitative paradigm in information systems research. This is followed by a description of the Grounded Theory method. The chapter also provides a description of the procedures that were followed to carry out the study. Chapter 4 reports on the findings of the study. The chapter shows how the Grounded Theory unfolded during the research process (Further details on the development of the concepts and categories are provided in Appendix A). Chapter 5 presents an interpretation of the Grounded Theory from a “power perspective”. Existing literature that supports or contradicts my interpretation is also provided.

Chapter 6 presents the conclusions. The major findings (themes) of the study are pulled together and conclusions are drawn. The findings are translated into implications for developing information systems and managing information for planners. Recommendations are made in areas that have been found to need further research. Chapter 7 provides an evaluation of the study.

1.9 Summary

In this chapter I started by presenting the background information on the research problem that the study intends to address. I discussed the inadequacy of technologically biased approaches in addressing information problems. A focus on people who use information is seen as necessary for a fuller understanding of information management.

The present study takes a behavioural approach and uses the Grounded Theory method to address questions about the use of information by planners when they are considering environmental issues in the development process. Data for the study was collected in Botswana using semi-structured interviews.

The conclusion I draw from the current study is that power relations endemic in the environmental planning process determine the ways in which the planners approach and

handle information. The conclusion translates into implications for developing information systems in support of environmental planning. I argue that system developers should develop systems functions that facilitate and enhance those information behaviours that are induced by the power relations experienced by the planners.

In the next chapter, I review literature relevant to the present study. The purpose of reviewing the literature is to develop insights into the current understanding of the use of information by people in their work roles. I also review literature related to the conceptual understanding of planning in general as well as environmental planning.

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Chapter 2: Literature Review

2.1 Introduction

This chapter presents a review of literature relevant to this study. The principal aim of the literature review is to develop insights into research on the use of information with a view to understand how such knowledge is helpful in the management of information for environmental planners.

The present study investigates the use of information in environmental planning. The focus of the study is on people (planners) using information in their work roles. The literature that I review in this chapter is intended to provide insights into understanding what previous research has produced in relation to people using information, especially when they are performing functions related to their work in the organisations. I focus on the ways in which people approach and handle information – this means I want to understand the behaviours exhibited (information behaviour) by people when they use information (Davenport, 1997: 83).

According to Davenport (*op. cit.*), the information behaviour of people or individuals is characterised by their ways of using, searching, processing, sharing, hoarding and even ignoring information that would otherwise have been acquired and used. This literature review focuses on the use aspect of information behaviour. However, the use of information cannot be understood without referring to the other components of information behaviour. Taylor (1991: 221), for instance, suggests that it is actually the sum of these various information related activities that the individual engages in that make information useful.

In my literature review, I use the terms manager and decision maker interchangeably to refer to the person or individual who is using information (i.e., the user or the information user). The terms are used in their generic forms. The use of the terms is just a reflection that most literature on information use that has relevance for the information systems discipline has focused on managerial work and decision making in organisations. Secondly, my focus is on the manager as a person or individual using information. Literature on the organisational use of information (for example organisational learning) will only be referred to in as much as it sheds light on the information behaviours of the managers.

I also examine literature on the conceptualisation of planning in the development arena. The literature review will focus on providing an overview of planning practice in general, highlighting both the traditional and current thinking in planning theory and practice. A discussion of environmental planning as a dimension of development planning is also given.

The literature review is organised as follows: I start by discussing the concept of information as understood in the theory and practice of information systems. This is followed by a discussion which reflects on the nature of the use of information by individuals as espoused in the literature. I first present a general overview of literature in which I define the use of information and show the ways and purposes for which information is normally used. The section that follows discusses the factors that affect the ways and purposes for which people use information. I use the model of Choo *et al.*, (2000) which classifies information use in three dimensions: *the cognitive dimension*, *the affective dimension* and *the situational dimension* as a framework for analysing various literature sources. I follow the presentation of individual and contextual factors that influence the ways people use information with a discussion of the influence of informational factors. The last section on the use of information discusses three examples of models that take a holistic approach to understanding the use of information.

The third section of this chapter reviews the literature on planning. I start by defining the concept of planning as used in the development arena. A discussion of the traditional view of planning then follows. I then discuss communicative planning as the current approach adopted in planning theory and practice.

The final section of the literature review focuses on the conceptualisation of environmental planning. A summary of the literature reviewed is given at the end of the chapter.

2.2 Information

Information is an important aspect of human endeavours. It is recognised as a critical aspect of society at different levels, including the individual level, the organisational level, the national level and even the international level. Concepts such as the information society, the information age, information explosions, the information superhighway, the information economy and many more have become common in everyday conversations. There are concerted efforts to cultivate attitudes that associate information with some cultural, social and economic values of society (Dick, 2002: 33 and Mutch, 1999). In organisations,

information is viewed as a critical resource for making decisions, solving problems or building up an organisational knowledge base (Choo, 1991).

Despite the recognition of the importance of information in our society, the concept of information remains vaguely defined in the literature. Information has been defined in many different ways. Even within a discipline such as information systems, there are variations in the way the concept is used. This problem is also compounded by the fact that information has been studied in many different disciplines, for example, computer science, communication, information science, information systems and informatics, each with a different focus.

In the light of the problems attributed to the concept of information, it makes logical sense that a study that has a focus on information provides the definition that it adopted. Meadow and Weijing (1997) have pointed out that the fact that there is no single definition of information makes it important for authors of documents to inform their readers on how they are going to use the concept. I will therefore start by reviewing literature on the concept of information as understood in information systems research and practice. I shall structure the discussion in two ways. First, I shall discuss the traditional view of information. This will be followed by an interpretive view of the concept of information as espoused by Introna (1997). I consider the latter as a more sophisticated and more productive way of understanding information in information systems.

2.2.1 The classical/traditional view of information

The definition of information as used in most of the information system literature developed mainly due to the advent of computer technology (Introna, 1997). The definition is very much linked to the development of technological based information systems. These systems were initially almost totally concerned with the processing of data (data processing systems). The concept of information was therefore defined in relation to data. In order to illustrate my argument, I provide examples of some definitions of information that are found in the information systems literature. The examples are given below:

Information is data that has been processed and is meaningful to the user (Ahituv and Neumann, 1986: 2).

Information is a sign or a set of signs which predisposes a person to actions. It is distinguished from data because data are not a stimulus to action but merely a string of characters or uninterpreted patterns (Murdick, 1980: 11).

Information is fundamentally different from data. Data is useless until some thought has been applied to its meaning (Wolstenholme and Henderson, 1993: 2).

Data can be text, numbers, audio, video images or any combination of these. Data can be collected in many different ways including: surveys, interviews, use of sensors, reading documents and even monitoring of brain waves, ... data in its raw form may or may not be useful to the decision maker; quite frequently, data must be processed to become useful. ... When we process data and convert it into a form that is useful and meaningful to the decision maker, it becomes information. Human beings apply facts, principles, knowledge, experience and intuition to convert data into information. Only then does it become useful for decision making (Gupta, 1996: 12).

Information is the outcome of processing raw data into a meaningful form so that they can be interpreted by the receiver (Alexopoulos and Theodoulidis 2003:330).

The definitions given above show that there are three essential elements about information: the receiver or decision-maker (user), the process of transforming or converting data, and meaning. The transformation process makes data meaningful to the user and therefore adds value to the data. From the above definitions, we can see that it is the meaning that is critical for data to be information. However, the definitions do not explain where the meaning comes from, although the meaning is viewed as a critical component of information. Several questions remain unanswered by these definitions: a) whether the meaning is a property of the processed data; b) does the user look in the data for meaning? Alternatively, c) is it the user who creates the meaning? Without providing such guidance, the definition of information remains incomplete and its usefulness is limited. Introna (1997) argues that the component of the meaning to the recipient has always been ignored in the information systems literature. He further argues that, even after considering the meaningfulness to the recipient, the definition remains incomplete because we still do not get a clue as to how the meaning of the data is created.

A second limitation of the definitions of information given above is that considerable emphasis is put on the processing of the data. This makes technology (especially the

computer) indispensable to our approach to understanding information because of its capability to process data. In that regard, the information itself is relegated to the peripheral. Researchers have noted this emphasis on technology as a problem in the theory and practice of information systems. Davenport (1997:3), for example, argues against too much emphasis on technology. He points out that people are interested in the information. However, “our fascination with technology has made us forget the key purpose of information: to inform people”. Likewise, we have given limited attention to understanding the meaning of information. Therefore, it makes sense to refocus our efforts on information if we are to make our information systems more relevant to the needs of the users.

I shall address this deficiency in the definition of information that I have shown above by taking an interpretive view to understand how people create meaning from data. This will help to inform us how the recipient understands the data and provide us with a better way of understanding information. Introna (1997) proposes a way of looking at information as understanding. He considers the interpretation and the understanding by the recipient as necessary and sufficient to understanding the concept of information. In the next section, I shall discuss this concept from the interpretive perspective.

2.2.2 The interpretive way of looking at information

The discussion in this section is based on the conceptualisation of information put forward by Introna (1997). I consider his description and explanation much more sophisticated than the early definitions of information. Furthermore, his approach is predisposed towards what people do with the information.

The interpretive view of understanding information is underpinned by the philosophy of hermeneutics which provides a framework to explain the way people interpret and understand text. Text in this context is used in a more general way to refer to, for example, words, printed documents, speech, artefacts or observations that people make (Introna, 1997: 65-67).

In a brief review of the history of hermeneutics, Introna (1997) points out that hermeneutics is a theory of interpretation and understanding. Hermeneutics was originally referred to in the interpretation of ancient texts such as the bible. I use it here to understand how people interpret text to create meaning and understanding. In hermeneutics, the process of achieving an understanding of text is essential to the creation of the meaning. The process

depends on the context in which the interpretation is made. The same text could mean different things. For instance, the interpretation of a word in a sentence depends on the whole sentence. The same word used in different sentences may have different meanings because the contexts of interpretation are different. In addition, the interpreter's situation influences the interpretation. This situation refers to the individual biases, "fore-understanding", and prejudices that he or she has when reading the text (Introna, 1997: 66 and Lee, 1999: 18).

Introna (1997: 79) argues that "information is hermeneutic understanding". In this notion, the creation of the meaning is essential to understanding information. Introna argues that people always have some understanding of a situation because they are always part of that situation. Through the interpretive process, meaning is created and "things" become much clearer to the individuals who are involved in the interpretive process. The critical point of this approach is how meaning comes about and where the meaning comes from. The meaning comes from the process of interpretation of the text. This process leads to a better understanding by the individual.

Introna dismisses the notion that information becomes meaningful through processing. The meaning is created in the process of interpretation in which the text is related to the context. The processes are also influenced by the fore-understanding, prejudices and biases resulting from the individual's involvement with the situation in which the interpretation is made.

The implication of the interpretive perspective of information is that information managers and system designers should refocus their attention on the way people create meaning to understand the situation they are facing. Consequently, they should design information systems that help the individuals to create meaning and understanding of their situation.

To summarise, in this section I have explored a more sophisticated way of looking at information using the interpretive view. This approach uses hermeneutics to bring to the foreground the way meaning is created. The conclusion drawn from this approach is that information is about interpretation and understanding. This interpretation is affected by the context and the prior understanding of the situation that the individuals have at the beginning of the interpretive process.

Although the interpretive view of understanding information seems to provide a better way of looking at information, authors have largely not used it in their research. Most of the available literature is based on the traditional definition. The literature I review in the next

sections will therefore assume that definition. In the case where the researcher has adopted the interpretive view of information, or I use it for the purpose of illustration, I shall state it when I introduce the discussion.

2.3 Use of information

The discussion in the above section shows that information is a difficult concept and its definition has been inadequately covered in the information systems literature. Perhaps it is the problem of coming up with a definition of information that makes understanding how it is used in an organisation very difficult. Many organisations are still trying to find out what really happens to the information produced by the information systems that are usually consuming a substantial percentage of their budgets. The failures of these systems are attributed to the lack of understanding of the dynamics of information use within the organisation as well as among the individuals in the organisation (Butcher, 1998).

Organisations are spending substantial amounts of money on consultancies to produce information resources. Managers' desks and shelves are filled with information sources. In addition, organisations spend time circulating information among their members. However, the question of how people use information remains a daunting one to those in the disciplines which consider information as central to their discourse. Academic research has not been very successful in illuminating the way people use information.

We talk about using information and are involved with information in varied ways everyday. Perhaps it is this deep involvement that has prevented us from looking deeper at the use of information in our research. Vakkari (1996:460) observed that information use is an area that is not often examined in an analytical way.

In the next sections, I review some literature on the different factors that affect the way people use information. I begin by presenting a review of literature which highlights the need to use information.

2.3.1 The need to use information

People engage in a number of activities in relation to information such as seeking, searching and processing information. I regard information use as the latter and as the actual indication that information was needed (Choo *et al.*, 2000). The use of information (*information use*) refers to what people do with information after they have acquired it.

Information is used in an organisation to satisfy information needs (Allen, 1996:56). According to Choo (1998), these information needs arise from the “problems, uncertainties, and ambiguities encountered in specific organisational situations and experiences”. Taylor (1986) argues that these needs actually determine the use to which the information is going to be put.

The situations and experiences in which the information needs arise can be very complex. They can be understood from a number of perspectives (Allen, 1996). Consider a manager asking a sales representative about the performance of a certain product. Why does the manager need to know about the performance of the product? Perhaps, because the manager’s knowledge is incomplete, he or she will use the information for cognitive reasons. Secondly, the manager could be a member of a club where he or she will be meeting friends who are fond of talking about how others are doing at their work. In this regard, there is a social perspective to the use of the information.

Thirdly, the manager could be going to a board meeting to talk about improving the performance of the product. This is an organisational perspective. Fourthly, the manager may want to determine the budget needs for marketing the product. This is an economic perspective. This list could continue. The levels of complexity introduced by these varied and complementary perspectives are enormous and difficult to “tame”. Therefore, the factors that determine the ways in which people use information are many and varied because the needs that have to be satisfied are many and varied as well. These factors can be related to cognitive, social, organisational and economic factors (McGee and Prusak, 1993 and Allen, 1996).

The study of the role of information in managerial work has greatly influenced our understanding of the way people use information (Katzer and Fletcher, 1992.) Managers use information to complete tasks in their managerial roles (Mintzberg, 1973 and Keen and Morton, 1978). It would seem rational and logical that the managers follow some sequence which leads them to identify an information need, gather information and thereafter make decisions based on the information that they have collected. Therefore, the decision-making process would be based on the available information.

The model of information use presented above assumes that the decision-making process (the rational decision-making model) follows a series of steps in a rational manner: defining

the problem in a perfect manner, identifying all the criteria that is required to deal with a problem, weighing all the criteria accurately according to their preferences, identifying all relevant alternatives and accurately calculating and choosing the alternative with the highest perceived value (Bazerman, 1998: 4). This model assumes that the decision maker uses information to arrive at an optimal or best possible decision (Shangraw, 1986).

Butcher (1998: 50) argues that while it seems logical that when an individual is faced with a decision he or she will require any information that is perceived to be relevant to come up with an optimal decision, available research has shown that not always to be the case (Feldman and March, 1981: 172). The use of information in the decision-making process does not always follow a sequence of predefined steps which are predictable of the way information is going to be acquired and used.

Available empirical evidence shows that people's preference for information is affected by several factors. It is not only the decision itself that determines the use of information. Caplan (1976), for example, studied the impact of various information types in policymaking and found that policy makers prefer information that is produced within their agencies. A second example that refutes the rational model is the suggestion by Slocum (1982) who argues that the place of the decision-maker in the organisation can also affect the way he or she uses information in a decision-making process. The same individual will display different ways of using information when deployed in different organisational positions. Thus, it is not necessarily the decision that influences the way the information is used.

In their seminal paper in which they analysed some cases of the use of information in previous studies, Feldman and March (1981: 174) made six observations about the gathering and use of information in organisations. These are:

- Much of the information that is gathered and communicated has little relevance to decisions that are made
- Information is very often used to justify decisions that have been made and is often collected after the decision has been made
- Information is often used for purposes for which it was not requested
- Much more information is often requested regardless of the information that may be available at the start of the decision-making process

- People will complain about the unavailability of information to make a decision while they continue to ignore information that is available
- People will often collect more information than they can actually use or expect to use for a decision and the relevance of the available information is not always clear because the decision-makers appear to be constantly needing information, requesting more information while complaining about the inadequacy of the information.

An analysis of the literature reveals that the use of information as assumed by the rational model of decision-making is not always reflected in the information behaviours of the decision-makers. It is not always as predictable as the rational model would suggest, and is at times contrary to what would be expected from the perspective of the rational decision-making model (Beyer and Trice, 1982: 596). In the following section, I discuss the purposes for which people use information.

2.3.2 Purposes for using information

In order to understand the use of information in a more general way, a number of researchers attempted to analyse the literature on the subject. These analyses have produced various findings describing the ways and purposes for which people use information. In this section, I present two of these models based on the empirical findings from analysis of literature by the respective authors.

When Beyer and Trice (1982) and Todd (1999) analysed research on the use of information, they observed that the ways in which people use information can be classified into three categories: *instrumental use*, *conceptual use* and *symbolic use*. The three categories are not mutually exclusive. Todd argues that this classification is the dominant one in research on the ways people use information (p.854).

a) Instrumental use

The use of information is said to be instrumental if the organisational outcomes and the changes of the practices and procedures are a direct result of the application of the information. Deshpande and Zaltman (1982) suggest that *instrumental use* of information refers to a direct application of information for solving a problem or making a decision. The *instrumental use* of information is prefaced by the existence of a concrete problem whose

solution depends on the information itself. For example, when a land use planner zones land for agricultural use based on the available data that points to the soil's potential to support the growing of a particular crop, the use of information is *instrumental*. Another example is where a planner has to locate a sewage pond in an area that uses ground water and information that shows the location of the aquifer and water flow is available to the planner. The planner would use the information on the occurrence of the aquifer and the area it covers to make sure that water from the sewage ponds does not feed into the aquifer. Because of the availability of information, the planner makes decisions that otherwise would not have been made without the information.

b) Conceptual use

The *conceptual use* of information refers to a situation where the application or use of information is indirect. Information is used to broaden the user's knowledge base and does not serve a particular project (Todd, 1999). In *conceptual use*, information provides new ideas, new theories and stimulates new thinking and interpretation of issues surrounding the decision context, but does not induce any changes in the decisions (Landry *et al.*, 2001). The *conceptual use* of information also presupposes that the user assimilates and internalises the information and that it becomes part of his or her knowledge. This knowledge could be used in future when a relevant situation arises. For example, a planner who keeps updating himself or herself on the latest development in environmental issues by reading journal literature learns a number of things that may not find immediate use but may become pertinent at another time when a relevant situation arises.

c) Symbolic use

Symbolic use of information occurs when the user uses information to legitimise his or her views. *Symbolic use* of information presupposes that the information user has a pre-conceived idea that needs to be supported by the available information, an opinion or some individual's decision that may be based on instincts, values or beliefs. Information can also be used to support a decision that has already been made (Diamantopoulos and Souchon, 1999; Goodman, 1993; Piercy, 1983 and Knorr, 1977). When people use information in a symbolic way, they may hoard information that supports their thinking and deliberately reject information that is contrary to what they hold as the correct view. Alternatively, they may distort the information to suit their purposes. An example of *symbolic use* of information is when planners decide on a project, locate it and thereafter look for

information to convince other people to support the project, even if it means distorting the information. Another example of *symbolic use* of information is the use of information for political gains. Alternatively, information can be used as a social symbol of commitment to rational decision. In this regard, information is used to display authority and exhibit behaviour that is regarded as proper within the context of the organisation without real commitment to the outcome the information would bring to the decision that is going to be made (Feldman and March, 1981: 177).

Another model based on the comprehensive analysis of research that describes the ways and purposes for which people use information was suggested by Taylor (1991: 230). He analysed literature on information use and concluded that the ways in which people use information can be classified into eight categories: *enlightenment*, *problem understanding*, *instrumental*, *factual*, *confirmational*, *projective*, *motivational* and *personal or political* (p.230). The descriptions of these categories as provided by Taylor are as follows:

a) Enlightenment

Enlightenment refers to using information or ideas to make sense of a situation. Information is used to answer questions such as: Are there similar situations to the one that the person is facing? What is the history or experience of company X in making product Y, and how is this relevant to our intent to manufacture Y? (p. 230).

b) Problem understanding

The use of information for *problem understanding* is more specific than in *enlightenment*. In *problem understanding*, the individual intends to get a better comprehension by focussing on getting answers to questions relating to a solution to a particular problem (p. 230).

c) Instrumental

Information is used instrumentally if the individual wants to identify and accomplish a task. The individual gets instructions on doing something under certain conditions. *Instrumental* use of information may also lead to the identification of other types of information required to know what to do and how to do a task (p. 230).

d) Factual

Factual information use refers to using information to determine the facts of an event or a phenomenon to describe something. In *factual* information use, quality (accuracy, reliability) is a critical issue as it may constrain the use of information. The quality of

information is determined by the actual quality of the data in representing the reality. Quality may also be based on perceptions of the information users (p.230).

e) Confirmational

Confirmational refers to using information for the purposes of verification. The user could use information to verify a piece of information that he or she has already acquired. The information user may seek a second opinion such as in a medical context when a patient or doctor goes to seek a second opinion about an ailment (p. 230).

f) Projective

In *projective* information use, information is used to predict what is likely to happen in the future. Examples of *projective* information use are making forecasts, estimating or calculating probabilities for the future. It excludes political or personal related situations (p. 230).

g) Motivational

Motivational information use is concerned with the user's involvement in a situation. The individual uses information to "initiate and sustain personal involvement, in order to keep moving along a particular course of action" (Choo, *et al.*, 2000:16 and Taylor, 1991:230).

h) Personal or political

Personal or political use of information is concerned with relationships, the enhancement of status and reputation and personal fulfilment. This means the individual uses information for personal or political gains (p. 230).

The two models of the purposes of information use by individuals are very similar. Taylor's model can be considered as an expansion of the first one. The main limitation that I find in the models is that the categories are not mutually exclusive, and this constrains the usefulness of the models. In addition, the models are difficult to apply in practice. They do not provide pointers on how to improve the design of information systems and information management practices in the light of the purposes of information use by individuals.

2.4 Factors influencing the way people use information

Research into information use has attempted to determine the factors that influence individuals to use information. A cursory examination of previous studies provides some

insights into the factors that drive individuals to use information. Examples of such factors are the individual's motivation to process information, the ability to process information and the opportunity to process information (MacInnis and Jaworski, 1989). O'Reilly (1983) observed that the context, the information itself and the individuals determine the way the information is used by decision-makers in organisations. Taylor (1986: 35) suggested that the organisation as a whole, the roles or functions of people and the problems that are generated by the people influence the way information is used.

A categorisation of the factors that drive the use of information by individuals in organisations is a difficult task (Wigand *et al.*, 1997:74). However, these factors can be grouped into three broad categories: the individual information user (e.g., ways of processing information, motivation to process the information), the context (e.g., organisation, task, setting, problematic situation) and the information characteristics (Wang and Chan, 1995: 33; Low and Mohr, 2001 and Salaum and Flores, 2001).

In this section, I examine the factors that affect the way individuals use information, using the model of Choo *et al.* (2000) to analyse literature on the individual and contextual factors. This model classifies the use of information in three dimensions; *the cognitive dimension*, *the affective dimension* and *the situational dimension* of information use.

The cognitive and affective dimensions relate to the individual factors that determine the use of information. I argue that the individual is central to the analysis of information behaviour. However, I also note that individuals are not in isolation. They perform work roles that require them to use information against the backdrop of other members of the organisation. Davenport (1997: 100) argues that ignoring the fact that these other members of the organisation influence the way individuals use information is unrealistic.

The use of any piece of information in a decision depends on several factors, such as: when we got the information; where did we get the information; does the information support our beliefs about the issue; whether we have a particular stand that we have taken about the decision; who else has an interest in the decision; what effect does the decision have on the individual and other stakeholders? Such factors are among those that will influence the ways in which any piece of information will be used and they define the affective dimension of the use of information.

The situational dimension of information use refers to those contextual variables that may either enable or constrain the individual to use information (Wang and Chan, 1995). Lastly,

there are information characteristics that are essential to the use of information. These characteristics will be discussed at the end of this section.

2.4.1 Cognitive dimension of information use

The central tenet that defines the cognitive dimension of information use is the conceptualisation of the way individuals process and use information on the basis of psychological and cognitive attributes. The processing and use of information is explained in terms of the individual's cognitive styles, preferred modes of perception, the structure or state of the individual's knowledge and cognitive capacity to handle an information task. These attributes partly explain the information behaviour exhibited by people when they encounter an information-related task. These differences in cognition, cognitive styles and preferences make people process and use information in different ways (Gardner and Martinko, 1996).

Researchers have proposed a variety of mechanisms for differentiating personality types, cognitive preferences and cognitive capacity (Todd and Benbasat, 1993 and Keen and Morton, 1978). Research into the ways individuals process and use information suggests that people are not fully rational and exhaustive in acquiring and using information. Such behaviour is related to the limited cognitive capacity of humans to process information (Wigand *et al.*, 1997: 75). Wigand *et al.* (1997) observe that "the human cognitive capacities are as a rule insufficient for fully understanding especially complex tasks, to recognise the relevant information need and to completely process all relevant information" (p. 75).

Another important part of the cognitive dimension is cognitive complexity, which relates to people's ability to solve problems in relation to their cognitive structure. The basic measures of cognitive complexity are the level of *differentiation* and *integration* that people display in processing information. *Differentiation* refers to the number of dimensions that an individual uses to perceive environmental stimuli (Wang and Chan, 1995: 35). People with a low level of *differentiation* can only deal with limited categorisations of information and therefore easily become overloaded. *Integration* refers to the complexity of the rules that the individual uses to organise differentiated dimensions in an information task. People with a low ability to integrate can easily be overwhelmed by too much information. This means they easily fail to make sense of the information. The theory on cognitive complexity

suggests that each individual has an optimal amount of information that he or she can comfortably deal with. Information that is below the optimum level leads to boredom while too much leads to panic (Keen and Morton, 1978: 73).

The discussion of cognitive complexity and cognitive capacity presented above reveals that people have a limited capability to process and use information. The ability of individuals to handle cognitive complexity varies in relation to the levels of *differentiation* and *integration* that they display when they deal with information tasks. These cognitive attributes are essential determinants of the information behaviours of people.

Other cognitive attributes that explain the ways in which people use information are related to the styles or preferences for processing and using information. There are a number of mechanisms for explaining these individual styles that have been used to analyse the use of information in decision-making.

The Myers-Briggs Type Indicator (MBTI) and the use of heuristics have been widely used to explain the use of information in managerial work (Baranowski and Dunn, 1996; Gardner and Martinko, 1996 and Bazerman, 1998). These mechanisms are described below as examples of how individual cognitive styles may affect the ways in which people process and use information.

The MBTI classification scheme was derived from the work of Carl Jung and further developed by Isabel Myers and her colleagues (Gardner and Martinko, 1996; Provost, 1993 and White *et al.*, 2003). MBTI classifies people along four pairs of dimensions of cognitive styles: *sensing/intuiting*; *introversion/extroversion*; *thinking/feeling* and *judging/perceiving*. These sets of personal attributes or preferences combine to form distinct personality types whose preferred mode of perceptions affect the ways in which they interpret their environment. Therefore, individuals will also display different ways of processing and using information in accordance with these preferred modes of interpreting the environment. (My discussion is based on the summary of the personality types as suggested by Gardner and Martinko (1996:47) in an article in which they reviewed literature of the MBTI applied to managerial studies in relation to the use of information).

a) Introversion versus Extroversion

This personality type refers to the individual's orientation towards the outer world. Its focus is on the mental energy that people use to deal with situations. Introverts tend to use mental energy from within, using concepts and ideas from their "inner world". They are less

proactive in seeking input from other people and tend to be less eager to influence others. On the other hand, extroverts are more oriented to the outer world, valuing the opinion of other people and preferring to share ideas and information freely. They need to build support for their ideas and prefer to have discussions with other people about a situation they are facing.

b) Sensing versus Intuiting

Sensing individuals are oriented toward dealing with situations in a more systematic way and rely on information perceived through their five senses (Choo *et al.*, 2000). They prefer to deal with practical situations and pay attention to detail. Intuitive individuals are inclined “toward idealistic, unconventional and creative behaviour” (Gardner and Martinko, 1996: 64). When faced with a situation, they look for patterns and relationships that can help them to make sense of the situation (Choo *et al.*, 2000).

c) Thinking versus feeling

This personality type refers to the way the individual prefers to make a decision. The thinking type individuals prefer to structure problems according to a method which they follow to arrive at a solution. They have interest in the logical consequence of their actions and choices. They have a predisposition towards analysing situations to find out what is wrong. The feeling types are predisposed to what is important to them and others and they base their decisions on personal values even if it goes against logic (Baranowski and Dunn, 1996: 242).

d) Judging versus Perceiving

This aspect of personality refers to how quickly an individual comes to a decision. Perceiving individuals are not quick to come to a decision. They leave their options for much longer and continue to gather more information, preferring to adapt to the emerging situations. Perceiving individuals deal more effectively with unstructured tasks. Judging individuals prefer to deal with structured tasks and rely on the available information to come to a decision.

The differences in the cognitive styles or preference styles of individuals explain the way individuals would prefer to deal with situations and their use of information. MBTI classifies people into personality types predisposed to certain ways of dealing with information-related tasks.

Another variable for differentiating individual cognitive styles or preferences in processing and using information is the use of *heuristics*. Bazerman (1998: 5) observes that heuristics are simplifying strategies or rules of thumb that people use to arrive at a decision. These strategies help individuals to cope with complexities surrounding decision-making processes. The use of heuristics enables the individual to find some shortcuts, thereby reducing the amount of information processed to arrive at a decision. Although *heuristics* are useful in simplifying the decision-making process, they can lead to some biases or even introduce some serious errors in the decision-making process.

Three general *heuristics*: *heuristics of availability*, *heuristics of representativeness* and *heuristics of anchoring and adjustment* were suggested by Tversky and Kahneman (1974), and were found to be applicable across populations in explaining how people arrive at decisions (Bazerman, 1998 and Choo *et al.*, 2000).

The *availability heuristics* are used when assessing the likelihood or probability of occurrence by recalling familiar and vivid instances. When using the *heuristics of availability* the individual focuses on the frequent, the recent and memorable events. The individual uses information relating to those occurrences or events to make decisions. For example, a traveller who normally drives without a seat belt may decide to wear one after hearing more frequently about fatal accidents on the road. The decision that the individual takes about security when driving is influenced by the available information that he or she gets repeatedly.

A second type of heuristic that people use is the *heuristic of representativeness*. People use *heuristics of representativeness* when they want to “assess the likelihood of an event’s occurrence by the similarity of that occurrence to their stereotypes of similar occurrence” (Bazerman 1998:7). According to Macrae *et al.* (1993), the individual tends to use stereotypes when information processing is difficult or too demanding. This is done to find out if an event or object can be put in a certain category or group which will allow the individual to make some prediction based on what is known about the events or objects that belong to that category.

For example, when a consumer sees a new electronic product on the market, he or she may verify whether the product originates from a producer who has a reputation for good electronic products. The consumer may make a prediction that the product is likely to be a good one and purchase it based on the information available about the producer. This

example shows how the use of the *heuristic of representativeness* may lead to biases – in this case, through the omission of a thorough evaluation of the product.

The last heuristic is the *heuristic of anchoring and adjustment* that people use when they try to estimate the value of a new quantity (Choo *et al.* 2000). The individual must first identify the initial or starting value, which is the anchor. Using the anchor the person then makes some extrapolation toward an estimation of the next value. For instance, managers may estimate the amount of stock of a product they require for the end of the month based on the records of sales from the previous months. The *heuristic of anchoring and adjustment* may lead to errors when the individual fails to get inputs from the environment that may lead to a deviation from the trend.

The use of heuristics simplifies information processing for individuals. Individuals use certain strategies to simplify information processing when making judgements in decision-making. These simplifying strategies may, however, lead to errors in decision-making.

In this section, I have shown that individual attributes that relate to individual cognition influence the ways in which individuals process and use information. People have a limited cognitive capacity to process information. This limitation is a constraining factor for the individuals to be fully rational and exhaustive in processing and using information. Another factor that affects the ways in which people use information is the cognitive complexity ability of individuals. Individuals with a high cognitive complexity ability will tend to handle complex information tasks better than those with a low cognitive complexity ability.

People have different cognitive styles or preferences which determine their personality types. These personality types influence the ways in which people prefer to deal with information-related situations. Such preferences affect the ways in which the individuals process and use information. Lastly, I discussed the use of heuristics as mechanisms that are used by individuals to cope with information tasks. In conclusion, it will be unrealistic to expect people to use information in a similar way. The personal attributes that are derived from the psychological and cognitive attributes account for some of the variations that we see in the information behaviours of people.

In the next section, I discuss the affective dimension of information use as another factor that influences the way people use information.

2.4.2 The affective dimension of information use

When people perform work roles in organisations, they assume a certain status and build a good reputation for themselves. People also earn respect from colleagues and co-workers, desiring to portray a positive self-image. These personal values need to be maintained and enhanced. Sometimes individuals have to make sacrifices to get these personal values. Argyris (1994) points out that people behave in a way that suppresses negative feelings, avoiding vulnerability, risk and embarrassments or anything that would make them appear incompetent.

Staw and Ross (1987: 70), for example, report that managers respond to social pressures, arguing that sometimes managers persist on a course of action even though it appears irrational, because they do not want to appear incompetent, damage their reputation or lose power because of failure. They (the managers) try to justify the need to continue with a project that does not seem plausible because they want to maintain their reputation as strong leaders. Therefore, the information that the managers receive will be filtered in such a way that only information that reinforces the positive effects or reduce the negative effects is processed and used.

Choo *et al.* (2000: 17) report that when people process information they may avoid information that may arouse strong negative emotions. This means people avoid hurting others' feelings, causing embarrassment, conflict or regrets. They avoid tarnishing their self-image and instead work towards enhancing their status or reputation.

Feldman and March (1981: 182) point out that sometimes individuals in organisations use information as a "symbol of commitment to rational choice", not using information to achieve a better outcome, but rather regarding it as something of social value that signals personal and organisational competence. In such cases, people use information because it helps to enhance or maintain a positive image.

Another important factor that determines the way individuals may approach and handle information is related to organisational incentive systems. Feldman and March (1981: 175) point out that organisations provide incentives for gathering more information when dealing with organisational tasks. Individuals are rewarded for decisions that are based on the best available information. Such a reward system was reported to have an effect on the ways in

which individuals seek and use information. Another important factor that the authors observed is the use of information for surveillance purposes. People also collect gossip. They gather information that has no real value to the decisions, monitoring the environment for new surprises and preferences or changes that are happening in the world.

An example of a study that shows how affective factors can influence the information behaviours of people is by Argyris (1994). He interviewed supervisors in a company that applied Total Quality Management (TQM) techniques to help identify some areas of the work that needed improvements. He found that the supervisors had known the areas that needed improvement prior to the TQM initiative, but never acted on the information. The reasons given for not acting on the information included rivalry between the departments and the culture of the organisation that avoided getting others in trouble for the sake of correcting problems. Therefore, by not using information to correct the problems, the supervisors were considering the negative effects that such actions would bring to themselves and other members of the organisation.

In summary, it can be argued that the factors that influence the affective dimension of information use revolve around people using or avoiding using information because such a behaviour reinforces positive effects and reduces negative effects on the individuals themselves or others.

2.4.3 The situational dimension of information use

When we take an organisational perspective to understand information use, we find that information users are not isolated individuals, but rather, part of the organisations in which they work. They perform roles and tasks which are in the interest of those organisations. Therefore, it is in the interest of the organisations to manage and direct the works of the individuals so that they can achieve the organisational goals.

The organisation puts in place policies, procedures and rules that define the context under which the individual performs tasks. The individuals in the organisation fulfil their work roles and complete their tasks against the backdrop of these rules, policies and procedures. These facilities are in place to influence the outcome of the tasks that are performed to achieve the organisational goals.

The contextual factors that influence the way people process and use information contribute to the understanding of the situational attributes that may enable or constrain the productive

processing and use of information (Wang and Chan, 1995). These situational attributes can be understood from the perspective of the organisational culture and the qualities of the tasks to be completed (Wigand *et al.*, 1997; Choo *et al.*, 2000) and O'Reilly, 1983).

Studies of information behaviours have shown that the way people in work roles seek and use information depends on the task that the worker wishes to complete (Belkin *et al.*, 1982 and Ingwersen, 1992). These studies have identified a variety of factors relating people's behaviours to the task (Dervin and Nilan, 1986) as well as the relationships between the types of tasks and the information needed to complete the tasks (Bystrom and Jarvelin, 1995). The performance of the task by the individual is also influenced by the complexity of the task (*op. cit.*). Bystrom and Jarvelin further observe that there is a relationship between the task that an individual does and the type of information needed to complete the task.

Vakkari (1999) and Bystrom and Jarvelin (1995) note that the complexity of a task is central to determining how it is performed. They argue that task complexity can be viewed from many perspectives. The dominant perspective is to associate the task complexity with the pre-determinability of or the uncertainty about the task. Pre-determinability refers to the extent to which the individual can determine the information requirements, process and outcome of the task. The pre-determinability is often associated with the extent to which the task is structured. A more structured task refers to one in which the way to perform the task can be highly determined in advance. The task becomes more structured if the information requirements to process the task and outcome of the process are well known and understood in advance.

Organisations structure the tasks using standard operating procedures that guide the individuals on how to perform the task (Cyert and March, 1992). In this regard, the task rules and routines influence the way the individuals use information to complete the task in the organisation.

There are four basic types of rules or operating procedures that normally guide the individuals in organisations on how to complete a task. These are *task performance rules*, *continuing records and reports*, *information handling rules* and *plans and planning rules* (Cyert and March, 1992).

According to Cyert and March (1992), *task performance rules* outline the procedures for performing the tasks in the organisation and may apply at different levels. Task

performance procedures may regulate the information behaviours of managers and may even control the way the operators use the available information to complete tasks. Task *performance rules* ensure consistency in approaches to tasks through coordination of the work of the sub-units, and define the information that is required to complete a task and stipulate how the individual should use the information (March and Simon, 1958).

Choo *et al.* (2000) point out that organisations maintain *records and reports* for the purposes of control and prediction. While records may not always be used, their presence serves as a form of surveillance. Organisational members assume that someone will check them. *Records and reports* may also be used as a basis for predicting the future, defining the information that an organisation keeps for the future, including the time period for which the information will be kept.

Information handling rules define the sharing and distribution of information in the organisation, determining the kind of information that should be generated and passed on to others. They also define who should get what information and the form in which the information should be presented. *Plans and planning rules* are used for the allocation of resources for the various activities of the organisation, defining how information is used to allocate the resources (Cyert and March, 1992 and Galbraith, 1973).

Another contextual factor that defines the situational variables that influence the way individuals performing work roles in organisation use information is the *organisation culture*. The organisational culture has been defined in many different ways by different researchers. Cabrera *et al.* (2001) note that the *organisational culture* is concerned with the norms and shared practices that people in a work place learn and consider to be valuable, although it may influence groups of people in an organisation in different ways.

According to Schein (1992), the *organisational culture* is based on the assumptions and beliefs that influence the inherent thoughts and feelings of members of a group. The *organisational culture* is developed as the organisation learns to deal with problems of external adaptation and internal integration (Choo *et al.*, 2000). It is normally expressed in collective values, norms and knowledge in such forms as rules, regulations and procedures which eventually affect the behaviour of members of the group (Von Solms and Von Solms, 2004). Such expression of values and attitudes of the members of the organisation affects the supply and use of information.

According to Sims and Lorenzi (1992), the organisation culture provides a framework that defines how the members of the organisation handle information. It also defines the information that members get, how they get it, and to whom the information should be passed. The use of information is enabled or constrained by the pattern of beliefs and attitudes towards information that prevail in the organisation.

A study by Davenport *et al.* (1992) that shows how organisational culture influences the ways in which people use information examined the management of information in organisations from a political perspective. It was found that politics or power in organisations play a central role in the way information is used. The study also found that the reason for the failure of many information initiatives in organisations is the failure on the part of the organisation to manage the politics of information use.

The organisational culture defines an appropriate behaviour for members, for instance, a pattern of behaviour and attitudes that express an organisation's orientation toward information. Davenport (1997: 84) referred to such a culture as an information culture. He argues that an information culture can be "open or closed, factually oriented or rumour- and intuition-based, internally or externally focused, controlling or empowering". The organisational culture may also include the preferences of certain types of information channels or media. Some organisations may prefer face-to-face communication; others telephone, teleconferencing or written communication.

The information culture originates from individual and organizational values and the resultant behaviour becomes a device for the standardisation of the performance of information related activities. It actually represents the values and attitudes toward information and what "should" or "should" not be done in relation to the sharing of information in an organisation. Consequently, information culture has an important effect in the information sharing behaviour of people (Graham and Pizzo, 1996).

Jarvenpaa and Staples (2000) investigated the impact of information culture on the use of the electronic collaborative media for sharing information. They found that the use of electronic media for sharing information and contacting people were positively associated, but only weakly, with a more structured and closed information culture. Jarvenpaa and Staples concluded that people who are engaged in activities that require more information sharing and using preferred a more structured information culture. From this study we can

infer that a more effective use and sharing of information require a balance between an open culture and a closed one.

In another study involving a series of experiments, Constant *et al.* (1994) found that attitudes about information sharing depend on the form of information. Sharing tangible information (such as documents) may depend on social attitudes and norms of organisational ownership of information. On the other hand, the sharing of expertise (such as demonstrations of how something is done) may depend on the needs of individuals or groups in the organisation.

The landmark study by Davenport *et al.* (1992) on information politics also illustrates how information culture can influence information sharing. The study found that in most of the “information-oriented companies” that were studied, “people were least likely to share information freely”. The jobs and the roles of the people were defined by the unique information that people held. Information was viewed as a source of power and made individuals indispensable in the organisations. When information was shared it was more often within rather than across units or departments in the organisation (see also Jarvenpaa and Staples, 2000).

The political behaviour of people with respect to sharing information is viewed as a response to certain organizational situations. Therefore, effective sharing and use of information in an organisation requires managing the politics surrounding the information related issues. Such management of information politics is seen as an information governance that defines and assigns information activities to members of the organisation. For instance, an organisation which manages its information politics will have in place a clearly defined policy on who operates the data centre, who decides what information is to be gathered, what information is going to be used and for what purpose, and what standards the organisation should follow.

Davenport *et al.* (1992) proposed five models that define different political arrangements or ways of governing information in organisations. These models are *technocratic utopianism, anarchy, feudalism, monarchy and federalism*.

- *Technocratic utopianism* refers to the belief that technology can solve all problems of information governance in an organisation. An organisation that follows this model of governing information will tend to focus on the acquisition and

accumulation of technology with little regard for the tangible benefits derived from such technology.

- *Anarchy*: refers to a situation where individuals manage the information, often at their own peril.
- *Feudalism*: refers to a situation where business units define their own information needs and report limited information back to the corporation. Individual departments control the information activities of acquisition, storage, distribution and analysis. The managers are seen as feudal lords, controlling the creation and distribution of information and also determining the meaning and interpretation that should be attached to the information in their departments. This model was found to be the dominant information governance model among the organisations investigated by Davenport *et al.* (1992).
- *Monarchy*: refers to case where one central person dictates information management policies on behalf of everyone else.
- *Federalism*: refers to a situation where the use of information is done in consensus and negotiation among business units. This model of information governance recognises the politics in organisations as a necessary and legitimate activity as long as it is dealt with appropriately. In the federalism form of information governance the use and definition of information is negotiated amongst the managers. All members of the organisation share the resulting definition and interpretation of information.

The five models mentioned above relate to the choices that organisations make in relation to the governance of information. Although it is critical that organisations should always make a conscious effort to define the model that they wish to follow, information politics is often ignored in organisations (Davenport, 1997). Davenport suggests that managers need to talk honestly about the political model of information in their organisations regardless of how they decide to govern it.

To summarise the discussion on organisational culture: organisational culture is undeniably an important factor in the use of information by people in organisations. Through its effect on the pattern of beliefs, attitudes and values towards information, the organisational culture strongly influences what information members of the organisation can create, acquire and use to fulfil their roles in the organisation.

In this section, I reviewed literature on the individual and contextual factors that affect the ways individuals use information. The first section reported on the personality factors that affect the ways people process and use information. On the cognitive side, it was found that people have certain cognitive styles or preferences of processing information that influence their inclination to acquiring and using information. On the affective side, it was found that people would avoid using information that may lead to negative feelings towards themselves and others. People would be more inclined to use information that is going to have a positive effect on themselves and others.

Lastly, the contextual factors that influence the way people use information were discussed. It was found that the quality of the tasks that individuals complete and the organisational culture affect information use. The quality of the task affects the use of information through the ways in which the task is structured by rules, regulations and procedures that define the information requirements, process and outcome of the task. The organisational culture defines the predisposition of the organisation to information through a pattern of beliefs, values and attitudes. It is through the organisational culture that information for an organisation is defined and interpreted. The organisational culture may affect the creation of information as well as its distribution in the organisation.

In the next section, the informational characteristics that affect the way individuals use information are discussed. I explore these factors in relation to individuals' perception of the quality of information.

2.4.4 Information characteristics affecting its use

Research has characterised information in many different ways. However, a cursory examination of the literature on the subject reveals that information quality is an essential attribute that determines the use information (O'Reilly, 1982; Low and Mohr, 2001; Miller, 1996). High quality information is more likely to be used than low quality information.

Quality is not a property of the information. Available literature shows that the information user's perception of quality influences the degree to which he or she acts on the information (Maltz, 2000:114 and O'Reilly 1982). Users may use different criteria to measure information quality (Salaun and Flores, 2001) and the perceived quality of the same piece of information may differ depending on the situation of the individual. Previous studies have

shown a correlation between the perceived information quality and the actual use of information (Van Birgelen *et al.*, 2001; Simpson and Prusak, 1995 and Maltz, 2000).

Extant literature in information systems identifies various attributes that characterise information (Swanson 1985). However, an examination of information quality related measures in the literature (especially in the information systems literature) suggests that the measures are constructed in relation to the information system output(s). For instance, the information quality is measured by focusing on a particular output(s) of an information system such as systems success (Delone and Mclean, 1992:64). This means that the quality of information is determined with a view to pronounce on the success of a system. Olson and Lucas (1982) suggested the report appearance and accuracy as measures of information quality in automation information systems. King and Epstein (1983) proposed sufficiency, freedom of bias, currency, reliability, timeliness, understandability, decision relevance, comparability and quantitateness as appropriate measures of the information quality. Bailey and Person (1983), focusing on the perceptions of the managers of the system, suggested accuracy, precision, currency, timeliness, reliability, completeness, conciseness, format and relevancy as measures of quality.

Measures of information quality that are based on a particular system cause a problem when we want to generalise. Therefore, the usefulness of such measures becomes limited when we try to develop information systems for different contexts.

Efforts to make information quality measures more useful by identifying factors that can be applied across contexts have achieved only varied success. The number of information quality related attributes differ from one study to the other (Swanson, 1985). Miller (1996) discusses ten information quality related dimensions that he suggests as useful benchmarks for improving the effectiveness of information systems and the development of information quality strategies for all organisations. These ten information quality dimensions are *relevance, accuracy, timeliness, completeness, coherence, format, accessibility, compatibility, security and validity* (p.79-81).

a) Relevance

Relevance has been considered as the most important measure of information quality. This is confirmed by its appearance in many discussions of information use regardless of context or level of aggregation of information quality measures adopted. Simpson and Prusak (1995: 413) contend that “relevance to the user’s situation is nearly always a primary

characteristic". Relevance refers to the adequacy of the information to address the user's information needs. Simpson and Prusak argue that in highly structured situations the relevance of information is specified within the operational procedures. This means information that is needed for the completion of a task is specified before the task begins.

Wilton and Myers (1986: 473) discuss the importance of adding dimensions to the relevance of information and refer to "logical relevance" and "evidential relevance". The former is concerned with the extent to which the information is fitting a task while the latter is concerned with the conceptual value of information in changing the beliefs of its users. Considering the logical relevance of information, available information can be highly relevant but not so useful because the intended user already has the information.

Conversely, irrelevant information is not necessarily equated with poor quality. As pointed out by Miller (1996: 79), irrelevant information could just be an indication that the situation at hand does not require that information.

b) Accuracy

Accuracy refers to the correctness of the information. According to Ashill and Jobber (2001: 54), "information accuracy refers to the extent to which the output information is sufficient to satisfy its intended use". Thus, accurate information will give a correct description of the object being investigated. As Freiden *et al.* (1998: 216) pointed out, accuracy has to do with how well the information represents the phenomenon it purports to describe. Information that is not accurate is misinformation and is misleading. Therefore, information provided must be as accurate as the user desires if it is to be useful.

Miller (1996:79) contends that accuracy refers to the degree that information is addressing the underlying reality. He further argues that different levels of accuracy can suit different users or uses. Information can be too accurate in the sense of being too precise, where the degree of precision exceeds the user's processing capability, causing confusion that can result in misuse or abandonment of the information. However, most studies suggest that high accuracy is associated with high quality and increased use of the information.

c) Timeliness

Timeliness refers to whether the information arrives when it is required. The information is useful only to the extent that the user receives it at the time when it is needed. If the information is describing a changing phenomenon, the description needs to show the changes. Out of date information may be obsolete and of little value. In fact, out of date

information may be misinformation and misleading. Timeliness implies that the information is constantly changing and redefined in line with the perceptions of the user (p. 80).

d) Format

Format refers to the underlying form and context for interpretation. It refers to how the information is presented to the user. The appropriate format of information depends on the preference of the user and the situation of information use (p. 80).

e) Completeness

Completeness indicates the extent to which the information describes the target phenomenon. A complete description of a phenomenon is essential. If parts are missing, the information may not be useful especially if it leaves out some cases or elements of the case that are crucial for the user. Too much information in terms of precision and details provided can also be a problem if it exceeds the processing capability of the user. The user may not process the information in a timely fashion. Therefore, there is a need for a balance between the completeness of the information and the processing capacity of the users (p. 80).

f) Coherence

Coherence refers to how well the information comes together and is consistent with itself. Too many irrelevant details destroy the coherence and this may lead to ambiguous information that confuses the user. The user may reject the information because he or she is unable to process it effectively (p. 80).

g) Accessibility

Accessibility requires that the user gets the information as and when he or she requires it. Accessibility and timeliness should complement each other. The user perceives information to be of quality if it is accessible when it is needed (p. 80).

h) Compatibility

Compatibility refers to the extent to which the structuring of the information fits with other information that is delivered to the user, making it suitable for enhanced uses. The structure needs to change in accordance with the user's requirements (p. 80).

i) Security

Security is an essential aspect of information systems. Two forms of security: logical security (barriers, e.g., passwords, transaction authentication, etc.) and disaster recovery planning (from natural disasters), are normally put in place for the confidentiality and the integrity of the data in information systems. High information security measures can increase the user's trust of information that they get from the system (pp.80-81).

j) Validity

Validity is an information quality characteristic that is determined by being able to verify the information as being true and satisfying appropriate standards related to other dimensions of quality. The user finds information to be valid if he or she is able to verify the accuracy, timeliness, and completeness of the information (p.81).

In this section, I have discussed ten information quality dimensions as espoused by Miller (1996). The discussion has shown that the perceived information quality is an important factor in the use of information. Miller (1996) argues that the user is central to the determination of the quality of information. Information quality is a dynamic entity, varying with usage as well as with time. However, what is important to users is the value of information to the completion of their tasks. This value of information is determined by the user.

The perceived information quality is an important factor for those involved in the design of information systems. According to Miller (1996), providing information or designing systems needs an understanding of quality in all its dimensions. Such an understanding helps in designing information systems that are attuned to the information quality as perceived by the users. System developers need to focus on the user to develop a behaviour-based, process-oriented understanding of the users in terms of their perceptions of the quality of the information they use.

To summarise this section in which I focused on the factors that affect the use of information: I discussed the three main factors that affect the ways in which people use information - individual factors (cognitive and affective), contextual factors (situational) and informational factors. This review has shown that these factors are many and varied, but lack a unifying theory. Without a unifying theory, the usefulness of these factors is limited.

The lack of a unifying theory of the factors that determine the use of information makes managing information for users a very difficult task, because not all the important factors will be fully understood and captured in any given situation. In order to address this

theoretical deficiency, some researchers have suggested holistic approaches to analysing the entire organisational information environment. In the next section, I discuss three models that take a holistic approach to understand the use of information in organisations.

2.5 Holistic approaches to using information

In this section, I discuss three models that follow a holistic approach to explain the use of information. These models endeavour to explain the use of information by considering the entire environment in which it is used. These are the models of Taylor (1991) - *Information Use Environment* (IUE); Katzer and Fletcher (1992) - *Information Environment of Managers* and Davenport (1997) - *Information Ecology* model.

2.5.1 Taylor's Information Use Environment (IUE)

Deviating from the earlier approaches to understand the use of information, Taylor (1991: 218) suggested a holistic approach to understanding the “*user and uses of information* and the context in which those users make choices about what information is useful to them at particular times”. Taylor criticised the earlier works for putting too much emphasis on the technology and the information content aspects to identify the factors that determine the use of information. He suggests that focusing on the contexts is a more productive way to understanding the use of information.

Taylor referred to the contexts within which information needs arise and information is used as the *Information Use Environments* (IUE). These contexts comprise elements that a) “affect the flow and use of information messages into, within, and out of any definable entity; and (b) determine the criteria by which messages will be judged” (p. 218). Taylor breaks data about the IUE into four categories: “*sets of people, typical structure and thrust of the problems of those sets of people, typical settings, and what constitute the resolution of the problem*” (p. 220).

The *sets of people* refer to the groups of people and their demographic and non-demographic characteristics. When identifying the demographic variables that define information environments and behaviours, Taylor suggests education and the socio-economic status as the most important variables. Other variables such as age, marital status and gender are not critical in determining the information behaviours of people. Among the non-demographic variables, Taylor recommends media use, social networks, attitudes towards new

technology, education, risk-taking and innovation as important variables in determining the information behaviours of people (p. 222-224).

Taylor identifies four categories into which people can be classified (*sets of people*):

- *the professions* (including engineers, lawyers, social workers, scientists, teachers and managers);
- *the entrepreneurs* (including farmers and small business persons);
- *special interest groups* (including consumers, citizen groups, hobbyists, political action groups and ethnic cultural groups) and

the special socio-economic groups (including the information poor, the disabled, the minorities and the elderly).

The *typical structure and thrust of the problems of these sets of people* define “the kinds and structure of the problems deemed important and typical by those sets of people” (p. 221).

Taylor argues that these problems are not static. They change from time to time when actors get new information. The changes may also be facilitated by the situation and the perceptions of the actors. When faced with a problem the individual is concerned with getting some clarity on the area where he or she has some doubts by: a) recalling previous experience for analogy; b) acquiring new knowledge or by confirming knowledge that illuminates, resolves or alters the problem; or c) discovering that there may be no resolution to the problem (p. 225). Taylor argues that problems across IUE are different and each IUE has a discrete class of problems that the individuals have to face. He mentions four dimensions relating to structure (well-structured versus ill-structured), complexity (complex versus simple), agreement on assumptions (assumptions agreed upon versus not agreed upon) and familiarity (familiar versus new patterns) as typical dimensions of problems that people usually encounter (pp. 224-226).

The third category of the IUE is the *typical setting* which refers to the nature and variety of the settings in which people use information. The setting is concerned with the physical context in which the groups of people work, including the types and structures of the information that flows in the setting. In identifying the setting, Taylor suggests four aspects that influence the information behaviours of the actors. These are the *organisation, access to information, domain of interest* and *the history and experience*.

The first aspect, the organisation, is an important attribute of the setting. The way the organisation is structured and the style of management adopted in an organisation establish

attitudes which influence the information behaviour of employees. The structure and style in place may predispose the employees towards either productive or negative information behaviours (p. 227).

The second aspect of the setting that influences information behaviours is the access to information. Taylor conceptualised access to information in a rather broad way to refer to not only the physical access, but also the psychological access. Much as the actors can have physical access to information, it should also match what they want as well as their capability to work with such information (p. 228).

The domain of interest, the third aspect, refers to what the organisation actually does, such as manufacturing a certain type of product, providing education, planning development or distributing a product. The domain of interest determines the type of information that employees handle and what they want to achieve with the information (p. 227).

The last aspect of the setting is the history and experience of the organisation. Taylor points out that with the passage of time and the increase in specialisation, the way the organisation acquires information may be made routine and bureaucratic such that the effect of new information may be reduced. Therefore, an organisation that has been in existence for a long time, specialising in a certain area, tends to complete most of its tasks routinely and this affects the ways in which the individuals approach and handle information to complete the tasks (p. 228).

The fourth category of the IUE is the *problem resolution*. Taylor observes that the resolution of problems is usually a process which takes the actors through a series of questions and answers. In the process of resolving the problem, the actors may use information in one or more of the following eight ways: enlightenment, problem understanding, instrumental, factual, confirmational, projective, motivational and personal or political. In this regard, the purpose of using information becomes an important factor in determining the information behaviour (p. 230).

In addition, *problem resolution* defines the orientation to the content of information that the actors use. This component focuses on any identifiable traits that are inherent in the information, apart from the content. These information traits can be related to the dimensions of the problem and the needs of the people who are working on the problem. In terms of information traits, Taylor found eight continuums:

- Quantitative continuum (ranging from quantitative to qualitative)

- Data continuum (ranging from hard data which is empirically derived to soft data which is not directly observable, and must be inferred)
- Temporal continuum (ranging from historical or precedence to forecasting and modelling)
- Solution continuum (ranging from a single solution to a range of options from which the receiver can choose)
- Focus continuum (ranging from factual information of well-understood problems to diffuse information of idea generation and brainstorming)
- Specificity of use continuum (ranging from applied to theoretical)
- Aggregation continuum (ranging from clinical information to census or aggregated information derived from large populations)
- Causal/diagnostic continuum (causal information discusses why something happens while diagnostic information describes what is happening) (p. 231).

Taylor's model of IUE provides significant insights into how we can understand the information behaviour of people. Although the model was derived from theoretical concepts of existing literature, Taylor found the model useful to analyse IUE for three groups of professionals (engineers, legislators and practicing physicians).

Notwithstanding the success of the model in accounting for information behaviours using existing literature, Taylor did not actually test the model in the field to determine its usability as a tool for gathering data about information behaviour. Nor did he provide a guide on how the model could be applied in the management of information or in the development of information systems to address the information behaviours that are exhibited in a given IUE. Therefore, it can be argued that while the model has the potential for changing the way we understand information behaviour, its applicability is yet to be tested in the field.

2.5.2 Katzer and Fletcher's model of the Information Environment of Managers

Katzer and Fletcher (1992) based their analysis on *people, organisational settings*, and *typical problems* that are handled and the range of acceptable *resolutions* that were identified in Taylor's (1991) model of Information Use Environments.

Katzer and Fletcher identified the context and the person as essential components in the information environment of managers. The person and the context have a direct influence on the other components of the model. The information environment of managers is defined by factors relating to them (managers) working in a setting, taking on various roles and carrying out various activities (p. 249). The managers, in their settings, perform various roles and activities and encounter *problematic situations* that they have to deal with. These *problematic situations* are essential determinants of the information behaviours of the managers. According to Katzer and Fletcher, “a problematic situation can be thought of as an item that requires cognitive and perhaps behavioural action” to get it resolved. The item may be created by an individual, but it is influenced by the features of the setting in which it takes place (p. 231).

When managers seek a solution to the *problematic situation*, they perform actions that determine the way they use information, engaging in information behaviour to find answers to the following questions: What information is needed? Where can they seek the information? How can the information be sought? How much information will be required? How is the information going to be interpreted? How is the information going to be assessed? How is the information going to be used? (p. 233).

Another component of the information environment of managers is the setting. The setting is defined by those organisational characteristics that influence the information behaviour of the managers. Katzer and Fletcher grouped the organisation variables under two broad categories: the rationality of the organisation and the organisational structure (p. 246). In defining the rationality of the organisation, they use an analogy, that, like managers, organisations often fail to be completely rational in their information behaviour(s). Katzer and Fletcher observe “that organisations use shortcuts to escape or minimise the problems of overload, complexity and ambiguity”. Social, political, technical and financial factors determine the extent of rationality of the organisation (p.246).

The organisational structure, such as decentralisation or centralisation affects the information flow and use in the organisation. Katzer and Fletcher argue that differences in the structure of the organisations correlate with the differences in the processes and cultures of the organisations. Such differences are associated with the orientation of the organisations to the use of information (p. 247).

Another critical factor in the model of the information environment of managers is the person. The characteristics of the person who is performing the roles determine the information behaviour that is exhibited during the resolution of a *problematic situation*. For the individual person, Katzer and Fletcher suggest that the cognitive, psychological and physical attributes determine the information behaviour exhibited (p. 243).

Lastly, the dimensions of the problem, i.e., the nature of the problem addressed, influence the use of information during the resolution of a problematic situation and serve as criteria for the managers to assess and determine the characteristic of the information that is required (p. 242).

The model presented by Katzer and Fletcher is dynamic. The *problematic situation* changes over time and these changes are considered essential to understanding the information behaviour of managers. As managers adapt to the changes of the *problematic situation*, the information requirements also change and the focus on the problems shifts. Therefore, information behaviours exhibited by the managers can be understood in relation to the changes in the problematic situation (p. 248).

The critical feature of the model of Katzer and Fletcher (1992) is that it provides a way of linking the information behaviour of managers to the information use environment through the problematic situation (Choo *et al.*, 2000). Such a theoretical link sheds light onto how managers actually use information.

2.5.3 Davenport's Information Ecology Model

Davenport (1997) proposed an Information Ecology model. He suggests the model as an alternative for understanding the way people use information in their work settings. Like Taylor, Davenport criticises the traditional approaches that emphasise the use of technology at the expense of the information and the human; considering it no longer suitable in our current environments where the availability of information has increased tremendously. Information ecology is a more holistic and comprehensive approach to understanding the use of information. Davenport (1997) points out that managers who take an ecological approach believe that

- Information is not easily stored in computers - and is not data
- The more complex an information model, the less useful it will be

- Information can take on many meanings in an organisation
- Technology is only one component of the information environment and often not the right way to create change (p. 5).

The information ecology model emphasises the need to understand the entire environment in which information is used. It puts “how people create, distribute, understand and use information at its centre” (p. 5). The information ecology model consists of three nested environments: the *information environment*, the *organisational environment* and the *external environment*. According to Davenport the *information environment* is at the core of the model, influenced, however, by both the organisational and the external environments.

The *information environment* consists of six major elements: *the information strategy*, *information politics*, *information behaviour and culture*, *information staff*, *information process* and *information architecture*. These components provide an overall landscape of how information is used in an organisation (p. 34) and are essential in driving its use in an organisation. Davenport suggests that organisations that endeavour to ensure the effective use of information need to manage these factors.

a) Information strategy

Information strategy refers to how the organisation intends to deal with such aspects as the information content, the common information in the organisation, the information process as well as new information markets. In formulating the information strategy, the organisation wants to address such questions as: What do we want to do with information in our organisation? What content do we want to have? What information are we going to circulate to members of the organisation? What process is the organisation going to use in relation to handling of information? What new markets are we going to target including those that are external to the organisation? (pp. 46-57).

b) Information politics

Information politics is regarded as the critical component of the information environment. It focuses on the power that the information provides and the way the organisation is structured in terms of the responsibilities to manage and use information (p. 35). Davenport considers identifying behaviours that can interfere with the sharing, hoarding, filtering and passing only information that serves them (users) well in terms of power and control in the organisation as essential for understanding the use of information.

c) Information behaviour and culture

Information behaviour and culture are related factors and may be the most influential in determining the way information is used in an organisation. Information behaviour refers to the way “people approach and handle information” (p.83). This includes, as examples, the way the information is searched for, used, shared, modified, hoarded or even ignored by the people. Davenport argues that the way the organisation manages crucial information behaviours relating to sharing information, handling information overload and cutting down on multiple meanings of information to organisation members, is critical (p. 85). Despite the importance of information behaviours in the determination of its use, Davenport points out that it has not been explicitly addressed in organisations.

Culture refers to the values and beliefs of the group or organisation. Such group or organisational values and beliefs result in a pattern of behaviours and attitudes that express the general orientation of the organisation towards information. According to Davenport, this *information culture* determines how the organisational members “value information, share it across organisational boundaries, disclose it internally and externally, and capitalise on it in their businesses” (p. 35).

d) Information staff

The *information staff* refers to people who are responsible for the information resources of the organisation. They define, manage, analyse, create, maintain and advise on the information resources in the organisation. These people may be technical experts, content experts such as librarians, as well as professionals in specific fields who are required to support the information requirements of other members of the organisation. The information staff may influence the information behaviours of people and the overall information culture of an organisation by the way they analyse, interpret, categorise, filter and integrate the information in the organisation.

Davenport suggests that there is a need to manage and integrate the activities of the information staff as their primary purpose is to make information meaningful in the organisation. The *information staff* need to provide information that is accurate, timely, accessible, engaging, applicable and rare. Davenport sees their work as complementing each other in pursuing these information-related goals. He argues that in order for an organisation to be successful it needs to manage the information activities of the *information staff*. Davenport suggests pruning information, adding context, enhancing format and choice

of the right media as additional activities for the staff to increase the value of information (pp. 108 - 127).

e) Information process

The *information process* “describes how information work gets done” in an organisation and is defined by all those activities that are performed by the information workers. Davenport argues that it is essential to understand the work processes and the activities in which information is used such as the ways to determine information requirements, capturing, scanning, categorising, formatting, packaging, distributing and using information. By focusing on these activities, we can get a clear picture of the ways in which information is used (pp.134-151).

f) Information architecture

The last component is the *information architecture*. According to Davenport, the information architecture provides a guide to the “structure and location of information within an organisation”. This guide can achieve its purpose by describing and mapping the current information environment of the organisation. It should be noted that because of the rapid changes in the information environments the *information architectures* should also change accordingly (p. 156-174).

The information ecology model provides a new way of thinking about the factors that influence the way information is used by focusing on the entire information environment of the organisation. From that environment, we can distil the critical factors that drive the ways in which information is used. According to the information ecology model, the user and the information itself are recognised as the core factors in understanding the way information is used.

In this section, I have reviewed literature relating to information and its use to provide insights on what has been researched and understood. The review shows that earlier studies have focused on identifying isolated and independent factors that influence the use of information. There was a bias in the research linked to the technology that was used. For instance, the quality of information was determined by the output of an information system.

In the last section, I described three models that deviated from the earlier approaches to consider the entire information environment as necessary for a better management of information.

The present study investigates the use of information in environmental planning. Environmental planning is taken as an information intensive area in which the understanding of the ways the planners use information is essential for effective management of information. The literature that I have reviewed in the section above provides a framework for thinking about appropriate methodologies to investigate the way the planners use information in environmental planning.

In the next section, I provide a brief review of the literature of planning from a development perspective. The first part of the review focuses on providing a conceptual understanding of planning, followed by a brief description of the concept of environmental planning. The purpose of the next section is to provide an understanding of the context in which the subjects of the present study use information.

2.6 Planning

A central concern of any government is the sustainable development of its people. Governments have identified a variety of planning systems as one of the mechanisms for delivering development projects. These planning systems make use of expert knowledge (scientific and technical knowledge) to facilitate actions relating to various interests of the public (Friedmann, 1987).

The concept of planning has been defined in a variety of ways. However, there are some commonalities among the definitions. A review of some definitions given in a selection of literature on planning provides an idea of the meaning that planning researchers attach to the concept. Examples of some definitions of planning from the literature on planning are that planning is:

Concerned with the long term development of an area and the relationship between the local objectives and the overall community and regional goal (Cullingworth, 1993: 9).

A deliberate social and organisational activity of developing an optimal strategy of future action to achieve desired set of goals for solving novel problems in complex contexts and intention to commit resources and to act as necessary to implement the chosen strategy (Alexander, 1992: 73).

An integrated sequence of interrelated decisions, from setting goals, objectives and targets for certain time horizons, to designing courses of action to be implemented with particular

means and implementation processes (Briassoulis, 2001: 411).

An analysis of the above definitions reveals that planning involves some actors, a set of goals and problems to be addressed, context (area or place), time reference and some means or actions to achieve the goals. Planning is a goal-directed activity. The actors employ some mechanisms and engage in processes to achieve the goals. Planning mechanisms focus into the future. They are, however, influenced by the past and the present.

Planning for national development normally takes place in public institutions or agencies. The interests of the public and the state therefore compete for the attention of the planners (Wadley and Smith, 1998: 1009 and Friedmann, 1987). These competing interests present a number of constraints on the systems that the planners have to deal with.

Briassoulis (2001) and Cullingworth (1993) point out that politics is the major issue that usually come into play in planning. Other factors that influence the planning systems are the variations in the value systems of the interested parties. The interests of parties involved in the problem that the planning is addressing are also different. Lastly, there are the power struggles among the various groups in the planning process (Gilg, 1996).

Margerum (1997) and Lawrence (2000) observe that while early planning systems did not recognise the influence of these latter factors, the current systems recognise that value systems, politics and power struggles have taken a centre stage position in the planning process. The recognition of these factors was a gradual process resulting in the evolution of planning processes from the traditional rational approach to the current processes where communication and consensus building are the drivers of the planning systems.

2.6.1 Traditional view of planning – the rational model

The rational model of planning was the earliest to be developed in planning theory and practice. It focuses on the logic of optimal choice. The application of the rational model in the planning process took the form of comprehensive planning (also referred to as the blue print or master planning) (Lawrence, 2000: 608). According to Lawrence, the process had simple methodological procedures that involved survey, analysis and the preparing of a plan. Drawing from literature, Margerum (1997) reports that the model recognises that the problems in planning are complex and interrelated, requiring a broad approach that takes

into account an array of variables. However, according to the rational model, the planners are expected to deal with these complex situations in a rational manner to arrive at the best decision possible. The rational model is based on the following assumptions:

- Planners approach the planning process in a systematic way and reason systematically in search for the optimal solution to the problem
- A single set of goals and objectives are pursued in the planning system. In addition, there is a single criterion that can be applied to address a problem
- The best alternative will be identified and selected during the planning process
- The environment under which planning takes place is predictable and can be controlled by the planner
- The planner is an independent expert advisor whose input is guided by technical and scientific information
- The planning process is separated from the political process
- The parties whose interest are affected by the planning are a pluralistic society where competing interests have equal access to power and
- The resulting plan will be implemented (Lawrence, 2000: 608-609).

An examination of the assumptions on which the traditional view of planning is based reveals that some of them are unrealistic. The model assumes an ideal situation where the forces such as politics, power, values, beliefs and interests may not lead to unexpected consequences in the planning process. These assumptions were criticised by a number of authors in the planning literature. In the next paragraphs, I discuss some of the criticisms that have been raised against the rational model of planning.

Lawrence (2000: 61), Margerum (1997) and Gilg (1996) point out that some of the criticisms of the rational model of planning include the dominance of the experts in the planning process while the public is only taking a peripheral role. The public in this case is just taken as consumers of the “ideal plans” that are produced by experts. The model also fails to consider the limitations that arise from the unavailability of resources. For instance, it is too ambitious to assume that all the plans that are produced will be implemented. Resources may limit what is possible to implement; such conditions need plans that are flexible and can be adjusted to suit the availability of resources for implementation.

Another factor that critics of the rational model of planning have raised relates to the planners' cognitive limits to processing and using information. The amount of information

that the planners can process and use is bound by the limitation of their cognitive capacities. Therefore, to assume that the planner will be exhaustive in identifying all variables is unrealistic.

Furthermore, the environments under which planning takes place is not always predictable and controllable as assumed in the rational model of planning. The model puts too much emphasis on the use of scientific and technical knowledge and fails to recognise the creativity of individuals in using non-scientific and non-technical knowledge to solve problems. The rational model of planning fails to recognise the collective nature of planning as well as the central role of dialogue in the process. The political nature of planning is also not acknowledged. Other contextual variables that characterise the problems and situation in which planning takes place are not integrated in the rational planning model. The rational model has also been criticised for producing plans that are too broad and general with a limited focus on the interest of the participants and the public (Lindblom, 1959).

In response to the criticisms raised against the rational model of planning, there has been a gradual move towards interactive and participatory approaches that recognise the broad picture and the interconnections of key issues and actions in planning (Margerum, 1997:470). These models have assumed different names such as deliberative planning, collaborative planning, integrated planning, transactive planning and communicative planning. However, the critical point is that they approach planning in a broad and holistic way recognising the influence of social, cognitive and contextual factors. For the purpose of this discussion, I shall discuss these approaches under the heading of communicative planning. This model is receiving the most attention in the latest research on planning systems because of its predisposition to communication activities that characterise the current planning models (Faludi and Altes, 1994).

2.6.2 Communicative planning

The central tenet of communicative planning is communication action and consensus building. It emphasises the importance of dialogue in bringing personal experiential knowledge and technical knowledge into planning. Communicative planning also focuses on consensus building among the participants.

Although there is no standard definition of communicative planning in the literature, there are, however, features that are common to planning paradigms that are manifestations of communicative planning. Allmendinger and Tewdwr-Jones (2002) observe that participants who are drawn in to serve their interests or the interests of the groups that they represent make communicative planning decisions collectively. The process involves arguments raised by the participants who are believed to be committed to the values of rationality and impartiality. Allmendinger and Tewdwr-Jones (2002: 9) analysed the literature and summarised the following ten elements as common features in communicative planning:

- Planning is an interactive and interpretive process
- Planning is undertaken among diverse and fluid discourse communities
- Planning is a respectful, interpersonal and intercultural discussion methodology; focusing on arenas of struggle, where public discussions occur, where problem strategies, tactics and values are identified, discussed and evaluated, and where conflicts are mediated
- Planning involves advancing diverse claims for different forms and types of policy development
- Planning is about developing a reflective capacity that enables the participants to evaluate and re-evaluate their work
- Planning is a strategic discourse being opened up to include all interested parties which in turn generate new planning discourses
- Participants in the discourse gain knowledge from other participants in addition to learning new relations, values and understandings
- Participants are able to collaborate to change the existing conditions and
- Participants are encouraged to find ways of practically achieving their planning desires, not simply agreeing and listing their objectives (p. 9).

Although the elements of communicative planning are based on very sound principles and look very attractive, some of them may be very difficult to achieve. The proponents of communicative planning are very optimistic about the changes that they bring to the planning process. For instance, Hillier (1998) argues that if properly implemented, communicative planning can lead to very positive outcomes in terms of fairness, transparency in participation and in the decision-making processes. She argues that information can be made available to all in a non-technical manner. Power and biases can

be controlled while all those who are involved may get the opportunity to make their voices heard.

In communicative planning, the role of the planner is to facilitate the processes that characterise the various elements. Drawing from extant literature, McGuirk (2001: 198) observes that the functions of the planners are those of regulating the communicative planning practice. They facilitate the processes and address issues that may constrain the communicative planning process. They address the distortions that may result from the exercise of power by the participants, working toward directing the attention of the participants towards a more productive planning process. They analyse and guide the processes of making judgments and claims, assessing how these claims are validated in the process. The planners mediate and negotiate the outcomes of the communicative planning process. Furthermore, they act in anticipation and counteract misinformation if they detect it, clarifying and elucidating policy options and implications. The planners challenge misrepresentations and unjustified appeals by the participants (Gunder, 2003: 273).

While the principles of communicative planning are viewed as ethical and morally positive, some critics have questioned whether it is possible to achieve them in practice. This is particularly so because planning takes place in highly politicised environments. The influence of power is unavoidable in planning. Therefore, to claim that the processes are based on truth, honesty, legitimacy and integrity is unrealistic and too optimistic for practice (Gunder, 2003). However, despite the criticisms, communicative planning remains the dominant paradigm that planning institutions and academia are currently grappling with.

In this section, I have highlighted some of the salient issues that are found in the planning literature. I focused on two perspectives: the traditional view of planning and communicative planning which is currently dominating the planning literature. In each case, I highlighted the main principles that underpin the planning paradigm. This was followed by the main criticisms that have been raised against the respective planning paradigms.

The various paradigms that I have discussed have been applied to different dimensions of planning in the development arena, including economic, environmental, physical and social planning. In view of the objective of the current study, which is to investigate the use of information in environmental planning, I shall now highlight planning issues as they relate to environmental planning. According to Greed (1996:262), environmental planning, as epitomised in the sustainability movement, appears to have taken centre stage as the most

fashionable form of planning in terms of publications, planning school courses, conferences and academic discussion.

2.7 Environmental planning

The field of environmental planning is still evolving. It emerged as a response to environmental problems caused by human development. Environmental planning is a complex process, involving many activities that are geared towards improving the quality of environmental decisions (Huse, 1995 and Blowers, 1992). The objective of environmental planning is to predict how human activities will affect the environment and come up with strategies on how best to make use of natural resources without compromising their sustainability (Seffino *et al.*, 1999).

In environmental planning the environmental issues are included or considered in the planning process. The activity is trans-disciplinary and involves people with different backgrounds (academic, professional, etc.) and interests. It is characterised by debates and negotiations among various groups with different interests and interpretations of an environmental planning problem (Karacapilidis *et al.*, 1997).

Environmental planners deal with diverse and varied areas of knowledge domains, including pollution control (water quality and air quality, noise and the management of solid and hazardous waste), land use planning and environmental impact assessment (Ortolano, 1984). According to Blowers (1992), environmental planning activities normally take place in local governments.

Ortolano (1997: 16) argues that environmental planning covers a broad range of areas. He provides a guide as an illustration of the typical settings and activities that characterise the works of the environmental planner. This includes:

- New facility development, including work on assessing impacts of proposed projects, mitigating environmental impacts. Facilities include public works and private development projects
- Old facility decommissioning, for example, dismantling obsolete nuclear power plants, cleaning up toxic wastes at military bases scheduled for closure and rehabilitating ecologically damaged land such as strip-mined areas

- Facility operation, including monitoring compliance with pollution control requirements, reducing waste generation by recycling materials and conducting environmental audits of facility performance
- Government policy analysis and environmental program implementation, as illustrated by studies evaluating the effectiveness of environmental laws and policies
- Urban and regional development, including analysis of the suitability of land for different uses and the development of policies to control land use in ways that conserve resources and minimise the public exposure to natural hazards such as landslides and floods (Ortolano, 1997: 16).

The environmental planning process requires a broad range of environmental information (Huse 1995; Ortolano, 1984 and 1997 and Dorney, 1989). Huse (1995) and Bolstridge (1998) further point out that environmental planning processes make use of information from a variety of disciplines (e.g., the natural sciences, sociology and economics) to satisfy the information needs expressed for the different processes.

2.8 Summary

In this chapter, I reviewed literature that is relevant to the current study, exploring the concept of information as used in information systems literature. This was followed by a review of literature on the ways and purposes for which people use information. I also reviewed literature on the factors that drive the individuals to use information in the ways that they do. In the last section of the first part of this chapter, I discussed three models: Taylor's (1991) Information Use Environment, Katzer and Fletcher's (1992) Information Environment of Managers and Davenport's (1997) Information Ecology Model. The second part of the literature review focused on developing some conceptual understanding of planning and environmental planning.

From the literature reviewed in this chapter, it was found that the concept of information has been vaguely defined in most of the standard texts on information systems. A sophisticated approach to understand the concept takes an interpretive perspective and uses the theory of hermeneutics to focus on how meaning is created. According to the interpretive perspective, information is about interpretation and understanding. Through the interpretive process, I have argued that people create meaning to get an understanding of the situation that they are facing.

The literature review further revealed that the use of information by people is a complex activity which is driven by many factors. I classified those factors into three categories relating to the individual (cognitive and affective), the situational (tasks and organisational culture) and the informational (perceived quality of information).

The cognitive factors relate to the individual's cognitive capacity, cognitive complexity and cognitive styles and preferences to deal with information. These factors affect the ways in which people prefer to process and use information. On the affective dimension, it was found that when people process and use information they do that selectively, using information that has a positive effect for themselves and others and avoiding information that can give rise to negative feelings. The situational factors refer to those that relate to the contexts. The organisational culture and the ways the tasks are structured by rules, regulations and procedures affect the information behaviour of the individuals as they complete the tasks in their roles.

Another important factor that drives the way individuals use information is its perceived quality. Important information quality characteristics are relevance, accuracy, format, completeness, accessibility, coherence, compatibility, timeliness, security and validity. The user determines the quality of the information.

The literature reviewed has shown that earlier studies which aimed at identifying the factors that affect the ways in which people use information had limited success. The factors were just listed and lack a unifying theory. The number of factors varied from one study to the other depending on the level of aggregation the researcher chose. This makes the application of findings very difficult, especially in information management and the development of information systems in different contexts.

Deviating from the trend in the earlier works, Taylor (1991), Katzer and Fletcher (1992) and Davenport (1997) suggested that the use of information can be understood by looking at the entire environment of the users. These models seem to be promising in providing new ways of understanding the information behaviour of people in work roles. However, the applicability of the approaches is yet to be tested in the field.

In the last part of my literature review, I focused on the concepts of planning and environmental planning in the development arena. The review focused on understanding the concepts as used in the literature, in particular, two paradigms of the planning process. The first paradigm is the traditional rational model of planning, where the aim was to produce

“ideal plans” by planning experts. This model has been criticised for being based on unrealistic assumptions.

The second (current) planning paradigm is that of communicative planning, which is based on communication action and consensus building. Communicative planning brings individuals or groups with interests in the plan to participate in the process. In communicative planning the interests of all those who are affected by the problem addressed by the plans are considered.

Lastly, I discussed the concept of environmental planning, focusing on the way the environmental issues are considered in the development planning process.

To conclude, literature that is relevant to information systems research has been dominated by work on the use of information in managerial work and decision making. Initially, these works focused on identifying factors that influence the use of information. However, these factors lacked a comprehensive unifying theory. They were studied as isolated and independent factors. The number of critical factors varied from one study to the other depending on the level of aggregation chosen by the researcher, which constrained the usefulness of those factors. Secondly, research linked the factors that influence the use of information to the use of the technology. For example, the quality of information was determined by the output of an information system.

Recent literature reviews in information management suggest holistic approaches, in which the use of information is understood in relation to the entire information environment of people in their work roles. However, currently there are not many empirical studies to support the validity of the categories described in the holistic approach models of information management. The present study will address this discrepancy by investigating the use of information from the information behaviour perspective. Information behaviour has been identified in the Information Ecology Model of Davenport (1997) as an essential factor in the management of information. Therefore, an empirical investigation of the use of information from the information behaviour perspective is essential for understanding and applying the Information Ecology model in the management of information in organisations.

The present study investigates the use of information in environmental planning - an information intensive area in which the understanding of the ways the planners use information is essential for its effective management. The study takes a behavioural approach to investigate how the planners approach and handle information when they

address environmental issues. An understanding of the way information is used from a behavioural perspective is essential for a deeper understanding of information management.

In the next chapter I discuss the methodology and the design of the current study. I also describe the procedures that I followed to carry out the study.

2.9 References

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Chapter 3: Research methodology, design and application

3.1 Introduction

This chapter discusses the research methodology, design of the study and application of the methodology to investigate the use of information in environmental planning. The chapter begins by providing an overview of the research paradigms dominant in information systems research. This is followed by a discussion of the suitability of information systems research methods to the present study and the selection of the interpretive qualitative methods as appropriate to researching the use of information by planners. The section that follows provides a general background to qualitative research. I then discuss how the study was located within qualitative research and thereafter highlight the presence of qualitative methods in information systems research in general. This is followed by a presentation of the dominant qualitative research strategies in information systems, emphasising the reasons they were not selected for the current study. The selection of the Grounded Theory method to inform the processes and procedures of data collection, analysis and presentation of the result of this study is then presented. Information on the nature, procedures and techniques of the Grounded Theory method and its application is also provided.

In the section of the chapter on the research procedures I present a plan of how the research was carried out. I also report on how I selected the participants, collected data using semi-structured interviews and analysed it through the process of coding to develop a Grounded Theory of the use of information in environmental planning. The research plan is also presented in the form of a picture to summarise the processes, actions and activities carried out during the research process. I also provide some highlights on how the evidence (data) was corroborated as well as how the theory was validated by the respondents. The chapter ends with a summary of the execution of the research plan.

3.2 Dominant research paradigms in the information systems research

There is a wide range of methodologies regarded as legitimate in the conduct of information systems research (Galliers, 1992 and Mingers, 2003). The discussion of information systems research is in itself multi-disciplinary. It covers both social and technical aspects involved with the development and use of information systems (Galliers, 1994). In addition, the conduct of the research itself is based on a spectrum of significantly different assumptions. These assumptions form the basis for characterizing the different paradigms or philosophical approaches that inform the design that is followed when a study is conducted.

Guba and Lincoln (1994: 116) argue that “paradigms are crucial; no inquirer, we maintain, ought to go about the business of inquiry without being clear about just what paradigm informs and guides his or her approach”. Although this argument was not directed at a specific discipline, when considered in the light of information systems research, it is found that there are two dominant paradigms that have guided the conduct of research in the discipline. These are the *positivist* and the *interpretive* paradigms. The basis for this categorisation is the *ontological* and *epistemological* assumptions of the researcher as he or she engages in the investigation. *Ontological* assumptions refer to the researcher’s beliefs about reality while *epistemological* assumptions are concerned with the researcher’s beliefs about what should be regarded as knowledge and how the knowledge should be obtained (see Orlikowski and Baroudi, 1991; Myers, 1997 and Locke, 2001).

3.2.1 *Positivist paradigm*

The *positivist* paradigm is defined by epistemologies whose goal is explanation through theory proving, prediction and control of what happens in the social world. The methods try to achieve this by searching for regularities and causal relationships between constituent elements. A research within the *positivist* paradigm focuses on the ontologically assumed objective and external reality that is shared among the observers. The researcher is meant to be neutral, exterior to the phenomenon being investigated, value free or at least non-interfering (Burrell and Morgan, 1979). Denzin and Lincoln (1998) point out that positivist

research is characterized by designs that put emphasis on the early identification and development of research questions and a set of hypotheses, choice of a research site and selection of sampling strategies as well as the specification of research strategies and methods of analysis that will be employed.

The weakness of the *positivist* research designs lies in the rigidity of the procedures. The researcher may not easily follow leads that develop from insights that are gained during the subsequent stages of the research process. Furthermore, the methods seeks to explain complex phenomena by a selected few variables. The phenomenon is removed from the context, oversimplified and studied without due regard to contextual influences that may shape it. In this regard, the *positivist* paradigm was judged inappropriate for the current study.

3.2.2 Interpretive paradigm

When describing interpretive research, Walsham (1995: 375) points out that “Interpretive methods adopt the position that our knowledge of reality is a social construction by human actors. In this view, value free data cannot be obtained since the inquirer uses his or her preconceptions in order to guide the process of inquiry”. The researcher interacts with human subjects of inquiry and in the process the perceptions of both parties change. Klein and Myers (1999) posit that research can be classified as *interpretive* if it is based on the assumptions that our knowledge of reality is gained through social constructions such as language, consciousness, shared meanings, documents, tools and artefacts.

The *interpretive* research approach is *in situ*, holistic and contextual. This means the methods takes cognisance of the context in which the phenomenon is embedded. The interactions of the people involved are important in shaping the research outcome, which is regarded as subjective. The goal of interpretive research is to understand the phenomenon through debate. The researcher is meant to be neutral, but not value free and he or she is regarded as part of the phenomenon being investigated.

3.3 Suitability of information systems research methods to the current study

In order to develop a theory of the use of information by the planners, we need to understand the contexts and processes in which information is used. This means our approach needs to be holistic and focused on understanding the use of information within the context that affects the ways in which the planners approach and use information. These contextual factors are considered critical factors influencing and shaping the ways in which people use information (Davenport, 1997).

The present study followed the qualitative research approach and is located in the *interpretive* paradigm. The choice of the approach is based on the research questions and the assumptions on what is knowledge and how we ought to know (see section 3.2 of this thesis). Before presenting a detailed discussion of the research strategy employed in the current study, a general background to qualitative methods is given. This is followed by a discussion of qualitative research methods as espoused in the information systems literature.

This study investigated how environmental planners use information, and adopted a qualitative research approach to understand how planners use information in the context of their work roles in development projects with environmental concerns. The study adopted a behavioural approach. The research questions and the conceptual framework that emphasized studying the information behaviour within the work context influenced the choice of the qualitative research approach for the current study. This approach is consistent with the trend observed in information behaviour research (as noted by Wilson (1994)) where there is a preference of qualitative methods for investigating processes and behaviours related to information.

Furthermore, considering the general trend in social science research, Williamson and Schauder (2000) also observed that there is a recent movement emphasizing “contextualized understandings of human behaviours”. This trend is also observed in information systems research in general (Silverman, 1998 and Avgerou, 2000). Because of this trend, qualitative approaches have significantly contributed to the knowledge of human

behaviours in the development of theories, concepts, hypotheses, and models through analysing phenomena in various contexts.

Consequently, drawing from extant literature and experience, it was found that the interpretive qualitative research approach was appropriate to study the use of information by environmental planners as a behaviour occurring in the context of their work situations. In the next section I discuss the methodological stances relating to the qualitative research approach to show their relevance to the current study.

3.4 A Background to qualitative research

This section discusses the qualitative research approach in terms of the methodological stances that are associated with it.

Qualitative research uses text or words as data. Examples of data sources for qualitative research could be narratives, data obtained from observations, interviews, and documents. A qualitative approach allows the researcher to study a phenomenon within a given context (Denzin and Lincoln, 1994 and Creswell, 1994). This means the phenomenon is not investigated outside its context because its existence depends on that context. Moreover, the context is essential in giving meaning to the phenomenon under investigation.

According to Strauss and Corbin (1998), qualitative research methods are suitable for investigating problems where the researcher is interested in capturing the nature and the meaning that the participants give to that experience. Both the meaning and the nature of experience are shaped by the context in which the phenomenon is embedded. Therefore, it is critical that the researcher understands the effect of the context if he or she is to fully understand the phenomenon.

Denzin and Lincoln (1994) pointed out that in a qualitative research “things” are studied in their natural settings. The methods attempt to make sense or interpret the phenomenon under investigation in terms of how people understand it. The meanings that the people give to the phenomenon and how they create the social experience are valuable to the researcher as well. Cutcliffe and McKenna (2001:3) have argued that in qualitative research we look for the “intersubjective and constructed realities, constructed by those people who inhabit and experience those realities”. Furthermore, we are interested in getting a detailed description of the participants’ experiences and meanings they have of the phenomenon that we are investigating.

3.4.1 The role of the researcher in qualitative research

Researchers following qualitative methods stress that reality is subjective, constructed through the social interaction and that there is an “intimate relationship between the researcher and what is studied and the situational constraints that shape the inquiry” (Denzin and Lincoln 1994: 2). The researchers also assume that the research process is value-laden and biased. However, as Lincoln and Guba (1985) point out, we need to expose our values and explain them rather than hide them.

A qualitative research strategy puts emphasis on the individual’s personal experiences to the understanding of a phenomenon (Poggenpoel *et al.*, 1999) and this has the value of giving the researcher a deeper understanding from the perspective of the individual from whom the data is obtained. The researcher does not aim at establishing objective facts about the social world because it is believed that objective knowledge is not possible to get (Peck and Secker, 1999). The outcome of the research is our interpretation of the participants’ understandings of the phenomenon we are studying.

In a qualitative research strategy, participants are given the opportunity to report about their experience in their own words (Gerdes and Conn, 2001). As pointed out by Denisov and Christofferson, quoting Thorngate (1995), “... they construct stories that make sense of what they did...” (Denisov and Christofferson, 2001: 21). The researcher interacts with both the subject matter and the participant, and makes subjective interpretations of the observations from the data (Creswell, 1994 and cf. De Vreede, Jones and Mgaya 1998). To that extent, the outcome of a qualitative study depends on how the researcher relates to the participants, and how they jointly interpret and create meaning of the subject matter as they interact. Toma (2000) pointed out that in qualitative research, the researcher’s involvement is inevitable, necessitating a good relationship with the participants in order to obtain credible data.

According to Gerdes and Conn (2001), the researcher plays the role of a data-collecting instrument. Consequently, the ability of the researcher to create an environment that is conducive for the collection of data is essential if he or she is to serve well as a “data-collecting instrument”. This could be achieved by the researcher involving himself or herself closely with the participants, observing protocol as well as establishing rapport.

One of the strategies that can be employed to cultivate and maintain good relations is seeking permission using the correct channels. This could be established by opening a dialogue with the stakeholders prior to the data collection. Devers and Frankel (2000), in their discussion of qualitative methods, pointed out that there is a need for nurturing the researcher-participant relationship in all its stages until the end of the process. Making intense interactions with the stakeholders strengthens the final product (Toma, 2000) by giving the researcher a better understanding of the phenomenon.

In relating to the phenomenon or the subject matter under investigation, qualitative methods underscore that no human being is an empty vessel. The researchers have their own beliefs, attitudes, biases and they also come into the research with prior knowledge on the subject. The researcher needs to declare his or her predisposition when reporting the study so that the research consumers can read it in light of that position. In qualitative research methods, the researcher is seen as part of the research process, and his or her biases and predisposition shape the process.

3.4.2 Collecting and analysing data in qualitative research

A qualitative research approach allows the researcher to gather in-depth data which is usually in the form of text, and thereby get a detailed description of a phenomenon (Marshall and Rossman, 1995). The researcher has a variety of methods at his or her disposal, including the use of interviews, focus groups, documents and other recorded materials as well as participant observation. The data collection involves “dynamic interactions between the researcher and the participants and the context under investigation” (Gerdes and Conn, 2001: 186). However, the question that the researcher wants to answer determines the appropriate method for collecting data (Frankel and Devers, 2000b).

When analysing the data, the researcher tries to make sense of it. Data from qualitative research is not usually amenable to statistical analyses because it violates all the assumptions (inherent in statistical data) and is usually not in numerical format. Analysing qualitative data therefore involves systematically reducing and organising it in different ways that gives the data some meaning (Kane and O’Reilly-deBrun, 2001). Like the data collection, the process of analysing qualitative data is interactive, and involves disassembling and reassembling as well as making comparisons among sections of the data. The analyst uses his or her creativity, intuition and wisdom to examine the data and search

for patterns and themes (Gerdes and Conn, 2001). The process is cyclic. The analyst moves backward and forward, disassembling and reassembling the data several times to search for unique features. In order to enrich the process, the data is coded such that each element can be related to other elements as well as to the original source. By applying a variety of methods of analysis, the researcher gets a deeper understanding of the data.

3.4.3 Research questions amenable to qualitative approach

Qualitative methods are particularly suitable for studying areas where there is a scarcity in literature. These are areas where the existing literature is inadequate for logical deduction techniques to deduce variables that describe the phenomenon (Strauss and Corbin (1998). According to Frankel and Devers (2000a), qualitative methods can also be used to explore a new area and/or to develop theories that are not possible to generate using the existing knowledge. In addition, the methods are suitable for investigating areas impossible to address using quantitative methods because the questions are difficult and the existing literature does not capture the personal experiences of those involved with the phenomenon.

In summary, qualitative research is gaining popularity among researchers who are investigating problems that relate to human behaviours. This often includes information systems, as evidenced by the increasing number of qualitative research articles published in the leading journals of information systems. Hence, it is becoming imperative for information systems researchers to be familiar with the salient issues that characterise qualitative research. Table 3.1 below provides a summary of the basic tenets associated with qualitative research approaches as suggested by Snape and Spencer (2003).

Methodological Stances Associated With Qualitative Research
<p>Perspective of the researcher and the researched</p> <ul style="list-style-type: none"> • Taking the ‘emic’ perspective, i.e., the perspective of people being studied by penetrating their frames of meaning • Viewing social life in terms of processes rather than in static terms • Providing a holistic perspective within explained contexts • Sustaining empathetic neutrality whereby the researcher uses personal insight while taking a non-judgmental stance
<p>Nature of research design</p>

<ul style="list-style-type: none"> • Adopting a flexible research strategy • Conducting naturalistic inquiry in real-world rather than experimental or manipulated settings (though methods vary in the extent to which they capture naturally occurring or generated data)
<p>Nature of data generation</p> <ul style="list-style-type: none"> • Using methods of data generation which are flexible and sensitive to the social context in which the data are produced. • Using methods which usually involve close contact between the researcher and the people being studied, where the researcher is the primary instrument
<p>Nature of research methods used</p> <ul style="list-style-type: none"> • Mainly qualitative methods, including: observation, in-depth individual interviews, focus groups, biographical methods such as life histories and narratives, and analysis of documents and texts
<p>Nature of analysis/interpretation</p> <ul style="list-style-type: none"> • Based on methods of analysis and explanation building which reflect the complexity, detail and context of the data • Identifying emergent categories and theories from the data rather than imposing <i>a priori</i> categories and ideas • Respecting the uniqueness of each case as well as conducting cross-case analysis • Developing explanations at the level of meaning rather than cause
<p>Nature of outputs</p> <ul style="list-style-type: none"> • Producing detailed descriptions and rounded understandings which are based on, or offer an interpretation of, the perspectives of the participants in the social setting • Mapping meanings, processes and contexts • Answering 'what is', 'how' and 'why' questions • Considerations of the influence of the researcher's perspectives

Table 3.1: Methodological stances associated with qualitative research (adapted from Snape and Spencer, (2003: 4))

Although attempts have been made to document requirements of qualitative research approaches as highlighted above, there have been many criticisms of the credibility of the studies that follow the qualitative approach. The following section discusses some responses to the criticisms by pointing out some of the suggested ways of establishing the trustworthiness of studies using qualitative methods.

3.4.4 Establishing the trustworthiness of qualitative research

Although qualitative research methods are increasingly gaining recognition in the social science arena, they have been criticised for being subjective, lacking facts, and lacking rigour in the techniques applied or used (Malterud, 2001). The rigour that is applicable to quantitative research, namely, to establish validity and reliability of the output of studies, is not applicable to qualitative research and this leaves the methods open to criticisms.

To counter the criticism, proponents of qualitative methods suggest alternative canons for assessing the *rigour* and *trustworthiness* of qualitative studies. They suggest *credibility*, *dependability*, *conformity* and *transferability* as appropriate measures which are inherent in the processes and techniques employed to carry out the research from its inception to the finished research product (Lincoln and Guba, 1985 and Frankel and Devers 2000b: 120-121). In this regard, the procedures that are followed to gather and analyse the data, and present the results determine the *trustworthiness* of the outcome.

In order to uphold quality in a research study, the researcher needs to demonstrate such quality through the processes, decisions and procedures used in carrying out the research. The documentation of the research activities should be as detailed as possible to help the reader understand exactly how the researcher arrived at the final product.

According to Frankel and Devers (2000b: 120), the *credibility* of a research study depends on the way in which the researcher develops and executes the procedures throughout the research process. The procedures should be evident to the research consumer through proper and clear documentation.

Dependability refers to the manner in which the data gathering and analysis procedures are systematic and clear. The procedures should be documented such that they can be tracked and traced. This will enhance the confidence people have in the outcome of the study (Frankel and Devers, 2000b and Lincoln and Guba, 1985).

Conformability, according to Frankel and Devers (2000b: 121), refers to the “extent to which evidence corroborates the findings”. This means the findings should be reflected in the data by providing evidence to substantiate the assertions raised when presenting the results of the study. The evidence supporting each finding should be confirmed across different data sets from different cases or subjects of the study.

When people read a research report, they want to know whether the findings that are reported could be transferred to their own situations and settings. This means the reader is questioning the *transferability* of the findings to other contexts. *Transferability* requires that the context of the study be described in detail. This will enable the readers of the research to compare that context with their own and consequently make judgments on whether the study would be applicable (Frankel and Devers (2000b: 121).

To summarise, *trustworthiness* is an important issue in qualitative research. The *trustworthiness* of a qualitative research is embedded in the whole process from the beginning to the end. It can be gauged from the way the researcher carries out the study, the extent to which participants are allowed to verify the findings as well as the sharing of the findings with other researchers (Lincoln and Guba, 1985).

3.4.5 Sampling in qualitative research

The proponents of quantitative methods stress the generalisability of the findings of their studies. In quantitative methods, the representativeness of the sample is crucial and the use of probabilistic sampling procedures is essential. In qualitative studies, we are not looking for a representative sample, but rather, for representative examples to illustrate a phenomenon so that it can be described and explained in a variety of ways from different perspectives. This helps us to understand a phenomenon in terms of its different dimensions and properties.

A qualitative study aims at capturing as many manifestations of the phenomenon as possible. To achieve this, we aim at getting diversity in our respondents to ensure a variety of examples that are related to the phenomenon (Barbour, 2001). We look for a variety of specific cases to maximise variations of cases to analyse. More variations allow the investigator to understand the phenomenon in many different ways. The research seeks to offer a comprehensive if not an exhaustive description and explanation of the phenomenon.

Lincoln and Guba (1985) suggest that the sampling process in qualitative research should aim at getting a wide range including negative cases, typical cases and critical cases relating to the phenomenon under investigation. The participants are chosen because the researcher believes they have the capability to respond to the research question because of their experience or involvement with the phenomenon (Barbour, 2001 and Cutcliffe, 2000), or because they can give a different view that will open a window for further data collection and/or analysis. Each participant is selected because the researcher believes that he or she will serve a specific purpose.

The methods of sampling that have been widely used in qualitative studies are “*purposive sampling*” and “*theoretical sampling*”. *Purposive sampling* aims at getting diverse views so that the researcher can learn different perspectives of the phenomenon (Devers and Frankel, 2000). Malterud (2001) pointed out that a number of variations is necessary for getting results that can be applicable to a wider situation. According to Devers and Frankel (2000), *purposive sampling* aims at enhancing the researcher’s understanding of the experiences of selected individuals or groups. This is achieved by selecting respondents that have the potential to give the greatest insight into the research questions. Such “information rich” cases are essential for the development of theories and concepts that enhance the investigator’s understanding of the phenomenon (Devers and Frankel, 2000a: 264).

Theoretical sampling can be taken as a subset of purposive sampling. In theoretical sampling, a participant is selected based on a need to address a concept or a category that has emerged from analysing some data (Glaser and Strauss, 1967) and the procedure continues until the researcher reaches a stage where there is no longer anything new that comes from selecting further participants. Glaser and Strauss referred to the point where new data no longer illuminates any new aspect of the phenomenon under investigation as “*theoretical saturation*”.

3.4.6 Ethical considerations

A study that involves human subjects needs to take into account the *ethical* implications. It is essential that the research is not carried out at the expense of the subjects in terms of exploitation, loss of dignity, invasion of privacy and physical or psychological discomfort (Emory, 1985). Careful consideration should be given to minimise the negative effects of the research on the subjects.

Punch (1994) pointed out that the majority of ethical issues in qualitative research revolve around the harm that the research can cause to the respondents, the need to obtain the consent of the respondents, the requirement to act without deception and the confidentiality of the data. Punch argues that the subjects should be seen as “partners” in the research process and the procedures that are adopted in the research should not cause them harm. Concerning consent, the subjects should be fully informed and aware of the consequences of taking part in the research. The subjects should not be deceived. They should be aware that their participation in the research is based on their own decision and participation should be voluntary.

The researcher should respect the privacy and confidentiality of the subjects. Data for the study should only be used for the purposes agreed to by the subjects when the consent was sought. The researcher should ensure that the data is not disclosed to persons other than those agreed to by the subjects.

3.5 Locating the current study in the qualitative research paradigm

According to Choo *et al.* (2000:14), information is used by “engaging mental schemas and emotional responses within a larger social and cultural context”. These contexts become essential factors when we investigate the way information is used. Extant literature shows that in order to understand information related behavioural aspects, the meanings that people have of information and those behavioural aspects are essential and need to be captured (Wilson, 1984).

The present study underscores that the context is an important factor for understanding how the planners use information. These contexts may vary to include, among others, personal situations that the environmental planners find themselves in regarding the environmental concerns in development projects, the projects that the planners do, the institutional or council roles, information availability and access and the tools for handling information.

Recognising the importance of context and meaning and seeing the need to capture them, this study focused on the meanings that the environmental planners have of the use of information in the contexts that are presented by the environmental planning process. The study focused on eliciting the meaning that the environmental planners hold about information and the way they use the information in the work they perform to meet the

environmental requirements of the development projects. In formulating this study, the planners were seen as actors in the construction of meanings and understandings of the realities of using information when addressing the environmental concerns of development projects.

Strauss and Corbin (1998) and Malterud (2001) pointed out that qualitative research methods are suitable for investigating problems where the researcher wants to understand the meaning that the participants hold of their experience of the phenomenon. In the present study, I adopted the qualitative approach to elicit information that would provide us with a holistic picture of the way the planners use information based on their shared understandings and the meanings that they constructed in the context of their work roles. The qualitative approach was considered to have the capability of giving us a deeper understanding of the personal experiences relating to the use of information from the perspective of the planners from whom the data was going to be obtained. Furthermore, drawing from Ritchie (2003: 28), it can be noted that by following a qualitative research approach it would be possible to get an in-depth description of the way information is used by the planners.

Notwithstanding the orienting theory (Strauss and Corbin, 1998) in which the behavioural perspective was used as a general guide, this study did not have an objective of specifying theoretical propositions at the beginning (Yin, 1994). Instead of predefined variables imposed on the respondents by a preceding theory defining the research framework, the theoretical concepts and categories emerged from the data (Glaser and Strauss, 1967).

However, the researcher influence on the research process was inevitable (Toma, 2000). Drawing from the observations of Peck and Secker (1999) relating to qualitative research, I did not have the intention of establishing the objective facts about the use of information by the planners because I believe that such knowledge is not possible to obtain. Furthermore, in accordance with the canons provided by qualitative research methods (Denzin and Lincoln (1994: 2) and Lincoln and Guba (1985)), I defined the information behaviour framework of investigating information aspects as the starting point for carrying out the present study. This framework formed the basis for the values, beliefs and biases that may have influenced the findings of this study. However, I took care during the execution of the research design to allow the concepts to emerge rather than clutter them with my biases.

To summarise this section, the present study was located in the interpretive qualitative research paradigm. The study focused on the planners as users of information in the context of addressing environmental concerns in planning and implementing development projects. The goal of the study was to understand the interplay between the planners and the way they use information in the context of environmental planning. Consequently, the contextualised study of the use of information locates this study in the qualitative approach in social science research (Lincoln and Guba, 1985: 47).

The qualitative design as used in this research was aimed at exploring and describing the use of information as a behaviour of the planners working in situations that require the consideration or inclusion of environmental issues in the development planning process. Qualitative research is particularly useful as a tool to explore the relationship between individual behaviour and the social environment. It also provides a framework to extract the meaning from detailed narrations of the participants.

Qualitative research can be undertaken in a variety of ways, and the researcher has to decide on a particular method appropriate for the research problem or issue being studied. In this study, the Grounded Theory techniques of carrying out a qualitative study were used for the data collection and analysis to develop a theory of the use of information in the environmental planning process. However, before presenting a detailed discussion of the Grounded Theory method, I highlight the presence of qualitative methods in information systems research in general, focusing on the dominant methods and pointing to the reasons why they were not selected for the present study.

3.6 The presence of qualitative research methods in information systems (IS)

The focus on qualitative methods in information systems research is relatively new. However, an examination of the literature shows that the use of the methods continues to increase (Lee, 2001a and Trauth 2001).

The move to embrace qualitative methods in information systems research was necessitated by the evident inadequacy of the so-called “scientific method” in addressing the information systems phenomenon. This means the traditional methods of researching information systems were proving to be inadequate in addressing how users can harness the power of technology to serve humankind. This is particularly so because information systems are not

just technical systems, but manifest themselves to a considerable extent as social systems. In a recent editorial statement in the MIS Quarterly journal, Lee (2001b: iii) points out that research in the information systems field should examine more than just the technological system or just the social system as separate entities, rather it should also focus on investigating the phenomenon that emerges when the two interact. Lee's view suggests "methodological pluralism" as an important aspect in researching the information systems phenomenon. In this section I discuss the use of qualitative research methods in the field of information systems, with a view to highlight how the current study fits into the general research agenda and methodologies embraced by the information systems community.

A number of information systems researchers are increasingly conducting research from the qualitative perspective with the objective of interpreting the phenomena of interest (Benbasat and Zmud, 1999). I also observe that the conferences of the Working Group (WG) 8.2 of the International Federation for Information Processing (IFIP) have made seminal contributions in sensitising the information systems community about qualitative methods. While I acknowledge that the W.G. 8.2 has no "legal mandate" to dictate or define what should be the best method for researching the information systems phenomena, there is no doubt that these conferences have made an extremely important contribution to the discussion of qualitative methods. The papers presented at those annual conferences testify to the interest that has developed in qualitative methods to researching the information systems phenomenon. The debates have prompted information systems researchers to engage critically with qualitative methods. Galliers (1992) cautions, however, that the researchers should not blindly adopt these research methods. The selection of a method to use for any particular study should be guided by the research questions and the objectives of the study.

The use of qualitative methods is not without challenges. Many researchers are struggling to learn about new research methods as well as trying to keep up with the new technologies (Trauth, 2001). There is also a deficiency in criteria for evaluating the output of such research (Klein and Myers, 1999). However, there is a gradual change in the mindsets towards qualitative research and a number of leading information systems journals are publishing qualitative research articles despite the challenges.

3.7 Dominant interpretive qualitative research approaches in information systems research

There are many examples of *interpretive* qualitative research methods in the information systems literature. The frequency of use of these methods in empirical studies varies. An examination of some of the leading information systems journals shows that Action Research, Ethnography, Case Study research and the Grounded Theory method have been more often used or discussed (see also Myers, <http://www.isworld.org>, accessed on 25th August 2005). The present study uses the Grounded Theory method. However, before providing a detailed discussion of the method, each of the other dominant methods will be discussed, emphasising the reasons for not selecting them for use in the current study. The discussion of the Grounded Theory method will focus on justifying its suitability, in terms of procedures, techniques and the resulting outcome.

3.7.1 Action research

In the last two decades, there has been a growing popularity in the use of *action research* amongst the information systems community (Baskerville, 1999). Greenwood and Levin (1998: 2) define action research as “social research carried out by a team encompassing a professional action researcher and members of the organisation or community seeking to improve their situation. Action research promotes broad participation in the research process and supports actions leading to a more just or satisfying situation for stakeholders”. An analysis of the above definition shows that action research emphasises participation. According to Wadsworth (1991) it is critical that the participants feel that they are fully involved in the project process and they should actually own the outcome of the process. The results of an action research project are grounded in a particular situation, thus making them highly relevant, with benefits that are twofold in that they do not only solve an immediate problem but also inform theory through the reflection of the researcher (Baskerville and Wood-Harper, 1996).

Action research emphasises collaboration between the researcher and the participant. However, the extent to which the researcher takes the lead in the process may vary from one researcher to the other as well as between research settings.

The conduct of an action research study is based on the assumption that complex social systems cannot be reduced for meaningful study, but rather, they should be investigated and understood as whole entities by introducing changes into the processes and observing the effects of those changes. This means action researchers believe in intervention in which the researcher aims to introduce change to the situation studied (Greenwood and Levin, 1998 and Baskerville, 1999).

The notion of intervention made action research inappropriate for the current study. In this study, I had no objective of bringing a change or an intervention to the settings in which the study is located. My goal was just to understand and develop a theory of how the planners use information when they are engaged in the environmental planning process.

3.7.2 Case study research

Case studies of technological implementations have often emphasised the importance of context in the research design and analysis. According to Yin (1994), the goal of a case study is to investigate a contemporary phenomenon in a real-life context. This is particularly so when the boundaries between the context and the phenomenon of interest are not clearly evident. The method relies on multiple sources of evidence for data (triangulation of data sources).

Extant information systems literature shows that case studies of technological implementations have been investigated in their “natural settings” (e.g., Markus, 1983; Walsham, 1993 and Orlikowski, 1996). In fact Walsham (1993) suggests that most information systems studies conducted in the interpretive paradigm are in-depth case studies.

Yin (1994) argues that studying a phenomenon in real-life context is the main characteristic that distinguishes a case study research approach. However, the way context is defined in the case study method is problematic. According to Yin, context is viewed as everything outside of the unit of analysis. In relation to the current study, considering that contextual factors influence and shape the processes involved in the use of information, I find such a view of context not very productive in helping me to understand the interplay between the various contexts in which users find themselves, and the ways in which they approach and handle information. Rather, I need a research method that would allow me to capture the

contextual factors without actually imposing any limitations on what should be considered as part or not part of the context.

3.7.3 Ethnographic research

An ethnographic research approach considers context and culture as crucial elements in the research process. According to Harvey (1997), ethnographic methods are based on the assumption that cultures have hidden traits which can be discovered when a researcher is immersed over an extended period of time in a culture, with which he or she is unfamiliar. The ethnographic method has been found to be useful in information systems research in that it produces a “lived” understanding of the culture of those being studied (Baskerville and Stage, 2001). When using the ethnographic research approach, the researcher (during the research process) acts like a member of that particular culture and gathers data using a variety of methods, including interviews, documents and participant observation.

According to Myers (1999), participant observation is regarded as one of the distinguishing features of ethnographic research. However, the method poses some challenges to researchers. For instance, it is not always possible, for pragmatic reasons, for the researcher to participate in the lives of the studied groups for such an intensive and extended period of time. In relation to the current study, the ethnographic method was found not suitable for pragmatic reasons, mainly related to the governance of councils and granting of permission. In fact, in one of the city councils, the researcher was only given two months to carry out the study (see appendix F). Such a restriction would not have allowed the researcher enough time to conduct an ethnographic study.

3.8 Choosing the Grounded Theory method

The main objective of this study was to investigate how environmental planners use information when they address environmental issues in the development process. The study had an ultimate goal of developing a theory of the use of information applicable to the environmental planning practice as performed and experienced by the planners.

According to Lang and Armour (1980: 238-239), the information processes of environmental planning are very complex. There are many different actors participating in the processes and the information is sought to satisfy a variety of requirements. Faced with such a complexity, it was essential to select a research method that would untangle the

complexities in the information activities of the planners. An appropriate method would allow us to capture the use of information and the associated complexities and help in simplifying these complexities in analysing the tasks, processes and activities relating to the use of information in environmental planning (see Strauss and Corbin, 1998 and Goulding, 2002).

Grounded Theory has been described as a method that “adapts well to capturing complexities of the context in which actions unfold enabling the researcher to understand all that may be involved in a particular substantive issue” (Locke, 2001: 95). Furthermore, the Grounded Theory method as originally formulated was informed by the symbolic interactionism school of thought (Glaser and Strauss, 1967), an approach that Boland (1987) suggests as relevant for capturing the complex information issues associated with individuals. Consequently, the Grounded Theory method was found to be appropriate to investigate how the environmental planners use information in environmental planning.

3.8.1 What is Grounded Theory

In this study, I use the Grounded Theory approach as espoused by Strauss and Corbin (1998) - a method of qualitative research that puts emphasis on the generation of a theory from data collected in a social research study (Wimpenny and Gass, 2000). In Grounded Theory, concepts and categories that describe a phenomenon emerge from the data that is collected during the study and the resulting theory is suitable for the substantive area in which the data was collected.

According to Rennie (2000), Grounded Theory uses text data to enable the researcher to understand the meanings that people hold of the phenomenon under investigation. The text data, which could be obtained using a variety of techniques, may include any one of or a combination of field notes, interview transcriptions and/or documents.

Rennie (2000) pointed out that studies that employ the Grounded Theory method lead to a deeper understanding of the social phenomenon. This is brought about by the researcher’s prolonged interaction with both the subjects and the data. In addition, the researcher is able to give a fuller description of the concepts and their relationships, thus building a theory that explains the social phenomenon. The concepts and categories that describe the phenomenon are drawn from the data. This data is systematically gathered and analysed according to Grounded Theory techniques, and the concepts and categories are “allowed to emerge from

the data during the research process” (Strauss and Corbin, 1998: 13). The resulting theory is therefore grounded in the data, hence the name **Grounded Theory**.

Concepts and *categories* are essential components for building a Grounded Theory. Concepts are the “building blocks of theory” (Strauss and Corbin, 1998: 101). The concepts are drawn from the incidents, events, and actions through an analytical process of comparing different incidents and naming those relating to the same elements with the same term. In that way, the basic units of the theory are accumulated (Strauss and Corbin, 1998 and Pandit, 1996). A category of concepts is more abstract than a mere concept. Categories are generated from the concepts by grouping those that describe the same element under one term. They are broader and tend to be applicable to a wider situation than concepts.

When categories have been generated, the next stage in theory building will be to find out how they are related amongst themselves, to the concepts and to the phenomenon that they purport to explain. The findings of the study then take the form of propositions or hypotheses (Strauss and Corbin, 1998).

3.8.2 Selecting participants using Grounded Theory techniques

When using the Grounded Theory method to investigate a phenomenon, selecting the participants, data collection and analysis run together non-sequentially. This is important because the selection of data subjects is based on concepts and categories that emerge from the data. Although the researcher makes a tentative plan for the study, the actual steps that are followed emerge as the research progresses.

The Grounded Theory approach uses a non-probabilistic sampling procedure, which is referred to as theoretical sampling (described in Section 3.4.5 above) to select the participants from whom data is collected (Glaser and Strauss, 1967). Participants are selected because of their relevance and purpose in providing additional information to the categories that have emerged from analysing data from previous participants (Strauss and Corbin, 1998). The selection of participants continues until the categories that have emerged from the data reach a theoretical saturation point, where data from additional participants do not uncover any new concepts or categories when analysed in relation to the theory that has emerged.

Barbour (2001) argued that theoretical sampling offers the researcher the liberty to control the selection of participants rather than rely on pre-selected participants. The subjects that

are picked may include outliers or deviants. Such variation in participants enriches the data by providing diverse perspectives. Extant literature points to the fact that diversity in the participants leads to the diversity of data and this is essential to generating a theory applicable to a wider area than the area under investigation (Baszanger, 1997 and Glaser and Strauss 1967).

When the study begins, there is no analysed data. Therefore, there are no concepts, categories, or hypotheses on which to base the selection of the first participant(s). The first participant(s) are therefore selected with the understanding that they have a broad knowledge of the subject and can set the tone or highlight the direction for further selection of the participants (Cutcliffe, 2000). Strauss and Corbin (1998) contend that concepts from existing literature, the investigator's knowledge or a preliminary study could be used as the basis for gathering data during the first interview(s). After analysing data from the first participant(s), the emerging concepts and categories provide the basis for further theoretical sampling. It should be noted that even the participants who are selected when the study has already begun could still give new direction by giving a different perspective. When new dimensions emerge, the researcher adds them to the categories and explores them further to saturation.

Wimpenny and Gass (2000) suggest that in order for the study to benefit from the Grounded Theory procedures, the analyst should collect data, not a third party. This is important for the analyst to get a deeper understanding of the phenomenon. An informed researcher collecting data will be able to seek in-depth information and make reflections during the data collection process. This ensures that the data collected is more relevant. As Rennie (2000) pointed out, the meaning of the data is captured at the collection stage before transcription. This is because the researcher can do more probing. He or she can get meaning from the different modes of communication such as non-verbal communication in the case of interviews. Transcribing the data further improves the understanding, and enhances the analyst's ability to make sense of the data. By transcribing the data, the analyst prolongs the interaction with it and has the opportunity to go through all the data before beginning the analysis.

3.8.3 Data collection and analysis in a Grounded Theory approach

Data can be collected using a variety of methods. The researcher can select data collection method(s) based on their appropriateness for the research questions. Data from different methods can be compared and used to corroborate the findings. The use of different methods to collect data provides the investigator with a variety of perspectives on how the phenomenon is understood by the participants. Using different methods, the investigator tends to have more incidents and events that provide more information to describe the concepts that emerge from the data.

Interviews have been used in many studies that follow the Grounded Theory approach. Other methods such as participant observation have also been found to be appropriate to collecting data. There is no standard rule as to exactly how one goes about choosing an appropriate method for data collection. The investigator's creativity and imagination determine how best he or she could make use of the data collection methods that are at his or her disposal (Strauss and Corbin, 1998).

3.8.3.1 Analysing data according to Grounded Theory techniques

Data analysis for a study that employs the Grounded Theory approach is guided by *theoretical comparisons* and *theoretical coding* to build a theory from the data (Glaser and Strauss, 1967 and Strauss and Corbin 1998). According to Strauss and Corbin, *theoretical comparisons* are "tools (a list of properties) for looking at something somewhat objectively rather than naming or classifying without a thorough examination of the object at the property and dimensional levels" (p. 80). *Theoretical comparisons* sensitise the investigator to the data by giving opportunities to "stand back" from the analysis and ask questions relating incidents and events in the data to some experiences that he or she is familiar with.

For instance, the investigator could ask such questions as: Where else have I seen this incident? What did it mean? Such questions are essential in that the researcher can draw from similarities and differences to enhance his or her understanding of the phenomenon investigated.

Theoretical coding focuses on the development of concepts, categories and relations that leads to the generation of the theory (Cutcliffe, 2000 and Glaser, 1978). In theoretical coding the search for concepts, categories and relations from the data is the core of the analysis. Three coding techniques are applied to the data when using the Grounded Theory method. These are *open coding*, *axial coding* and *selective coding*. *Open coding* of the data commences during the data collection stage. It involves going through the data transcriptions line by line (sometimes sentence by sentence or paragraph by paragraph) and identifying the concepts and categories. In *open coding*, same conceptual labels are assigned to data that have the same meaning.

Axial coding focuses on putting together the disaggregated data (disaggregated during open coding) in new ways that will make connections between categories and subcategories. In *axial coding*, the analyst systematically searches for relationships among categories to discover how they relate to each other (Strauss and Corbin, 1998).

Once the major relationships between the categories have been established, the new theory is derived based on them. This process is referred to as *selective coding*. The process involves “integrating and refining the theory” (Strauss and Corbin, 1998: 161). In *selective coding*, the categories are organised to show the central concepts in the theory. The analyst constantly compares the incoming data with the discovered categories and existing data and look for incidents that the theory fails to explain so that it can be refined further.

The researcher can also discuss the findings with the participants enabling them to verify if the discovered theory captures the phenomenon, as they understand it. Debriefing of peers is also important for the researcher to check whether the results are worthwhile or are just the researcher’s hunches. The process continues until the researcher reaches a stage where analysing data from new participants does not add anything new to the categories.

In addition, as the theory emerges, the analyst starts to search for negative cases. Negative cases point to problem areas and help in further refining the theory.

Other tools that can aid the analysts are “memos” (Strauss and Corbin, *op. cit.*) Memos contain the “product of analysis or directions for the analyst”. Memos are of three kinds. These are *code notes*, *theoretical notes* and *operational notes*. *Code notes* describe the actual outcomes of the coding processes. Theoretical “memos” contain the abstract thoughts and ideas that come out of the theoretical coding process. *Operational notes* are records of

the procedures that are informed by the outcomes of selective coding. They also include notes that remind the analyst of things to be done.

Memos become very useful when presenting the final product as they act as reminders to the findings and the procedures that were followed to carry out the study. Diagrams can also be used for illustration. They are the “visual devices that depict the relationships among the concepts” (*op. cit.*: 217). Diagrams (and memos as well) help the analyst to record the analytical process.

3.8.4 The use of literature in Grounded Theory research

According to Cutcliffe (2000), existing literature may provide some conceptual clarity when using the Grounded Theory method. It can also provide the basis and understanding upon which the theory would be built, and allows the researcher to define terms that are used in the study.

By reviewing the existing literature, the researcher becomes sensitive to concepts and hence he or she can more easily discover them in the data (Strauss and Corbin 1998 and Cutcliffe, 2000). The researcher is able to capture things that he or she would not “see” in the data if it were not for the knowledge obtained from the literature.

Although Strauss and Corbin (1998) believe that the researcher should have a knowledge of the existing literature when they begin the research, they emphasise that literature is more important when the concepts and categories have been discovered from the data. They argue that knowledge of the literature allows the researcher to compare his or her findings with the existing literature.

Literature on existing theories also gives the researcher a perspective with which to approach the study. In that regard, the literature could inform the research questions as well as the questions that are asked when data is collected. The existing literature can also be used to confirm findings of the study.

On the negative side, Strauss and Corbin (1998) pointed out that literature could be a hindrance to the investigator’s creativity. Instead of discovering concepts and categories, the researcher may reproduce the existing ones and fail to discover new insights that are informed by the data. A detailed and comprehensive literature review is therefore not considered as the first stage in Grounded Theory (Cutcliffe, 2000). The use of literature

should be done with care lest the researcher impose the concepts that will ultimately build the theory.

3.8.5 Informing the readers

Getting qualitative research accepted by the readers has always been difficult because the rigour and trustworthiness of the procedures are under constant criticism (Gerdes and Conn, 2001). They are embedded within the procedures that the researcher uses to execute a study. The researcher needs to give a detailed description of the steps that were followed and the reasons behind each procedure. He or she needs to report on the reflections, thoughts and decisions that were made at all stages of the study (Rennie 2000 and Malterud, 2001). This is done through the documentation of the process to demonstrate that the research was thoughtfully and systematically done. The predispositions of the researcher need to be declared, ensuring transparency of the procedures, and hence, the trustworthiness of the results (Hall and Callery, 2001).

The current study adopted the Grounded Theory techniques to collect and analyse data regarding information and how it is used by planners when they address environmental issues in development projects. The study focused on the development projects to allow the respondents to talk of concrete examples of things that they did during the project processes rather than generalise on what is expected to be done on a day-to-day basis. The next section reports on the actual procedures that I engaged in to investigate the use of information in environmental planning .

3.9 The Research procedures

In this section, I provide a description of the procedures that were followed in this study. Figure 3.1 below shows a simplified outline of the major activities of the research process.

Initially, I prepared a guide (providing the logical steps) with tentative steps that I was going to follow during the research process. The guide had the flexibility to adapt to changes that became necessary as I gained insights during the course of the study. Henning (2004:142) suggests that an emergent plan with a strong logic is a better option to carrying out a qualitative research study. Figure 3.1 below shows the various stages of the research that emerged from the time the research idea was generated through to the final research product.

The procedures emerged during the course of the research as decisions and approaches were continuously reviewed in the light of new insights gained.

The components of the plan include the generation of the research idea, preliminary consultation to determine feasibility as well as focusing of the study. This was followed by a preparatory exercise to develop the researcher's competencies and skills in research methods as well as the knowledge domains relevant to the current study. An appropriate research site was then selected. I then prepared a research proposal for the supervisors and subsequent approval by the ethics committee. The proposal was the basis for application for permissions to interview the respondents and obtain funding from the sponsor. The University of Botswana funded the study (see appendix E for budget and correspondences with the funding office).

The latter phases of the study were the data collection and analysis phases. The two phases ran together non-sequentially and were prefaced by pilot testing of topic guides. Finally, the results of the study were presented, leading to the completion of the thesis.

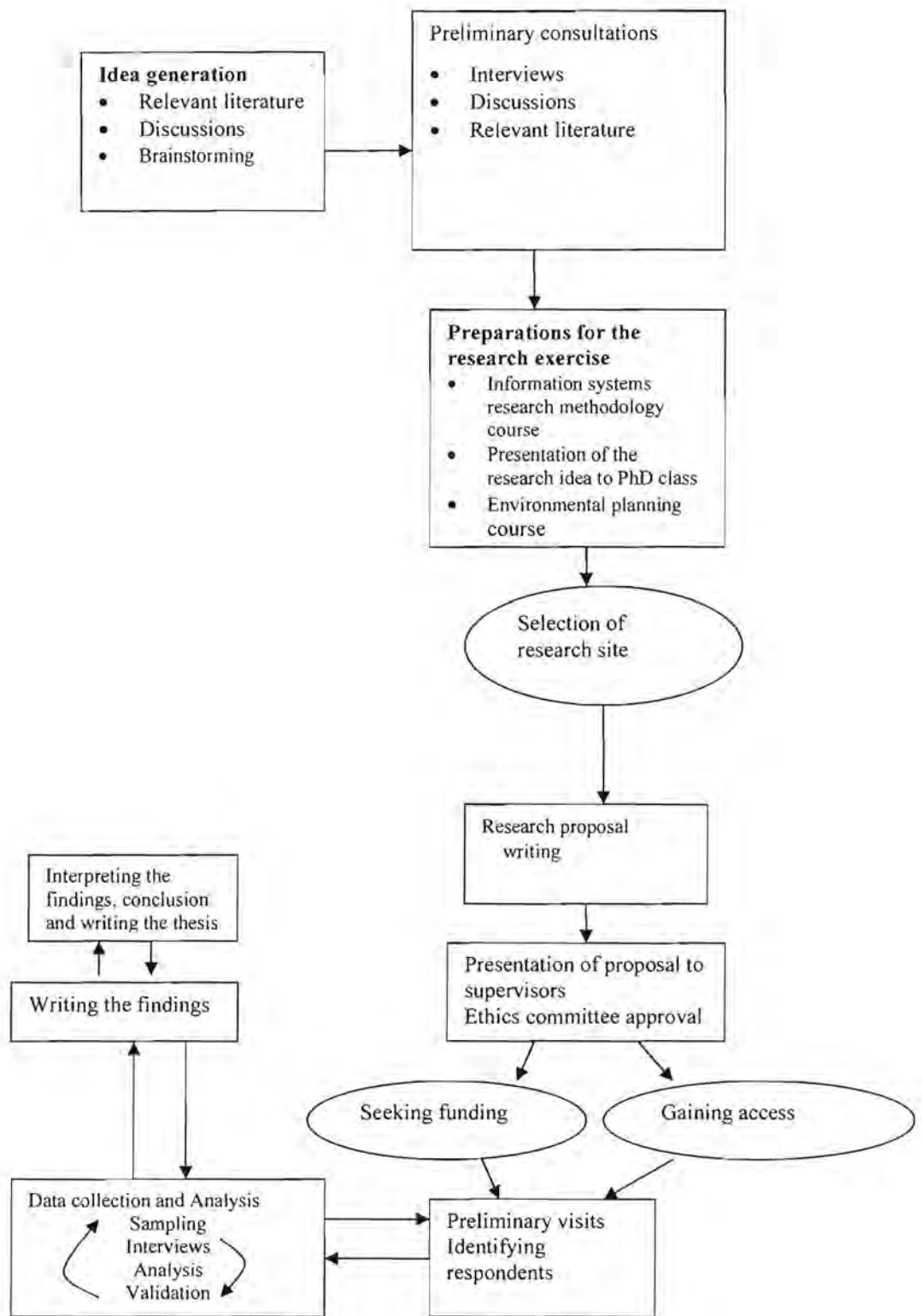


Fig. 3.1 The Research plan

3.9.1 Preparations for the study

Preparations for the study involved building the researchers competencies and skills in research. I attended a research methodology course of the doctoral degree program in Information Systems and National Development at the University of Cape Town.

In addition, I also attended a one semester undergraduate non-credit course on environmental planning. This was to complement the readings in grounding myself on the theoretical and practical issues of environmental planning. The course provided me with the basic knowledge to participate meaningfully in discussions relating to environmental planning. Care was always taken not to lose track of the overall objective of the study - exploring the use of information in environmental planning.

Following the preliminary activities that prepared the researcher in developing skills in research methods as well as developing knowledge in the environmental planning theory and practice, a research proposal was prepared. The proposal was presented to a committee of three academics. An academic with a background in environmental science was invited to sit in during the presentation to give advice on environmental-related content.

Since the study was going to use humans as subjects for gathering the data, approval was also sought from the ethics committee of the Faculty of Commerce of the University of Cape Town (see Appendix G for approval from ethics committee chairperson). The proposal, initial interview guide and the consent form (see Appendix B for interview guide and Appendix C for consent form) were submitted to the committee to seek approval. The approval from the ethics committee chairperson marked the beginning for ethical considerations that were observed throughout the research process. Subsequent interview guides were shared with the supervisors for approval before they were put to use.

The consideration of ethical implications was regarded as essential. I wanted to ensure that the research was not done at the expense of the subjects in terms of exploiting them, affecting their dignity, invading their privacy or causing any kind of physical or psychological discomfort. A deliberate effort was made to ensure that the study conformed to the ethical requirements of academic research.

3.9.2 Preliminary consultations

During the early stages of planning this study, some consultations were made with environmental practitioners with the objective of getting feedback on the feasibility of the study, and establishing the existence of the phenomenon of the use of information experienced in the context of environmental planning from the perspective of practitioners. The preliminary consultations allowed me to gain new ideas on the reality of the context and possible settings for investigating how information is used when environmental concerns are addressed in the development process.

The preliminary consultations were done prior to developing the research proposal. They involved talking to experienced researchers in the information systems, information science, social development, and environmental sciences domains of knowledge. I also interviewed professional environmental planning practitioners.

Seven professionals holding senior positions in different institutions involved with environmental issues were interviewed during the initial consultation phase of the study. The interviews took a discussion format and were guided by the following questions:

- Where is the location of the major activities of environmental planning in Botswana?
- What will be the appropriate way of grouping practitioners dealing with environmental issues in the development process?
- What issues do the environmental planners consider topical relating to the environmental planning practice Botswana?
- What is the availability of the potential respondents?
- How is the general information environment for environmental planners in Botswana?

These questions were directed at distinguishing the various contexts associated with the use of information. Wilson (2000) pointed out that studies of information users need to distinguish the various contexts before a study is planned because the

information user may be found in many different information contexts. Responses to these questions provided insights during the design of the research.

The discussions held during the initial consultations highlighted the dispersion of groups that address environmental concerns, with councils (local government) repeatedly being cited as the main institutions dealing with development projects that have environmental concerns. At the end of the consultation, it was decided that for practical reasons relating to time, finance and depth of the study, there should be a focus on one group of people dealing with environmental issues and development. Councils were tentatively selected as the main site for the research and the evidence was later confirmed and corroborated with existing literature that councils are indeed taking the lead in the integration of environmental issues in the development planning processes (see Blowers, 1992).

A second decision emanating from the preliminary consultations was the focus on projects rather than asking question about day-to-day work. It became evident that the respondents spoke better of what they did when they were referring to a particular project. They could “map” the actions and activities that they did. The focus on projects enabled me to obtain data based on concrete actions and activities.

3.9.3 Selecting the councils in Botswana as the research sites

Lewis (2003:49) argues that the selection of a research setting and the population for a study is a critical issue in the design of a research. She pointed out that while the research questions may determine the setting and population for a research, extant literatures and the knowledge of the research context are also essential.

I based the selection of the research sites on extant literature, research questions and the insights gained from the preliminary consultations. The research design was always left flexible to gain from insights derived from the incoming data. For instance, after the initial data collection process, it became necessary to extend data collection to other people who participated in the projects, but do not work in councils. The inclusion of these other people was necessary to corroborate the evidence that I was getting from the respondents in the councils.

Environmental planning is performed by different categories of professionals who are affiliated to different institutions (Dorney, 1987 and Ortolano, 1984 and 1997). The extent to which the different institutions participate in environmental planning relating to development projects varies. Consequently, the extent and type of participation in a national context became the guiding factor in isolating the different groups for the current study.

Drawing from the insights from the initial consultations and available literature it was found that councils are the major players in driving the environmental planning processes in development projects. Councils were identified as the main local authority institutions driving the development processes. The involvement of councils with projects with environmental concerns was found to be relatively higher than most of the other institutions. This was confirmed by the discussions during the initial visits, general literature, as well as technical literature with a national focus in Botswana. Other institutions may be generating information and providing expertise when required but ultimately it is the councils whose efforts determine the overall success of the environmental planning process (Blowers (1992); Baldwin, (1985:4) and Botswana Government, (2002 a and b)).

Based on the conviction that the major activities of integrating environmental issues in the development projects can only be grasped by looking at how it is performed by people on the ground and having practical experience in the planning and implementation of the development projects, this study focused at the council level in Botswana. Councils initiate and implement a large number of development projects with environmental concerns. This study was concerned with the councils only to the extent that they were identified as key players in the environmental planning initiatives.

Whereas the study framework employed in the current study could, in principle, be applied to different categories of professionals and institutions, the councils were found to be more appropriate as far as the consideration of environmental issues in the development process is concerned. This study provides both empirical illustrations and a methodological approach that demonstrate theory underpinning the way council workers use information when they consider environmental issues in the development process.

It was impractical in terms of financial resources to select respondents from all councils in Botswana. Therefore, Grounded Theory principles were employed to choose the councils from which to get the respondents. The guiding principle was to maximise diversity in terms of environmental issues and projects that the councils were dealing with. I wanted to

select councils that would provide diverse experiences in terms of examples of projects and environmental issues that were addressed in the environmental planning process. Five councils were selected for the following reasons:

- Gaborone City Council (GCC) – The capital city of Botswana. The headquarters of most environmental organisations including government agencies in the country are based in Gaborone.
- Francistown City Council (FCC) – A fast growing city with many environmental organisations including Non-Governmental Organisations (NGOs) and government departments that have influence on the environmental planners in the city council.
- Selibe Phikwe Town Council (SPTC) – The town is dominated by mining industry. It has been having problems of pollution resulting from waste products from the mine.
- Palalpye/Serowe Sub-district Council (PSSDC) in Palalpye – Rural villages dominate the district. There are a variety of farming activities taking place in the district.
- North West District Council (NWDC) in Maun - This is a centre of tourist attraction. There are game reserves and national parks and the area is endowed with many species of wildlife. The council also covers the Okavango Delta which attracts a lot of interest from both local and international communities because of its unique environmental features.

The variations in the environmental issues and the type of development projects in the selected areas became the basis for the diversity in the ways the planners conceptualise as well as use information. In addition, the fact that the participants chose to talk about both public as well as private projects contributed to increasing the number of examples that could be drawn to illustrate the ways of conceptualising and using information. Ortolano (1997) notes that the way decisions are made differs when dealing with a public or private project.

3.9.4 Seeking permission

The permissions for carrying out the empirical research for this study were sought at different levels in Botswana. The first level was to get permission from the Office of the

President to carry out the study in Botswana. At the second level, there were the Chief Executive Officers of councils who granted permission for the respondents in councils to be approached (see Appendix F for correspondences requesting permission and letters granting permission).

Initially, a letter addressed to the Office of the President was written to seek permission to do the study in the country. Application forms provided by the research office at the Office of the President were completed. Together, the covering letter seeking permission, completed application forms and the research proposal were submitted to the research office. The response to the application was positive, permission was granted in the form of a letter responding to the application that was submitted.

The second stage was to seek permission from the councils. This was done through a letter addressed to the Council Secretaries (Chief Executive Officers in the councils). The contents of the letter involved introducing the researcher as well as explaining the nature and purpose of the research. The letter was sent to the selected councils. A copy of the permission that was granted by the Office of the President was enclosed as evidence that permission had been granted to carry out the study in Botswana.

After a week from the date at which the letters were sent by post, a follow up was made through a telephone to get feedback on whether the letters were received as well as to find out about the action that was taken regarding the request for permission. In addition, the follow up was used to initiate dialogue as well as develop connections with the council authorities.

All the councils had received the letters within one and half weeks. Two councils, the North West District Council (NWDC) in Maun and Serowe/Palapye sub-district gave permission in written form. After a further request during the initial visits, Francistown City Council and Selibe Phikwe Town Council gave written permissions. As for Gaborone City Council, the letter from the Office of the president was regarded as sufficient permission to approach the individuals in the council.

3.9.5 Sampling the participants

Ritchie *et al.* (2003: 78) suggested that in a qualitative research approach it is not necessary to look for a statistical representative sample, but rather for diverse experiences among the participants. As noted by Barbour (2001), diversity in the respondents is essential to get a

variety of examples relating to the phenomenon that is being studied. This diversity adds more dimensions and properties to the concepts and categories that are discovered, thus leading to a better understanding of the phenomenon (Strauss and Corbin, 1998).

The respondents were selected from the various departments of councils which deal with projects that have some environmental concerns. The respondents included different cadres ranging from technical officers to heads of council departments. The criteria for inclusion in the study were that the person:

- Should be involved in development projects that have environmental concerns from their commissioning through implementation and thereafter
- Should have participated in at least one development project where an environmental issue was under consideration
- Should be willing and available to participate in the interview
- Should give informed consent to participate in the research.

The cadres from which the respondents were selected evolved as I gained more insight into the way information is used and the working habits of the respondents. The final selection included technical officers, operational managers, inspectors and technicians who are implementing projects in the field as well as the heads of council departments. This was necessary to add diversity and insight on the categories in relation to the project roles, tasks and activities performed. Additional respondents were selected from outside the councils. These people were selected to provide corroborating evidence to the claims that were made by the respondents from the councils.

The sampling process was continued until the theory was fully developed and incoming data was not adding anything new. Table 3.2 below gives a summary of the respondents. A list of the interviews conducted is provided in Appendix D.

Council Departments	Heads Departments Deputies	of and	Technical and unit managers	Officers	Totals
Environmental Health	7		8		15
Economic Planning	3		2		5
Physical Planning	5		2		7
Engineering and Architecture	9		4		13
Commercial Affairs	4				4
Totals	28		16		44

Others (external to council provided corroborating evidence) 10

Table 3.2: Summary of the respondents

Forty-four people were interviewed from the councils to provide data for the development and validation of the theory of the use of information for environmental planning. Ten respondents provided corroborating evidence. It should be noted that it was not the number of respondents that was important but the examples that they provided relating to the use of information when they consider environmental issues in the development process.

3.9.6 Visits of the study sites

Initial visits were arranged to spend half a day at each research site, to familiarise myself with the institutions as well as to make connections with the respondents within the institutions. These visits were arranged with the assistance of the officers who were assigned to attend to the application for the permit in the councils. During the visits, I met with some potential respondents, and held brief discussions about the research and the purpose of the interviews. Contact information for those individuals was obtained. The officers who were identified were given the opportunity to choose to participate or not.

They were assured confidentiality and also told that they will be expected to sign a consent form at the beginning of the interview if they agree to participate in the study.

For one of the research sites, North West District Council in Maun, it was not possible to make the initial site visit because of geographical distance. Contacts were made by telephone in preparation for the visit when the interviews were to be held (note that some respondents were identified at the stage when the interviews were held).

When the interviews were conducted, two people declined to participate even though they had initially agreed. One respondent claimed emergency work and the other did not give any reason, I did not ask for the reasons as per the requirement in the consent form. Eight respondents did not want to be tape-recorded because they said they were not comfortable to talk while they are being recorded.

3.10 Data collection and analysis

Data collection and analysis for this study was done in accordance with Grounded Theory techniques.

3.10.1 Data collection

Data for this study was collected using semi-structured interviews. The purpose of the interviews was to get detailed and direct accounts of concrete instances of using information when environmental concerns of development projects were addressed. The interviews focused on past projects, allowing the respondents to report on the concrete steps, activities, actions and motives relating to the use of information.

Because the respondents were allowed to choose a completed project that they felt comfortable to talk about – specifically, about information-related issues that they engaged in when environment-related concerns were addressed, the data for this study came from the reports of their retrospective perspectives on what occurred during the course of the project.

The essence of the approach was that since the use of information is not a readily observable phenomenon, it would be teased out of the strategies, actions, activities, tasks and roles performed by respondents during the course of the projects. This approach enabled me to get data on the use of information from the perspectives of the respondents.

3.10.1.1 Preparing the interview topics

General concepts of information behaviour (see Chapter One, Section 1.2.1 for the definition of information behaviour) guided the preparation of topics that were covered in the first wave of interviews. I also included topics on the enablers and constraints of social behaviour as suggested in Giddens' theory of Structuration (Giddens, 1979). The interview guide was continuously changed during the course of the data collection process. Some changes took place when the sequence of the topics in the guide was abandoned in favour of the emerging discussion. Some questions were added to the interview guide during the interviews.

The second and successive interview guides were prepared with topics drawn from concepts and categories emerging from the data collected. Each interview guide was revised on a continuous basis. The emerging concepts and categories were presented to the respondents for their recognition and confirmation. The interim findings were also shared with experts.

3.10.1.2 Interviewing

The interviews were conducted with the respondents to explore the topics in detail (see the interview guides in Appendix B). Because of the open-ended questions, issues were explored and developed as they arose during the interviews.

The questioning approach that was adopted allowed the respondent to freely report on various dimensions of the topic, not prescribed to them. The topics were introduced by statements such as "Tell me about ---". This approach had the advantage of:

- Allowing the respondents to use their unique ways of defining the issues
- Enabling respondents to raise important issues not contained in the interview guide.

It was also assumed that no fixed sequence of questions was going to be suitable for all respondents. I used the interview guide as a checklist of the issues that I wanted to cover. During the interviews, the respondents explored a broad range of issues associated with using information in the tasks, activities and roles arising from the projects. The respondents reported on how they engaged in those issues. Furthermore, they also articulated the learning aspects in the projects, reflectively assessing the impact that the

tasks and activities they undertook, or just their involvement, had on their own personal experiences.

The data were saturated after thirty-two interviews. However, the process continued until forty-four interviews were held to allow for the validation of the theory. I conducted the interviews over a period of twelve months. Forty-two interviews took place in the offices of the respondents, one in a hotel garden and another in a council conference room. The interviewees were offered a choice of location whenever possible. This was done to make them comfortable with the environment in which the interviews were conducted

All the respondents signed consent forms prior to the interviews. Thirty-six interviews were tape-recorded with the permission of the interviewees. Field notes were taken during and after interviews, focussing on noting non-verbal communication as well as reflections that were made during and after the interview that could not be communicated verbally during the recording. For the interviews that were not tape recorded, notes were taken to capture as much detail as possible relating to the interview.

3.10.1.3 Searching for corroborating evidence

The evidence provided by the planners was corroborated by interviewing ten people outside councils. The focus of this process was at data level and the purpose was to verify some of the claims that were made by the planners. This means that the interviews with these people were held to confirm what was reported by the planners by sampling a few cases from the available data. For example, when a planner claimed that the project was successful, it was also important to find out from those who were participating in different capacities if they shared the same view. Another example was when a planner claimed that he disseminated information to some people. In such cases I wanted to find out from those who were given information to confirm if the activity took place. The evidence provided by the ten respondents showed that the claims made by the planners were credible.

The people who provided corroborating evidence participated in the projects that were described by the planners and they were identified with the help of the planners. They (planners) were asked to give names of people they worked with who were not serving the interests of councils in the projects.

3.10.1.4 Theory validation process

The theory that was discovered was validated by the respondents. The validation was done during the last stages of the data collection and it was carried out in two different ways. First, the theory was shared with the respondents by presenting it to them in the form of a diagram showing the categories and their relationships. The respondents were then allowed to make their comments based on the diagram and the explanation given by the interviewer. In the process there were some discussions with a view to get the opinions of the respondents regarding the theory. In the second instance, the respondents were not shown the theory but were guided in a discussion to talk about the categories. This process followed an open discussion format, with the planners freely expressing their views and opinions regarding the theory.

The two ways of validating the theory showed that the planners were in agreement with how it explains the way they use information when they address environmental issues in the development planning process. This increased my confidence in the research process and outcome.

3.10.2 Data analysis

Data was analysed using the N6 software package, a version of the NUD*IST software series for analysing qualitative data.

The data from the first twenty-nine interviews was transcribed verbatim using Microsoft Word. This was necessary to allow for a line by line analysis when I was still coding the data to identify the concepts and categories.

However, as Strauss and Corbin (1998) suggest, line by line analysis become unnecessary after the concepts and categories have been identified and developed. At that stage the analysis can be done by considering larger “units” of data including a response or an answer to a question as whole, or even the interview as a whole. Hence, data from the last phases of the interviews was analysed by listening to the tapes several times and taking notes to aid the analysis process.

The transcribed data was saved as text-only-format and formatted for importation into N6 for line-by-line text unit analysis, to enable a detailed examination. Printouts of the data were also made to code data while away from the computer. This facilitated reviewing the

data in different environments including at home, in the office, in the car, library as well as when relaxing. On the printouts, different colours were used for each coding session to write the topics and small explanations in the document margins. Dates were also inserted for each coding session to track the development of the concepts and categories as the documents were repeatedly read. The coding that was done on the printed versions of the data scripts was transferred to the computer immediately when getting access to the computer.

The data was analysed according to Grounded Theory techniques (Strauss and Corbin, 1998). This allowed the theory to emerge with subsequent stages of data collection and analysis - informed, guided and directed by earlier outcomes. Throughout the coding process, I developed questions for which I sought answers from the data. I also focused on the processes that related to the elements I was coding. The data was initially coded to generate concepts (topics) describing the meanings of the various text units from the interviews. The concepts were then grouped to form categories. The categories were then linked. The process was interactive with different stages of coding occurring simultaneously in some cases. Two main stages of the coding process which provide a macro view of the way the analysis was carried out can be identified. These are:

- Analysing data for contextual factors
- Analysing data for informational elements.

For both stages, the Grounded Theory techniques of open coding, axial coding and selective coding were followed.

3.10.2.1 Analysing data for contextual factors

The initial analysis aimed at confirming the location of the respondents, location of the phenomenon and identifying appropriate terminologies that characterise the involvement and discussions of the respondents about the environmental issues in development projects. The data was coded for contextual factors that define the respondents' involvement in the environmental planning process. The analytical questions that guided the coding process at this stage were "what do the respondents do and how are they involved?" These questions were asked in light of the respondents' involvement with environmental concerns in development. I wanted to identify the work or job-related contexts that drew the respondents to use information and the ways in which those contexts unilaterally or in

cohort affected the information task and actions situated or emerging during the work processes.

I also examined the data for variations in the contextual factors. For instance, I coded the data for factors relating to different stages of the project. These variations were inspirational in guiding me on the different directions to probe for examples illustrating the emerging informational elements. The data was also examined for variations in behaviours that were elicited when the respondents were dealing with both new and old projects. Furthermore, the data was also examined for variations in tasks and activities that were performed by the respondents.

3.10.2.2 Analysing the data for informational elements

As the coding process continued, I developed some guiding questions to provide different ways of thinking about the data and the emerging concepts so that I could categorise the concepts in the best ways possible. Interim findings were shared with information and environmental experts whose critical views stimulated more diverse ways of looking at the analysis at both the content and procedural levels.

Data was analysed for the characteristics of the general information context in which the participants performed work in human development projects. This aspect of the analysis was the basis for understanding the information context within which the respondents did their work. The following elements provided a guide for the analysis of the information context of the projects:

- Availability of information relating to the environment
- Accessibility of the information
- The value attached to information by the respondents
- The flow of information
- Technological issues and
- The general profiles of information related attributes of the project.

The initial coding yielded seventy concepts (topics) (see Appendix A for details). These were considered as too many concepts to describe a single phenomenon. The concepts were then re-examined for possible renaming, merging and or deleting. In order to be systematic,

the re-examination started with the concepts that coded single text units and then moved on systematically to those that coded more text units. The process yielded forty-four broader concepts and categories relating to more numbers of text units and documents coded per concept or category.

The concepts and categories were “scanned” to further enhance the understanding of the meanings and to add more properties and dimensions to them. The “scan” was meant to generate more insights into the emerging categories and was guided by the following questions:

Who is engaged with the situation that the concept or category is describing?

What is the reason behind the engagement?

How are they engaged?

What resources are consumed when they are engaged?

What are the time and spatial attributes for the situation?

The properties and dimensions resulting from the scan were used for further comparing the concepts and categories for similarities and differences. This comparison resulted in further reduction of the categories. More data was collected to get more examples illustrating the emerging categories and their relationships as well as corroborating the evidence that I was getting from the data. Seven main categories were identified and linked (See Appendix A for more details on how the concepts and categories were developed and linked.). More data was also collected to validate the findings through the respondents.

3.11 Summary of the execution of the research plan, data collection, analysis and the resultant outcomes

The field work for the current study was carried out over a period of twelve months. Data was analysed as and when it was gathered. The analysis of data continued even during the writing stage, when the data was consulted as further insights developed because of the continued reflection on the findings.

In order to avoid “interview fatigue” for the respondents, each respondent was interviewed once at his or her site and subsequent interviews were conducted with other planners. This approach also enabled me to get a variety of examples to illustrate the concepts and

categories that were discovered. Planners from the same council tended to talk about the same projects more often. This could have limited the input from experiences from the large number of projects that were carried by the different councils Table 3.3 below provides a summarised view of the main activities in accordance with the phases of data collection. Remarks are given to highlight the main functions, objectives and outcomes at each stage.

Data collection, analysis (stage) and site	Remarks
<p>Stage one took place at Palapye/Serowe Sub-district Council (PSSDC)</p>	<p>Data collection and analysis was driven by the orienting theory. The objective at this stage was to define in general terms and how information use related factors are located within the processes of environmental planning. The analysis aimed at developing the appropriate terminology and general profile and the responsibilities of the various officers who are dealing with environmental issues in the development planning process. Data analysis was mainly open coding to identify the topics that needed to be explored further to understand how planners use information in the environmental planning process.</p> <p>At this stage only five (5) interviews were held. Data collection had to stop so that there was time to reflect on the emerging themes and also give way to theoretical sampling which was to take place in the subsequent stages of data collection. The sampling at this stage was done to get a broad and general understanding of the subject. The interview questions were general.</p> <p>Important topics were discovered and they were used in the development of the interview schedule for the second phase of the interview process.</p>
<p>Stage two took place at Francistown City Council (FCC)</p>	<p>The main objective at this stage was to explore the topics that were discovered in the first stage in more detail. The activities involved interviewing and analysing the data to get a deeper understanding of the topics as well as following some leads to new themes.</p> <p>Data analysis was mainly open coding and axial coding, some relationships between the categories begun to emerge.</p> <p>Twelve planners were interviewed at this stage. The interviews were stopped when it became evident that more time was needed for detailed analysis of the data. This was important because the analysis that was done in between the interviews was not comprehensive, and there was not enough time for reflection before going to the next interview, which is an important aspect of theoretical coding. The main categories of the Grounded Theory were discovered at this stage. Some important relationships between the categories were also discovered.</p>
<p>Stage three took place at North West District Council (NWDC)</p>	<p>The main objective at this stage was to further develop relationships between the categories as well as finding more examples to illustrate the categories and the relationships. There was also a focus on refining the categories and identifying the core category.</p> <p>Data analysis was mainly axial coding and selective coding.</p> <p>Twelve planners were interviewed at this stage. Again the interviews were stopped to allow for time for a comprehensive analysis and deeper understanding of the data.</p> <p>At the stage the core category was discovered and the relationships between</p>

	the categories were developed.
Stage four took place at Selibe Phikwe Town Council (SPTC)	<p>This stage focused mainly on the validation of the Grounded Theory. Further questions were asked in relation to some of the categories, searching for any evidence that could refute the findings (negative cases). One of the main activity was to share the Grounded Theory with the planners, and seek their views, so that they can make inputs as well confirming whether the Grounded Theory describes what they do.</p> <p>Eleven planners were interviewed. At this stage it was becoming clear that the Grounded theory was relevant and does describe what the planners do in relation to the use of information in environmental planning. The interview stopped to allow for some time to reflect on the findings.</p>
Stage 4 took place at Gaborone City Council	<p>This was the final stage and it focused on further validation of the Grounded Theory. During this stage, I had the opportunity to share my findings with some planners in a more open discussion, rather than asking for more information from them.</p> <p>Only four people were interviewed. The process had to stop because it was becoming clear that it was very unlikely that anything new could be discovered. The findings were found to be relevant in describing the ways in which the planners use information when they are engaged in environmental planning.</p>

Table 3.3 Summary of the execution of the research plan

As noted in Table 3.3 above the second and third phases of data collection which took place at Francistown City Council and North West District Council respectively represent the critical stages in the development of the Grounded Theory of this study. It was during those stages that the main categories were developed and linked. Hence, the examples for illustrating both the existence and relationships between categories are drawn mainly from the interviews that were conducted at those sites.

In the next chapter, I will report on the findings of the study, showing how the Grounded Theory of the use of information for environmental planning emerged as data was gathered and analysed according to the Grounded Theory techniques discussed in this chapter. The categories discovered will be presented and relevant segments of the data will be quoted to support the findings.

3.12 References

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Chapter 4: Findings – The Grounded Theory

4.1 Introduction

This chapter presents the findings of the present study, which are a result of applying the empirical research procedures discussed in Chapter Three to collect and analyse data about the use of information by the planners. In addition, the objective of this chapter is to show, in a systematic way, how the Grounded Theory emerged until it reached the final stage when it was fully developed (see also Appendix A for more details). The main finding of this study is the Grounded Theory of the use of information by the planners when they address environmental issues in projects.

The chapter thus begins with a presentation of the contextual factors. The information elements (tasks, actions and activities) are then located in the contexts in which they occur. This is followed by a presentation of the respondents' perceptions of the information environment with regard to the projects that they do, before presenting the different ways that the planners conceptualise information in their work roles. Lastly, I will focus on the Grounded Theory of the use of information for environmental planning. The format for presenting the theory is as follows: I start by presenting the relevant categories, before presenting an illustrative diagram and looking in detail at the categories and subcategories. I provide supporting evidence in the form of quotations from the field data to show how the findings are grounded in the data. The quotations are referenced in the text using the codes that were assigned to the interview sessions that were held during the data collection.

As indicated in Chapter One above, the objective of this study was to investigate the use of information in environmental planning. The study used the Grounded Theory method. Interviews were used to collect the data. The subjects of the study were drawn from people in the development arena, working for councils (local government) in Botswana.

The Grounded Theory developed in the present study shows that there are seven main categories relating to how planners use information in environmental planning, viz: the *dynamic project information context*, *role context*, *motivators*, *pattern of information use*, *experiential knowledge*, *informational power* and *strategy for information*. The *pattern of*

information use is the core category. These categories were found after initially coding the data to identify the concepts and thereafter re-examining them using different “scans” to group them in various ways.

The Grounded Theory presented in the current study was formulated in stages with subsequent stages being informed, guided and directed by earlier findings. Throughout data collection and analysis, the emerging concepts and themes guided the development of interview questions for further data collection.

4.2 Defining the location of the informational elements

Initially, the factors relating to the particular contexts in which information is used were identified. Projects, roles, tasks and activities were identified as essential contextual factors. The informational tasks, actions and activities (informational elements) of the planners were found to be embedded in these contextual factors. The use of information could thus be understood in relation to the latter. The contextual factors that were identified at the beginning of the data analysis influenced the discussions that enabled the respondents to tell me how they used information. I also looked deeper into the data to understand the use of information in relation to these contextual factors.

Figure 4.1 below provides a hierarchical relationship of the contextual factors linked together as concentric circles, with project occupying the outmost circle and roles, tasks and activities closer to the centre of the circle. Each level of the concentric circles symbolically represents a level of involvement or context of users which required both analytical and empirical evaluation to gain insights into the informational elements (information tasks and actions) that are associated with that particular contextual factor.

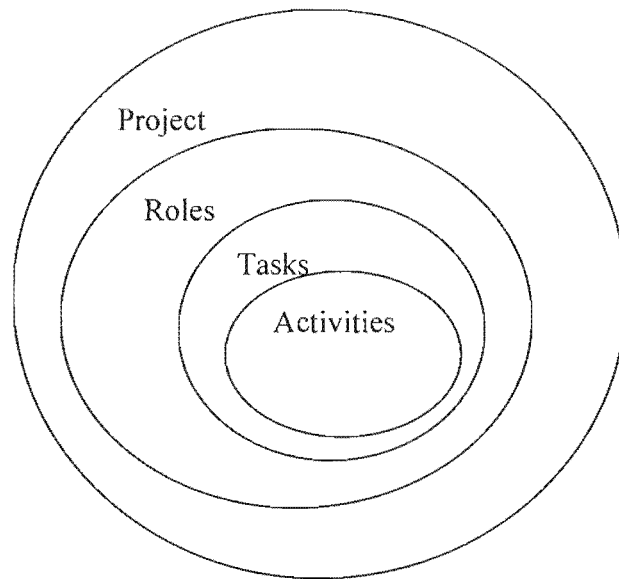


Figure 4.1: Contextual factors

The contextual factors given above set the “boundary lines” for understanding the use of information as well providing the context for analysing the informational tasks, actions and activities of the planners. In the present study, these factors were used as a base or a “stepping board” to understand the informational concepts relating to the ways in which the planners use information.

For example, the planner’s access to certain information may be understood in relation to the role that he or she is performing in a specific project. The planner may, for instance, be involved in disseminating information because of a campaigning activity of council. He or she may visit a certain website on the Internet because it cites a project similar to the one he or she is working on. These information elements (such as the examples given above) happen in the contexts defined by the project, roles tasks and activities of the environmental planning process. In the next paragraphs, the contextual factors are explored further.

The data was examined for variations in the contextual factors. This was found necessary for understanding the use of information-related concepts from a variety of contextual perspectives. These variations were also inspirational in providing guidance on the different directions to probe for examples illustrating the emerging informational elements. For instance, when I discovered an information task or action related to the planning stage of a project, I also examined data relating to the implementation stage and looked for evidence that might explain a similar information task and actions at that stage of the project as well.

When examining the data for further dimensions and properties of the contextual factors, it emerged that the planners called the projects *human development projects* (as opposed to just simply projects). Although the respondents emphasised this concept, it did not appear to be significant to understanding how the planners made use of information. As a result, I maintained the concept “project” in the analysis to refer to the broader context defining the use of information by the planners.

Available data also showed that different approaches were required for completion of the tasks in the two main project stages, namely, the planning and the implementation, and may provide some variation in the purposes and intentions for which the planners use information. In addition, it was noted that dealing with new projects might elicit information behaviours that are noticeably different from those of older projects.

The data was examined for variations in the role of the planners in the projects and it was found that their roles are closely linked to their jobs as council employees. The roles could be categorised as management, monitoring and advisory. In examining the data for variations in tasks and activities, it was found that these factors were overlapping. The variations in the tasks and activities were grouped together as disseminating information, sourcing information, making presentations, writing reports and proposals, participating in meetings, workshops and seminars in different capacities.

Although the various dimensions of the contextual factors were regarded as fundamental in guiding the development of the Grounded Theory in the current study, the data collection process and analysis were always left open for the emergence of further contextual factors which might enhance the discovery of informational elements. It is important to note that these variations were only used as initial pointers to the location of the theoretical elements for the development of the Grounded Theory on the use of information. I avoided making the contextual factors too specific, as that would have led to too much influence from my prejudices, beliefs and values before I could collect enough data to inform my understanding. Figure 4.2 below shows the contextual factors and their variations.

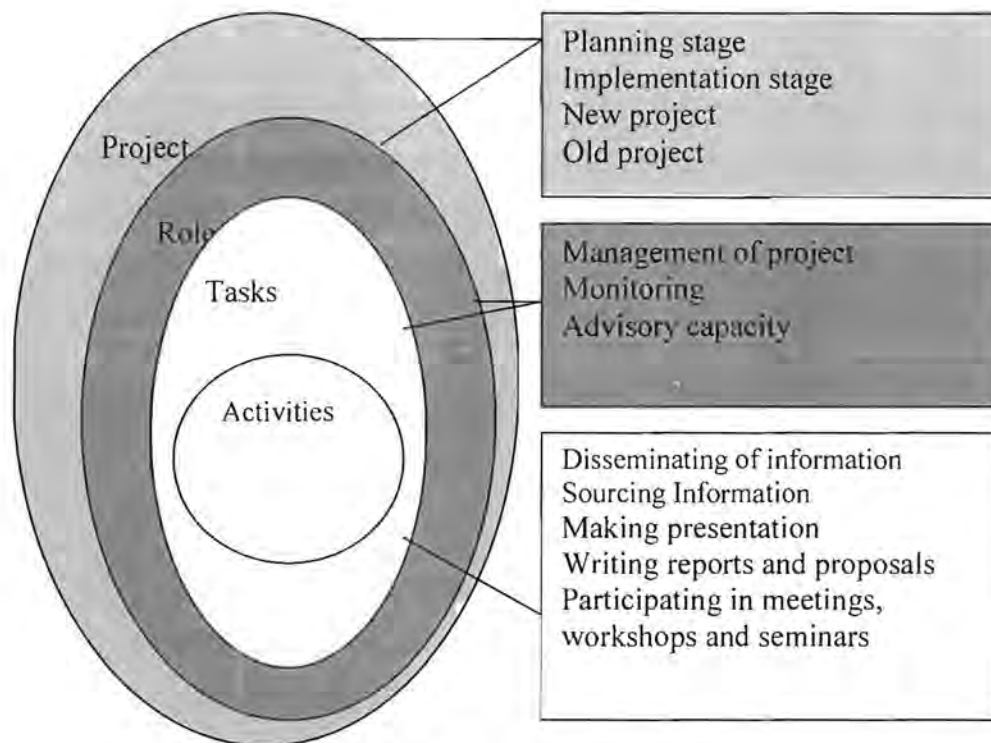


Fig. 4.2. Variations in the contextual elements

The data showed that the involvement of the planners in the environmental planning process creates a personal motivation to use information. For instance, one of the respondents who was talking about the motivation he experienced when involved in a project pointed out that:

Yaa, it wasn't a problem - you see- when you come up with a project of that nature, it excites, it excites, it excites you and you don't run short of words you ought to say -- (Interview, FCC5)

As the respondent notes, the excitement derived from doing the project motivates him to continue with the project.

The contextual factors and motivations are not sufficient to determine all informational elements that describe the information requirements for the environmental planning processes. It was found that some structural elements have some theoretical relevance to the information tasks, actions and activities. These structural factors emanate from the distribution of power and authority among the planners, agencies and other stakeholders that take part in the projects. These power and authority relationships require that the planners

apply information to neutralise or counteract these power bases so that they can move forward and facilitate the environmental planning process. One of the respondents pointed out that:

...Because unfortunately as managers, we don't give the councillors the directions which to take. It is like they have superfluous powers whereby you just simple present your case and they make decisions. It is not like you go and stand on decisions and you go with it. You give them and they make the decisions (Interview FCC9).

The informational elements (tasks, actions and activities) of the planners can be understood by examining the use of information in relation to contextual factors, motivations, and power and authority. These three factors define the information tasks, actions and activities or requirements for the planners as they engage in projects with environmental concerns. Figure 4.3 below shows how the factors that define the information elements are related.

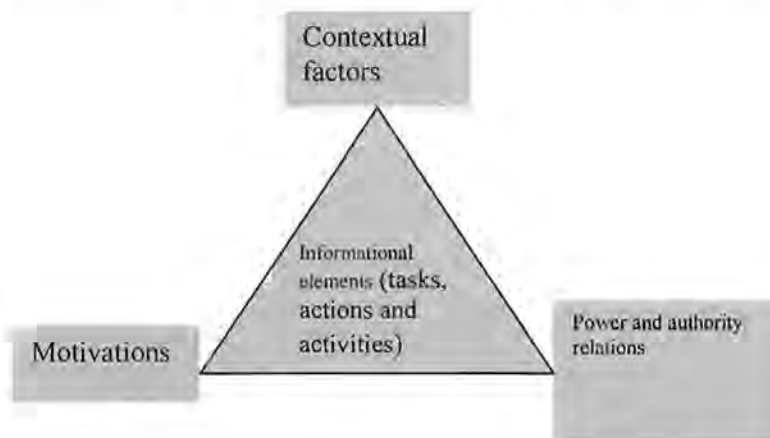


Figure 4.3 Factors defining informational elements

To summarise, the contextual factors, the motivation and the ways of handling power and authority in relation to the projects emerged as the key elements determining the theoretical entities that define the informational elements in the environmental planning process. Consequently, it was necessary for further development of the Grounded Theory to tease out the informational elements that are aligned to these factors.

The next phase in developing the Grounded Theory was to identify the informational elements embedded in the contextual factors, motivational factors and power and authority

relations experienced by the respondents in the process of addressing environmental issues in projects.

In the next section, I start by presenting an overview of how the planners perceive the information context in which they work, before examining their conceptualisation of the information. The concepts and categories for the Grounded Theory were identified within the respondents' own conceptualisations of information. These conceptualisations were derived from the data and are presented in Section 4.5 below. No attempt was made to define information for the respondents. What is reported in this chapter as the use of the information is in accordance with the ways in which the respondents themselves conceptualise information. The categories that were discovered are manifestations of motivations, contextual factors and authority and power relations experienced by the planners in the environmental planning process.

4.3 The interplay of informational elements and environmental planning

The analysed data has shown that whenever there is a development project, environmental issues are presented as one factor that has to be dealt with throughout, that is, from initiation, through approval to implementation. It is an ongoing process which is part of all the stages including, after the completion of the project, the evaluation and monitoring stages.

The data showed that the planners engage in a variety of information tasks, actions and activities which enable them to direct the selection of alternatives that are more acceptable to the majority of the stakeholders in the environmental planning process. It was found that the planners use information as a tool to help them to facilitate the process of making choices during the project process. The *pattern of information use* was identified as the core category for describing and explaining the way the planners use information.

Notwithstanding the variations in the claims made by the respondents with regard to the volume of information they handle during projects, the data has shown that the respondents are generally not experts in the environmental issues. Therefore, facing a complex environmental issue "head on" is relegated to the experts and under such circumstances, the planners become facilitators of the processes that ultimately attain the goals of councils.

The purpose of the council is to plan and implement environmental decisions in conjunction with various environmental agencies and experts. The analysis of data of the present study has shown that it is imperative that the planners have a sufficient level of understanding of the environmental issue so that they will be able to guide and own the decisions that are made regarding those issues. The planners should also have the ability to implement the decisions and communicate the issues to council committees and other stakeholders, including the public.

In the next section, I present the findings regarding the respondents' perception of the information environment and thereafter their conceptualisation of information.

4.4 Perceptions on the projects information environment

The data was analysed to understand how the planners perceive the information environment of the projects in general. It was found that available information relating to different environmental issues could be found in the councils and externally in government departments. These departments have specialised mandates relating to the environment. For example, maps reside with the department of Surveys and Mapping and information on water resources is found at the Department of Water Affairs. Other environmental agencies, research institutions and people in general, including experts, can also provide valuable information.

Internally, in councils, most of the information used is in the form of reports that are kept in the registry departments. The respondents reported that there is a general lack of proper organisation of information in the councils. This worries them because it makes the retrieval of information difficult. The respondents expressed that there is clearly a need for a system that would more easily enable them to retrieve reports from the past. For instance, one respondent described his experience relating to the organisation of information as follows:

Well, I don't know if we missed anything, but in short, I think you heard that there are some of the things that I want and they are here [pointing at some stacks of papers, reports and files] but I can't access them. But sometimes I fail to help people even though I have information and knowing it is available but because I am supposed to – [go through stacks and stacks of reports and files] ... Besides that ... I think that is the only problem that I see (Interview FCC7).

The way the respondent described his experience in the quotation given above shows that the organisation of information is a problem that is affecting the work of the planners in terms of accessing the information.

The data clearly shows that the inaccessibility of information due to a lack of proper organisation is a concern among the councils in general and is receiving attention in one way or another. The respondents' general views are that the problem will require external expertise to assist the councils to deal with the situation. They also expressed a hope that the recent efforts to bring computers into the councils would alleviate the problem. One respondent talking about the situation with regard to the organisation of information and how the council intended to deal with it pointed out that:

The information flow, like the information that you get in the offices, the information is there but there isn't any single channel which can lead you to what information you want. If I may give an example for instance, I deal with maps, with data, all the information is here, but if somebody comes here, because of the nature of the storage I would have to scout, I know that the information is there, I know where to get it. The system as it operates, it leaves much to be desired because having stayed here for two years, I know where to get the information, but if you come here today, you are new and you need some information, then it will take you some time to get that information (Interview NWDC7).

In addition, when asked about the efforts to address the situation, he said:

Yes, I think is to have some sort of a databank... Yes, actually we have discussed it very much. Like right now we are trying to sort of link ourselves as planners. We have started actually to try to link ourselves through the internet and computers so that I put all the data that I have in my office. I will put it with my colleague here. But like I said, it is among few people because although people have computers in their offices, I think very few people use computers and very few people know the importance of the computers (Interview NWDC7).

As noted above, the problem of the organisation of information in the council is receiving attention and there is a hope of solving the problem using computers.

The information flow both internally within councils, as well as from councils to other stakeholders was described as not conducive to effective performance. A respondent talking about the flow of information in a project pointed out that:

Well, based on my previous experience I have identified so many gaps in the project process. One, the information flow was not

really up to standard as per the modern management practices. You see where you could have all stakeholders within a very short time getting the right information and making the right decisions. Because, the approach in this particular project which I experienced was that information after being collected and put together through this long process of monthly reports. We didn't have even an instant interlink with other stakeholders whereby that information could flow easily and then be able to be used to make decisions, you see. You could have a case for example, whereby at the inception of the project a particular plot could not be accessible maybe because the owner was not available. And because we don't have even various records how to trace the owners of such plots, it end up, you know such situation ended up drawing all along until almost at the end of the project. So that is why I am saying that information, it was not easy to have information flowing to all the stakeholders who were affected by the project. Because if we had a process whereby such people could be easily traced then we could easily say we are going to affect your plot. We need you to give us consent and then we will make a decision to move forward. Now you look for the person who is not known. Or he changed the plot number, you don't know to whom it was transferred. That is one experience I got of missing information, gaps (Interview FCC9)

The respondent notes that the flow of information needs to be improved and aligned with the requirements of the project. According to him, the way information is managed for projects in the council is lagging behind current developments in information management practices.

The work of the respondents is guided by government policies and legislative acts which can be found in the offices of the senior members of the councils. There is also an environmental manual which is used to guide the planners in their actions.

The majority of the respondents do have computers with Internet access in their offices. They are also connected to the government's electronic mail system. In their day-to-day operations, the respondents interact with professional co-workers, environmental experts, various developers, politicians and the wider public.

In the next section, I discuss how the planners conceptualise information.

4.5 Conceptualisations of information

One of the objectives of this study was to determine how the environmental planners conceptualise information. It was found that the respondents conceptualise information within the activities they do. This means that what becomes information to the respondents is perceived in the actions that are taken to accomplish a project's environmental goal. For

example, one of the respondents who was involved in a project of waste management referred to the number of litter bags collected as environmental information. Another respondent who was working on a project for the siting of a landfill referred to the history of a village as environmental information. A directory of environmental experts and companies became environmental information for other respondents who wanted to identify a company that might be able to do an environmental-related assignment for council.

The data shows that what ultimately becomes information in a project cannot be determined in advance. It emerges and evolves with the activities as the project progresses. Four ways in which the respondents conceptualise information were identified. These are:

- The content form conceptualisation
- The physical form or source conceptualisation
- The knowledge conceptualisation
- The idea (or view) conceptualisation.

4.5.1 The content form conceptualisation

This refers to the subject matter regarding an entity. Examples of such entities are waste management, land, property ownership, resources inventories, evaluations and finance.

The quotations given below illustrate the expressions used by some respondents when referring to the content aspect of information. It was found that the respondents in these cases had more concern for the content of the information than the other attributes that may be related to information. For example, one respondent said:

Yes, getting that information, you have got to read literature on waste management, waste disposal of hazardous material, this kind of hazardous material. Okay, we have got literature, we learn--- (Interview FCC2).

Another respondent said:

We get information from the department of surveys, which comes in the form of cadastral information. Well, the information that I am using is map borne... Because I go on site using the map to locate the premises (Interview FCC10).

The content may be presented as text, statistics, drawings, graphs, lists, charts and maps, and may be in printed form or electronic form. The information may also be given verbally.

4.5.2 The physical form or source conceptualisation

The physical form or source conceptualisation refers to the nature of the material in which the information is presented. The participants have referred to information as “hard copies” and “soft copies”. The “hard copy” refers to the printed sources while the “soft copy” refers to the computer held information. When conceptualising information as the physical form or source, some respondents pointed out that:

Yes, what we could do is, like it happens in the case of Francistown, most of the information is in is in hard copies. Retrievable information is in hard copies apart from the one in soft copies. So, what we would do is retrieve those reports, for example drawings and make the hard copies or copies of the same and just give them as they are. Because really we didn't process that information in other form, we simply, if he wants the layout plan we show him a particular layout. If the one they want is a particular report we simple reproduce it and give it to them (Interview FCC9).

Another respondent said that:

Most of them will be ..., let me say, most of the information actually is in written form, and it may be at some - maybe you derive that from a government policy. We have government policies [pointing to the document], ... background and every thing. Most of the time, you find that we use information that is in the files (Interview FCC7).

It can be noted in the quotations given above that the respondents had more concern for the physical aspects or format of the information source than other attributes that may be used to describe information. They emphasised the physical materials such as “hard copy”, “soft copy”, pointing to the documents and referring to them as information.

4.5.3 The knowledge conceptualisation

The planners also conceptualise information as knowledge that is acquired through training and experience. Reading of literature also adds to the knowledge. In relation to use, when

information was conceptualised as knowledge, the respondents reported that they had to recall what they learned or experienced and applied it to the situation at hand. For instance, conceptualising information as knowledge, one of the respondents said that:

But most of the time exactly I was using my background experience, the experience that I acquired through training that, that if one has to come with a project of that nature, these are the things that one has to look into. So basically, I was referring to my background information and also from the literature (Interview FCC5).

The above quotation also shows the emphasis on the experiential nature of the knowledge. This knowledge had also been referred to as background information.

The respondents reported that they used the knowledge when working with consultants. The knowledge was found to be essential in enhancing the participation of the planners in the projects. This knowledge is also useful when preparing tenders, as well as when evaluating the reports prepared by the consultants.

4.5.4 The ideas conceptualisation

The analysed data showed that other people are consulted to give ideas and views regarding the environmental issues. These ideas or views comprise both expert and non-expert ideas. The respondents referred to such ideas as information. These ideas and views are acquired through conversational encounters, including brainstorming and discussion sessions, as examples. Such encounters allow the participants to present their ideas which may be guided by expertise, beliefs, views and understanding of the environmental issue. For instance, one participant when talking about preparing and contributing information to discussions of environmental issues, pointed out:

Basically, we prepare to a level where you could not only understand but also participate, have an input in the discussion, contribute to whatever it is, workshop or seminar by bringing in additional ideas or information (Interview NWDC1).

Another respondent talking about the information that he got from another project said:

Normally when we want to make a change, we consult them before we meet to find out what they are doing. So before we

meet I come with the ideas that I have taken from elsewhere, others will also do the same (Interview NWDC5).

According to the analysed data, the respondents refer to these ideas as information.

4.6 Precursors to information use – defining the Grounded Theory

The findings reported here are based on the analysis of data collected by interviewing council workers about using information when they address environmental issues in development projects. As indicated in Section 4.2 above, there are three critical factors that determine the theoretical elements that define the informational task, actions and activities of the planners. These are the contextual factors (projects, roles, tasks and activities), the motivations and the power and authority relations in the environmental planning process. These factors translate into the Grounded Theory for the use of information by the planners.

The Grounded Theory of the use of information developed in this study consists of seven main categories which provide an assessment and definition of the way the planners use information when addressing environmental issues in development projects. These categories comprise:

- Motivators (factors motivating the planners to use information)
- Dynamic project information context
- Role context
- Experiential knowledge
- Pattern of information use
- Informational power and
- Strategy for participation.

The categories given above also highlight the behaviours of the respondents related to using information. The *pattern of information use* is the core category.

Figure 4.4 below shows how the components that define the way the planners use information may be related in a simplified way, with the arrows in the diagram symbolically

representing the influence between the categories. The theory may be understood as follows:

The *dynamic project information context*, *experiential knowledge* of the planner, *motivators* and *role context* influence the information tasks, actions and activities that determine the *pattern of information use* exhibited by the planners. The *dynamic project information context*, which can be either an enabler or a constraint to using information, defines an information profile of a project.

The information tasks, actions and activities of the planners in a project are necessitated by the requirements of their roles. The contexts of these roles (*role context*) determine the kind of information the planner should act upon, as well as how the planner should act upon the information to participate effectively in the project. For instance, information may be available, but it is only individuals with certain defined roles or necessary *role contexts* that may get the necessary support of the information in realising certain goals of the project. The *role context* may influence the *pattern of information use* in a direct way. It may also motivate the planners to influence others or orientate themselves to perform their roles effectively. These motivating factors (*Motivators: influencing others and orienting oneself*) also influence the information tasks, actions and activities, while they are also being influenced by the *role context*.

The *pattern of information use* generates the *informational power* base of the planners which directly influences the *strategy for participation* that is used to embrace relevant participation and assessment of the environmental issues in the project. The *Strategy for participation* can be enhanced by *situated power* derived from supporting policies and the institution. These supporting policies and the institutional support provide legitimate and coercive power bases that may have influence on the *strategy for participation*. When the planners execute the *strategy for participation*, they engage in information tasks, actions and

activities which affect the *pattern of information use*. The *experiential knowledge* is obtained from participation in projects and training and is enhanced by routine information-related habits of the planners. It makes an essential input to the way in which information is ultimately used in a project.

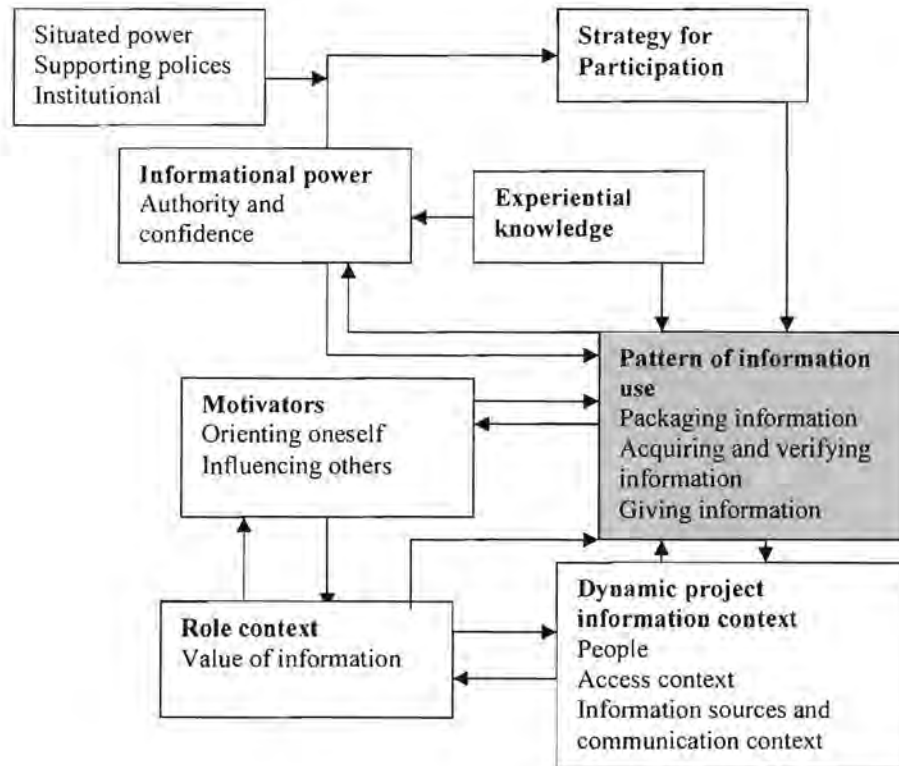


Figure 4.4: Precursors to information use

The data for this study showed that the interactions that planners engage in during the environmental planning process are a result of both physical and emotional involvement of the respondents with the projects. The interactions occur at both conscious and unconscious levels.

The Grounded Theory that was discovered in this study provides a systematic way of understanding the way the planners use information in relation to the way the *dynamic project information context*, *role context*, *motivators* and *experiential knowledge* determine the *pattern of information use* (information behaviour) that generates an *informational power* base which drives the *strategy for participation* used by the planners. In the next section, the categories of the Grounded Theory will be discussed in detail and evidence from data to illustrate the properties and dimensions of the categories will also be provided.

4.6.1 Motivation to use information (Motivators)

Two motivational factors that create a need for the planners to use information in the projects were identified. These are the need for *orienting oneself* and the need for *influencing others*. The next section describes these motivational factors.

4.6.1.1 Orienting oneself

“*Orienting oneself*” or the orientation that the planners give themselves, is a self-preparatory activity to dealing with an environment-related situation in a project. The data has shown that the planners formulate a guiding idea or viewpoint relating to the environmental issue under consideration. “*Orienting oneself*” prepares the planners to engage with the issues intellectually and contribute to the decisions that are made regarding the issues in a meaningful way. The orientation is normally motivated by new and unfamiliar issues that have to be addressed. Planners constantly encounter new environmental issues that motivate them to orientate themselves into ways of dealing with those issues. For instance, one respondent pointed out that:

On the technical side again is that may be, you see this environmental issues are quite fairly new in this country such that there are a few people who can tackle those issues, or who have the know how ... if there is a hazardous waste in Palapye, how could that be tackled, how could that be disposed off. ... And the other issue is that of legal framework. because our laws in Botswana have not taken account to the environmental issues such that anybody can do what ever he or she likes. He or she knows that he or she won't be taken to task and, the law enforcers they don't have that technical know how, probably somebody else maybe spilled toxic waste or damaged the environment is taken to task. Even our police, they don't have that know how of how to go about it (Interview PSSDC5).

Such a situation as described above is a cause of uncertainty because the respondent is not sure whether he or she will be able to handle the situation successfully. This then raises a fear of the possibility of failing to handle the situation in accordance with the professional requirements of the roles of the planners. For instance, one of the respondents who was participating in a project in which they were handling issues that were unfamiliar to him and other stakeholders pointed out that:

Yes, what I am... saying here is that, some of their fears again, were that, look we don't know the background like I was alluding

previously that, it was also my fear. Their fear was that look, we are giving this, although it is promoting Batswana participation, but, at the same time it is not every individual who appreciate that [waste] is a good activity: the collection of [waste] is a good activity. Some people may just be doing it for remuneration purposes. So, yes, colleagues had fears to say look, we are giving this people - It may be too early. [We] need to have had some seminars or something like that (Interview, FCC4).

Moreover, when asked about the general feeling they had when they continued with a project having such uncertainty, the respondent said that:

Yes, I want to be honest, we dealt it very raw. One would say you know we just said let us take chances, let us just take chances because we haven't done it before. No other local authority, I think had actually done privatisation of litter picking. What we knew, or what we had heard of was the privatisation of collection in Gaborone. But, not really picking, but we said let us take chances, you know, if we fail or succeed, ... [we] would have succeeded (Interview, FCC4).

As the respondent notes above, an unfamiliar situation raises some doubts of whether the project will be done well, and this becomes even a greater problem if the planner fails to get adequate orientation. In this particular case, the respondent was worried because he was participating in a project where there were no case examples in the country to learn from.

The respondents reported that environmental issues are new to many people working in councils and elsewhere in the country. Therefore, it makes logical sense for people involved with such issues to get the necessary orientation. This helps them to gain confidence in handling the new situations. Therefore, the use of information is motivated by a need to gain confidence to deal with the situations in a more acceptable manner.

4.6.1.1.1 Orienting oneself as a learning endeavour

The respondents reported that they learn about the common understandings of the issue. They prepare themselves for situations where they may be required to argue a case for or against an environment-related issue. When carried out to completion, the orientation leads to the formulation of a sufficiently clear focus and a position that is taken by the planner in relation to the issue. For instance, one respondent pointed out that:

Basically, we -- -- prepare to a level where you could not only understand but also participate, have an input in the discussion,

contribute to whatever it is -- , workshop or seminar by bringing in additional ideas or information (Interview NWDC1).

While engaged in the orientation activities the planners provide themselves with sufficient information on the environmental issue to have a clear perception of the issues and tasks involved to the extent that they can share ideas and information with other stakeholders.

The orientation that the planners normally engage in may require more information than what is available in the councils. In that regard, the planners consult with external institutions, experts and other stakeholders to obtain further orienting information. The planners may discuss the ideas with colleagues and get facts from the information sources that are available and accessible to them. Through these processes, the planners learn more about the issues and get a better understanding. The quotations given below highlight some of the ways of orienting the planners described. For example, one of the respondents, expressing how he learnt about the disposal of hazardous materials, said:

Yes, getting that information, you have got to read literature on waste management, waste disposal of hazardous material, this kind of hazardous material. Okay, we have got literature, we learn, ---. But also, we had this tour where we visited some landfills in South Africa (Interview FCC2).

In addition, talking about the objective of a tour they took, the respondent further said:

Well, this one, the objective was to learn how they dispose their hazardous material (Interview FCC2).

As it can be noted in the quotations given above, the respondent engaged in reading literature and participated in the tour because he wanted to learn about environmental issues that he was addressing.

The data showed that *orienting oneself*, as a learning endeavour, is a necessary aspect that prepares the planner to facilitate the environmental planning process.

4.6.1.1.2 Ways of orienting oneself

The analysed data has shown that there are a variety of ways in which planners can get the necessary orientation. These include: consulting other institutions that may have had a similar issue before and seeing the live situations, talking to other people about the situation (e.g., brainstorming and discussions) and consulting the available literature in books, reports

and the Internet. Engaging consultants and working with them is another strategy which was used by the respondents to orient themselves about new and unfamiliar issues. The quotations below give some of the views that the respondents have expressed about what they have done regarding orientating themselves:

Yes. I would say, like I was saying we consult. If we have a certain case in the district and we know maybe Kweneng District had the same, then we will try to get hold of them and know how they actually got to solve it and consult another different district then we see what will be applicable to our case (Interview PSSDC3).

In addition, another one said:

Yes you read around that theme, you research, get some information from the Internet so that you can be able to see how people are doing and what is the new development and so forth, and then you can be able to share that information with the people. Because normally we start with colleagues you know, we brainstorm, sort of, because normally we have departmental meetings where we brainstorm. Then there is this coordinating committee and then from there you can discuss it further (Interview FCC3).

Another respondent, who was managing a landfill, reporting how he got the orientation, said:

Doing waste disposal in a landfill is obviously a different issue in the sense that we need to follow certain stages, certain methods again which are used to dispose off waste, you see that, you need to be conversant with that. And I am happy to say when we opened the site we engaged a foreign company who are very experienced in landfill to assist us, you know in opening the site with us, to work with us. They were with us for about almost a year. So, in the process I learnt in the process, basically with disposal, you see that. So, ever since they left us, I mean I didn't have a real problem. Except that, the project is quite a new phenomenon in Botswana (Interview FCC2).

The three quotations given above provide examples of the ways that are used by the planners to orient themselves, including reading, brainstorming, consulting other councils and working with experts.

4.1.1.1.3 Orienting oneself to issues, tasks and activities

As the project progresses the individual is continually “*orienting oneself*” to the emerging dimensions of the issues, tasks and activities. Although there was not much differences in the ways in which the planners orient themselves to the tasks, activities and environmental issues, it was found that the attributes of the environmental issues that are required for “*orienting oneself*” to the issue include:

- The theoretical background of the issue which is obtainable from the available literature
- Available alternatives to dealing with the issue in development
- Case examples of what other councils have done with the issue (locally and internationally)
- Policy requirements
- Current information relating to the issue.

However, “*Orienting oneself*” to the *tasks and activities* requires that one understands the tasks in detail. The data shows that when “*Orienting oneself*”, the respondents gather information through inspection of projects sites, they talk to people, and hold discussions with colleagues and other interested parties. When talking about preparations for tasks that were to be carried out, one of the respondents said:

What we were trying to do was to just go around the town. If you can call it inspection of the area, where you just go around looking at the extent of littering. Because by so doing, by determining the extent of littering we were trying to weigh the volume of the work so that we can be able to rationalise it properly. Well it was the open spaces in a particular area was important, two, the rate of illegal dump in a given location, because where there is lot of illegal dumping, then obviously it would require more resources or more work. So, these were the things that we wanted the information on (Interview FCC3).

The data shows that when orienting themselves, the planners collect information that enables them to determine the resources required to perform the tasks. They also find out about the availability of those resources.

The councils provide the respondents with opportunities for orientation, such as, making time and funds available for workshop and seminar attendance, visiting of relevant projects sites elsewhere, as well as hiring experts to work with the planners.

To summarise, the need for orientation and the subsequent orientation activities are critical aspects affecting the *pattern of information use* of the planners. They are also determined by the role that the planner is playing in a project. In the section that follows, I discuss how the planners influence other stakeholders in the planning process.

4.6.1.2 Influencing others

When the planners orient themselves, they take positions or certain viewpoints regarding the environmental issues, and would like to influence others in the direction of that viewpoint. The planners use a variety of influencing strategies when they deal with people with different opinions, purposes and intentions in the projects. The data showed that in such cases information is used to dissuade people from their opinions and intentions. For example, a respondent who had taken a position about a landfill project pointed out that:

Okay, it was ..., somehow my contribution, somehow influenced other members to take the direction I was pointing at, but eventually that what it tends to be like ... that. Yes, it tends to influence other members to follow. To follow where I was looking to, because we were differing ... (Interview FCC5).

In expressing their intentions to influence others, some of the respondents used such phrases as:

“to convince them”, “to educate”, “change attitude”, “to bring awareness of the magnitude of the problem”, “make them to appreciate”, “change opinion”, “put in picture”, “get them go along with us”, “make them see and understand”, “so that they talk our language”, “show them the sense”.

In this regard, the planners use information as a tool for achieving the objective of influencing the other participants. It was found that information was used to influence an individual or a group of people. Four ways in which information was used to influence others were identified and used as the basis for identifying the strategies that the respondents had actually used to influence other people in the projects. These ways of using information are:

- Subordinate using information to influence a senior person
- A senior person using information to influence a junior person
- An individual using information to influence a group of people
- Using information to influence the community.

The four ways of using information mentioned above translate into five strategies or tactics that the planners use to influence others. These strategies are:

- Information and networking
- Educating (informing) the client
- Showcasing or creating a positive image
- Justification of action
- The use of representatives and other influential structures.

In the next sections, I will present the above strategies and illustrate them with examples from the field data.

4.6.1.2.1 Information and networking

The data for this study showed that the planners create networks of support with partner institutions, colleagues, stakeholders, individuals and groups to enhance the influence they can achieve. Networks facilitate the easy flow of information, different viewpoints and ideas among stakeholders with different intentions and purposes in the project. Within the networks, the participants disseminate information to facilitate the activities that exert influence. They perform the role of liaison persons with various stakeholders. For example, one of the respondents described how he ensures that his ideas get through the committees as follows:

...Yes, before the meeting, we normally had kind of a joint; kind of a caucus meeting to say yes, this are the issues that we are going to take forward in our meeting. We don't involve the Gaborone people in that meeting... Yes, that is preparation; they will only here us now when we are in a meeting that the whole issue has started, coming with some issues, somebody backing up and things like that. So we normally have a kind of caucus meeting, we organise our thoughts, this is what we are going to present, this are the issues and this is what we expect. And if we seem to experience some negative response, how do we respond to that. We come with some other answers to that. Some other

ways of getting them going along with us. So we... and when during that meeting..., well at times some don't want to prolong discussions, after the meetings I normally go to those councillors who were a bit resistance to either the money allocated to say no you won't realise the benefits now. But in the long term you will realise the benefits. Then we conduct an informal discussion. Yes, there are some contributions, you find them following ... (Interview, FCC5).

The planners described their roles as that of providing information to other stakeholders participating in the projects.

--- And my role really was to provide the necessary information, which would enable the design process to proceed as per the required tenders. --- There is information, which resides with various stakeholders like lands, DTRP, Water Utilities and the service providers. And we as the main client what we did in the project process was that, the consultant would come and listen to these service providers, where there was, - they would provide information specific to their areas of services. As and when they had problems they would come in and we would say this are our consultants, please give them the necessary information because their design is going to impact on your services already on the ground (Interview FCC9).

Another respondent pointed out that:

--, my role was on the questions of the components we were fitting, ...needed maybe liaising with the ministry on how much they can or how far they can go in funding that project (Interview FCC7).

As the respondents note in the quotations given above, the planners see their role in the network as that of providing the necessary information and liaison with different stakeholders to facilitate the processes that take place.

Information and networking activities take place both internally within councils and externally with other agencies and experts. The planners facilitate the creation of relationships. They provide information that brings all the stakeholders to be part of the team's viewpoint regarding the issues and tasks relating to the project. The information and networking activities facilitate the flow of information on decisions and activities to the various stakeholders.

It was observed from the available data that the networks formed for any given project emerge from the existing structures as the project progresses. It is not determined at the

beginning. Additional members may join the network, as their input is required. Some members may drop out of the network when their roles become less important to the project. The quotation below illustrate how the network of participants emerges during the course of the project.

Well, we have structures in place, like the urban development committees and or the district development committees in the districts. That is how you identify the core people. That is why I am saying it starts with everybody getting that information. The role that the different departments play varies in magnitude and is assessed. ---- -

Those whose degree of involvement is low, you will simple show that the project has no conflict with their plans. Those people whom you see a potential conflict of the project with their plans are the ones that form the core or the reference group for the project. But, this is just one of the examples, but I think the most important thing is consultation which is two way (Interview FCC7).

The network formed for a project develops from existing structures and keep changing during the course of the project. The data showed that in forming the networks, the planners create a “sphere of influence” that changes as the projects progress. This enables them to move forward in facilitating the environmental planning processes as they gain more support from different stakeholders.

4.6.1.2.2 Educating (informing) the client

“Client” refers to those people who are getting the services of the planners. The data showed that the process of educating the client is an information dissemination or information giving exercise. Inherent in the exercise is the assumption that environmental projects will be accepted and supported by clients who understand the issues that the project is addressing. There are a number of reasons for educating the clients. First, the clients should understand the activities and resources that are required for the project. They are also educated on how the environmental issues should be part of the development proposals. When talking about what they do in relation to educating the clients, one of the respondents pointed to this effect by saying that:

-- Well, in the council, [we do not handle material things], -- for us, our job ... is to educate people, not really to work with materials ... to show people the way (Interview FCC2).

The clients are also educated on what they should expect from the council when development projects that have some environmental concerns are carried out. Such projects may be from the private sector, government or the council itself. The planners educate the clients about environmental issues to increase the chances of success of the projects. One of the respondents who was preparing information for educating the clients said:

In fact, it is one of the most challenging things to do for a professional. And, this is a very interesting experience that you need to digest that information to the finer components and in a layman's language so that they really get the concept of what you are trying to tell them. And, I have realised through that approach that at the end of the day, the majority of them take it in good faith and they use it (Interview FCC9).

According to this respondent, when the clients are educated, and they understand the situation, they use the information in the way the planners expect them to do. In educating the clients, planners also package information for them. Furthermore, they counsel and guide them to the viewpoint or position that they have taken regarding the issue. For example, one of the respondents when referring to the way they guide and counsel the clients when they educate them, said that:

Yes, we are guiding the committee. We are also counselling the committee, the local representatives. We are counselling them. Showing them the need ----. But, most of them are learning. It is only that learning is a process. It takes time (Interview FCC10).

The data showed that the planners educate the clients through face-to-face talks, meetings, workshops, lectures, pamphlets and campaigns. The quotations given below provide examples of the ways that are used by planners to educate the clients. For example, one of the respondents, talking about a sanitation project that was done by the council, said:

Well we had to use existing channels, like -- SHA group, the department which normally deals with the plot owners, - the low-income plot owners. So we involved their services in trying to convince ... actually physically talking and convincing them, that what is being provided is not only for the good of the council, but the good of everybody. That is how we managed. -- They had to sweet-talk some of them to actually allow them to access their property and ask them to have their consent in writing or signed (Interview FCC9).

In addition, another respondent, talking about how a pamphlet he was preparing was going to assist in educating the clients, pointed out that:

Well the information obviously that I will be accumulating is geared towards enlightening my clients. I want to enlighten my clients .I want to put together the facts. So that whoever, a lay person in waste management at least have an insight of what is happening to the waste that he throws away, you see that (Interview FCC2).

It was noted that the different ways of educating the clients may be used together to complement each other.

4.6.1.2.3 Showcasing or creating a positive image

The data showed that the planners have a perception that council should lead by example. The respondents pointed out that “the eye of the public” (Interview FCC1) is on the projects that councils initiate. The public is using the council as a yardstick to measure good practice.

According to the data analysed, the planners have a perception that if council does not lead by example, then it will be difficult to enforce good environmental practices on the public. For example, if council is going to implement the environmental health policy effectively, then it should also be seen applying the policy in its premises. When the planners engage in the environmental projects in council, they want to display what is regarded as good practice in dealing with environmental issues. This approach to handling council projects indirectly influence people to understand environmental issues in the ways the planners understand them. For instance, talking about a council project, a respondent said:

... it was an easy thing for us to convince those in the authority to say we should be exemplary. And more so, if we give-- if we handle food and then we are found to be not in a clean environment then it means that whatever we are giving out is also not clean., ... eyes can catch a lot of things. And the people will say, but if these people can come to our business and say our businesses are not clean and yet at their slaughter places is not clean, are they telling us the truth (Interview FCC1)?

The respondents pointed out that in order for council to be exemplary, it needs to communicate information about its projects. The information is sometimes requested. It was noted that the planners use a variety of methods to disseminate information about council projects regardless of whether the information is requested or not. Some examples

of these methods include the production of pamphlets, public meetings and tours of project sites with individuals or groups of people.

Showcasing was also identified at the individual level. The respondents strive to maintain a good image of themselves to their superiors. One of the respondents who was working on a project to produce an information booklet pointed out that before the booklet could be made public, it would be taken to those in higher positions of authority. While some editorial work was expected to be done, it was also evident that the respondent wanted to get some recognition and appreciation from the superiors, as well as to showcase to others what is happening in his unit.

The data showed that when they showcase environmental related issues, the planners portray a sense of giving progressive ideas that should be accepted. Sometimes the ideas are given in the local language to impress the clients. Respondent FCC5, when reporting about how he told the community about a project he was doing, pointed out that being able to tell complex concepts to the community in the local language brings a feeling of being admired, accepted and respected. The respondent said that:

you see the elderly looking at you and you are communicating in Setswana. And, they really appreciate that -- at least we have a local person communicating to us about the developments. Yes, that is the other thing that we appreciate that we are locals (Interview FCC5).

To lead by example is also a way to avoid embarrassing situations. This was found to be a factor that motivates the planners to give information to those that need to be influenced. The need to lead by example also affects the working habits of the planners to strive to create a better image for themselves and the council.

4.6.1.2.4 Justification of action

The analysed data showed that justification and supporting of decisions and ideas is an on-going activity that takes place from the commissioning or initiation of a project through to implementation and after the completion of the project during the monitoring stage. The respondents reported that they are continually challenged to justify their proposals and actions by the stakeholders. The justification is normally requested for resource allocation. The respondents cited financial resources as the leading factor motivating the stakeholders to request a justification of a project.

The planners reported that the justification requires that they support the decisions and ideas with facts about the issue. This requires the definition of the activities to be carried out and highlighting to the audience the need for such activities. The data showed that when justifying decisions, the respondents use available technical knowledge and information about the issue along with various tactics to inform the clients in a convincing manner. The justification of a project requires the planners to disseminate information relating to both the theoretical and practical aspects of the issue at hand.

The respondents reported that they usually obtain the information from various reports, reference books and textbooks. Most of the information sources are kept in the offices of the planners and the registry department(s) of council(s). Expert opinions, ideas and practical case examples were reported to form an essential component of the required information. Experts are also used to support the decisions that have been made. The motivation to engage in these information tasks, actions and activities is to make the clients understand the issue - how council intends to handle it, and more importantly its importance in relation to the environmental planning process.

4.6.1.2.5 The use of representative and other influential structures

It was found that another strategy of *influencing others* makes use of representatives to disseminate information to groups. One respondent talking about the use of representatives said:

Then we identified a number of stakeholders, all the primary school, all the schools, institutions, village development committees and other government departments, then we called a meeting for all of them where now we discussed how we can best ensure that our environment is kept clean always. Not only during the month of June, the expectation is that those committees, I mean the representatives from the various institutions and schools must take the message to their respective organisations (Interview FCC3).

In addition, another respondent said:

-- And the stakeholders obviously were taken as representatives of the particular communities, which they were representing (Interview FCC9).

Furthermore, another respondent said that:

Yes, the community. So that from the community as in a village it has this ward development organisation or associations. Those are, they represent the community, so we had a meeting with members of individual wards. The chairpersons of individual wards. We converged at one centre, we told them our mission and we explained to them that the facility which is coming is not for the local authority it is going to serve the entire village and you included (Interview FCC5).

The quotations given above show that the representatives are identified from existing structures such as schools, private organisations, government institutions and political wards.

Underlying the use of representatives is the assumption that, by convincing a member of a group who is influential in that particular group, he or she can thereafter influence other members of the group that he or she represents. The use of representatives ensures that more clients can have contact with somebody who has the information. The quotation given below illustrates this finding, when the respondent pointed out that:

... well so far..., let me say - most of the information that we compile as council employees in general - we compile that information for council and I think it comes from the concept that once you circulate things to council then it is as good as taking that information to the people on the ground. Because the assumption is that once the information is given to the councillors then the community will know about what you are doing (Interview FCC7).

Another structure that the respondents reported to be using when disseminating information is the “Kgotla”. The “Kgotla” is a public meeting place where traditional judicial activities are conducted in Botswana. It also serves as a place where consultations within the community take place. The respondents have exploited this structure and used its “influential power” in communities to disseminate information about environment-related issues.

The information that the planners use to satisfy the motivational requirements is drawn from the project information context and is influenced by the requirements of their roles in the projects. The planners’ motivations cause them to use information in ways that affect the *pattern of information use*. In the next section, I discuss the information context relating to projects that the planners facilitate.

4.6.2 Dynamic project information context

The analysed data showed that the information context of a project is one of the critical factors influencing the way the planners use information. The information context can be either an enabler or a constraint to using information. It may provide opportunities for the planners to access and interact with various information sources relevant to the project. The planners may also be able to verify the information that they use through the information context of the project.

As a constraining factor, the information context may be a source for misinformation. The information context may also make it difficult for pertinent information to be obtained by the planners. One respondent, referring to a constraining effect of the information context, said that:

We check the plans and then go on site because sometimes plans, they might not show an existing development, you see. Then if you don't go on site, you don't realise the architecture is trapping you. Then you go to present. When you are presenting you find there is somebody there who probably knows the area. He ends up contradicting you in the meeting and then that reflects negatively on your side (Interview FCC10).

The above quotation shows the information context as a potential source of misinformation to the planner, and thus, constraining his or her capacity to facilitate the environmental planning process.

The *dynamic project information context* defines the information profile of a project. It can be understood as a changing or dynamic entity, which is continuously adapting itself to the changing information requirements of the environmental planning process. These changes in the information context are determined by changing interests in the project, changing stakeholders and the emergence of new situations that need different information. The quotation given below reflects the dynamic nature of the project information context:

The other thorny issues when you construct projects, when you are doing those projects, most of the time you meet a number of people on the way, even water affairs, they deal with surface water, but we didn't get so much problem from them because of cause they are also interested to get water to the people. The other people are these professionals like Land Board, because we were crossing the real plots which they have allocated people and

people are going to them and all those things. The other people were the roads department because we had to cross parts of the roads which were intact. So, you find that now you have to meet with them and try to find out how you can solve the problem. So, those are the areas (Interview NWDC9).

As the respondent notes, “you meet a number of people along the way”, which means the information context is not static, it changes because the different people bring different types of information to the project. The data showed that the people who participate in a project add an essential dimension to the information profile of a project. It is the contribution of these people through their knowledge and sharing of information that forms a critical aspect of the *dynamic project information context*.

The *dynamic project information context* can be complex and the data showed that it involves a number of attributes that allows those in certain project roles to acquire the relevant information. Information products produced during the project processes also form part of the *dynamic project information context*.

The nature of the information and its availability were found to be important aspects of the *dynamic project information context*. As one respondent notes:

-- what is very important is being able to read and express yourself when you have the right kind of information, especially when it is statistical information that you can back yourself. And if you don't have that kind of information, it is going to be very very difficult. For example, like I was saying we did a little bit of research to find out how many things they don't have as a requisite for such things. So, I find it very easy when you have information on the fingertips (Interview NWDC3).

According to the quotation above, the planner ought to have the right kind of information. This means information may be available but if it is not the “right kind”, it may not be useful. The nature of information was reported to include expert opinions which are inductively derived from the knowledge of similar projects. Opinions of non-experts are also obtained during the course of the projects. The other information is obtained by visual inspections and observations by the planners and other stakeholders.

Information can also be found in the form of consultancy reports. Government reports, policies and standards also form part of the information context. Existing literature sources such as textbooks and the Internet were reported to be essential components of the *dynamic project information context*. However, examples of cases where textbooks and the Internet

were actually used in a project were not found in the data. The respondents just reported that they have used them. The quotations given below highlight the importance of the nature and availability of information during the project processes:

Aamm, - maybe one -- okay though we don't have the statistics readily available. But I think it is important for us to be able to know the number of plots, residential plots that are in Francistown, number of commercial plots that are in Francistown, and the rate of growth per year or so. So that we can be able to do our projection in an organised manner (Interview FCC3).

Another respondent said:

In some areas we have got some placards, the ministry of health, normally produces them, I look at them. They will have a chart I don't have them here now ---, which shows the accumulation of tyres and then I would be interested in the information and of course the picture itself, while I can take a picture here, I can also refer to that. (Interview FCC2).

In addition, another one said:

We get information from the department of surveys, which comes in the form of cadastral information (Interview FCC10).

The information presentation takes the form of text, drawings, statistics, graphs, lists, charts and maps. Three elements were identified as the main components of the *dynamic project information context*. These are:

- People as sources of information
- Access context
- The information sources and the communication context.

According to the analysed data, the contribution of each factor may vary from one project to the other.

4.6.2.1 People as sources of information

People (experts, the community and other stakeholders) form an essential component of the *dynamic project information context*. Reporting on the importance of people in relation to the information context, one of the respondents said:

-- so we have a forum and at the forum we meet and you find that people from the private sector also come, NGO, government and community they come together and then try to help in deferent ways and we try to discuss the issue, and is one of getting to know about the issue, its an information sharing process. We work closely with NGOs and like IUCN. These are people with a focus on conservation - But we use them as a source of information when we need information. So, this is how we operate. So we usually work hand in hand with different people and that way it helps with the information sharing (Interview NWDC2).

Another respondent, also reporting about the way she uses people as sources of information, said that:

With me, when there is a problem I try to involve other people that I work with before I approach those that the problem is facing. This is my endeavour to get their opinions here and there. The thing is you will come up with an idea and the others will help in its development, (Interview NWDC4).

The planners reported that experts are valuable sources of information. They provide expert ideas, views and opinions. They are also a source of inspiration. For instance, one respondent pointed out that:

... Then like I am saying you will find that I am not an expert and usually I have to run around and try to consult the environmental experts. But usually when it comes to such an issue, usually let say they will come up with the plans, and I will have to consult. Like those in the physical planning just to put me into the picture that this is right. So that when I take a decision, even if I am not an expert on that I have to convince the people for instance why are we saying a septic tank is not good at a certain place (Interview NWDC2).

The experts are involved in different ways. The data showed that the experts may provide information as resource persons, or facilitators, by providing information in meetings, workshop and during discussions. The experts are regarded as the custodians of good quality information and their involvement adds quality to the output. The quotations given below illustrate the value attached to information obtained from experts. For example, one respondent reported that:

When I encounter an issue which is not familiar to my day to day experience, obviously in that case I would make reference to those I perceive know something about that issue. - I refer it - I would ask questions - I would enquire. ... You consult with

others - others - maybe the stakeholder, or other people whom you feel they may have the information that you need. You contact them - I think it is information of good quality that we have received so far with regards to the environment. When we were preparing our development plans, we were assisted or given some kind of information regarding the environment. I thought that was useful and information of good quality (Interview NWDC1).

When talking about seeking assistance from the experts, another respondent pointed out that:

Yes, or by literally going to their offices and they cooperate. Again, this other guys of the of Harry Oppenheimer- These ones of the University of Botswana- like that document over there of tourism (pointing at a document in the office), that is the Okavango Delta management plan, we wanted to make an integrated management plan. So, they helped us come up with a document - -- that when we want to make a district tourism plan for instance, how can we go about it. What kind of consultancy can we use for instance, so normally they are very helpful- you see - so, they are other sources of information.

--- Yes, we can just call them ourselves and at times, they call us themselves. These are some of the people who are very helpful especially when we are dealing with issues that we do not understand what to do (Interview NWDC2).

Experts are regarded as valuable sources of information and the planners seek their assistance when they are addressing environmental issues in projects. The planners also strive to create long-term relationships with the experts who are found in environmental institutions throughout the country. However, despite the importance of the experts in the work of the planners, their numbers are limited and this can be a constraining factor of the information context of a project.

The community and other individual stakeholders also form a valuable component of the information context. Reporting on how he obtained information about an environmental problem in an area under his jurisdiction, one respondent said that:

Oh, the people, it is the community actually, the people from the public, they actually brought that to our attention. ... My immediate reaction was actually first to go and see those areas. Then after that I had to call a meeting, for all the stakeholders. That is why I say I included the Land Board, I managed to agree with them, we went to see the site after that we agreed on what measures to take. One of those as I said is the identification of particular zones whereby you can exercise control (Interview NWDC7).

In the quotation given above, the respondent reports that the community members can be valuable sources of information as well. The community and other stakeholders normally provide information in the form of ideas or views. This information is normally solicited in public meetings or meetings with those stakeholders.

4.6.2.2 The access context

It was found that the respondents get access to information in relation to the roles that they are performing in the projects. Access may also be determined by the effort of the individual in their roles.

I coded the data relating to access to information with the view that access can be understood in two dimensions, namely, the physical and the cognitive (or mental) dimensions. Physical access refers to information being physically located in a certain place and can be retrieved in preparation for usage. The cognitive access to information refers to whether the information is amenable to being manipulated and applied to a situation by the planner. The analysed data showed that both these facets of accessing information influence the manner in which the planners exploit the information context as well as using information in the context of their roles.

Planners formulate ways of improving both the cognitive and physical accessibility of information in the projects. For instance, talking about information that is difficult for the planner to understand, one respondent said that:

Yes, it is like some of these things get so technical - you see. But you are suppose to make a decision - but at times you find that you just make those decisions without understanding. And you are actual inviting trouble for yourself. But you have to do it anywhere with that feeling or wish that somebody else could be doing it and answerable to that because you rely on their information. Because you will just be relying on their information not that you really understand the problem. These are the kind of situations that we sometimes find ourselves in. The thing is I rely on other people's opinion, and you can even see yourself that you are not really up to the mark in understanding the issue. With the community, you try to reduce yourself to their level so that they can understand. Whilst when you are dealing with the private sector you find that they are better informed than you are and when you try to present a case which - in which your understanding is not that much, they can spot it easily. So, normally in cases like that we try to get other departments so that we present jointly, especially when it comes to technical issues so that the expert can try to explain and assist with specifics. Here, because you find that the people you are dealing with are better

informed, sometimes even more informed than you (Interview NWDC2).

As noted in the quotation above, when dealing with technical issues that are above the comprehension of the respondents, the strategy that planners use to deal with such situations is to work jointly with the experts rather than acquiring the information and using it alone. In that way, planners are able to maximise the cognitive access to the necessary information.

The physical access to information depends on the way the information sources are organised. Good organisation of information improves the physical access to information because the information sources will be easily retrieved. The respondents pointed out that they actually need access to different information sources to accomplish their tasks and it is the accessibility of these various sources that influences the information that is going to be used by the planners. The information sources that are used by the planners will be discussed in the next section.

4.6.2.3 The information sources and the communication context

The analysed data showed that the respondents interact with a variety of *information sources* and use different *communication channels* to transmit as well as receive information.

4.6.2.3.1 The communication context

The data for the present study showed that there are a variety of communication channels that are used to transfer information. For instance, when referring to the channels of communication, one respondent said that:

The information flow, like the information that you get in the offices, the information is there but there isn't any single channel, which can lead you to what information you want, (Interview NWDC7).

This means the planners may not depend on a single communication channel for information. They have to select the communication channel that is suitable for the situation that they are dealing with. The communication channels may either enable or constrain the flow of information. They determine the way information is transferred to those who need it. Reporting on how information is transferred between the planners and the experts, a respondent pointed out that:

We can write letters to each other, we can send email or we arrange meetings, sometimes workshops and we can meet and then discuss issues. Sometimes we meet on a one to one base. But, already we have established friendship with most of the NGOs around, so whenever we want to talk about something we can just call them over or go to their office to discuss. Or if you want their input on something, we inform them in advance and then arrange a meeting to discuss the issue (Interview NWDC2).

Another respondent, emphasising the way communication takes place when they have a project, said that:

So, in actual fact, we use information ... too much of contacts, and maybe phoning, faxing. We haven't used very much of the Internet here, because we requested to have it but it was a little bit difficult due to some inconsistencies in the council, so we rely very much in telephones, we rely very much in letters and fax. So you find that to get an information, sometimes you get the person, sometimes you don't get and sometimes when you send something maybe he will neglect it, take action, but that is how we collect a number of this data and after collecting the data then we start working on them (Interview NWDC9).

Reporting on some of problems that they sometimes face when they require information, the respondent further said:

Maybe they will tell it is not here or they will tell you that the information we have, haven't been printed, we will be sending to you or our fax is not working, so there are a number of things given as reasons behind (Interview NWDC9).

The above quotations show that communication forms part of all the tasks and activities of the planners. The methods of communication that are mainly used by the planners are *written communication* and *oral communication*. According to the analysed data, these methods of communication may complement each other. For instance, one respondent reporting on giving a handout to people after a meeting, said:

Well if it is something, which you think they might need a kind of a paper to refer to or to look at after the discussion, you sit down and put in the points that you want to discuss with them. Then at the end of the day, you send them off with some form of handout, either in Setswana or in English. Then to them, again it is a kind of a reference. Yes, that is another way of preparing for such thing. We prepare some notes for handouts (Interview FCC5).

The handout that was given in that particular instance was to complement the oral communication.

The data showed that during the course of the projects the planners are involved in both internal and external communication. Internal communication takes place from the top down as well as from the bottom up. There is also horizontal communication that takes place between departments as well as between peers. The external communication takes place between planners and various environmental institutions and organisations, government agencies, individual stakeholders and the public.

Table 4.1 below outlines the types of communication channels that were used by the respondents:

Communication method	Initiator of the communication process	Purpose(s) of the communication
1. Oral communication		
a) Meetings	Standing arrangements at regular intervals	Presentation of reports Open discussions
b) Face-to-face conversations	Participants	Exchange ideas Brainstorming on an idea
c) Training	External	Participants have worked as resource persons on some topics of specialty: e.g., Environmental Health Participants also attend training just as participants or learners
d) Telephone calls	Participants	Brief communication such as reminders, arrangement of meetings or brief verbal report on projects
e) Presentations		Provide information to a targeted audience
2. Written communication		
a) Reports	Standing arrangement	Reports are meant to communicate information on the activities of council. Progress of projects and recommendations on proposals. The report is the major information source/product that is being used. Reports are produced for meetings. Some are produced on a monthly basis. Report production may be a long
• Informational reports		
• Project monitoring		
• Recommendations		

		process that involves consultations and meetings.
		The respondents monitor progress of projects. This includes routine analysis of both quantitative and qualitative data for reporting purposes.
b) Handouts	Participants	Complement oral communication
c) Letters and memos	Participants	Communicate information to stakeholders. Memos are limited to internal communications such as announcing meetings, communicating agendas.
d) Proposals	Developers	Communicate information on the projects
e) Tender documents	Council committees	Provide specification for a project and spell out terms of reference for doing the project.

Table 4.1: Communication channels used

** Participant(s) here refer(s) to those involved in a project in different capacities.

4.6.2.3.2 Information sources used by the planners

This study found that a variety of information sources form part of the information context of a project. Books are used as a source of literature for theoretical perspectives relating to environmental issues. They enlighten the planners on the proper ways of dealing with these issues. The types of books the respondents reported to have consulted include reference books and textbooks. However, there were no specific cases from available data where I could trace how the information from the books was actually used in a project. There was evidence on the availability of books in the offices of the planners and some planners indicated that they read them. The interpretation that was made was that the books are used for orienting the planners to issues, as well as adding to the stock of knowledge that the planners have on environmental issues.

Other information sources that are used and provide information on how to deal with environment-related issues are the physical planning manual, urban development standards, and the country planning and development control code. Some of the information sources such as the legislative acts and policies are used on a regular basis and are kept on the desks

of most of the planners. Information is also obtained from memos and written as well as verbal reports that are normally presented in meetings.

The respondents reported that they prefer to use the Internet as source of the latest information about environmental issues. There are also placards that are produced in specialised fields dealing with environmental issues. Other sources of information used are maps. Proposals that are submitted by developers are also used as sources of information.

Table 4.2 below provides a list of the *information sources* used by the respondents.

Information source	Remarks
a) Government Publications <ul style="list-style-type: none"> • Policies and Acts • Government directives • Manuals, codes and standards • Development plans • Placards 	Provide the global framework for the operations of the respondents in projects. Manuals and codes provide the specification used by the participants in their tasks.
b) Project proposals	Provide the basis for the participants to make a recommendation on a development project.
c) Maps	Provide geographical location information for projects.
d) Internet	Used as a source for current information as well as seeing what is done elsewhere regarding the issue that the participants are handling.
e) People as sources of information <ul style="list-style-type: none"> • Experts • Communities 	Give expert advise and also educate the participants.
f) Individuals' knowledge and experience	A source for background information relating to issues, tasks and activities.
g) Internal reports, minutes, memos	Source of information for council decisions, tasks, activities and plans.
h) Project sites	Through visits of project site, and tours the participants collect information. Tours provide a learning opportunity for the participants.
i) Textbooks and reference books	The sources of literature relating to environmental issues. They are used for " <i>orienting oneself</i> " to the issue or as a source of information adding to the stock of knowledge of the planners.

Table 4.2: Information sources used by the respondents

4.6.3 The role context

The role of the planners in the projects determines a set of operations that they have to execute. Relevant information which involves documents, people, project schedules, correspondences, rules, procedures, and various communication tools that the planners use

depend on the role of the planner and the context in which he or she performs those roles. The roles of the planners can be characterised by a variety of contexts, including political and economic contexts as examples. For example, a planner who was involved in a project that was addressing environmental health issues in the small business sector, pointed out that:

When I started, I prepared myself because I knew they were going to question. Also I expected the issue to turn political because I know my work involves politics, because we deal with people, we are providing a service to people out in the public of which some find it difficult to understand issues. For instance if you talk about a plot and its use, they do not understand because they are obsessed with making money only. They do not care what you tell them. Because I anticipated some questions, we tried to come up with solutions, at least on what we will tell them about where they are going to move. And, because we have an open space that they can use, we anticipated that they may reject that based of some reasons that they will give. But, when you deal with people there is need to exercise some caution and care, one may not just tell them to go. So, we tried to prepare ourselves so that even when they come we will know how to tackle their concerns or complaints.

I gathered the information though getting opinions from other departments like physical planning. We met and worked together – because they are the ones who are dealing with plans for XXX [name withheld for anonymity]. But, the problem emanated from the fact that, as of 2000, XXX started to develop fast to the extent that even the planners were like overwhelmed, they were not expecting it. I am not sure whether it is because it is a tourism area and when people come here from outside, they end up developing interest to make a business here. Even our special dealers, now they are three hundred and twenty six. --- Special dealers' licenses open for citizens and non-citizens such as the -- shops, -- and the like, these multinational shops.

-- However, even before we wrote them letters to say they should move, we tried first by talking to them, holding meetings and telling them. But, they also raised their own ideas and opinions, consequently the meeting were very long taking up to around two hours. -- - (Interview, NWDC3)

The context in which the role is performed determines the kind of information that the planner selects to accomplish his or her goal. It also determines how the planner should handle the information. In the quotation given above, a context of the role that can be identified includes tasks that require the planner to answer questions which are motivated by political and economic contexts of the people involved. Such contexts determine the kind of preparations that the planner does in terms of acquiring and using information.

The context of a role (*role context*) is determined by a variety of factors. These may include the people that the role player interacts with, the value of the project to the people and the purpose for playing that particular role in the project.

The data showed that the value that the planner gives to any “piece of information” can be understood in relation to the *role context*. The planners recognise and appreciate the value of the information within their roles. The effort expounded towards information is related to the roles. For instance, *role context* may predispose the planner towards a certain type of information and the tasks, actions and activities that have to be performed.

4.6.4 Experiential knowledge

The data for the present study showed that the *experiential knowledge* of the individual forms an essential part of the factors contributing to the way information is used. *Experiential knowledge* is derived from the previous participation in projects and visits to other project sites to observe how the environmental issue is dealt with elsewhere. Other encounters with environmental issues over time add to the stock of *experiential knowledge*. This knowledge, although it had been referred to as information by the respondents, does not form part of the information profile of the projects *per se*. It depends on the experience of the individual planners. Referring to the importance of experience in their work situations, one of the respondents said that:

You see I think my confidence, like I said before, may be it comes from long experience. I have been in this job for the last twenty years. I have been in very different parts - I have worked as a consultant - I have worked with consultancy firms - I have worked with central government - I have worked with local authorities. So, the interaction of different people, different organisations, interaction with the community - it gives you the confidence to deal with many situations. Because I have the knowledge of trying to approach, different issues on different – because like you are saying it was not my first time to encounter that kind of problem. So, I - it is like I have a storage somewhere, that say like this situation you can apply this concept, this problem you can apply this approach. I think so (Interview NWDC7).

Other forms of acquiring knowledge arise from the daily routine information-related habits of the respondents. This way of acquiring knowledge develops the understanding of environment-related issues in general. These include keeping up to date with developments

through general reading. Such reading may be habitual, as pointed out by some of the respondents:

Well I read quite a lot. Sometimes I open the internet to see what is happening in other countries. I read - I have that interest to see what is happening about the climate change, just what is actual the source of this dramatic change that we are experiencing, droughts and all those sorts of things because they are linked to our activities (Interview PSSDC5).

Generally, we do not get the information we only know it by listening to the radios or reading papers (Interview PSSDC1).

Most of the time I was brainstorming only. To read, as a person who loves reading, sometimes I was reading. For example, reports from other councils who experienced this situation before us. I was also following literatures in the media to know what the business community is saying, including the officers and seeing who is seen to be on the wrong normally. In general, I could say, experience from other councils was essential and helped me a lot, assessing different approaches and then selecting the more appropriate one for my situation. (Interview NWDC4).

The data also showed that information that adds to the knowledge of the planners can be serendipitously found or encountered. Talking about how she learnt about some issues in a project, one respondent pointed out that:

Somehow, I am just getting this education from my colleagues. Like at times when we are discussing some of these things, somebody will say something you don't know. And, sometimes you read some of the books (Interview NWDC12).

In this case the respondent find out about the issues in a discussion that was not actually aimed at providing the information to her. However, the information turned out to be important to her.

The *experiential knowledge* influences the performance of the planners in the ways they select and handle information tasks and actions in the projects. The analysed data showed that the planners put a lot of value on their experiences when they are addressing environmental issues in projects.

4.6.5 *Pattern of information use*

The planners' information tasks, actions and activities that are determined by the various categories that I have discussed in this chapter can be understood in relation to a *pattern of information use* that is exhibited by the planners when they are addressing environmental issues.

The analysis of the data for this study showed that the *dynamic project information context*, *role context*, *experiential knowledge* and the motivations (*motivators*) of the planners are characterised by an array of tasks, actions and activities that define a *pattern of information use*. For instance when preparing a speech, one respondent reported that:

Yes---, you just visit some of the websites on the Internet regarding the topic. You look at the program, your future plans, what you have done before and bring it together and then come up with a speech (Interview FCC4).

This means the information is being pulled together from various resources to make the speech.

Another respondent, talking about processing information, said:

That is right, collect the information, package it up and then sends it to - the intention will be to pass it through to boss. - ---- I open books read and make notes. I go to Internet I make copies, I copy and I read, edit everything, and then on my diskette fit up the material (Interview FCC2).

On a regular basis, information from the monitoring activities of council is processed for reporting in meetings. Some of the ways in which the information is processed include the manipulation of the data to produce meaningful results, For instance, talking about processing data from the monitoring activities, one of the respondents said:

Yes, and then obviously they are other things which needs to come up in the report besides the data. The data give me say the figures that then I have to manipulate, transform into graphs, and interpret graphs and things like that. Then as for the management of the site, there are other things. Normally I say I have got a department in the landfill, the incineration, I have to know what is happening on the incineration, anything that goes wrong, any maintenance, you know and things like that. I need to reflect in the report - I mean - I have the working phase where the bulk of

the material goes to, you see. The progress there, I need to give in the report. So, besides the data, all the graphing and stuff like that, there is the general administration of the site (Interview FCC2).

The information products that were produced when the respondents performed the information tasks, actions and activities were identified. It was found that the main information products that were produced by the respondents are written reports that normally form the basis for discussions in meetings. According to one respondent, a written report is important for helping to make effective presentations. It was also reported that the planners sometimes give verbal reports.

Reports are a product of a collective effort. One thing that came out clearly in the data is that the respondents shared the responsibility of producing the information products as a unit or department. This was clearly demonstrated by the fact that whenever a reference was made to a report, the respondents ascribed the responsibility for the report to a team. Other information products that were reported to be produced by the planners are tender documents, speeches, memorandum of agreements and information booklets.

The data for the present study showed that *the dynamic project information context, the role context, motivational factors* and the *experiential knowledge* individually or jointly influence the information tasks, actions and activities of the respondents. These tasks, actions and activities form a *pattern of information use* characterised by ways of:

- *Packaging information*
- *Acquiring and verifying information*
- *Giving information.*

4.6.5.1 Packaging information

The purpose of *packaging information* is to put information together into a more meaningful and understandable information product for an audience. The analysed data showed that *packaging information* can take place at either the content level of the information or just the information source level. In relation to packaging information, the individual may:

-- in that process --- [I will be] -- bringing information relating to finance, information relating to what areas to be covered, information relating to which people would be served and all that [is] collected --- and put together -- (Interview FCC9).

Packaging information may also involve extracting, collating and summarising information to suit the target audience. Information may also be translated into the local languages such as Setswana. While collating, extracting and summarising information was done for different audiences including the public, councillors and students in some cases, it was most prevalent when the respondents were preparing reports for submission to council committees.

Translations were done for the public and the information was given verbally or in the form of handouts. According to the respondents, translation is an effective way of delivering project information to the public. For instance, talking about his experience when delivering information about a project to the public, a respondent pointed out that:

-- And, you are communicating in Setswana and they really appreciate that -- at least we have a local person communicating to us about the developments. Yes, that is the other thing that we appreciate that we are locals (Interview FCC5).

The purpose of the translation was to ensure that the public clearly understands the issue that was discussed.

In relation to the information sources, when *packaging information*, the respondents reported that they retrieve the information sources and make copies for the clients. According to the analysis, *packaging information* in this way is done for professionals or experts. For instance, talking about *packaging information* for a consultant, a respondent said that:

Yes, what we could do is, like it happens in the case of Francistown, most of the information is in is in hard copies. Retrievable information is in hard copies apart from the one in soft copies. So, what we would do is retrieve those reports, for example drawings and make the hard copies or copies of the same and just give them as they are. Because really we didn't process that information in other form, we simply, if he wants the layout plan we show him a particular layout. If the one they want is a particular report we simple reproduce it and give it to them (Interview FCC9).

The quotation above is an example of *packaging information* where the respondent was concerned with getting the right information source to the consultant.

4.6.5.2 Acquiring and verifying information

The planners use different methods to collect and gather the information that they put to use. Table 4.3 below provides information on the methods that the respondents used to collect and gather information

Method of gathering information	Remarks
a) Inspection and visits to project sites	The participants do inspection of sites or visits to collect information to support decisions as well as get monitoring data. Also used for gathering information to verify information given to the participants by clients (information from outside council).
b) Questionnaires	Used to gather information relating to the views of the clients regarding a decision made by the participants in council.
c) Retrieving previous reports, maps and other documents within council and other government departments.	Used to gather information for consultants. Also useful when producing reports in the council. The gathered information is also used for the verification of incoming information.
d) Talking to people	Gathering information through discussions with colleagues or stakeholders.
e) Tours	Used to gather information to learn from other successful projects that are related to the project that is being done.
f) Studies	Usually done by consultants under the supervision and guidance of the planners. Provide scientific or technical information on the best alternatives to dealing with the issues.
g) Consulting experts or colleagues	Experts provide information in the form of reports. They can give information in the form of lectures and formal or informal discussions. Information can also be given in the form of advice and recommendations.
h) Consulting reference books – reading literature	Used for gathering information for the enlightenment of the participants about issues.
i) Searching the internet	Reported to have been used sparingly to gather information relating to current developments in the issues as well finding out how an issue was dealt with elsewhere.
j) Information requests	Data shows that the participants make some requests to be provided with information by other stakeholders.

Table 4.3: Methods of collecting information

It was noted that the different ways of gathering information may be used to complement each other.

The planners normally acquire and verify information before using it. As one of the respondents pointed out, the only time that he “refers to information as information” is after verification and establishing the source. The respondent said that:

Information can be obtained from many areas as you say, but, for instance the information that pertains to our work, if you are not careful you may find that you have received wrong information, so normally when I get the information, I do not take it as information until I know the source (Interview NWDC5).

One way of verifying information is to go to the field to check whether the information given corresponds with what is on the ground. In that way, the respondents compare the information they have with what is being observed on the ground at the project site.

The verification of information is motivated by different factors. One of the factors relates to the quality of information that is received. In this case, the planners are looking at whether the information that is given is correct. If the information is from a client or a developer in an application or proposal, the planners verify the information by checking it against the existing records. The planners also collect information on the site to enable them to check the accuracy and completeness of the information that they normally get from the clients.

A second motivation to verify information is the need to avoid embarrassment when people later on challenge the presentation based on what they have experienced on the ground that may be different from what the planner is presenting. A third reason for verifying information emanates from the fact that when dealing with information provided by the clients, the respondents seem to be sceptical of being misinformed. They reported that there is rampant misinformation in environmental planning. In fact, one respondent has expressed fear of being trapped by the clients who can deliberately give wrong information to the planners.

4.6.5.3 Giving information

The data suggest that there is a complex flow of information, both inside and outside councils. The respondents portray their role as that of giving information in the form of advice or recommendation. One of the respondents, describing his role in a project in relation to giving information, said:

-- My role really was to provide the necessary information, which would enable the design process to proceed as per the required tenders (Interview FCC9).

Within the councils, the information may come from a junior officer to a senior office (bottom up). The information that flows in this direction is on the operational aspects of projects. The data also showed that the subordinates give their ideas in the form of recommendations to the supervisors. A second dimension is the “top-down” flow of information in which the senior officers give information to their subordinates. The information that normally goes in this direction involves decisions that come from the committees. Any other information that the officers receive by virtue of their positions in the councils can also be shared with the subordinate staff when necessary. A third dimension is the lateral or horizontal dimension, which involves giving and receiving information from peers.

Planners also give information to people who are outside the council. These include the public and other agencies that have interests in the environmental issues that are addressed by the councils.

In this section, I discussed the ways in which the planners package information, acquire and verify information as well as give information to other people. These factors define a *pattern of information use* for the planners. The *pattern of information use* as discussed in this section forms the central or core category of the Grounded Theory of the use of information for environmental planning discovered in the present study. The *pattern of information use* generates the main power base of the planners in environmental planning.

4.6.6 Informational power

The informational tasks, actions and activities resulting from being involved in projects empower the planners to handle the environmental issues of the projects effectively. It was found that the main power base of the planners is based on information, and comes from the intensive interaction with information in their roles. The power base manifests itself in the *authority, confidence and support gained* from other stakeholders and institutions to pursue the environmental goals of the projects. It enhances the way the planners facilitate the processes of dealing with environmental issues in projects. This power base is referred to as

the *informational power* in the current study. The quotation given below illustrates the informational nature of the power base of the respondents:

Yes, because it will be part of the tourism project. You should make sure that those things have been included and they have been covered. Then like I am saying you will find that I am not an expert, and, usually I have to run around and try to consult the environmental experts - But usually when it comes to such an issue, usually let say they will come up with the plans. And I will have to consult like those in the physical planning just to put me into the picture that this is right. So that when I take a decision, even if I am not an expert on that I have to convince the people, for instance why are we saying a septic tank is not good at a certain place. I should be able to give reasons why that is not possible and should have supportive evidence so that even myself I can point out that I have consulted with environmental health people and this is their recommendation. That is how we get to do those things. But still, it has to be okay, it is part of it that even us who are not experts should be able to talk about the issue. Hence, we have to give the information from others and being in a position to support it. -- Yes, it is like some of these things get so technical - you see - but you are suppose to make a decision. - But, at times you find that you just make those decisions without understanding and you are actual inviting trouble for yourself, but you have to do it anywhere with that feeling or wish that somebody else could be doing it and answerable to that. - Because you rely on their information - because you will just be relying on their information not that you really understand the problem. These are the kind of situations that we sometimes find ourselves in. The thing is I rely on other people's opinion, and you can even see yourself that you are not really up to the mark in understanding the issue (Interview NWDC2).

The *informational power* is derived from the information tasks, actions and activities that characterise the work of the planners in projects. For instance, one respondent said:

What I do is.. - I talk during meeting, which is one of the most common interaction forums. If for example, they want some clarification about specific issues, based on my experience or based on whatever research I have done relating to that particular issue, I explain to them and put them in the picture. - In the real perspective of what the issue at stake- what is involved and then you give them the various options and tell them if you go this route, these are the implications, if you take this option, this are the implications. Then I leave it to them to make decisions. Then tell them obviously if you make this decision, these will be the side effects or these will be the Because unfortunately as managers we don't give the councillors the direction which to take. It is like they have superfluous powers whereby you just simple present your case and they make decisions. It is not like you go and stand on decisions and you go with it. You give them and they make the decisions, (Interview FCC9).

As can be noted from the above quotation, the planners present information that is intended to convey the preferred alternative of environmental issues in the projects.

The data showed that, although legislations empower the planners to deal with environmental issues in certain ways, the planners do not prefer to use it. Rather, the planners derive their power from the competence they gain from using available information. Talking about the approach to problems which involve the community, a respondent said that:

You need to talk to people, holding a meeting to involve them in a problem that you have is very important in your success in you work rather than just telling yourself that the law is there, --. But, despite the law, as a -- person you need to advise people first before invoking law sections, that makes the job much easier (Interview NWDC4)

Such an approach as illustrated by the quotation above shows the non-preference for using legislative acts or policies to enforce environmental decisions.

When the planners continually interact with the informational resources, they gain confidence and take ownership of the problems that they are handling. For instance, one of the respondents pointed out that:

Basically, we a prepare to a level where you could not only understand but also participate, have an input in the discussion, contribute to whatever it is, workshop or seminar by bringing in additional ideas or information. - Yes, when you are fully prepared obviously there is no other feeling that you could have except that you are feeling confident (Interview NWDC1).

In addition, another one said:

When I collected information from different sources, from there I tried to own and tailor the information and now present in light of my situation, (Interview NWDC4).

It can be noted from the above quotations that an important outcome of the informational tasks, actions and activities is to gain support from the other stakeholders and the institution as well as gain confidence to deal with a situation.

The *informational power* drives the process of participation in the project. In the next section, I discuss the *strategy for participation* that the planners use to facilitate the environmental planning process.

4.6.7 Strategy for participation in a project

The data for the present study shows that an essential factor when addressing environmental issues is the meaningful participation of the stakeholders. It is critical that the planners develop a sound strategy for the participation of the stakeholders in a project. The strategy that the planners use to get people to participate, and how they participate in the project, determine the outcome of the environmental planning process.

The planners use various strategies including meetings, workshops and seminars to involve various people and agencies in the environmental planning process. Through the *strategy for participation*, the environmental issues are assessed and this may lead to decisions being taken about the issues. The planners facilitate the processes that lead to the outcome of the environmental planning process. For example, the data showed that the planners prepare the agenda for meetings. They present different cases to the committees. In the event where there is not enough information, the planners seek the information and provide it to the participants.

Although it was found that the *informational power* is the main power base of the planners that drives the strategy that will ensure the fruitful participation of the stakeholders, there are cases where force was used to implement decisions related to environmental issues. In the next section, I will discuss the influence of this force on the *strategy for participation*.

4.7 Situated power

The data showed that sometimes the planners use punitive measures to direct the environmental planning process. The power base for applying punishments is derived from policies and legislative acts which give the planner the authority to take certain actions to enforce environmental decisions. The data showed that this is a form of coercion and I called this coercive force *situated power*. This power base is always available to the planners, but in a dormant form. The planners use the *situated power* when the information-based means of facilitating the environmental process fails. *Situated power* has no other

correlation with the information activities. This power base was named “*situated power*” because it is situated within the role regardless of the individual who is playing the role.

The analysed data showed that the planners as council workers extend their office roles to the projects and that gives them the legitimate right to exert influence in the projects. For instance, one of the respondents, when talking about his role in the project, said:

You see normally when we make reference groups for the consultancy, --. I think I was basically playing --- it was the role of my office. I was representing my office (Interview FCC7).

The *situated power* may influence the development of a *strategy for participation*. In such cases, the respondents may work with the law enforcement officers including the police. For instance talking about punishing those who do not abide by the law, one respondent said:

That means if you keep on talking and people do not hear - they will continue to relax as if nothing has happened. But, if you can have three or four or five examples, then people will see that the government is serious. We need to strengthen our enforcement capacity or to improve on enforcement. Like last time, in consultation with the police officers we had a meeting with the three police stations in Francistown. Then we agreed on a campaign where police officers were put in strategic places in Francistown in plain clothes. Then we were able to catch people littering and they were taken to the police station. Most of them paid admission of guilt ... okay it was fifty Pula (Interview FCC3).

Drawing from the *situated power* base, the planners may also tactically create conditions that put social pressure on the clients who may be having a different view. In such a situation, those who hold the same view as the planners are encouraged to denounce the opinions and intentions of those with differing viewpoints. In expressing such a view respondent FCC5 pointed out that:

Yes, you see the tactics that we normally use is that of experience, that in such a such a place there was an issue like this, is how it was handled and even if you can handle it the same it was handle that way. Those are some of the tactics that we normally use. Like when I said, well, if you want to maintain your farms the project will not come here. It will go elsewhere, it will go elsewhere. Then among themselves the had to say no no, let us give way for the project, something like that, so those are some of the tactics we try to use (Interview FCC5).

4.8 Summary

To summarise, it was found that when planners address environmental issues in projects, they conceptualise information in four different ways, including content, physical form or source, knowledge and idea conceptualisations. Within these conceptualisations, seven main categories were identified as primary in describing and explaining the use of information in environmental planning. These categories are *motivators*, *dynamic project information context*, *role context*, and *experiential knowledge* which independently or jointly influence the information task, actions and activities that determine the *pattern of information use* of the planners. The outcome of this *pattern of information use* is an *informational power* base that allows the planners to develop a *strategy for participation* in the environmental planning process. The *strategy for participation* provides feedback on the tasks, actions and activities defining the *pattern of information use*.

The empirical research procedures for the present study produced a Grounded Theory of the use of information by the planners. Such a theory may be interpreted in a variety of ways and may provide different meanings depending on how one interprets it. In the next chapter, I present an interpretation of the Grounded Theory developed in this study. I use the theory to understand the use of information in terms of power relations in the environmental planning process.

Chapter 5: Interpretation of the grounded Theory

5.1 Introduction

This chapter provides an interpretation of the findings of the present study. I attempt to make sense of the Grounded Theory that was discovered and presented in Chapter Four. Power relations arising in the environmental planning processes are considered as critical factors that affect the way in which the planners use information. As we have seen in the previous chapter, the planners engage in information tasks, actions and activities that generate the *informational power*, which is the dominant power base for them, and it drives the *strategy for participation* in the environmental planning process. In this chapter, I thus take a “power perspective” to interpret the Grounded Theory, also making reference to the literature that either confirms or contradicts the sense that I make from the categories in the theory.

I start by acknowledging that there may be different ways in which an interpretation can be done, because there is no single method of doing an interpretation; furthermore, there are no rules that must be followed and “there is no such thing as one correct interpretation” (Introna, 1997: 145). A theory can be interpreted from different perspectives and thus produce different outcomes. However, different interpretations can increase the explanatory power of a theory as they may lead to further refinements and a better understanding of the theory for those who will use it in the future (Probst *et al.*, 1998).

This chapter thus marks the beginning of the interpretation of the Grounded Theory discovered in this study. The interpretation I present here is the sense that I make of the theory and can only be understood as such. The reader is free to make his or her own interpretation provided it is guided by the basic elements that are presented in the theory. It is my hope that such interpretations will add value to the theory.

Notwithstanding the variations that can arise from various interpretations, it is critical that one documents fully, how he or she does the interpretation. This includes bringing the assumptions that are made to the foreground so that they are clear to the reader. I begin the interpretation by restating the Grounded Theory in a way that I understand the categories.

This will be followed by a discussion of power, focusing on how it has been conceptualised in information systems research. From this discussion a view of power that is considered to be appropriate to interpret the Grounded Theory is selected. Lastly, I present an interpretation of each category of the Grounded Theory to show how the use of information by planners can be explained in terms of power relations among the environmental planning stakeholders.

5.2 The theory of the use of information in environmental planning

The theory developed in the present study posits that the use of information in environmental planning can be explained by means of seven main categories with various relationships. These categories, listed below, were derived and validated using field data, which means that there is empirical evidence supporting their existence in the processes of environmental planning. These categories are:

- The *dynamic project information context* comprises the following three elements which define the nature and availability of information to the planners, viz: *people*; *access context*; and *information sources and communication contexts*.
- The *role context* is characterised by the demands placed on the planner by virtue of his or her roles and the resultant need for information that will enable him or her to move forward and accomplish the goals of the environmental planning process. The *role context* can thus be explained by the *value of information* to the planner in meeting the demands of his or her roles.
- The category *motivators* refers to the internal motivations that drive the planners to do something about situations arising in the environmental planning process. This factor is defined by two elements, which include the need to *orienting oneself* and *influencing others*.
- The *pattern of information use* is determined by the tasks, actions and activities of handling information. The planners make use of the information contexts to address the requirements created by the contexts of the role (*role contexts*) and the motivational drives. This category is the core category and it generates the principal power base that sustains the planners' involvement in facilitating the environmental planning process. The category is defined by the following three factors determined

by the tasks, actions and activities of using information, viz: *packaging information, acquiring and verifying information* and *giving information*.

- The *informational power* is generated by the information actions, tasks and activities engaged in by the planners. Furthermore, it is the main power base, which keeps the planners meaningfully involved in environmental planning processes. The *informational power* leads to the selection of a *strategy for participation* in the environmental planning processes. It is defined by two elements: *authority and confidence* and the *gained support*. The *informational power* can be enhanced by the *experiential knowledge* of the planner.
- The *strategy for participation* spells out the choices that the planner makes to involve the other stakeholders in the environmental planning processes. This includes how the stakeholders are informed of the project's process, whether and how they can also contribute information and ideas to the environmental planning process, as well as making decisions.
- The *experiential knowledge* is an attribute of the individual planner which can enhance his or her performance of the information tasks, actions and activities, as well as enhancing his or her *informational power* base.

Situated power operates as an intervening factor to the development of a *strategy for participation*. It is not directly linked to information, but may be an alternative power base for the planners. This is particularly so when they are dealing with external agencies, groups or individuals and require supporting policies and institutional support to administer some punitive measures to those who fail to comply with the policy requirements that are in place. *Situated power* is coercive in nature and manifests itself in the form of policy enforcement. This power base always exists but is dormant until situations approach a crisis level. The *situated power* base is not so much a preferred alternative, but necessary when dealing with situations that are problematic and require the use of force because the information related means of handling environmental processes are failing.

The factors that describe the use of information presented above interact amongst themselves in a variety of ways, positively or negatively reinforcing each other to strengthen the *informational power* base for the planner to move through a network of power bases that are embedded in the processes of environmental planning. If I am to make sense of the theory, there is a need to look at each of the categories and

interpret it within the context of environmental planning guided by the “power perspective”. This will help in making a meaningful explanation of the Grounded Theory.

5.3 Interpreting the theory

The first question that I asked was: Where do I enter the theory if I am to make a meaningful sense of it? This is a theory built from data obtained from the field when I was trying to make sense of a variety of situations that were described by the respondents. Therefore, the choice of a point of entry was influenced by the interpretation of the data and the sense I made through this. I make this choice at a point when I have been “immersed” in the data for more than a year and have seen the theory emerging from it and validated it through the respondents. There is no doubt that these “intense interactions” with the data, the respondents and the theory have influenced my beliefs and values on the perspective that I take regarding this theory.

5.3.1 Selecting power as an interpretive device

The theoretical landscape of the study of the use of information is vast. In addition there are many approaches and views relating to the use of information. The theory base from which to choose an interpretive tool is immense and multidisciplinary, including theories from disciplines such as sociology, management science, psychology and organizational studies as examples (see Baugh *et al.*, 1984; Boland, 1987, Davenport, 1997, Choo *et al.*, 2000). However, the insights gained from carrying out a particular study, especially during gathering and interpreting the data, can provide a useful means of selecting an interpretive device that is “grounded” in the data, hence making it suitable for interpreting the substantive theory.

The alternative is having an interpretive device that is “not grounded” in the data. This means a selection in which the researcher is free to include any theory he or she may choose. While this approach may be useful, its arbitrariness may be problematic when the researcher attempts to apply the device to the individual categories which are grounded in the substantive context from which the theory was developed. The interpretive device may not be applicable to the context. Furthermore, its trustworthiness in informing the desired outcome will always be contested.

For the purpose of the current interpretation, the “power perspective will be used as an interpretive device. What was remarkable as I developed the Grounded Theory from the rudimentary concepts was the way in which power dominated the interactions in the environmental planning processes. I noted that in the process of addressing environmental concerns, there is a network of power relations with power advantages and relations shifting between individual stakeholders or groups of stakeholders to the others. Hemmati (2002: 88), when discussing multi-stakeholder processes for governance and sustainability, notes that power is normally reflected in the behaviours of the team members. Therefore, based on the experience of developing the Grounded Theory and to some extent on the existing literature, I take the power relationships as critical in interpreting the theory.

The planners’ advantage or disadvantage when dealing with power relations could always be related to the informational attributes which are defined by the *dynamic project information context*, *role context*, *motivators*, *pattern of information use*, *experiential knowledge*, and the *informational power* which drives the *strategy for participation* in environmental planning.

The information provides a power base for the planners to be able to participate and fully play their roles in the environmental planning process. In this regard, I chose *informational power* as a starting point to making sense of the Grounded Theory of the present study. I take *informational power* as crucial in understanding the use of information when the participants fulfil their role requirements in environmental planning. I also take a “power perspective” to interpret the contribution of all the other categories to understand the use of information in environmental planning.

The contexts (*dynamic project information context* and *role contexts*) and *motivational factors* make it possible for the planners to engage in the information tasks, actions and activities (*pattern of information use*). For instance, the information context must be responsive and attuned to the dynamic situations that are created by shifting and evolving power relations as well as the non-linear activities of using information.

Secondly, the planners engage in information tasks, actions and activities because they have a motivation which I have found to be the need for *orienting oneself* and the need for *influencing others*. These motivational factors are influenced by the demands of the planners’ role and the kind of situations that the roles present (*role contexts*) for them to deal with when they carry out the environmental planning processes. It was found that power pervades all the other categories of the theory. In the next section, I start by highlighting my

understanding of power and how I conceptualise it in the interpretation of the Grounded Theory.

5.4 The power perspective

What is power? What will be the most productive way to understand power to explain how it enables or constrain the planners in using information in environmental planning? These are the questions that need to be answered before using power as a tool for interpreting the Grounded Theory.

The concept of power is very elusive. We talk about power everyday of our lives and are consciously or unconsciously involved with it when we are at home, work, or at a social function. It pervades everything that we do (Introna, 1997). Therefore, it also makes logical sense to have found that power pervades the processes of environmental planning that influence the way information is used by the planners.

Perhaps this pervasiveness of power is the reason for the difficulty in coming up with a definition that suits all the different contexts in which it is experienced. There have been many attempts to define power but with varied success (Koop and Grant, 1993; Prakken, 2000: 140 and Swingle, 1976: 46). I will not put forward yet another definition, but I shall provide some essential attributes that relate to power and are essential in guiding the interpretation of the Grounded Theory of the current study, of which power is a critical component. I shall try to understand what power does so that I can have insights on its effects on the way the planners use information.

Extant literature has classified power according to sources or bases, which are referred to as power bases. The most common types of these power bases are the *reward power*, *coercive power*, *referent power*, *legitimate power*, *expertise power* and *informational power* (Raven, 1993: 229 and Lam, 1996:14), and are defined as follows;

- *Coercive power* – draws on one's ability to threaten or administer some form of punishment
- *Reward power* – based on the promise of monetary or non-monetary compensation by the individual who has control of the resources
- *Legitimate power* – draws on one's right to influence
- *Referent power* – based on target's identification with influencing agent as model

- *Expert power* – draws on one’s superior knowledge
- *Informational power* – based on the ability to convince by (rational) argumentation.

In the present study, it was discovered that information is central to generating a power base for the planners to guide and facilitate the environmental planning process. Therefore, it is important to understand how the *informational power* base helps the planners move through a web of power-related forces that are embedded in the environmental planning processes.

According to Raven (1993), *informational power* is based on information or the logical argument presented by the influencing agent in order to implement change. The information can be presented directly or indirectly. Indirect presentation is normally used if the influencing agent is operating from a weak power base such as a subordinate trying to influence a supervisor, while direct presentation of information is common when the influencing agent is operating from a stronger power base such as an expert or a manager trying to influence a subordinate. The underlying factor defining *informational power* is that there must be information or a logical argument that the influencing agent presents (Raven, 1993: 229).

5.4.1 Power in information systems research

Extant literature provides many examples in which information systems have been studied in conjunction with the issue of power (e.g., Markus, 1983; Boland, 1987; Introna, 1997). These studies highlight several ways in which we can think of power in relation to information systems in organizations. This section briefly reviews the various ways in which the information systems research community has conceptualised and made sense of power.

Researchers in the information discipline(s) have always maintained that there is a direct link between information and power. For instance, the use of the metaphor “information is power” has dominated discussions for those who research information issues (Hirschheim and Newman, 1991). Feldman and March (1981) maintain that the mere possession of information can also be a source of power. Those who possess or have access to certain information can use it to further their interests.

Available literature on organisational studies has also shown that professional knowledge can be used as a source of power (Mintzberg, 1979 and Pfeffer, 1981). This means that

people who have some special knowledge, not possessed by other members in a particular group, can influence thought and behaviour of those who do not have the knowledge.

Consequently, the recognition of power in information systems research may not have come as a surprise. This includes the studies that focus on the information technologies on which the information systems are based. For instance, Beniger (1986) suggests that Information Technology (IT) in itself can be used for control. In his argument, Beniger associates IT with the power to control. His argument is based on the use of a telegraph to control railroad traffic. The conclusion we draw from this study is that the presence of technology and the ability to use it enhances one's power base.

Zuboff (1984) suggested that information technology and the associated information management practices can be used as a tool for strengthening political positions in organisations. The deployment of information technology leads to shifts in power relations. According to Zuboff, information technology can be a tool for empowering as well as for disempowering the workers. In empowering the workers, the technology can enrich the skills of the workers, enabling them to do work in a more effective and efficient way. This may result in increasing the productivity as well as improving the work outcome. On the other hand, the deployment of an information system in an organisation can lead to the deskilling of other workers and or change in the distribution of power amongst the members of the organisation (see Markus, 1983). In this regard, there will be "winners" and "losers," with the "winners" gaining an information-based power which reinforces their social power base in the organisation (see Travica, 2005).

5.4.1.1 Conceptualisations of power

The information systems literature shows that there are some variations in the conceptualisation of power. For instance, power can be conceptualised as a facet of human relationships. This means it can be discussed in terms of its influence in the relationships between people. Secondly, "power can be viewed as a personal trait or power can be viewed as a consequence of a position within a hierarchy" (Horton, 2003: 122). This means power can be thought of as something that people can have and use as a tool, and people could use it to promote their interests.

The other view of power which has attracted the attention of several information systems researchers draws from the political view in organisational studies (see Davenport, 1997,

Travica, 2005). These studies postulate that organisational politics play a central influence in the development, implementation and use of information systems (see Markus, 1983; Zuboff, 1984; Markus and Bjorn-Andersen, 1987; Davenport, *et al.*, 1992, Orlikowski, 1992; Iivari and Lyytinen, 1999). The development, implementation and use of information systems are regarded as political, with power relations being an implicit part of the processes.

Knights and Murray (1994: 38) maintain a general view that political activities are the focal processes “through which organisations are sustained, reproduced or transformed”. Information systems in organisation may act as instruments of change, and transform organisations through their effects on the various organisational functions (Moreton and Chester, 1997). When we investigate information systems in organisations, there will always be power issues involved and the researcher needs to proactively look for ways in which those issues should be addressed.

Another view of power comes from the work of Clegg (1989), who sees power as something that is socially contested. This view is supported by Boland (1987) when he suggests that power follows from the dialogue of actors who attempt to interpret and understand a phenomenon in relation to their organisation. Power tends to have different meanings for different people because different interpretations lead to variations in the way it is understood and articulated.

The view of power as a socially contested phenomenon has implications for the ways in which power is handled in research. Knights and Morgan (1990) concur with Clegg (*ibid.*) and Boland (*ibid.*) when they point out that the variations in the meaning of power cause its definition to be situation dependent. It is therefore unproductive for researchers to grapple with coming up with a definition of power because it changes with the situations that are being addressed. Knights and Morgan (1990) suggest that it will be more productive to investigate the manifestations, mechanisms or exercise of power.

Horton (2003: 123) notes that the focus on the socially contested and situation dependent view of power in the information systems literature has been relatively low. Several researchers have been concerned with trying to come up with a definition of power rather than exploring its nature and the role that it plays in practice. According to Horton (2003), it will be productive for researchers to examine the complexities and various dimensions of the phenomena that embody power.

5.4.1.2 Attempts to resolve the power approach dilemma

Horton (1998) discusses four dimensions of power. These dimensions provide a framework for understanding and making sense of power. This framework, which was developed by Hardy (1994), is based on the work of Lukes (1974). Lukes himself focuses on three dimensions. According to Lukes (*ibid.*), these dimensions of power represent the different views of looking at power that were developed over time.

The first dimension of power seeks to examine the actual behaviour in making decisions. This dimension takes an intuitive view that power exists, for example, when “a person A gets a person B to do (or be done to) something that is not in B’s interest to do”. In this case, power is believed to reside with the “winner” who is “A”. According to Lukes (*ibid.*), this dimension of power focuses upon real activities such as the making of decisions. However, when studying decisions that have been made, no account is taken of those issues that may have been ignored or not taken into account for one reason or the other (Horton, 2003). Furthermore, it can be observed that one underlying assumption in this dimension of power is that power often has to be exercised when there is a difference in the interests of those who are involved.

The second dimension of power relates to the ways in which individuals or groups may dominate others in relation to decision making. Power is understood to exist, for example, when “a person A limits the set of possible actions available to B to only those that serve the interest of A”. For example, a manager in an organisation may control the agenda for a meeting by allowing only those items that serves his or her interests to be discussed, or, intentionally, excluding some people by not informing them of the meeting. Again, it should be noted that this dimension of power also focuses on behavioural aspects and concrete actions, which can either result in a decision taken or not taken (Lukes, 1974). Like the first dimension of power, it also falls short to explain the exercise of power through the inactivity of people (Horton, 2003).

The third dimension of power exists, for example, when “a person A limits or controls the values and preferences used by B to select possible actions to only those that would lead to the actions that serve A’s interests”. For example, communities instil certain (control and limit) values and preferences on children. This results in the children recognising those values that are preferred by the community to which the children belong. An important point to note about the third dimension of power is that the exercise of power does not necessarily

take place when there is conflict or when a decision has to be made. This dimension of power has an orientation to a view of power that acknowledges the ways in which issues can be prevented from arising at all, such as avoiding conflict (or differences in interests) altogether.

One of the main contributions of the third dimension of power is to allow us to think beyond associating power with conflict (differences in interests). This means power can be exercised in the absence of a conflict. However, despite this contribution, there are still some practical problems that are unresolved. Hardy (1994) and Lukes (1974) suggest that the issue of why opposition and conflict would not arise is not clear. Furthermore, this conceptualisation of power does not provide guidance for us to understand why issues may be controlled or limited by those who exercise power.

Lukes (1974) tries to provide guidance to the conceptualisations of power by distinguishing between instrumental power and symbolic power. Instrumental power addresses dimensions one and two discussed above. According to Hardy (1994), instrumental power is exercised when there is a desire to secure an outcome against opposition. Symbolic power addresses the third dimension discussed above and is concerned with the unobtrusive use of power to secure an outcome by preventing conflict from arising.

Knights and Morgan (1990) argue that one of the fundamental flaws with the three dimensions of power discussed above is their deterministic nature, with power seen in the sense of a cause-effect relationship. The sense that power has to be in the possession of someone who eventually brings about the effect (influence) by using it to his or her advantage is also viewed as problematic. According to Knights and Morgan (1990) this power view is limited and does not adequately reflect work situations where a considerable amount of what is happening differs from that which is intended (i.e., unintended outcomes).

In an attempt to resolve the problems arising from the conceptualisations of power discussed above, Hardy (1994) proposed a fourth dimension of power, which is referred to as the conceptualisation of power that “addresses the power of the system”. This framework postulates that power is neither given nor received, but exercised and only exists in action (Foucault, 1980). Power is regarded as a pervasive phenomenon that is concerned with relationships between parties (Hardy, 1994). Power can be understood as taking the form of a web-like structure in an organisation, manifesting itself as part of the relationships in the organisation. A fundamental notion implicit in this dimension of power is the “unconscious

acceptance of the cultures and subcultures, rules, norms and values of how the organisation does things with the combination of structural and non-structural mechanisms of the system” (Berghout *et al.*, 2005: 33).

Another interesting notion following from the fourth dimension of power is the framework that considers three circuits of power. These are the episodic circuit, the social integration circuit and the system integration circuit (Clegg, 1989). According to Introna (1997), in the episodic circuit, power is manifested by agents capable of producing their intended outcomes by the use of controlled resources and established outcomes. The social integration circuits consist of norms, rules and meanings of a particular group and the technical integration circuits comprise of technical means and techniques of production. These three circuits provide a way of exploring and understanding power as a network of relationships. In this regard we can think of power as existing as relationships or simply by considering every relationship as already a relationship of power (Berghout *et al.*, 2005: 33, Introna, 1997).

5.4.1.3 Power Perspective adopted to interpret the Grounded Theory

The discussion of power in the above section shows the variation in the conceptualisation of power. I find the fourth dimension very interesting in capturing the complexities of power issues in organisations. In this study I use the power concept as espoused by Introna (1997) to interpret the Grounded Theory of the use of information by environmental planners. Introna’s conceptualisation of power is based on the fourth dimension of power discussed above.

Introna suggests a way of looking at power that, according to him, is more productive in information systems research. Drawing from extant literatures, he argues that power is a “relation between forces”. Farace *et al.* (1977: 163) also suggest that “power exists only in relationships”. Moreover, it is important to examine those power relationships because sometimes people enter them not even aware that they exist.

According to Introna’s (1997) view, power in itself is not something that has a location as an objective being. Power emerges from the interactions of a network of forces. He refers to the force as the “the capacity to act or be acted upon” (p. 145) and this force is directed on the actions, while power continuously shifts and circulates in relation to those actions. The individuals experience the changing situations due to the force relations because they are in

the network of power relations, and they can also exercise power. There is no single direction in which power can be said to act. Any direction is possible. I find this view of power to be prudent in explaining power relations and the use of information in environmental planning.

5.6 The Grounded Theory interpretation

An interpretation of the Grounded Theory for the present study from the “power perspective” shows that the factors that describe the way the planners use information represent the ways in which they express themselves to address power-related experiences emanating from the environmental planning processes. The environmental planning processes create varying power relations among the stakeholders. These power-related conditions make the planners behave in certain ways in which information enables them to cope with the emerging situations. The planners achieve their goals by facilitating and giving guidance when environmental plans are being developed and implemented.

In the process of addressing these power-related exigencies of environmental planning, the planners interact with relevant information environments to create information contexts for the projects. Secondly, planners attach certain “value labels” to information products because of the potential that the information may have to address their experiences in terms of the power relations.

Thirdly, the planner may be motivated to influence other stakeholders to directions or positions that they deem most feasible regarding the project that is being handled. The planner may be taken aback when he or she finds that he or she is not quite familiar with the issues to start learning or “*orienting oneself*” to situations that the environmental planning processes present. Furthermore, the planner engages in information tasks, actions and activities (*pattern of information use*) that generate *informational power*. Drawing from the *informational power* the planner can select a *strategy for participation* that he or she deems appropriate to deal with the emerging power relations. The influence that the planners have on the power relations in environmental planning is informational in nature since it emanates from the ways in which he or she is involved with information.

An important aspect to note is that the involvement of the planner with information does not follow a linear sequence. The involvement is a response to changes in the power relations. I also note that power is not located in the planners, nor is it located in the other stakeholders. It manifests itself amongst the stakeholders as they interact during the

environmental planning processes. These manifestations of power creates some variations in the power advantages of the stakeholders, sometimes putting the planner at a disadvantage in terms of power relations with the other stakeholders.

It was found that even though the power bases for other stakeholders may change, including that of the planner to some extent, the *informational power* remains the dominant power base for the planner. This power base is sustained by the *dynamic project information context* and information tasks, actions and activities which involve *acquiring and verifying information, packaging information and giving information* to the various stakeholders. The *motivators* and the *strategy for participation* strengthen the planners' participation in environmental planning. In the next section, I analyse the power relations emanating from the environmental planning processes.

5.7 Power relations in environmental planning

I use an example of a project that one of the respondents of this study was involved in to illustrate the existence of power relations in an environmental planning situation. The example is given in Table 5.1 below, and provides typical power relations experienced by the planners in the projects they do. This example illustrates the "fluidity" of power, and how it can shift backwards and forwards amongst the stakeholders during the course of single project. A critical point to note is the dependency of the planner on the information that he or she acquires, packages and gives out as he or she deals with various power relations that emerge and evolve during the course of the project. Table 5.1 below provides a description of the project with explanations of my views on power relations given in square brackets.

This excerpt describes a sanitation project in which the City Engineer (hereafter referred to as the planner) was involved as the manager of the project for council. The project was located in a part of the city which had been using pit latrines for sanitation purpose. Because the population in that area had grown tremendously, the use of pit latrines was no longer suitable because people were crowded and the city council was no longer coping with draining of the latrines on a regular basis and they would get filled up, with the smell from them rendering the place not conducive for living. In addition, the pit latrines were seen as a source of pollution for the underground water, which is an essential water resource for rural communities in the country. The sanitation facilities in the area were seen as a health hazard. The issue had been raised in public meetings of council. *[This is more like public information that everybody can have and draw their own conclusions about the perceived problem. There are no distinctive power relations that emerge at this stage except that the public sees that council has the legitimate power and authority to rectify the problem. The decision of what could be done rests with the council authorities and they are the ones who can help to solve the problem. We are beginning to see the need and importance of acquiring, packaging and giving information by the planners]*

The planner did a study, collected data regarding the problems that council and the inhabitants of the area were facing, looked at other available information sources, consulted environmental health experts, held public meetings and thereafter compiled a report. He recommended that it was time that the sanitation system be upgraded to a waterborne system which is used in most areas in cities. He submitted the proposal to council, and with all the information that was backing his argument he got support to launch the project that would upgrade the sanitation system in the area. *[The planner takes the role of his office and systematically gathers and packages the information to convince council that something needs to be done. Everything goes well as there is substantial evidence to back the planner's proposition. It can be noted that the planner sees that it is only by presenting such information that he will be able to get the support. The idea is to make a clear and logical argument. This is what Raven (1993: 229) referred to as informational influence. The importance of packaging information is also becoming evident.]*

The design of the system was outsourced to a consultant who was identified with the help of the planner through a tender process. The planner assumed the supervisory role and worked with the consultant, to make sure that everything goes according to the plan. He arranged for regular meetings for the consultant to come and make presentations to a steering committee of which he was the chairperson. The design was finally completed and submitted to the planner. *[The planner gets "more powerful" as he directs the work of the consultant. He has the power advantage. The consultant relies entirely on the planner for the information that he requires for the design process. As the chairperson of the steering committee, the planner can influence the decisions on whether to accept or reject the outcome of the consultancy. The consultant works to satisfy the planner. The planner holds more information about the project than anybody else participating because he has access to what the consultant is doing all the time as well as to what council wants. The planner acts as liaison person for both the consultant and the steering committee. Any existing information that the consultant requires from council is requested through the planner who acquires the information, packages the information and gives the information to the consultant].*

After the consultant had completed the designs, the planner took over from him to present to other stakeholders. The most important was the presentation to the finance committee which required the planner to justify why council should fund that particular design. However, with all the information available and the preliminary report, it was possible to convince the committee that it was necessary to fund the project with environmental reasons given as the most critical. The planner managed to get the funding for the project. *[At this stage, there is a shift in power relations because the planner does not chair the finance committee. It is chaired by the head of the economic planning unit of council. The planner now has to provide a justification of the design. The final decision does not rest with the planner. Much as he can influence the decision that is made he has to provide a convincing report which he did using all the information he has so far gained from the project. However, the critical point is that the planner is guiding the committee by providing information that the other members of the committee do not have and that is the basis for the influence he can make on the decisions of the committee. The planner influences the committee through the information and the logical argument that he is able to put forward for the committee's consideration].*

The next stage of the project was the construction which was also outsourced. Because the Planner was the one to supervise the project, he had to inform all the stakeholders, including the members of the public who were going to be affected by the project when the company started digging trenches in front of their properties. On the public side, the planner concentrated on the area that was directly affected by the project, leaving out other areas which were indirectly affected. However, because the new system requires that waste water flows through a pipe system to the ponds outside the city, it meant that some other areas outside the area that needed a change in the sanitation system were going to be affected and the excavation was going to be done at their properties as well, and their consent was required.

When the construction started the process of getting consent from property owners was still on going as well and it proved to be difficult because unexpectedly the planner found that the property information was not up to date. Those who could be found managed to give consent. For others it was difficult because some had moved and changed addresses and information to trace them could not easily be found. When they got to areas which were not directly on the part where the sanitation facilities were needed, the problem became even worse because the people complained that they were not informed before. This meant the planner had to go into negotiations and apologise for his mistake. In the meantime, the project that had started well was delayed and the contractors had to wait for the owners of the properties to give consent. *[The power advantage has now shifted to the public: the planner now operates from a weak position. This was caused by the information gap due to records which were not up to date and the mistake of failing to inform (give information) all the affected people before the project started. However, information and logical arguments still remain the source of survival for the planner.]*

The project which was estimated to have been completed before the start of the rainy season was delayed until it started to rain and the trenches were not covered. The trenches became a danger to the lives of the people whom the project was supposed to help. Unfortunately, at around the same time when this project was under way, a water reticulation project in a nearby village resulted in two fatal accidents when two children drowned in open trenches which were flooded. The public used the experience from the neighbouring village as a weapon against the planner for failing to complete the project on time. Furthermore, because of the delay the planner had to go back to the finance committee to seek for more funding. *[The power advantage of the planner is almost completely eroded, but he still keeps to his information canons as there seems to be no other power base to get him through the problem. The planner keeps acquiring, packaging and giving information.]*

While all these things were happening, council required that the planner provided a progress report on a regular basis at scheduled meetings. Some of the meetings according to the planner were just an embarrassment on his side. He could find that some stakeholders knew many things about the project which he did not know. *[The planner sees the whole thing as an attack on his personality. Information that was supposed to be given to him finds its way to other stakeholders and he gets to know about things in the meetings. However, the planner continues to gather information and use it despite operating at a lower power base. The need to verify information becomes more pertinent for the planner to avoid contradictions that may lead to further embarrassment.]*

Despite all the delays, the project was finally completed and the waterborne toilet system worked as expected. *[This is good news for the planner, as he uses the opportunity to recollect himself since he is no longer in the spotlight. He regains his power advantage when he reports that the system is successful].*

Table 5.1 Power relations in environmental planning

The above excerpt shows how power relations can change during the course of a single project. As the project progresses the planner uses the *informational power* base to facilitate the environmental planning process. We see the planner maximising his or her advantage by *acquiring, verifying, packaging and giving the information* to the other stakeholders as well as putting a logical argument for the case they are working on.

The use of *informational power* by the planner produces varied success. When the power relations change, different information strategies are required to deal with emerging situations. It can also be noted that the change in the power relations amongst the

stakeholders presents varying demands on the planners and this leads to variations in the approaches to using information. However, it is interesting to note the dependency of the planner on *informational power* despite the changes in the power relations which create advantages and disadvantages in the influence the stakeholders have on the environmental planning processes. The dependence of the planners on information and the creation of a logical argument is remarkable. The planners constantly have to acquire, verify, package and give information during the entire project period.

5.8 Informational power

Informational power is one of the categories in the Grounded Theory discovered in the present study. The *informational power* for the planners is derived from the *pattern of information use* and can be enhanced by the planners' *experiential knowledge*. The *informational power* makes it possible for the planners to formulate and execute a *strategy for participation* during the environmental planning processes.

The basis for using information by the planners is to influence the environmental planning processes through countering power bases arising from those processes. The "informational influence" (Raven, 1993: 229) is an essential factor in understanding how information is used. As noted when describing the Grounded Theory, one of the motivations for the planners to use information is to influence other stakeholders to a viewpoint that they consider more appropriate. The planners are interested in changing the behaviour, attitudes, beliefs and values of the other stakeholders.

The advantages and disadvantages of the planners in relation to power change due to shifting power relations amongst the various stakeholders. These changes make the planners use information in different ways. A planner with a power advantage uses information with *authority and confidence*. He or she gains the support of the stakeholders. The support of the stakeholders is gained during the processes, it is not something that is given, but rather it is the way the planner uses information that determines whether he or she gains the support of the stakeholders.

The power advantage resulting from power relations among the stakeholders is not always on the side of the planners. Projects sometimes do not go smoothly and the planner has to "face the heat" when struggling to meet the demands of the environmental planning processes. When the planner is operating from a disadvantaged position due to shifts in power relations, he or she struggles to regain the power advantage by engaging in processes

that generate *informational power*. This may create stressful situations for the planners. The planners engage in some information tasks, actions and activities (*pattern of information use*) that help him or her to “cope with the stressful situation” (cf. Wilson, 1997:554). The planner struggles to regain *authority, confidence and support* so that he or she can continue with the role of facilitating the environmental planning process.

While *informational power* is seen as the dominant power base of the planners, I acknowledge that the power base can be enhanced by the *experiential knowledge* of the individual. The other factors, namely, the *dynamic project information context*, the *role context* and the *motivators* and to some extent the *experiential knowledge* are seen as triggers of essential information tasks, actions and activities which generate a *pattern of information use*. It is this *pattern of information use* that actually generates the *informational power* for the planners. The *informational power* gives the planners the *authority and confidence* to come up with a productive *strategy for participation* to generate a desirable environmental planning outcome. In the next section, I discuss those tasks, actions and activities that generate the *informational power* of the planners.

5.9 Pattern of information use

Power pervades all actions and processes of environmental planning. The informational tasks, actions and activities which generate the *informational power* are not an exception to that. Therefore, it is productive to analyse the *pattern of information use* of the planners from a “power perspective”. The *pattern of information use* is the core category in the Grounded Theory of the use of information for environmental planning developed in the present study. A recap of the theory follows.

The Grounded Theory discovered in the present study explains how information is used in environmental planning using the case of Botswana. The theory emerged from the analysis of data to understand the informational use elements that were experienced by the planners when they participated in projects that had environmental concerns to be addressed. I looked for behaviours related to the use of information that emanated from the planners’ involvement in the environmental planning processes. I found some observable actions or behaviours that are critical to the generation of the *informational power* which drives the *strategy for participation* of the stakeholders in the environmental planning process.

The *pattern of information use* actually tells us about the observable behaviours (information behaviours) that are exhibited when the planners are involved in environmental planning. These behaviours generate an *informational power* base which we have seen to be used by the planners to sustain their involvement in the projects and their onward progression towards attaining the set goals regarding the environment-related issues in projects.

Consistent with extant literature, it was found that the use of information is not an event but rather a process with iterations that take place in multiple directions (*cf.* Dervin, (1992). The users of information engage in the processes of using information by performing a number of tasks, actions and activities which enable them to move on with the environmental planning processes.

The *pattern of information use* that is exhibited by the planners is a response to the changes in the power relations and is intrinsic to the processes of environmental planning. In the same way as power relations, the *pattern of information use* shifts backwards and forwards as the planners move continually with the environmental planning processes. Solomon (1997: 1136) also noted that there are no logical steps where the planner would determine an information need, then gather, organise, use information and then decide on the actions to take. The processes emerge and can follow any sequence regarding *acquiring and verifying information, packaging information* and *giving information*.

Various literature sources also support this argument. For instance, Davenport (1997) also noted an emergent view regarding the way people use information. The Grounded Theory that I discovered states that the use of information emerges from the underlying processes that trigger the behaviours that form a *pattern of information use* which generates the *informational power* for the planners.

By engaging in the behaviours that characterise the *pattern of information use*, the planners make it possible for the stakeholders to take actions and decisions. They give meaning to the environmental planning process by enabling the stakeholders to interpret the situations using the information that they give (*giving information*) them and the way in which they package the information (*packaging information*) for them. In that regard, the value of the information is realised in the manner in which it enables the stakeholders to interpret the arising environmental planning situations.

Choo *et al.* (2000: 119) pointed out that the value of information lies in its ability to enable actions and this becomes possible after the information has been given “meaning and significance in the minds of the actors”. Therefore, it can be argued that by *packaging information* and giving it to the stakeholders, the planners create an environment conducive for an interpretation to be made, thereby creating meaning of the situations arising from the environmental planning process. It is through these processes that the decisions on the environmental issues relating to development projects are informed and facilitated by the planners.

The *pattern of information use* is characterised by certain behaviours including *packaging information, acquiring and verifying information* and *giving information*. These factors are defined by the tasks, actions and activities that the planners engage in within contexts and processes related to environmental planning. To understand the contribution of these elements (*packaging information, acquiring and verifying information* and *giving information*) to the processes of environmental planning, I shall analyse them in relation to power. First, I look at how the elements are related amongst themselves.

5.9.1 Relationships between the elements of the pattern of information use

The tasks, actions and activities that characterise the *pattern of information use* by the planners generate the power base for the planners to deal with environmental planning situations. They also enable the creation of the meaning of situations through the interpretation of information, and hence enable the actions and decisions in environmental planning processes.

The elements that define the *pattern of information use* are interrelated. The distinction as to when and where one process ends and the other one begins is fuzzy. The order in which the processes happen is not always clear, because the processes are entirely dependent on each other. We can depict them as working together in different combinations to drive actions and decisions in environmental planning through the outcomes that emerge from the information tasks, actions and activities.

The planner is an “information hub” in the environmental planning processes. The role of acquiring, packaging and giving information is central to his or her participation in the processes. As Margerum (1997) also noted, they facilitate interactions among the

stakeholders. In a similar argument, Innes (1999) suggested that the roles of planners are to find and present formal information designed to suit their audiences. To achieve these goals they need to acquire relevant information, package the information properly and give it to the stakeholders in a manner that will make it possible for appropriate interactions to take place and generate relevant actions and decisions relating to the environment.

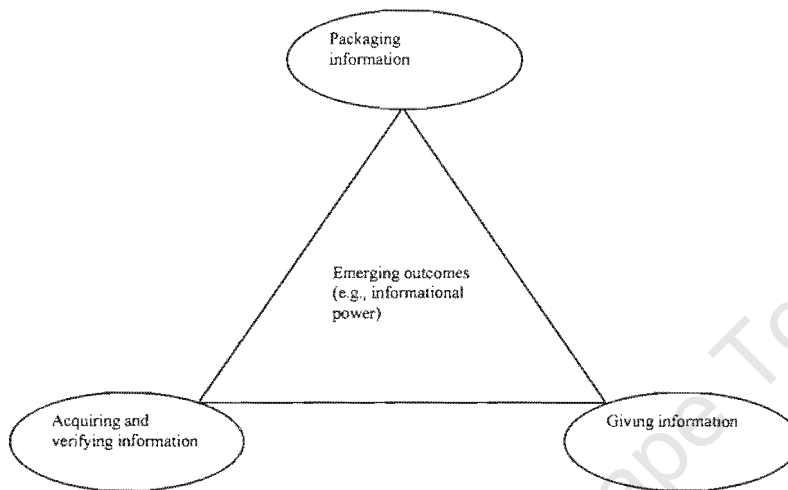


Fig. 5.1 Relationships between the pattern of information use elements

Figure 5.1 above shows how the elements that define the *pattern of information use* in environmental planning are related. On the vertices of the triangle are the three elements, *packaging information*, *acquiring and verifying information* and *giving information*. The sides or lines joining the vertices show the influences between the elements. The influence among the elements is in both directions. The area of the triangle symbolically represents the emerging outcomes, notably the *informational power*. The interpretation of the situations, which make sense of environmental planning processes, becomes possible because of the facilitation of processes by the planner using the “informational influence” or the *informational power* generated.

How do the elements of *packaging information*, *acquiring and verifying information* and *giving information* generate the *informational power*? Is it just through exposure to information? Or are there are other factors that lead to the emergence of the *informational power* and its variation in response to shifts in the power advantages among the various stakeholders involved in environmental planning? I shall address these questions by

analysing each subcategory of the *pattern of information use* in relation to the environmental planning situations and the “information influence”.

5.9.2 Acquiring and verifying information

The involvement of the planners in environmental planning and the changing power relations subject them (the planners) to conditions that create a variety of information needs. For instance, in the excerpt of a planning process in Table 5.1, when the planner finds out from the meeting that some of the information which was supposed to have come to him as the manager of the project was given to other stakeholders, he felt embarrassed. This meant that further acquisition of information was needed to avoid future embarrassment as well as to uplift his image in the eyes of the stakeholders and show them that he can be relied on. There are a number of incidences from the data from which the theory was developed that corroborates this understanding of the theory. For instance, one of the respondents pointed out that:

Yes, we look here, the other things advertised here. All the requirements are listed here [holding a physical planning manual]. So our duty is to ensure that those proposals, they meet this requirements. We check the plans and then go on site because sometimes plans, they might not show an existing development, you see. Then if you don't go on site, you don't realise the architecture is trapping you. Then you go to present. When you are presenting you find there is somebody there who probably knows the area. He ends up contradicting you in the meeting and then that reflects negatively on your side (Interview, FCC10)

A need for information may also arise when the planners encounter a new situation of which they have no previous experience. A new situation means the planner is unable to put up a logical argument to facilitate the environmental planning process. This means that the planner is operating from a weak power base. He or she may fail to answer a question that is raised by the other stakeholders and this will reflect negatively on him or her. Information is therefore required to raise the power base of the planner in relation to other stakeholders. This scenario is reflected in the subcategory *orienting oneself* which depicts one of the motivational factors to using information.

The composition of the stakeholders for environmental planning is another factor that affects the planners' needs for information. The presence of environmental experts puts more pressure on the planners because expert power may add a considerable difference to the

power relations in the environmental planning processes and it may lead to some differences in the need for information.

However, the thrust of my argument is that the environmental planning processes create needs for information by the planners. These information needs present themselves in a variety of ways. The planner discovers those needs during the processes and these needs shape the way the planner acquires information.

Various literature sources support this interpretation regarding the acquisition of information. Wilson (1981) suggests that the reason behind the acquisition of information is a need. Such needs arise in contexts which may include the person himself or herself, social contexts and work roles. These needs are affected or influenced by cognitive, affective and situational factors (Wilson, 1994 and Choo *et al.*, 2000).

For instance, consider a planner participating in a project who encounters a new environmental issue during the course of a project, and realises the deficiency in his or her knowledge (cognitive need). It can be argued that the presence of experts among the stakeholders who participate in the project may create a difference in the power relations (situational factors). The planner may feel intimidated and frustrated, but because of the requirement of the role, he or she has to make a presentation to the stakeholders. The planner then gathers information with a view to avoid embarrassment as well as to build his or her reputation (affective factors).

Power relations in environmental planning dominate the information needs that arise and hence affect the way the planners acquire information. Behind each information need, there are power relations that the planner has to deal with.

5.9.2.1 Using information to acquire information

Today, with the advent of technology and environmental movements we are seeing information being made available to everybody. This is particularly so with information relating to the environment. In that regard, it can be argued that the question of a difference in power relations created by information does not arise among the stakeholders, because everybody has access to it and can acquire it. How does the Grounded Theory discovered account for this scenario from the power perspective?

I found that the role of planners in projects is central in environmental planning. They act as “information hubs” for the project processes. They link the stakeholders together through the information they have and the associated tasks, actions and activities. They have access to most information regarding the projects. They interact with the stakeholders through various communication channels. Such interactions give them access to more information than the other stakeholders. This information is essential for further acquisition of information (Johnson, 1996: 100 and MacDonald, 1998), and gives the planners an advantage over the other stakeholders in terms of acquiring information that may not be accessible to everybody.

MacDonald (1998:14) argued that information is actually used in order to acquire information, and he said:

One can get snippets of information, but further acquisition of information to complement the snippets to tell the whole story is very much harder. This is because the acquisition of further information demands the use of information already obtained. Those who have information are better placed to demand information than those who do not. ... The more an individual knows the more aware he can be about the information he wants to acquire.

In relation to the Grounded Theory discovered in this study, it can be argued that the information that the planners have makes it possible for them to be able to acquire further information. They need this information to be able to locate and interrogate the available information sources to get what is required. Furthermore, to have the knowledge that there is information that can be acquired the planner needs to have information. Therefore, it is the influence of the information that the planners have that creates a difference in the acquisition of information for the environmental planning processes.

The intensive interactions that the planners have with the *dynamic project information context* are the source of the power advantage that the planners enjoy in acquiring information in ways that are different from the other stakeholders. Furthermore, the interaction with the stakeholders as individuals or in groups strengthens the planners’ capacity to acquire information. It is through these interactions that the planners get to know what information to acquire, where to get the information, what questions to seek answers to from the information sources.

For example, when a planner encounters a new issue that relates to the environment, the planner may feel disoriented and may not know what to do. Even trying to acquire

information at this stage is not easy. If the planner were to go to meet an expert, he or she will not be able to ask meaningful and useful questions, because in the first place the planner does not know what questions to ask. The planner is operating from a weak “informational influence” at this stage.

However, as the planner continues to get more “bits of information” and put them together, he or she gets more insights and starts asking well focused questions, knowing exactly what gaps need to be filled. Moreover, the planner is able to get more information from a source that he or she would otherwise not get much from without the prerequisite information.

5.9.2.2 Information acquisition as a transaction in power relations

According to MacDonald (1998), effective information acquisition takes place when there is a transaction taking place. This means one has to give information in return for the information that one gets.

Although power is not an object and cannot be located in an individual, the interactions in which the planners are involved lead to changes in the power relations amongst those involved. Those with power advantage in terms of the “informational influence” that they can exert during the “informational transactions” benefit more. This means that if the planner does not have information, then he or she has nothing to offer and therefore would not get much either. In that case, trying to acquire information from a source will not be that helpful because he or she is operating from a weak power base in terms of *informational power* relations between himself or herself and the source and his or her “bargaining power” is low. If the planner already has some information then he or she has a high “bargaining power” and therefore can utilise it to exploit the information source.

5.9.2.3 Strengthening the effect of information acquisition

An extension to the acquisition of information is the need to verify the information. From the power perspective, this is seen as strengthening the planner’s power base. For example, when I was collecting data for this study, one respondent pointed out that if one gets information and goes to present it and it turns out that the information is not correct and someone knows the correct information, he or she may point it out in a meeting and the presenter will be embarrassed. (See quotation above, from Interview FCC10 on page 217 of this document). This means that, if the planner does not verify the information used, the planner would be working from a weak power base and that weakness would be revealed

when the other person points out that the information is wrong. Because the planner is expected to lead the environmental planning processes, the planner will have to go back to try to strengthen his or her power base by acquiring more information to verify the information in hand. It should be noted that in going to acquire more information, the planner uses the information he or she already has to find the right sources, hence operating from a stronger power base with respect to the sources that he or she is going to consult.

Acquiring and verifying information is not an end in itself but rather a sub-process that takes place within the bigger process of using information. Once acquired, the information is used in other processes which include packaging the information and giving the information or even for the acquisition of further information. I will now turn to *packaging information* and *giving information* and analyse them in relation to power relations operating in environmental planning.

5.10 Packaging and giving information

So far, I have introduced the planner as an “information hub” acquiring and verifying information. The planners acquire information from many sources, including people, printed sources and computer held sources. The planners use different communication channels including oral communication and written communication. There is also another part of the process, which involves *packaging* and *giving information*, which is the focus of the discussion that follows. I will analyse *packaging information* and *giving information* together because unlike with acquisition and verifying information the distinction between the two is fuzzier. Davenport (1997: 148) also observes that the two are very much connected.

5.10.1 Packaging and giving information as a role requirement

In order to fulfil their roles, the planners need to give information (*giving information*) to the other stakeholders. Planners produce various information products which act as vehicles for creating interactions that enable the stakeholders to make sense of situations that arise in the environmental planning processes. The creation of information products (*packaging information*) involves a number of processes.

The planners receive information from unrelated and diverse sources. This information can be said to be coming in “bits and pieces” from different information sources using different

communication channels. The use of the phrase “bits and pieces” here is metaphorical. I am referring to the fact that the need for the production of information products would not manifest itself immediately, and neither would the planners get the information from one source. They go through a number of processes to achieve that. The process is non-linear and emergent. The planner cannot predetermine the process.

After getting the information, the planner adds structure to the information so that it can make meaning to the planner and others. Rottger *et al.* (2001:447), when justifying the need for a meta-database in environmental information systems, pointed out that they (the planners) often have to compile studies and combine expert opinions. The planners do not only compile the information, they interpret the information and make sense of the situation that the information is relating to. The information products – one of which, the report, has been found to be the dominant one – reflect the interpretation that the planner has made. Consequently, it is the planners’ interpretation that actually matters in influencing the environmental planning processes.

5.10.2 The power of interpretation in environmental planning

The value of each “piece of information” that the planner receives depends on the use that he or she makes of it. In general terms, MacDonald (1998: 32) argued in his book that the value of information is “entirely from its use and this demands its amalgamation with other information”. In line with MacDonald’s argument, it can be argued that it is through the compilation of “bits and pieces” of information from different sources and combining them with experts opinions that the planners give value to information that they acquire. The resultant information package will get further value from usage by the stakeholders to influence the environmental planning processes.

The planner produces information packages through the interpretation that he or she makes of the information acquired. The stakeholders use these information packages/products to inform action and decisions through interpretation. Therefore, the influence of the planner on the environmental processes is indispensable. Effectively, “the voice” of the planner permeates the environmental planning processes through the information packages that he or she creates.

Planners produce a variety of information products or information packages that form part of the processes of environmental planning. These include reports, memoranda, letters and

agendas for meetings. The dominant information product is the report. The production and distribution of these products as part of the role of the planners influence the power relations that are embedded in the processes.

5.10.3 The planner as an interpreter of the knowledge of other stakeholders

The target audience determines the production of information packages. This means that before the planners set out to package information, they need to understand the recipient or potential recipients of the information package. Packaging of information requires that the information is structured for the user to be able to use the information (Davenport, 1997: 146).

In order to produce information packages that are useful and understood by the stakeholders, the planners need to have a knowledge of the users with regards to what they already know about the information related to the situation that the information package will address. This is important for the planner to format the information package in a way in which the users will be able to appropriate the information (MacDonald, 1998 and Johnson 1996). By playing a role that requires them to give information, the planners have an advantage of knowing what the other stakeholders know, and such knowledge influences the power relations among the participants in environmental planning.

The interpretation of the processes of packaging and giving information has interesting implications on how we should look at the role of information in environmental planning. It should be noted that the influence that the information has in environmental planning cannot be directly linked to the outcome. It is hidden within the interpretations that are made and the power relations that lead the planners to be involved with information in certain ways. For instance, it is the way the planners interpret the information that they acquire in relation to the interpretation that they make of the knowledge of the stakeholders which gives meaning to the information packages that they produce for environmental planning processes. It is the interplay between these factors that ultimately affect the power relations in the environmental planning processes.

Various literature sources support my argument for packaging and giving information. For instance, a similar argument that supports this finding is that by Innes (1999) who pointed out that “when information is most influential, it is also most invisible.” Hanna (2000)

referred to this scenario as a hidden role of information in the planning context. Referring to the use of information in general, Davenport (1997:151) echoes the same view when he argues that “information use is highly idiosyncratic and it is usually not clear when the information is actually used”.

Another point to note is that when the planners “immerse” themselves into the “bits and pieces” of information, they get more insights and their power base to acquire and use information is strengthened. This “immersion” has the potential to give a power advantage over the other stakeholders. However, it should be noted that the core factor in the *pattern of information use* is the “information influence” which actually drives the information tasks, actions and activities in environmental planning. The planner as the person *acquiring and verifying information, packaging and giving information* has considerable *informational power* in as much as he or she can interpret the information and create meaning, and it is this interpretation and meaning that inform the environmental planning processes.

The presentation given above of the tasks, actions and activities that characterise the *pattern of information use* does not emphasise the control of information as the source of power as has been viewed in the past (Graham and Englund, 2004: 163). It is actually the usage, not the control of information, that creates a difference in the power relations among the stakeholders.

In the next section, I discuss how the *dynamic project information context* is created by planners in response to the power relations arising from the environmental planning processes.

5.11 Dynamic project information context

The *dynamic project information context*, as the name implies, is a dynamic entity within the project context. It is emergent and evolves and gets refined during the environmental planning processes. The *dynamic project information context* is created by the planner as a response to the power relations emanating from the project. It is situation dependent as also suggested by Heywood (1997: 7): “in many cases we do not know exactly what kind of information we need to assess until some situation arises that makes it evident”. The way the situation presents itself and the power relations at that moment determine the kind of information contexts that the planners create.

5.11.1 The nature of the dynamic project information context

The planner creates the *dynamic project information context* during the course of the project on a continuous basis in response to arising situations. He or she makes an “impression” of the nature and availability of information in terms of *people, access context, and information sources and communication context* (“impression” is used here in a similar sense that an architect would make an impression of a building before it is constructed).

For instance, when a project is initiated, the planner analyses the situation. Through interactions with the stakeholders, the planner determines the nature of problems that the project presents. Potential obstacles and resistance that may arise from the power relations among the stakeholders are identified. The planner relates the situation to the information environment and creates an impression of its potential in dealing with the situations that the project presents. The planner makes an impression of the possible information sources, communication channels and access contexts including people who may provide the necessary information that may be of help in facilitating the environmental planning processes. If the planner sees a high potential in terms of the information that can support the processes of environmental planning, then he or she will get into the project with more enthusiasm, while a less promising support from the information environment leads to less enthusiasm. The enthusiasm with which the planner gets into the project has an effect on the power relations between the planner and other stakeholders.

The impression that the planner creates will be changing as new situations arise. For example, consider the sanitation project described in Table 5.1. During the initial stage when the planner was making a case for the project the information context was highly supportive and enabled the planner to operate at an advantage in terms of the power relations. However, when the planner was dealing with the owners of properties, the information context was not supportive and the planner was operating at a disadvantage in terms of power relations.

The *dynamic project information context* is not something that is given at the beginning of the project. It is dynamic, emerging and evolving with the project. It is created by the planner, influenced by both the physical and social environment of the project. For instance, access to certain information sources can be made available through other council authorities. Creation of information through consultants depends on the willingness of

council to fund that. Communication depends on the availability of the organisation's communication systems such as electronic mail, the Internet, telephones, and including appropriate fora such as meetings. The use of people as information sources will depend on their availability and willingness to participate.

The sensemaking that leads to the creation of the *dynamic project information context* is also seen in Rauscher's (1999:179) suggestion of the importance of a decision support system that should be developed during the decision-making processes of the management of ecosystems. Rauscher argues that such a system should evolve simultaneously with the decision processes, with the two informing each other and leading to the refinement of the other. The decision support system should depend on the way the *dynamic project information context* unfolds to the planner during the course of the project. However, Rauscher's argument is not backed up by empirical evidence.

The *dynamic project information context* is a critical element in the planner's efforts to deal with emerging power relations during environmental planning. Its necessity in enabling the *pattern of information use* cannot be overemphasised.

5.11.2 The need for a dynamic project information context

The *dynamic project information context* stimulates the planners to acquire information through its link to the environmental planning processes. It exposes the planners to useful as well as potentially useful information, as well as providing a context for the planners to acquire and verify information.

The *dynamic project information context* enables the processes of the *pattern of information use* through its improvements in information and communication possibilities for the planners. This leads to an improvement in *acquiring and verifying information, packaging, as well as giving information*. As an enabler, the *dynamic project information context* must be flexible to accommodate the changing demands for information by the planner which may become necessary because of the shifting power relations during the environmental planning processes. It may also be information rich, providing access to rich information sources that may include experts and information sources that are amenable to easy manipulation such as computer held information. In addition, it may also allow for the use of rich communication channels such as face-to-face communication.

5.11.3 Determinants of the dynamic project information context

My Grounded Theory provides three elements characterising the *dynamic project information context*, involving *people*, *access context* and *information sources and communication context*. Various literature sources show that these factors are essential in the information behaviours of people (Johnson, 1996 and Wigand *et al.*, 1997) with different communities of users having various preferences for different information sources and channels of communication (Taylor, 1991).

The planners use a variety of information sources and communication channels in a complementary manner to support the environmental planning processes. Written reports and meetings are used more often in the exchange of information. People, including experts and the community, also form an essential component of the *dynamic project information context* because the planners consult them when gathering information.

Another subcategory, *access context*, is regarded as a fundamental component of the *dynamic project information context* because it is directly linked to the acquisition of information. Planners can only acquire information that they have access to. The lack of easy access to information can inhibit its acquisition (Johnson, 1996).

While the *dynamic project information context* is essential for those pursuing the environmental goals of projects, not everybody has an interest in its contribution to the environmental planning processes. Only those in roles that create a demand for the acquisition of information have an interest in it. Those with relevant roles are the ones who create the *dynamic project information context*. They take advantage of available resources with respect to the projects to make it possible to acquire the information needed. These roles generate motivations in the environmental planning processes for the planners to learn about environmental issues (*orienting oneself*) or influence other stakeholders (*influencing others*) in directions which, through the interpretation of the information they acquired, they find to be most feasible for the environmental planning outcome.

In the next section, I will discuss the kind of *role contexts* that the planners find themselves in and how they create situations for the planners to engage in certain information tasks and activities.

5.12 Role context

Planners play different roles in the environmental planning processes. These roles may change during the course of a project. For instance, the planner at one point may play an advisory role, while at another point he or she can be monitoring the project. The planner can be a manager of the project as well. Despite the changing roles, an important thing is that the roles present power relations among stakeholders which require the planner to be involved with information.

The roles of the planners in the environmental planning processes present various contexts which create certain demands that influence the way the planners handle information. In fact a study by Baugh *et al.* (1984:236) also found that “a variety of role types would be differently attuned to information sources” in general. In that regard, the planners’ ways of handling information will vary according to the role that they are performing.

A *role context* that places more demands on the planner will also place more demands on certain types of information because of the value of the information in the arising situations. Likewise, the *pattern of information use* should be commensurate with the demands that the *role context* presents. In that regard, the value of the information to the planner will to some extent depend on the *role context*. Therefore, it was for this reason that I used the subcategory *value of information* to operationalise the *role context* in the Grounded Theory.

The power relations that arise because of the context in which the roles are performed may put certain demands on the planners. For instance, if the planner is performing an advisory role to stakeholders who include experts, the demand for information may be different from when the stakeholders have no environmental background. In the former case, the requirement for information will be to counter the expert power. Secondly, when a planner is performing an advisory role in a project that is politically unpopular, he or she will use information in ways that will counteract the power base derived from those with the political power to change things in their favour.

The context within which the planner performs a role (*role context*) is critical in determining the *pattern of information use* and producing motivations to use the information. The *role context* also affects the ways that information is made available to the planner (*dynamic project information context*). I shall now turn to those motivational factors that drive the

planners to engage in information activities that generate the *informational power* during the environmental planning processes. These motivations are created as a response to the demands of the *role context* and they influence *the pattern of information use* when the planner engages in a variety of information tasks, actions and activities to satisfy those motives.

5.13 The motivating factors (Motivators)

The category *motivators* in my theory relates to those elements that drive the planners forward to get involved with information in the environmental planning processes. Two factors were found to be essential — the need for *orienting oneself* and the need for *influencing others*. From the power perspective, I see these factors as triggered by the planners' need to cope with pressures or forces emanating from the power relations that characterise the environmental planning processes. For example, a planner working on a project that requires sanctioning from stakeholders with different views may find it necessary to employ more strategies of influencing. Secondly, a planner working on a project with stakeholders who are environmental experts may find it necessary to acquaint himself or herself with the issue more than if the stakeholders were non-experts.

In the two examples given above, it can be observed that the drive on whether to focus on *orienting oneself* or on *influencing strategies* is to a certain extent determined by the kind of power relationships that exist between the other stakeholders and the planners. For instance, when the planners realise that they are relatively uninformed about an environmental issue, they are operating from a weak power base and are at a disadvantage in terms of power relations. In order to shift power relations and gain the advantage, the planners engage in a learning endeavour. This is an orientation that the planners give themselves through a *pattern of information use* to shift power relations in their favour.

Influencing others is one of the *motivators* and is achieved through the building of information networks with those who 'matter(s)', educating the stakeholders, providing justification of what is done, taking advantage of already existing influential social structures or influential people, as well as presenting a positive image to the stakeholders. The motivation to influence makes the planners engage in a number of information related tasks, actions and activities. This means that the planners resort to informational strategies to influence the other stakeholders.

Power relations emerging from the environmental planning processes are the sources of the motivation for the planners to engage in activities that will sustain their facilitating and guiding of the environmental planning processes. The planners also draw from their experiences to strengthen the information-based activities to realise their goals.

5.14 Experiential knowledge

While the power base of the planners has been found to be derived from using information, because most of them are not environmental experts, it was also noted that in the process they accumulate valuable knowledge. The planners acquire *experiential knowledge* through their involvement in projects. It was also noted in this study that opportunities are available to the planners to have hands-on experience in areas where projects similar to the ones that they may be doing have already started or are being implemented.

Experiential knowledge can directly influence the planners' *informational power*. For example, planners could use the experience they have had to put forward a logical argument for a case they are handling in the environmental planning processes. Being able to provide examples from the past is a demonstration of power in terms of strengthening the ideas that the planners present in their arguments.

The *experiential knowledge* can also have an indirect influence on the *informational power* through its influence on the *pattern of information use*. In that regard, the planners *acquire and verify information, package information and give information* in certain ways because they have experienced a similar situation before.

Experiential knowledge can be regarded as a factor in the theory of the use of information in environmental planning whose presence may change the outcomes of environmental planning through its direct or indirect effect on the *informational power* of the planner. *Experiential knowledge* may lead to environmental planning outcomes which otherwise would not have been possible if the environmental planner did not have that knowledge. *Experiential knowledge* also affects the *strategy for participation* by giving the planner the *authority and confidence* to select strategies that have proven to work in similar situations.

5.15 Strategy for participation

The planner as the facilitator in the environmental planning processes makes choices affecting the stakeholders' participation. A variety of strategies can be used during the

course of a project to facilitate the participation process. For instance, planners can choose to hold workshops, seminars or meetings with the stakeholders. They can invite experts to lead some decision-making processes. They can, during the production of reports, work out a strategy on how other council members could contribute.

The way the planners select the *strategy for participation* was found to be essential in the processes of environmental planning. This sentiment is shared by Beierle and Cayford (2002:7). When considering the participation of the public in environmental projects, they remarked that it is the “process of participation, rather than its context” which is largely responsible for success or failure. By selecting appropriate strategies, the planner can largely influence the outcomes of the projects.

The strategies that the planners select will to some extent depend on the planners’ capability to facilitate the strategy to be productive. The power relations that exist among the stakeholders will influence the strategy that the planners select because the outcome of the strategy depends on the performance of the planners and how they execute the strategy within the emerging power relations.

For instance, the success of a meeting forming part of an environmental planning process will depend on how the planner is able to manage and control the deliberations of the meeting. The way the participants value the contribution of the planner is critical. This makes power relations an important issue. A planner with a power advantage and who is capable of using that productively will have a more successful meeting than a planner who is working from a disadvantaged position.

The success of a strategy that a planner uses depends on the *informational power* that the planner may derive from a variety of information tasks, actions and activities. The strategy that a planner uses also affects the *pattern of information use* of the planner.

The understanding that I get from the interpretation of the Grounded Theory is that, although the environmental activities are presented as democratic, having a major goal of increasing participation of as many stakeholders as possible, the whole process is a power struggle with the planner “bargaining” through “information influence”. The planners use the *informational power* which they derive from a variety of information-related tasks, actions and activities (*pattern of information use*) that are possible because of their *role context, motivations, experiential knowledge* and *dynamic project information context* to

select and execute a strategy *for participation* that will enable them to direct the environmental planning process.

This brings to a close the interpretation of the seven categories of the Grounded Theory that were found to be essential in explaining the use of information in environmental planning. Before presenting a summary of the interpretation, I will look at *situated power*. Although *situated power* does not form part of the main categories discovered in this study, it was found that it is an intervening factor which may in one way or the other affect the strategies that the planners may select to deal with in an environment-related problem.

5.16 Situated power

While the planners see environmental planning as a multi-stakeholder process which require a dialogue amongst the stakeholders (Hemmati, 2002), they have also expressed the view that there are times where literally force is necessary to ensure good practices. Force is not used on everybody but on those that planners have identified as deviants to the norm or established polices of the country. In such situations, *situated power* becomes an instrument of enforcement, and punishments are sanctioned against the deviants.

When considering *situated power*, it was found that council provides the participants with a source of power by way of authority delegated to the individual to represent the national interest in arriving at decisions that serve the interests of the council and government in implementing the national environmental policies. This finding may seem to be undermining the superiority of the *informational power* base, but, as one respondent remarked, this should be invoked as a last resort. Beierle and Cayford (2002) also dismiss its effectiveness in dealing with environmental related issues. In fact, as pointed out by one respondent in this study, it (power derived from regulations and policies) should not be referred to because regulations are imperfect and when brought to the foreground people will always find some loopholes to use to fight back. This may even involve lawsuits that may curtail the environmental planning process.

However, this finding contradicts a suggestion by Van Woerkun and Van Meegeren (1990) who seem favourably disposed towards external motivations in the form of legal and financial punitives as essential and reinforcing the information-based motivation. Their argument was not, however, backed up by any empirical evidence. With empirical evidence their findings might be different.

5.17 Summary

In this chapter, I started by restating the Grounded Theory of the use of information in environmental planning and explaining how I understand it. I then presented a discussion of power as conceptualised in the information systems literature, showing its appropriateness to interpreting the Grounded Theory discovered in this study. The seven categories in the theory were interpreted from the power perspective to show how power relations can actually influence the contexts and processes that are described by the categories. For all the categories, power relations were found to be essential and the interpretation has shown that the processes and contexts arising from the environmental planning processes can be linked to power relations between the planners and the other stakeholders. The planners' involvement with information in environmental planning processes is a response to power relations. Lastly, I examined *situated power* as an intervening factor that can affect how the planners select a *strategy for participation*.

This interpretation of the theory provided interesting insights into the ways in which information is used in environmental planning and the understanding that we get has serious implications for the way we manage information for planners. For instance, as managers of information we need to ask ourselves a number of questions: How do we manage information for planners who are struggling in a network of forces due to power relations? What is the most appropriate way to ensure that the planners have information that is relevant to meeting the demands of changing power relations?

In the next chapter, I will address some of the implications of these findings for information management. I will also make some recommendations on approaches that could be taken to manage information for planners engaged in environment-related projects.

5.18 References

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Chapter 6: Conclusion

6.1 Overview

This chapter brings together the findings and the interpretation from the previous chapters in ways that make it possible to draw relevant conclusions. In the conclusions, I raise some questions relating to both the practice of and research into managing information for the planners when they are considering environmental issues in the development process. While some of the conclusions may be applicable to other contexts, this discussion is limited to the environmental planning process. I use general literature relating to managing information to substantiate my conclusions.

The objective of the study was to investigate the use of information in environmental planning using the case of Botswana. The study took a Grounded Theory approach to develop a theory of the use of information. The following research questions guided the study:

- a) What is the environmental planners' conception of information?
- b) How do environmental planners use information?
- c) What are the critical precursors to environmental planners' use of information?

These questions were addressed through an empirical study that was carried out during a period of one year in Botswana.

The data, analysis, interpretation, and discussions presented in this thesis are based on separate stages that involved a number of processes. These stages are:

- The use of interviews to collect data in accordance with the Grounded Theory method
- Searching for corroborating evidence
- Analysing data using the Grounded Theory techniques of coding data — open coding, axial coding, selective coding and constant comparison
- Theoretical sampling
- Discussing the emerging concepts and categories with respondents and experts

- Validating the theory through the respondents
- Interpreting the theory from the power perspective
- Reviewing literature (conducted in parallel with most of the stages)
- Drawing conclusions and pointing out areas for further research (this is the subject of the current chapter)
- Evaluating the study in terms of its contribution to the development of theory in information systems (see Chapter Seven).

Through the above processes, four different ways in which the planners conceptualise information were identified. These are the content conceptualisation, the physical form or source conceptualisation, the knowledge conceptualisation and the idea (or view) conceptualisation. The study found that the way information is conceptualised is situation dependent. Planners can only know what information is when they are performing an activity, because they recognise and define information in response to the situations arising from what they are doing.

The main contribution of the present study is the development of a Grounded Theory of the use of information for environmental planning. I discovered seven main categories that describe and explain the way planners use information. These categories are *dynamic project information context*, *role context*, *motivators*, *experiential knowledge*, *informational power*, *strategy for participation* and *pattern of information use*. The core category is the *pattern of information use*. In addition, I also found *situated power* as an intervening variable that may influence the *strategy for participation*.

The concepts and categories that were discovered came from field data and were reported in Chapter Four. They were illustrated with empirical evidence in the form of quotations from interviews that supported their existence. This was a way of grounding the findings in the field data. Moreover, the respondents validated the theory. Lastly, I interpreted the Grounded Theory from the “power perspective”, to gain further understanding of the use of information by the planners. The explanatory power of the theory proved to be remarkable in its ability to account for the planners’ use of information in a network of power relations that pervade the environmental planning process.

In this chapter, I attempt to link the findings to the ways of managing information. I suggest ways in which information managers can develop information systems that will be

productive in helping the planners to facilitate the environmental planning processes in the light of power relations that pervade the processes. Furthermore, I provide information on further research that needs to be done in this area. Lastly, I present some concluding remarks. In the next section I start by presenting my conclusions about the use of information.

6.2 Information use

In the present study it was found that the use of information by planners is linked to the pervasive power relations of the environmental planning processes. The study showed that whether we choose to understand the planners' use of information in terms of the information context, context of the roles, motivating factors, experiential knowledge of the planners or participation process, power relations constitute the central determinant of the *pattern of information use* exhibited by the planners. The observable information tasks, actions and activities of the planners are manifestations of the power relations that characterise the environmental planning processes. Interestingly, even the information tasks, actions and activities that characterise the *pattern of information use* exhibited can be explained in terms of power relations.

Power relations are a critical component of the environmental planning process. Planners experience power relations in distinct ways which determine the ways they approach and handle information. Power differences amongst the participants in the environmental planning process are mainly a result of the variations in the power bases of the participants. The main power base of the planners is *informational power* and is generated from the tasks, actions and activities that determine the *pattern of information use* that they exhibit.

The findings of the present study point to a mutual relationship between power relations and the *pattern of information use* exhibited by the planners. The *pattern of information use* that the planners exhibit can be understood as a reaction induced by power relations that a planner experiences at a particular moment. These power relations are always changing and are never quite the same at different moments in the environmental planning process. Likewise, the *pattern of information use* exhibited by the planners is always changing.

For example, the power relations that the planner experiences when dealing with experts in a project may predispose him or her to do more information verification. Another experience of power relations such as the involvement of the public, may predispose the planner to

more information packaging. Even the manner of packaging may differ in relation to the power relations experienced — e.g., where other stakeholders have the power to stop a project or where their influence is not that important. More than one component of the *pattern of information use* activities may be performed by the planner at any given moment.

On the other hand, the Grounded Theory posits that the planners engage in a *pattern of information use* that generates *informational power*. This *informational power* drives the *strategy for participation* during the environmental planning process. It can be argued that the *pattern of information use* affects the power relations experienced by the planner through its effect on the *informational power* base of the planner.

A second conclusion that can be drawn from this study on the use of information is in relation to the exercise of power by the planners. The planners exercise power in the planning process through the *strategy for participation*. The theory developed in this study posits that the *informational power* drives the *strategy for participation*. Therefore, the *strategy for participation* embodies mechanisms of power through which the planner exercises *informational power*. Power is exercised and only exists in actions (Introna, 1997). Likewise, it can be argued that the actions that take place in the execution of the *strategy for participation* are the ones in which power is exercised. These mechanisms are themselves sources of power and give the planners the capability to influence the decisions that result from the processes (*cf.* Pfeffer, 1981).

Examples of ways in which the planners exercise power could be through their influence on the selection of participants, the agenda items for meetings and the activities that lead to the final production of the plan. For instance, it is the planners who determine when a project is ready for discussion and who put it on an agenda for a meeting. The planner may, upon seeing a need, invite an expert to talk about an issue that he or she thinks is vital to the approval of a certain project. He or she may organise a workshop or a seminar before proceeding with a project.

The *strategy for participation* is normally characterised by a discussion that the planners initiate to get approval or disapproval of a project. I argue that the process of getting approval of the plans is actually a play of power mechanisms for “achieving or restoring agreement and redeeming validity claims” (Byrne, 2004 and Ngwenyama and Lee, 1997). In the process, a debate is opened with the stakeholders aiming at getting a common understanding of the proposals. Proposals are evaluated and subjected to questioning of the

beliefs and knowledge on which they are based. This results in the establishment of the legitimacy of the claims on which the plan is based (*cf.* Hirschheim and Klein, 1994).

The outcome of applying the *strategy for participation* is an approval or disapproval of an environmental plan. A plan that is approved is then binding, and implementation has to be as agreed. Likewise, disapproval leads to the plan not being implemented or altered for further consideration. In this regard, the *strategy for participation* is a way of exercising *informational power*. The use of information can be understood in terms of generating the *informational power* that conditions the power mechanisms for the production of the plans.

To summarise, the study has shown that power relations pervading the environmental planning processes are continually changing and thereby inducing certain information behaviours in the planners. It was found that the information behaviours that the planners exhibit in response to changing power relations are associated with the production of environmental plans. In this regard, it can be concluded that power relations affect the environmental planning processes through their effect on the information behaviours of the planners. Conversely, the information tasks, actions and activities performed by the planners generate *informational power* which affects the power relations in the environmental planning processes.

I regard the framework of power relations described above essential to our understanding of the way information is used in environmental planning processes. The framework sheds light on some critical areas that underlie the basis on which we manage information in general, as well as develop information systems that are relevant for the environmental planning process. In the next section, I discuss the implications of the above conclusions for the management of information in the environmental planning context.

6.3 Implications for managing information

The value of my theory would be little if I cannot link it to the management of information for environmental planning. McGee and Prusak (1993: 106) suggested that a “discussion of a strategy and role of information within strategy processes would be of little value without discussing how an organisation sets the process for managing information and an approach to developing an information architecture that grows out of the information management process”. Similarly, by linking my findings to the ways of managing information, I am

making them (the findings) more useful - hence, adding more value to the study through a contribution to practice.

Drawing from McGee and Prusak (1993: 106) it can be argued that the Grounded Theory developed in this study and the interpretation made provide a qualitative discussion of the way information is used in environmental planning. I am now taking the discussion further by providing a general overview of how the theory can contribute to the way information can be productively managed for the planners.

The concept of information management (or management of information) is used here in the generic form. While I acknowledge that it has many facets including the functions of libraries, information systems (information technology based) and experts (e.g., functions of specific knowledge workers and executive assistants) (McGee and Prusak, 1993), my focus is on the information systems. This is because information technology based systems pervade all the other functions and have made inroads on many aspects of information-related issues.

For instance, today's library functions are based on information technology systems. The manipulation of information by experts relies heavily on information technology based systems such as word-processing, statistical packages and the Internet for the distribution of information. I do acknowledge the importance of these other information management roles and I suggest it as an interesting area for further research to see their contribution to the environmental planning process.

6.3.1 The categories of the Grounded Theory of the use of Information and Information Systems

The Grounded Theory developed in this study shows that the information tasks, actions and activities of the planners are characterised by a *pattern of information use*. This *pattern of information use* is an outcome of context, motivation, experiential knowledge and participation factors. When developing information systems for planners, developers need to understand these factors and develop system functions that support or enhance the informational attributes that are linked to them.

Many authors have shown that information systems, especially those based on information technology, may influence the way information is used through their effect on:

- the information environment
- the acquisition of information
- packaging of information
- distribution and dissemination of information and
- the design of tasks and the execution of tasks

(McGee and Prusak, (1993); Davenport and Short, (1994); Davenport, (1997) and Butcher, (1998)).

Information systems influence the interactions that take place within a process, either directly or indirectly (Clemons and Row 1994: 168). By focusing on the interactions relating to information that the planners engage in during the environmental planning process, we can draw some conclusions on the ways the information systems could influence the planners' ways of using information in those interactions.

For instance, the information systems can influence the ways the planners *acquire and verify, package and give information*. Moreover, information systems can influence the *dynamic project information context* through its effect on the *access context, information sources and communication context*, including *people as sources of information* for the planners. The information systems can influence the roles of the planners through their effects on the contexts that define those roles.

Furthermore, the information systems can affect the motivating factors through their influence on the way the planners learn about new environmental issues and can also affect the strategies that are used in *influencing others*. The information systems can influence the acquisition of *experiential knowledge* through their effect on how the planners can interact with the project environment. Finally, the information systems can affect the *strategy for participation* by providing the planners with different ways of executing the selected strategies.

Table 6.1 below provides some details on how the categories of my Grounded Theory may be linked to information systems in ways that would support and facilitate the effect of the *dynamic project information context, role context, motivators, experiential knowledge, strategy for participation* and *pattern of information use* that generate the *informational power* base for the planners in the environmental planning process.

In Table 6.1 below, I present the ways in which information systems may affect the aspects that define the categories in the Grounded Theory as examples. There may be many more ways in which information systems could affect the categories. I am not providing a blueprint for designing an information system for environmental planning, but I am providing examples of the important factors that need to be considered to illustrate my discussion.

Aspect of the Grounded Theory of the Use of information for environmental planning	Examples of the way the aspect may be affected by information systems
Dynamic Project information context	
<i>People</i>	Information systems can facilitate the exchange of information between planners, the experts and the public.
<i>Information sources and Communication context</i>	Information systems can enhance communication through such technologies as email. The availability of information sources can be enhanced, e.g., providing information via the Internet.
<i>Access context</i>	Information systems can change the access context by making information more accessible to the planner.
Pattern of information use	
<i>Acquiring and verifying information</i>	Information systems can enhance the acquisition of information through the use of complex information retrieval systems.
<i>Packaging information</i>	Information systems provide different ways of manipulating the information through their capabilities of graphing, statistical processing and production of pictures.
<i>Giving information</i>	Information systems can improve the distribution and dissemination of information.
Role context	
<i>Value of information</i>	Information systems can influence the design of tasks by affecting the type of information used to accomplish the tasks.
Motivators	
<i>Orienting oneself</i>	Information systems can affect the way the planners learn when they encounter new situations. For instance, learning can take place over the Internet.
<i>Influencing others</i>	Information systems can affect the strategies for influencing others through their effect on the information and networking capabilities, the way the planner can inform their clients, etc.

Experimental Knowledge	Information systems can enhance the planners' experience using virtual environments.
Strategy for participation	Information systems can aid the success of the chosen strategy, e.g., meetings, conferences, and workshops. Information systems can facilitate the effectiveness of the meetings through such technology as computer supported meeting rooms. Through the use of conference systems, more productive conferences can be run.

Table 6.1: Categories with examples of how information systems can affect them

There is no doubt that information systems can play a critical role in enhancing and supporting the factors that drive the use of information as defined by the categories of the Grounded Theory discovered in this study. In designing information systems, I suggest that the focus should be on enhancing, enabling and nurturing the factors that determine the use of information. Those system functions should be developed to facilitate and enhance factors related to the contexts, motivations, experiential knowledge, strategy and pattern of information use that characterise the environmental planning process.

6.3.2 Information Systems and Power Relations

Studies in information systems have shown that one of the implicit assumptions in the development of information systems is that power is counterproductive and often leads to user resistance or system failure (see Kling, 1980; Markus, 1983; Zuboff, 1984, Beniger, 1986 and Markus and Bjorn-Andersen, 1987). Unsurprisingly, the positive effects of power were not discussed in these studies. This is because the studies were informed by the earlier conceptualisation of power in which it was viewed in a cause-effect relationship. In this regard, at any given time, power has to be in the possession of someone who eventually uses the power to further his or her interests (Knights and Morgan,1990).

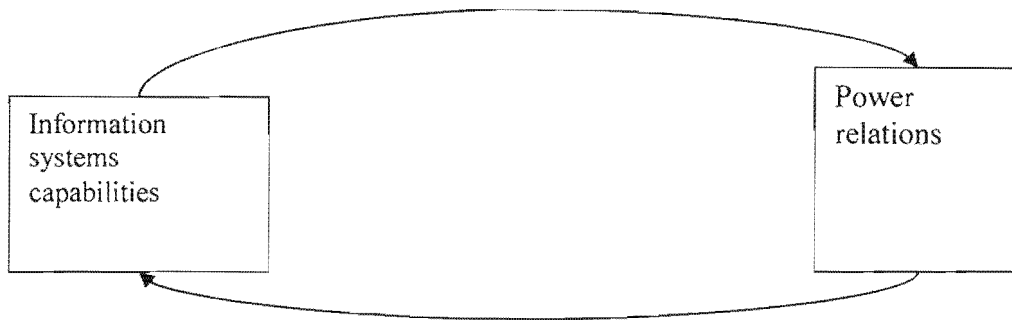
Information systems were viewed as essential in influencing the distribution of power in organisations (see Markus, 1983 and Zuboff, 1984), leading to a shift in the balance of power, with some people becoming “winners” and others becoming “losers”. This shift in power balance, as would be expected, creates a conflict, with the “losers” struggling to regain power while the “winners” “celebrate” their gains. Such conflicts usually resulted in the “losers resisting the information system that was responsible for the change in the balance of power (see also Travica, 2005).

In the light of how information systems could affect the power balances in organisations, much of the research in information systems has focused on power relations between the system designers and the users with a view to find ways in which user resistance can be minimised during the development and implementation of information systems (Sillince and Moukket, 1997).

However, this study suggests that power can be productive. Power relations have a positive effect on the environmental planning process. Differences in power relations can improve the quality of the process through their effect on the ways the planners use information. In the present study, it is suggested that power relations need to be treated differently in the development of information systems than has been suggested by previous research. Introna (1997) shares this view on the productiveness of power when he dismisses the earlier views on power by arguing that managers who strive to rise above power are bound to fail. This conclusion also compares favourably with the suggestion by Berghout *et al.* (2005) when they discussed the political (politics is here regarded as a manifestation of power) issues in information technology evaluations. They pointed out that politics will always be part of the decision-making process of organisations and there are benefits to be derived from these politics.

Figure 6.1 below illustrates the conclusion that I draw in relation to information systems and power relations in the environmental planning process.

Through their effect on the pattern of information use, the information systems lead to changes in the power relations



Power relations affect the information systems capabilities by influencing the kind of information tasks, actions and activities that need to be facilitated and supported by the information system

Fig.6.1. Relationships between information systems and power relations

As shown in Fig. 6.1 above, I suggest that it is productive to think of information systems in terms of their capabilities to influence the information-related behaviours that are induced by the power relations in the environmental planning process. Therefore, information system should be developed with the view to enhance their capability to influence the power relations that induce appropriate information behaviour.

Available studies have shown that information systems have an effect on power relations (Markus, 1983). Information systems can also be influenced by power relations (Introna, 1997, Byrne, 2004). Various studies that investigated the relationship between power and information systems have focused on the relationship between the organisational factors and development and implementation of information systems (Orlikowski, 1992; Sahay and Walsham, 1996; and Orlikowski and Robey, 1991). The studies have found that the structure within which information systems are developed and implemented shapes both the design and use of these information systems. Byrne (2004) points out that structural factors can be explored and used as tools for development of information systems. Information systems can be used to shape the structure as well as for understanding the kind of structures that exist and the way they are formed.

The present study took an information behaviour approach and found that the *pattern of information use* exhibited by the planners is induced by power relations experienced by the planners in the environmental planning process. The implications of this finding are that systems developers need to identify the information requirements of different power relations experienced by the planners by examining the *pattern of information use* exhibited in a given situation of the environmental planning process.

The system designers need to recognise that there is a mutual relationship between the power relations emanating from the environmental planning process and the information tasks, actions and activities that need to be facilitated and enhanced by the information systems. By considering this relationship, they will be able to provide information systems that are attuned to the work of the planners in generating the *informational power* that the planners require to facilitate the environmental planning process. I suggest the following as guiding questions for information system development in the environmental planning process:

- How can information systems enhance the generation of an informational power base for the planners?
- How can the power relations be transformed by the information system?
- How can information systems affect the power relations in the environmental planning process?

These questions will guide the information systems developers' efforts to develop information systems for the planners facilitating the environmental planning process. In this regard, the information systems developers are not attempting to overcome power. Instead, power is viewed as a productive and necessary part for the environmental planning process. The information system should enhance its influence in the environmental planning process by facilitating and supporting the factors that define a *pattern of information use* to generate the *informational power* base of the planner.

It should be noted that my conclusions do not provide a "blueprint explanatory model" for designing a specific information system for planners. However, I do provide a theoretical link to some of the salient issues espoused in the Grounded Theory on the use of information in environmental planning, and argue that these issues should occupy the minds of those who manage information or design information systems for planners. It should also be noted that I am not pointing at a specific information strategy to be employed, but to

significant informational factors identified in the Grounded Theory that could be supported and enhanced by information systems.

6.4 Areas for further research

The transfer of quality domain knowledge to the system developers has been identified as a problematic area in information systems studies (Belardo *et al.*, 2004: 43). The environmental planning process is not an exception considering the complexity of the process in relation to the information requirements, participation (Lang and Armour, 1980 and Ortolano, 1997), and the power relations that are inherent in the processes (Hemmati, 2002).

When managing information for the environmental planning process, the information managers ought to be involved in the environmental planning process. In that regard, the information manager will attain a substantial knowledge of the environmental planning domain and the processes that take place. The information manager should understand the *pattern of information use* that generates the *informational power* base in relation to the changing power relations that characterise the environmental planning process. By being involved in the environmental planning, the information manager develops extensive knowledge about the project and the teams or groups that have a stake in the process.

While the involvement of systems developers has been documented in information systems literature (Belardo *et al.*, 2004), it still remains a grey area when we consider the transfer of knowledge in situations where power relations are the drivers of the processes such as in environmental planning. This area needs further investigation to find ways in which information systems could support and enhance information-related factors that are generated in a network of power relations that drive the environmental planning process. Such research will further clarify the appropriate involvement that is required for the systems developers to appreciate the environmental planning process.

The findings of this study suggest that information managers for environmental planning processes need training as environmental planners rather than just being technical experts in information systems. This will enable them to appreciate the environmental planning processes in full. However, this suggestion does not follow directly from the findings and may seem like stretching the data too far. This area will need exploring in future research

on the issues of managing information for the environmental planning process. With more data, it will be possible to make statements that are more definitive.

Alternatively, the planners can be educated to manage information in their organisations. For instance, I found two councils that had geographical information systems technology installed, but the planners were not using it. They claimed that they only received minimal training through an in-service training program – hence, they could not operate the system. The planners described the system as a “white elephant” which had no function in the council.

The planners need skills enhancement programs for them to be fully involved in the development and actual use of information systems. Such programs will help the planners to exploit the information systems in their environmental planning endeavours. I find this an area that still needs to be investigated to develop methodologies that may improve the use of the technologies by the planners. We need to examine the kind of skills that are required and the best ways to develop those skills.

I acknowledge that many researchers have recognised the issue of power in information systems. In general, their focus has been on addressing power relations with the view of delivering information systems that are acceptable to the end-users (Howcroft and Wilson, 2003 and Avison *et al.*, 2004:37). My study suggests that the power relations among the stakeholders in environmental planning are themselves critical to the way the information is used by the planners even before the introduction of formal information systems.

In the present study, power relations were treated as a one-dimensional construct. This is a rather simplified way of looking at power. Power relations are complex. It will be productive to consider power relations as a multidimensional construct. This will give a better understanding of how power relations affect information behaviour. Further research is required in this area. We need to explicitly know the *pattern of information use* that different power relations elicit. I recognise that it would be very difficult because of the nature and “fluidity” of power in that sometimes people are involved in power relations unconsciously. However, this area needs further research if we are to inform the development of information systems for environmental planners.

Some interesting questions in this area that future research needs to address include: What are the different patterns or structures of power relations responsible for the particular kinds

or *pattern of information use*? What are the cognitive, physical and affective conditions that are related to power relations and the way planners use information?

Information researchers need to observe the power relations in the environmental planning process from which they can distil theories that inform the information management practices for planners. In addition, the information managers should take an active role in nurturing the relevant information behaviours that are elicited in response to the power relations in environmental planning.

I believe that the use of information as explained from the power perspective is extremely promising in advancing our understanding of the way information is used in the environmental planning process. However, we do not have standard methodologies for information systems interventions from such a perspective. It is imperative that our research focuses on the development of methodologies that explicitly capture power relations and opportunities they provide for information systems interventions.

6.5 Concluding remarks

This study has provided a general overview of the major factors that need to be considered in relation to the use of information in the environmental planning process. I identified frameworks for understanding the use of information in the context of these processes. It was found that the information behaviour exhibited by the planners could be explained in terms of power relations. These findings could have a profound effect on the way we research and practice information management for planners.

In relation to the development of information systems, I identified a framework of the range of issues that need to be considered to provide information systems that will enhance an appropriate *informational power* base for planners to participate meaningfully in environmental planning. Secondly, I suggested research questions that are important for future research to enhance the development of information systems for environmental planners. These questions pose challenges to those who are researching information management for planners to consider power relations among stakeholders as essential to understanding the way information is used. Power relations should be viewed as critical components of the environmental planning process that determine the information behaviour exhibited by the planners. Power can be productive and the development of information

systems should aim at enhancing those information behaviours which are determined by the power relations experienced by the planners.

Power should not be looked at as counterproductive or an obstacle to the development of information systems, but rather as a component of the environmental planning process that needs to be analysed to inform the development of information systems for planners. Moreover, the factors that define the way the planners use information emerge in response to the changing power relations among the stakeholders in the environmental planning process. Therefore, the management of information for planners should be responsive to the changing power relations as well.

Information managers ought to be deeply involved in the environmental planning process. It is only when they are fully involved in the process itself that they can understand the power relations involved. This will enable them to manage information to meet the demands of the processes that are driven by those power relations.

Information management processes should aim at enhancing the activities that define the *pattern of information use* that generate the *informational power* base of the planners. Information systems should be developed with a view to support and facilitate the planners' processes of *acquiring and verifying information, packaging information* and *giving information* in response to the emerging power relations.

The guiding questions in the design of information systems for planners should be: How can information systems support information requirements that are induced by the power relations in the environmental planning process? Secondly, how can the power relations be transformed by the information systems? We should be thinking of information systems as supporting, enhancing and nurturing the contexts, motivations, knowledge, strategies and resulting information tasks and activities in the environmental planning process.

The information systems should "leverage" the planners' capabilities to generate the *informational power* to counteract the power bases that they encounter during the project process. In that regard, information systems for planners engaged in environmental planning projects should address the following:

- The information systems should enhance the scope of *dynamic project information context*. The information systems should help the planners to see more potential in the information environment and to have a more holistic impression of the possible help that they could get as they enter the environmental planning process. Through

the information system, the planner should see a wider scope in terms of information sources, removal of communication barriers, improved access, as well as an improved environment for contacting and consulting people who may be valuable sources of information.

- The information systems that we provide to the planners should enhance their learning environments in varied forms. This is important because the planners are not environmental experts and as they have reported, they sometimes encounter new issues that they struggle with in the environmental planning process. In addition, the information should support the planners to “leverage” their strategies of *influencing others*.
- Lastly, the information systems should support and enhance the acquisition, verification, packaging and giving of information.

To summarise, power relations are essential determinants of information-related factors that characterise the use of information by the planners in the environmental planning process. The *informational power* is essential for the planner to facilitate the environmental planning process. Therefore, it makes logical sense to nurture, support and facilitate those factors that generate *informational power*. Information systems that do not focus on the information-related factors that are generated by power relations will miss opportunities for supporting the planners’ endeavours to facilitate the environmental planning process. An awareness of the importance of power relations and the *dynamic project information context, role context, motivators, experiential knowledge, strategy for participation and the pattern of information use* they (the power relations) generate can guide the development of useful information systems for planners.

6.6 References

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Chapter 7: Evaluation

7.1 Introduction

This chapter presents an evaluation of the present study. I use the models of Whetten (1989) and Klein and Myers (1999) to evaluate my research. The study used the Grounded Theory method to investigate the use of information for environmental planning. The method puts emphasis on the generation of a theory from the data. The phenomenon that is studied is described by categories that emerge when the Grounded Theory techniques of coding (open, selective and axial coding), constant comparison and theoretical sampling are applied to collect and analyse the data (Strauss and Corbin, 1998).

I interpreted the Grounded Theory that I developed in terms of power relations. The conclusions I drew show that power relations are pervasive in the environmental planning process and determine the ways in which the planners use information. These conclusions translate into implications for developing information systems and information management for planners. I also identified areas for further research.

Theories are essential for the development of knowledge in a discipline. Research seeks to develop valid and grounded theories that speak “to the issues and concerns of those we study”. The usefulness of a theory is judged by its explanatory power to account for the variations that are related to the phenomenon that it purports to explain (Strauss and Corbin, 1998: 265).

In this study, I validated the Grounded Theory with the respondents. However, it will be instructive to critique it in a more objective way. This will provide an interesting view on how readers may judge the theory. There are various ways in which a theory can be evaluated (Strauss and Corbin, 1998: 265). However, I find the criteria developed by Whetten (1989) and Klein and Myers (1999) relevant to the current study. I shall use both sets of criteria to evaluate the present study.

7.2 A Set of principles for conducting and evaluating interpretive field studies in information systems

Klein and Myers (1999) developed seven principles for conducting and evaluating interpretive field studies in information systems. Table 7.1 below provides a summary of the seven principles as espoused by the authors.

<p>1. The Principle of the Hermeneutic Circle</p> <p>This principle suggests that all human understanding is achieved by iterating between considering the interdependent meaning of parts and the whole that they form. The principle of human understanding is fundamental to all the other principles</p>
<p>2. The Principle of Contextualisation</p> <p>Requires critical reflection of the social and historical background of the research setting, so that the intended audience can see how the current situations under investigation emerged</p>
<p>3. The Principle of Interaction Between the Researchers and the Subjects</p> <p>Requires critical reflection on how the research materials (or “data”) were socially constructed through the interaction between the researchers and participants</p>
<p>4. The Principle of Abstraction and Generalisation</p> <p>Requires relating the idiographic details revealed by the data interpretation through the application of principles one and two to theoretical, general concepts which describe the nature of human understanding and social action</p>
<p>5. The Principle of Dialogical Reasoning</p> <p>Requires sensitivity to possible contradictions between the theoretical preconceptions guiding the research design and the actual findings (“ the story which the data tell”) with subsequent cycles or revision</p>
<p>6. The Principle of Multiple Interpretations</p> <p>Requires sensitivity to possible differences in interpretations among the participants and are typically expressed in multiple narratives or stories of the same sequence of events under study. Similar to multiple witness accounts even if all tell it as they saw it.</p>
<p>7 The Principle of Suspicion</p> <p>Requires sensitivity to possible “biases” and systematic “distortions” in narratives collected from the participants</p>

**Table 7.1. Summary of Principles for Interpretive Field Research
(Adapted from Klein and Myers (1999: 72))**

The seven principles described in Table 7.1 above are based on the philosophy of hermeneutics and were derived by Klein and Myers for conducting and evaluating interpretative field research which is hermeneutic in nature (Klein and Myers, 1999: 68).

While the hermeneutic nature of the Grounded Theory method cannot be taken at face value, Rennie (2000) argues that the techniques that are used to develop the theory are themselves hermeneutic. Hughes and Jones (2003) contend that the Grounded Theory method as used in extant information systems research fits well with the interpretivist type of research. Nevertheless, in anticipation of readers who may take issue with my assumptions of the hermeneutic nature of the Grounded Theory method, I start by providing a justification to that effect.

In his essay on "Grounded Theory as Methodical Hermeneutics", Rennie (2000) argues for the hermeneutic nature of Grounded Theory. Drawing from extant literature sources, he points out that "hermeneutics traditionally has been defined as a theory of interpretation of text that is difficult to understand" (p.496). Similarly, the application of Grounded Theory involves "understanding the meaning of texts of various sorts, whether as notes of participant observation of social conduct, extant writings or transcriptions of interviews" (p. 481).

According to Rennie, people following the Grounded Theory method represent their understandings in the form of categories and the relations amongst the categories. He gives an example of an analyst who conducts interviews and analyse data according to Grounded Theory techniques. Rennie points out that as the analyst conducts the interviews, he or she enters the hermeneutic circle. The analyst will have a sense of the text given by the respondent even before it is transcribed. Transcribing the text deepens the understanding, and this already gives the analyst a sense of the meaning of the whole text. The understanding that the analyst has of the whole text influences the understanding of the parts of the text during the analysis. Likewise, the understanding of each part of the text influences the understanding of the whole text.

The nature of the techniques for collecting and analysing data according to the Grounded Theory method makes the process follow the hermeneutic principles. When viewed within the broad framework of the theory of hermeneutics (theory of interpretation), the Grounded Theory method is hermeneutic. For that reason, I find the set of seven principles for

conducting and evaluating interpretive research in information systems developed by Klein and Myers appropriate for evaluating a research using the Grounded Theory method.

In the next section, I shall provide an evaluation of my study using the set of principles developed by Klein and Myers (1999).

7.2.1 The fundamental principle of the hermeneutic circle

This principle is regarded as the most fundamental and it guides the application of the other six to the interpretation of the field study material (Klein and Myers, 1999: 79). In this study, the application of the fundamental principle of hermeneutics could be illustrated by the way I developed the Grounded Theory as well as how I interpreted the theory.

As suggested by Rennie (2000), I entered the hermeneutics circle when I collected, transcribed and analysed the data. I got the sense of the whole text given by the respondent at the time of conducting the interviews. In choosing to transcribe the data myself, I deepened my understanding of the text. During the analysis of the data, my understanding of the whole text influenced my understanding of the parts of the text when I was coding the data. Similarly, my understanding of the parts of the text influenced how I understood the whole text and the way I framed the subsequent interviews.

The process of developing the theory involved shifting between various frameworks (wholes and parts). For example, I examined the concepts to understand them in relation to the categories; parsimony of the theory in relation to the comprehensiveness of the theory; empirical evidence in relation to logical sense; text units in relation to categories and categories in relation to processes. The discussion and examples given below illustrate how the fundamental principle of the hermeneutic circle was applied in the present study.

The Grounded Theory for the present study was developed from field data collected using open-ended questions. The most critical factor in the development of the theory was the identification of concepts and categories. Naturally, the coding process yields a substantial number of concepts and categories, which if all retained will make the theory very complex. I tried to strike a balance between parsimony and comprehensiveness by applying a variety of frameworks to interpret the findings. It was important to retain only those categories that are significant to understanding the use of information.

There was a need to maintain logic. In deciding whether to maintain a link between any two categories I was guided by the fact that there was both empirical evidence to support the link and that it makes logical sense to keep the link. Special attention was taken to avoid overlaps or giving the categories or subcategories different names while in fact, they should be one. Stated differently, I tried to avoid separating categories or subcategories that are not supposed to be separated. The examples given below illustrate how I achieved the result.

The first example relates to the category *dynamic project information context* and its subcategories: *people*, *information sources and communication context* and *access context*. A cursory view would point out that *people* and *information sources* would fit together as one subcategory because people are being used as information sources. However, such a combination undermines the underlying characteristics that make people different from other information sources. These include such factors as the willingness and ability of the person to participate openly as a source of information. This way of categorisation is hermeneutic in that it is only by considering the person as a source of information (part) in relation to other factors (wholes) that it makes sense to put *people* as a subcategory separate from information sources in the theory.

Another interesting area was the identification of the core category - *pattern of information use*. While the *informational power* may be seen as an equally competing category, the choice of the *pattern of information use* as the core category makes logical sense because it takes a central position in relation to all the other categories. In addition, the *informational power* is generated from the processes of the *pattern of information use*. Hence, the *informational power* is incidental even though it may be viewed as driving the environmental planning process.

Secondly, anchoring the categories in the processes where they occur helped in resolving complex theoretical issues related to the use of information within the environmental planning process. I was able to understand the use of information as a dynamic entity that is continuously changing with the processes. My Grounded Theory explains the use of information in relation to the interactions and actions of the planners. The use of information is not dissociated from the processes of environmental planning. They take place together and they are intertwined. Therefore, it is by interpreting the use of information (part) in relation to the environmental planning processes (whole) that it is possible to get an understanding of how the information is used by the planners.

The Grounded Theory was subjected to an interpretation which is also hermeneutic in nature, using a “power perspective”. The categories (parts) were seen to be robust in accounting for the use of information in power relations (wholes) that emanate from the environmental planning process.

In conclusion, it can be pointed out that the manner in which the Grounded Theory was developed and interpreted complies with the fundamental principle of hermeneutics as espoused by Klein and Myers (1999).

7.2.2 The principle of contextualisation

This study is explicit on the application of this principle. I provided an account of the context in which the subjects studied use information. The study sets the subject matter in its historical, political and development context by providing background information on the setting, role of the councils and the development planning system in Botswana. I also provided an account of the interdisciplinary nature of the environmental planning process and noted that the planners are normally not environmental experts. The way in which environmental planning is viewed in the development context was discussed and the different groups of people that have an interest in environmental planning were highlighted.

Another context factor discussed is related to the factors that affect the adoption of environmental planning projects in Botswana. This includes the influence of international conventions that the Government of Botswana has signed and the other government policies relating to environmental issues.

In the presentation of the findings, I explored and analysed the context and related it to the information tasks and activities of the planners. I reported the result of the analysis of the context prior to presenting the Grounded Theory of the use of information for environmental planning. This presentation helps the reader to get a sense of how I located the emerging Grounded Theory in the work of the planners.

Finally, I provided an account of how the participants perceive the information environment in which they work. I used quotations from the interviews to provide background information on how the participants feel about the availability of the information they are supposed to use in the environmental planning process.

The exploration of the context culminated in locating the informational tasks and activities of the planners in the environmental planning process. I found that the informational elements are bound by the planners' motivation, power and authority and the factors relating to the projects, roles, tasks and activities.

7.2.3 The principle of interaction between the researcher and the subjects

My research procedures are explicit on the way I interacted with the respondents to get data. I reported how I related to the subjects. First, I stated that participation was voluntary. Participants had a choice to participate or not to participate. Even those who chose to participate were free to decline answering questions that they did not feel comfortable with. I also provided a detailed account of how I sought permissions to carry out the study. Such reporting gives the reader an idea of the kind of environment in which the data was collected.

During the course of data collection, I realised that the respondents were more at ease to talk in relation to specific projects, rather than in general terms. This meant that I had to change my strategy to interview the respondents about projects in which they were involved. The respondents were free to choose a project that they felt comfortable to talk about. The way questions were phrased, such as "Tell me about..." affected the way the respondents responded. In the methodology chapter, I also reported how the interviews engaged the participants.

7.2.4 The principle of abstraction and generalisations

The Grounded Theory techniques that included the coding process, constant comparison and theoretical sampling, provided a way of understanding the phenomenon in an abstract way. Therefore, the theory that I produced is not just a reflection of the data but is an abstract way of understanding how information is used in environmental planning.

The second level of abstraction is the interpretation of the Grounded Theory from the "power perspective". I focused on the manifestation of power in the categories that define the Grounded Theory. I linked the category of *informational power* to the power relations that are pervasive in the environmental planning process. I used the interpretation to draw

useful conclusions on the ways in which the planners use information. The conclusions also show how power relations can affect the information behaviour of the planners. Finally, I presented some implications of the findings for the development of information systems.

7.2.5 The principle of dialogical reasoning

The application of this principle is probably the most difficult to discern in the present study. The nature of the Grounded Theory method emphasises “bracketing”, in which the researcher identifies and suspends what he or she already knows about the phenomenon being studied (Backman, 1999). However, it is not practical for the researcher to completely suspend what he or she already knows. Interpretation is subjective and the individual prejudices and biases are the ones that create the understanding.

The present study begins with an “orienting theory” which sets the intellectual basis of the research. I adopted a behavioural approach in this study. An information behaviour framework was used for developing research questions as well as guiding the development of topics for the first wave of interviews. I also borrowed from the theory of structuration (Giddens 1984) to include questions that could enable me to capture how the structure may either constrain or enable the way the planners use information. The Grounded Theory method underpinned by the philosophy of symbolic interactionism also provides an intellectual basis of the present study (Strauss and Corbin, 1998).

7.2.6 The principle of multiple interpretations

This principle was applied in the way I dealt with the category of *situated power* in the development of the Grounded Theory of the use of information for environmental planning. The category accounts for the conflicting behaviours which are exhibited when the power base of the planners shifts from the *informational power* base to a coercive power base. Although the influence of *situated power* is regarded as uncommon in the way the planner executes the *strategy for participation*, its influence cannot be completely ignored. I presented *situated power* as an intervening variable to the development of the *strategy for participation*.

7.2.7 The principle of suspicion

I was critical about the evidence that the respondents gave me. I applied the principle of suspicion in the way I sought corroborating evidence. As categories were developed, those concepts and categories for which I did not have convincing evidence were put in subsequent interview guides to explore them further to get more evidence and examples to support the claims that were made.

Evidence from people outside the councils was used to confront the claims made by the planners. For instance, when a respondent claimed that a project was successful, I also looked for the views of other people outside council to corroborate such claims to find out whether it was just the view of the planner or a correct reflection of what actually happened. During the interpretation of the data, one example was not taken as enough to illustrate the existence of a category. More examples were sought by asking further questions relating to those concepts and categories that were not convincingly represented by the data that was available.

In conclusion, the evaluation of the study using the model of Klein and Myers (1999) shows that the study has complied with the seven principles for conducting and evaluating an interpretive field study in information systems. The seven principles have provided me with an objective evaluation of the study in terms of the interpretative nature of the procedures employed. In the next section, I use the model of Whetten (1989) to evaluate the study in terms of the theoretical contribution that it makes to information systems research.

7.3 Whetten's model for determining what constitutes a theoretical contribution

The model of Whetten (1989) for evaluating a theoretical contribution provides seven factors or questions that need to be asked about the findings of a study. These questions are as follows: *What is new? So what? Why so? Well done? Done well? Why now? Who cares?* These questions guide the evaluator to come up with a holistic and objective evaluation of the theoretical contribution to knowledge. In the next section, I shall apply the model to provide an evaluation of the present study.

7.3.1 What is new? Does the study make a significant value-added contribution to current thinking?

The contribution that the current study makes is threefold. First, the study contributes a Grounded Theory of the use of information in environmental planning. The theory is relevant to the substantive area in which it was developed. A second contribution is the interpretation of the theory. The study has shown how power relations, pervasive in the environmental planning process, are necessary if not sufficient to explain the information behaviours that are exhibited by the planners.

The third contribution relates to the development of information systems. The findings of the study translate into implications that rebut assumptions inherent in the traditional approach to developing information systems in which power was associated with resistance of users and the ultimate failure of information systems. The study has shown that power can be productive and need to be examined to see the information requirements of the planners that are related to the information behaviours induced by power relations experienced by the planners in the environmental planning process. Relevant information systems should be attuned to information behaviours that are induced by the power relations. The study provides a conclusion based on the Grounded Theory to show how power relations and information systems capabilities ought to be mutually related if the information systems we develop in support of environmental planning are to be relevant.

7.3.2 So what? Will the theory likely change the practice of Information System research?

This study shows that the behavioural approach with a focus on the ways people use information has a potential to contributing to the way we approach and develop information systems. The findings challenge the assumptions on which the traditional development of information systems has been based. Furthermore, in the concluding chapter, I provide a number of research areas that future research needs to address. The research questions were derived from the gaps that were exposed by the current research as areas that need to be investigated to add to the suggested ways of thinking about the development of information systems, power relations and the information behaviours of planners.

7.3.3 Why so? Are the underlying logic and supporting evidence compelling?

The study has shown how the theory grew from broad contextual factors as I continually refined the emerging concepts and categories and assessed them against the incoming data. Quotations from data were used as evidence to support the categories. The resulting theory was interpreted from the “power perspective”, thus, adding more value to the theory in terms of showing its explanatory power in accounting for the way information is used to deal with power relations emanating from the environmental planning process. The interpretation of the theory allowed me to draw useful conclusions as well as develop questions for guiding those tasked with developing information systems to support information behaviours induced by power relations in the environmental planning process.

The study provides useful insights on the use of information by planners. While I do not claim that the theory provides answers to all questions that may be asked about managing information for environmental planners, it does provide a framework that enables appropriate questions to be raised when setting up an information management strategy for planners. This was achieved by giving pointers to the salient issues in the use of information for environmental planning.

It should be noted that I focused on broad issues associated with the use of information in the environmental planning process and this brought to the surface assumptions held by the planners about the use of information.

7.3.4 Done well and well done? Is the thesis well written, does the thesis reflect seasoned thinking?

In presenting the study, I provide the reader with an account of its development. First, I put forward my motivation to carry out the study. I also provide a layout of the research questions that I sought to answer as well as the objectives for carrying out the study. An outline of the thesis is provided to guide the reader on what to expect in each chapter.

Each chapter begins with a short summary to tell the reader what it contains. After presenting the material of the chapter, a summary of the presentation is given to bring the important issues together to help the reader to reflect on what he or she has read. At the end I highlight what the next chapter contains.

To make it easy for the reader to follow the study, I used examples to illustrate claims that I make as well as concepts that I consider difficult and may hinder the understanding of the presentation.

Chapter two provides a critical analysis of the literature on the use of information. Strengths and weaknesses of theoretical propositions on the use of information were identified and where appropriate I linked the literature on the use of information to the development of information systems. Chapter three presents the methodology that was used to carry out the study. The chapter gives the reader a sense of how I selected the methods and the assumptions on which these selections were based. I also provided an account of the procedures that were followed to collect and analyse data.

I presented the findings such that I show the reader how the Grounded Theory emerged from the data until it reached its final level when it was fully developed. In order to substantiate my claims I presented the Grounded Theory with several quotations from the data. This is a way of showing how the theory is grounded in the data.

The next stage was the interpretation of the Grounded Theory. This provides an account of my understanding of the Grounded Theory. It also shows the meaningfulness of the categories in explaining the use of information by planners. Based on the interpretation of the theory I showed how I drew useful conclusions that have interesting implications for developing information systems. Various literature sources were used to substantiate the findings.

7.3.4 Why now? Is the topic of contemporary interest to scholars in this area?

This study takes a unique approach to information systems research in which the people and information are central to the analysis. The approach is behavioural. The present study is appealing to the current thinking that is proposed in information management models such the Information Ecology model by Davenport (1997) and the Information Orientation model by Marchand *et al.* (2001), in which the focus on the information and people (information behaviour) is seen as paramount to productive information management practice.

My theory is widely focused in that it brings together elements of context, motivation, information behaviour, knowledge, participation and power to explain the way the planners use information in the environmental planning process.

7.3.5 Who cares? What percentage of academic readers are interested in this topic?

This study is of interest to many people. First, to academics and professionals in Information Systems Development. The study challenges the assumptions on which the development of information systems has been based. In that regard, the study calls for a rethink of those assumptions. In addition, the study identifies some interesting research areas that need to be investigated. The study is also significant to planners themselves as it provides them with ways to reflect on the effect of information in the environmental planning process.

The evaluation of the study using the model of Whetten (1989) shows that the study makes a significant contribution to the development of theory in information systems. The study also suggests a new way of thinking about the development of information systems for people performing work roles.

To summarise, this chapter provided an evaluation of the current study using two models, the model of Klein and Myers (1999) and the model of Whetten (1989). The models provided me with an objective way of examining the value of the study. The evaluation showed that the study complied to a large extent with the criteria provided by the two models.

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Data Analysis – The development of concepts, categories and establishment of relationships

A.1 Introduction

This appendix provides an account of the development of the concepts and categories, and the subsequent relationships that were discovered among the categories, leading to the development of the Grounded Theory described in Chapter four of this thesis.

The initial coding of the data from the interviews yielded several concepts and categories. Each of the discovered concepts and categories was examined many times with the view to establish its viability. This intensive examination of the concepts and categories resulted in some of them being deleted because there was not enough evidence to support their existence. Concepts and categories which were found to be similar were merged. Lastly, the substantive categories and subcategories were discovered and the relationships among them established.

The coding of the data was a long process, which involved reading through the data several times and giving conceptual labels to the data. After several trials of examination and re-examination of the data in different ways possible, the conceptual labels on the data translated first into seventy concepts and categories, then forty-four concepts and categories. Lastly, eight categories were discovered.

The concepts and categories discovered in this study emerged at various stages of the data analysis. The initial stages were considered to be transitional and they were characterised by situations where I reached some points where I could not discover new ways of categorising the findings without applying a different “scan” to examine the findings further. Therefore, the concepts and categories discovered during earlier stages were provisional until the last stage when the eight categories were discovered. Examples of these stages (provisional concepts and categories) are given below and include those stages when seventy and forty-four concepts and categories were discovered respectively.

The next section provides lists of the concepts and categories that were discovered.

A.2. The first seventy categories discovered

Key:-

- ***Bold and Italic*** – Name of the category (note that in some cases categories have been given more than one name. This means it was not possible to come up with only one name at that stage)
- / (forward slash) – separates concepts and or categories that have been merged or put together because evidence showed that they were similar.

A.2.1 Seventy categories

1. *Acquired knowledge/Experience helping the accomplishment of tasks/* Declarative content knowledge/ Tapping from experience/ Have been in the job longer/ Seen the project before
2. *Common sense determined actions/* Gut feeling and believe/ Use of common sense
3. *Experience success syndrome*
4. *Acquiring information*
5. *Actualising own viewpoint/* Wants ones position or point of view to prevail in the project/ Engaging in winning tactics/ Making a defence/ Fighting ignorance/ Waging war

6. *Influencing stakeholders/* Using information to influence behaviour/ The counselling planner/
7. *Building informing networks/* Networking
8. *Buying support/ Garnering support/*
9. *Creating a positive image/* Winning the support of the boss/ Getting approval/ Bargaining through case examples/ Positive affirmation/ Information as a tool for gaining support/Information as a tool for positive affirmation
10. *Caucusing /*Small talk in the office/ Brainstorming/ Creating a common understanding
11. *Context determined access to information/* Unconditional access/ Free access/restricted access
12. *Context determined communication/*Communication recipient influence/Individual determined communication/ Project determined communication.
13. *Triangulating communication methods*
14. *Triangulating information sources*
15. *Context determined use of information source/* Internal (production) determined use/ Owning agency determined use/ External (production) determined use
16. *Contextualised role/*role dynamism/ High effort requiring role/ Low effort requiring role
17. *Convincing with information/* Engaging in convincing tactics or strategies
18. *Cracking the whip through the law* (the use of force/power) **by a role player/** Applying punitive measures/ Forced behaviour change/ Showing the power of the law
19. *Educating the stakeholders/* Educating the client/ Guiding the stakeholders/ The advising planner
20. *Providing access/*Planner as an information access provider
21. *Engaging in learning tasks/* Evoking learning modes
22. *Exchanging information*
23. *Extent of availability or non availability of information determines the approach taken by the planner to handle a situation.*
24. *Using information as a lever/*Extent to which available information can enable the planner to put forward a case, defend it and convince stakeholders
25. *Gathering information/* Sourcing information
26. *Giving information/* Planner as a service provider
27. *Ground softening strategies/* Make work easier – Easing tasks
28. *Guiding against misinformation*
29. *Information as a determinant of confidence level performance*
30. *Information influence on the enthusiasm of involvement*
31. *Information process facilitation*
32. *Information sharing*
33. *Informational power*
34. *Informing bosses*
35. *Informing stakeholders*
36. *Informing peers*
37. *Informing subordinates*
38. *Justifying actions*
39. *Leading by example*
40. *Learning endeavours*
41. *Boosting confidence*
42. *Understanding the client*
43. *Gaining competence through information*
44. *Newcomers fail syndrome*
45. *Packaging information/* Extracting information/ Facilitating access
46. *Producing information products*
47. *People as misinforming agents*
48. *Planner as a custodian of standards/policing*
49. *Planner as a transmitter of information*
50. *Receiving information*

51. *Requesting for information*
52. *Role defined information activities*
53. *Role dependent participation*
54. *Role determined access*
55. *Role determined communication*
56. *Selective participation*
57. *Selective use of information sources*
58. *Selective use of strategy for participation*
59. *Showcasing*
60. *Showing by examples*
61. *Speciality/expertise determined use of information*
62. *Standing communication*
63. *Strategising*
64. *Strategy for participant selection*
65. *Engaging in strategy/tactics for influencing*
66. *Structuring the delivery of information*
67. *Supporting expert activities*
68. *Teaching by examples*
69. *Use of existing structures to pass information*
70. *Verifying information/ Comparing information*

The concepts and categories given above were further examined in conjunction with the incoming data. This led to the discovery of forty-four concepts and categories which are listed in the section below.

A.3 Forty-four Concepts and categories resulting from the re-examination of the seventy (listed above)

The concepts and categories given below were discovered after further examination of those that are listed in the previous section. Forty-four concepts and categories were discovered.

Key:-

- ***Bold and Italic*** - represents the main concepts and categories carried forward from those that are listed in the previous section.
- The name of the concept or category that is given first in each group is considered as the primary one.
- ***Bold, Italic and Underlined*** represents concepts and categories that were given new names.
- / (forward slash) – separates concepts and categories that have been merged or put together because evidence showed that they were similar.

A.3.1 Forty-four Categories

1. *Acquired knowledge/Experience helping the accomplishment of tasks/ Declarative content knowledge/ Tapping from experience/ Have been in the job longer/ Seen the project before*
2. *Common sense determined actions/ Gut feeling and believe/ Use of common sense*
3. ***The value of experience/Experience success syndrome/ Newcomers fail syndrome***
4. *Actualising own viewpoint/ Wants ones position or point of view to prevail in the project Engaging in winning tactics/ Making a defence/ Fighting ignorance/ Waging war*
5. *Influencing stakeholders/ Using information to influence behaviour/ The counselling planner/ Convincing with information/ Engaging in convincing tactics or strategies/ Engaging in strategy/tactics for influencing*
6. *Building informing networks/ Networking*

7. *Creating a positive image/* Winning the support of the boss/ Getting approval/ Bargaining through case examples/ Positive affirmation/ Information as a tool for gaining support/Information as a tool for positive affirmation/ *Showing by examples/ Showcasing*
8. *Caucusing /*Small talk in the office/ Brainstorming/ Creating a common understanding/ *Buying support/ Garnering support/*
9. *Context determined access to information/* Unconditional access/ Free access/restricted access
10. *Context determined communication/*Communication recipient influence/Individual determined communication/ Project determined communication/
11. *Triangulating communication methods/*Standing communication
12. *Context determined use of information source/* Internal (production) determined use/ Owning agency determined use/ External (production) determined use / *Triangulating information sources/Speciality or Expertise determined use of information/ Selective use of information sources*
13. *Contextualised role/*Role dynamism/ High effort requiring role/ Low effort requiring role/ *Role dependent participation/Role determined access/Role determined communication/ Role defined information activities*
14. *The use of force/power/cracking the whip through the law by a role player/* Applying punitive measures/ Forced behaviour change/ Showing the power of the law/ *Planner as a custodian of standards/policing*
15. *Educating the stakeholders/* Educating the client/ Guiding the stakeholders/ The advising planner/ *Teaching by examples*
16. *Acquiring information*
17. *Gathering information/* Sourcing information
18. *Giving information and Receiving information*
19. *Requesting for information*
20. *Getting information*
21. *Engaging in learning tasks/* Evoking learning modes
22. *Exchanging information/ Planner as a transmitter of information/ Information sharing*
23. *Using information as a lever/*Extent to which available information can enable the planner to put forward a case, defend it and convince stakeholders/ *Information as a determinant of confidence level performance/Information influence on the enthusiasm of involvement*
24. *Ground softening strategies/* Make work easier – Easing tasks
25. *Information process facilitation*
26. *Informational power*
27. *Informing bosses*
28. *Informing stakeholders*
29. *Informing peers*
30. *Informing subordinates*
31. *Justifying actions*
32. *Leading by example*
33. *Learning endeavours*
34. *Boosting confidence*
35. *Understanding the client*
36. *Gaining competence through information*
37. *Packaging information/ Producing information products*
38. Extracting information
39. *Facilitating access/ Providing access/*Planner as an information access provider
40. Participant selection /*Selective participation/Selective use of strategy for participation/ Strategising/ Extent of availability or non availability of information determine the approach taken by the planner to handle a situation*
41. *Use of existing structures to pass information*
42. Supporting expert activities
43. *Verifying information/* Comparing information

44. Guiding against misinformation

A.4 Development of main categories of the Grounded Theory

As the analysis continued, I looked further for ways to regroup the concepts and categories. The concepts and categories were constantly compared with the incoming data, searching for data sets that describe both similar and diverging concepts. The concepts and categories were “scanned” to enhance the understanding of the meanings and also to discover more properties and dimensions of each category. The “scan” was guided by the following questions:

- Who is engaged with the situation that the category is describing?
- What is the reason behind the engagement?
- How are they engaged?
- What resources are consumed when they are engaged?
- What are the time and the spatial attributes for the situation?

Following the application of the above “scan” I gained more insights about the findings. It emerged that most of the concepts and categories can be grouped in two different ways including those that are **context related** and those that are **process related**. The concepts that could not fit within these groupings were just referred to as **others**. The table below (Table A.1) shows how the concepts and categories were grouped together, leading to the development of the main categories and the subcategories of the Grounded Theory of the current study.

Context related concepts and categories (Context is defined by project novelty; project stage and stakeholders)	Remarks (insights leading to further grouping and naming of categories and subcategories)	Main categories and subcategories discovered
<ol style="list-style-type: none"> 1. <i>Context determined communication/</i> Communication recipient influence/ Individual determined communication/ project determined communication/ <i>Triangulating communication methods</i> <i>Standing communication</i> 2. <i>Context determined use of information source/</i> Internal (production) determined use/ Owning agency determined use/ External (production) determined use / <i>Triangulating information sources Speciality/expertise determined use of information/ Selective use of information sources</i> 3. <i>Context determined access to information/</i> Unconditional access/ Free access/restricted access 	<p>The context under which a particular information source or communication method is used varies in relation to the project that is performed. In response to context, the planners may use information sources and communication methods in various combinations (see triangulating and selective use as examples). It should be noted that although there are some standing arrangements such as meetings, the planner’s creativity (and innovation) and the way he or she mixes the information sources and communication methods may influence the outcome of the project processes. However, the availability, accessibility and usability become the defining factors, whether an information source or communication method can be part of the process of any given project. These factors, therefore, define the overall information context of a project. This information context is characterised by: People as sources of information (experts and community)</p>	<p>dynamic project information context</p> <ul style="list-style-type: none"> • Information sources and communication context • Access context • People

	<p>Other information sources (reports, books, acts, as examples; see page 185 for list)</p> <p>The communication method (oral, written as examples — see page 183-184 for list)</p> <p>The choice of the method of communication and information sources used are very much dependent on the project context. Therefore, the information context is dependent on the project itself.</p> <p>It should be noted that people as information sources have special characteristics that distinguish them from other information sources, such as their availability and willingness to participate.</p> <p>People can have either a positive or negative (source of misinformation, unwilling to participate) effect.</p> <p>The other factor that needs consideration is the condition for accessing the information; and to capture this dimension of the information context, a subcategory called access context was defined. Access context relates to the project in a similar way as the information sources and the communication method.</p> <p>Considering that the information context is dependent on the nature of the project, this category needs to be defined in relation to the project itself, including the variations that characterise the information sources and the communication methods used. Consequently, this category was named, dynamic project information context</p>	
<p>4. <i>Contextualised role/role dynamism/ High effort requiring role/ Low effort requiring role/ Role dependent participation/Role determined access/Role defined information activities</i></p>	<p>Roles can be differentiated by the amount of effort expended by the planners to accomplish them. Therefore, they can be classified as “high effort demanding” role or “low effort demanding” role. Consequently the planners’ appreciation of the value of information is a characteristic of the type of role that is being performed at any given time. It should be noted that the role is also a context dependent factor. The roles performed by the planners are not fixed, they change from time to time,</p>	<p>Role context</p> <ul style="list-style-type: none"> • Value of information

	even in a given project the planner can perform a variety of roles, and the need for information may change according to those roles.	
Process related concepts and categories		
<p>5. <i>Acquiring information</i> 6. <i>Gathering information/ Sourcing information</i> 7. <i>Giving information and Receiving information</i> 8. <i>Requesting for information</i> 9. <i>Getting information</i> 10. <i>Exchanging information/ Planner as a transmitter of information/ Information sharing</i> 11. <i>Packaging information/ Extracting information/ Supporting expert activities/Producing information products</i> 12. <i>Verifying information/ Comparing information/ Guiding against misinformation</i></p>	<p>These categories define the actual activities that the planners do in relation to information. The following are broad sub-subcategories that define the activities that the are performed by the planners in relation to information:</p> <ul style="list-style-type: none"> • Packaging information • Acquiring information and verifying information • Giving information <p>These subcategories define a pattern of activities that characterise the way the planners approach and handle information in the projects.</p>	<p>Pattern of information use</p> <ul style="list-style-type: none"> • Packaging information • Acquiring and verifying information • Giving information
<p>13. <i>Learning endeavours</i> 14. <i>Boosting confidence</i> 15. <i>Understanding the client</i> 16. <i>Gaining competence through information</i> 17. <i>Engaging in learning tasks/ Evoking learning modes</i> 18. <i>Actualising own viewpoint/ Wants ones position/point of view to prevail in the project engaging in winning tactics/ Making a defence/ Fighting ignorance/ Waging war</i> 19. <i>Influencing stakeholders/ Using information to influence behaviour/ The counselling planner/ The advising planner/ Convincing with information/ engaging in convincing tactics or strategies/ Engaging in strategy/tactics for influencing</i> 20. <i>Building informing networks/ Networking</i> 21. <i>Creating a positive image/ Winning the support of the boss/ Getting approval/ Bargaining through case</i></p>	<p>The categories in this group define those factors that motivate the engagement in information activities. These can be grouped into two subcategories, including the preparatory stage characterised by learning activities. Different modes of learning are used. I have likened this to an orientation exercise in which the planner gets himself or herself used to the project issues and activities.</p> <p>A second subcategory defining the motivation relates to those factors ensuring that the planner's viewpoint prevails in the project process. The planners employ various strategies to influence other stakeholders to buy into their viewpoint. These strategies ensure that the other participants see the planner's viewpoint as the best. In the process of selling one's idea, information may flow in different directions, such as from manager to subordinates and <i>vice versa</i>, or to other groups of people involved in the project.</p>	<p>Motivators</p> <ul style="list-style-type: none"> • Orienting oneself • Influencing others

<p>examples/ Positive affirmation/ Information as a tool for gaining support/Information as a tool for positive affirmation/ <i>Showing by examples/ Showcasing</i></p> <p>22. <i>Caucusing</i> /Small talk in the office/ Brainstorming/ Creating a common understanding/ <i>Buying support/ Garnering support/</i></p> <p>23. <i>Educating the stakeholders/</i> Educating the client/ Guiding the stakeholders/ The advising planner/ <i>Teaching by examples</i></p> <p>24. <i>Ground softening strategies/</i> Make work easier – Easing tasks</p> <p>25. <i>Informing bosses</i></p> <p>26. <i>Informing stakeholders</i></p> <p>27. <i>Informing peers</i></p> <p>28. <i>Informing subordinates</i></p> <p>29. <i>Justifying actions</i></p> <p>30. <i>Leading by examples</i></p> <p>31. <i>Use of existing structures to pass information</i></p>		
<p>32. <i>Using information as a lever/extent to which available information can enable the planner to put forward a case, defend it and convince stakeholders/ Information as a determinant of confidence level of performance/Information influence on the enthusiasm of involvement</i></p> <p>33. <i>Informational power</i></p>	<p>The concepts and categories in this group define the extent to which available information can enable the planner to put forward a case, defend it and convince stakeholders. Also, the factors that determine the enthusiasm of involvement, and whether the role can be performed with low or high confidence. The ability to win support from others (gained support) becomes an important factor. The informational power emerged as the main category embracing the factors of gained support and confidence.</p>	<p>Informational power</p> <ul style="list-style-type: none"> • Authority and confidence • Gained support <p>(Authority included to capture the planners' ability to mimic and act like environmental experts when performing their planning roles)</p>
<p>34. <i>Information process facilitation</i></p> <p>35. <i>Facilitating access/ Providing access/Planner as an information access provider</i></p> <p>36. <i>Participant selection /Selective participation/Selective use of</i></p>	<p>In this group of concepts and categories I consider how the planners strategically plan (strategising) and conduct the participation during the project process. This includes the systematic exclusion and inclusion of people to participate in the projects.</p>	<p>Strategy for participation</p>

<p><i>strategy for participation/ Strategising/ Extent of availability or non availability of information determine the approach taken by the planner to handle a situation</i></p>		
<p>Others</p>		
<p>37. <i>Acquired knowledge/experience helping the accomplishment of tasks/ Declarative content knowledge/ Tapping from experience/ Have been in the job longer/ Seen the project before</i></p> <p>38. <i>Common sense determined actions/ Gut feeling and believe/ Use of common sense</i></p> <p>39. <i>The value of experience/Experience success syndrome/ Newcomers fail syndrome</i></p>	<p>Planners perform better and find work easy if they have done a similar project before. Newcomers make a lot of errors and this increases the chances of projects to fail. Some of the phrases that back the argument for experience include: - Seen the project before - Have been in the job longer - Common sense, gut feeling and belief (it is worth noting that the planners sometimes take the experience for granted, and use it unconsciously) Planners derive their pride from experience in the job and it increases confidence. They also take a short time to complete tasks if they have the right experience.</p>	<p>Experiential knowledge (the name of this category given in recognition of the experiential nature of the knowledge valued by the planners)</p>
<p>40. <i>The use of force/power /cracking the whip through the law by a role player/ Applying punitive measures/ Forced behaviour change/ Showing the power of the law/ Planner as a custodian of standards/policing</i></p>	<p>Role-based force/power, not so much preferred but sometimes used. The force /power is applied indirectly by the planner, such as using police to accomplish a task or using the name of the Chief Executive Officer as a way of threatening people to perform tasks. The planner can only exercise this power indirectly at a time when he or she is performing a certain role in a project.</p>	<p>Situated power (power situated in the roles)</p>

Table A.1: Development of the main categories

A.5. Establishing relationships between the categories

After the main categories were discovered, they were then examined in conjunction with the data to establish the relationships between them. Only those relationships that were supported by the data as well as making logical sense were maintained. Table A.2 below shows how the main categories are related: -

Key

√ - Data supports the existence of a relationship and the researcher also sees logical sense in maintaining the link between the categories.

X - Means there is not enough evidence to support the relationship or the researcher does not see logical sense in maintaining the relationship (Note that this does not mean there cannot be a link, but that the evidence failed to persuade the researcher of a logical and significant relationship)

X√ - The effect of the category is not very strong and it is not always available.

The categories in the table below (Table A.2) should be read as, for example; the category **motivators** has an influence on the category **role context**.

Categories	Motivators	Role Context	Dynamic Project Information Context	Pattern of Information Use	Experiential Knowledge	Informational Power	Strategy for Participation	Situated power
Motivators	√	√	X	√	√	√	√	X
Role Context	√	√	√	√	X	X	X	X
Dynamic Project Information Context	√	√	√	√	X	X	X	X
Pattern of Information Use	√	√	√	√	X	√	X	X
Experiential Knowledge	X	X	X	√	√	√	X	X
Informational Power	X	X	X	√	X	√	√	X
Strategy for Participation	X	X	X	√	X	X	√	X
Situated Power	X	X	X	X	X	X	X√	√

Table A.2: Relationships among the categories

An examination of the relationships among the categories (see Table A.2 above) shows that the category, pattern of information use is central in defining the way planners use information. It is related to more categories when it is compared to others and also describes the critical activities that form the core of the information tasks of the planners. The category pattern of information use therefore forms the core category of the Grounded Theory discovered in this study.

Appendix B

Interview Guides

First Phase Interview Schedule

Introduction

.....

Do you mind if I record our conversation?

Tell me your position and the nature of work you do on a day-to-day basis.

In our discussion, we are going to talk about what you understand about environmental information and how you use it in your work. I would like to refer to this process as *environmental planning*

Environmental planners' work with environmental information

Tell me about the integration of environmental issues in the development planning process.

Tell me about your understanding of environmental information.

Tell me how environmental information is relevant to your work.

Tell me your experiences in bringing environmental information on board in your day-to-day activities.

Tell me how you ensure that the necessary environmental information becomes part of the work that you do.

How involved are you in environmental information seeking and gathering for your work?

How do you keep yourself current with information developments in environmental issues?

Do ever feel that you have much environmental information to an extent that you do not know what to do with the information?

If you have an environmental information related problem/issues, how do you usually get a solution?

What kind of assistance do you normally need or wish other people could give you to use the environmental information to complete an environmental related task?

Tell me how helpful your educational training is to working with environmental information related issues

What are your immediate educational training needs regarding the use of environmental information in your work?

Tell me about the environmental information related support that you get both from within and outside your institution, formal and informal.

In what way(s) do you think the support could be enhanced further?

Tell me about your successes and or failures relating to the use of environmental information.

Tell me what were the reasons for the successes and failures.

Tell me about the resources (time to read reports, skill, finance, etc) to get environmental information you need and use it to your satisfaction.

Are those resources mentioned above readily and adequately available?

How does the attention that environmental issues are getting from different sectors of the society affect your use of environmental information as a major stakeholder in realising the societal environmental goals?

What are you hearing people saying about environmental information in your workplace?

Tell me about the constraints to using environmental information when you create development plans?

Tell me some of the specific things to which you use environmental information for.

Think back to some experiences/projects you have had with environmental information that are outstanding, satisfying or most disturbing.

Tell me your experience(s) about finding environmental information to support specific activities that you do?

Think back of sometime where you had to present an opposite view to the information that a colleague had presented or was in support of, how did your colleague take the criticism. How easy was it to do it?

How do you take it when other people criticise the information that you present?

How free or open are your colleagues to accept different views from other people?

How does the way people take the criticisms affect the use of environmental information?

Tell me how you handle environmental information that you doubt its veracity, correctness or completeness?

Tell me how helpful are your colleagues when it comes to working with environmental related issues.

Do you prefer to be given information in a formal or informal manner and why?

If you get information, what attributes of information do you usually check before you include it in a report that you are going to present to your planning committee?

How do you like to work on an issue that requires more attention to environment? (alone, committees etc.)

What do you find as the most difficult information related thing that new comers face in environmental planning?

What advice have you given to other people (including those who are new in the department) regarding the use of environmental information?

What advice have other people given to you on using environmental information?

Tell me about the role that the institution you are working plays in influencing your understanding and use of environmental information.

Tell me about the role the community plays in influencing your understanding and use of environmental information.

Conclusion

Think about what we have talked about today. What do you think is most important for you to use environmental information effectively and efficiently?

Have we missed anything?

Second phase Interview schedule

I will be talking to you about using environmental information when you are dealing with human development projects. My drive for this discussion is premised on the fact that environmental issues have to be considered or included in the planning and implementation of such projects. When I ask you about information I will be referring to information that specifically refers to the consideration or inclusion of environmental issues in the projects that you do. I have selected you because you are in the development arena and therefore are involved with human development projects and also it is a requirement that the environmental issues are included or considered in all your projects. As we talk about projects I would like you to think of a real project that you actual did and give your responses based on that particular project.

Use of environmental information in Human development projects

With reference to a project that you were involved in;

Tell me about the roles and activities you did when planning for a human development project

Tell me about using environmental information when you are planning a human development project

Tell me about the implementation of a human development project.

Tell me about using environmental information during the implementation of these projects.

Tell me about the environmental information requirement and use for a new project

Tell me about environmental information requirement and use for an old project.

Management of the human development projects

With reference to environmental information or environmental issues in a project that you have done before;

Tell me about managing the human development project.

Tell me about the tasks and activities that you did when you were managing a human development project

Tell about the environmental information you required to fulfil those tasks and activities.

Tell about sourcing the information

Tell me about how you used the environmental information to accomplish those tasks.

Monitoring of a human development project

With reference to a project that you were involved in monitoring;

Tell me about environmental information requirements when you were monitoring a human development project.

Tell how you search and gather the information

Tell me about how you use the environmental information when you are monitoring a human development project

Advisor to a human development project

Think of a project were you were supposed advise the stakeholders on an environmental issue;

Tell me about the tasks and activates in both the planning and implementation of the project.

Tell me about using the environmental information to achieve those tasks and activities.

Tell me about getting and using the environmental information to perform those tasks and activities.

Tell about the persons/people that you have advised as individuals or groups.

Tell me about compiling environmental information to give advice to those persons as individuals or in a group

Disseminating information

Tell me about the tasks and activities that you undertake when disseminating environmental information.

Tell me about compiling the environmental information to give to the various groups that you deal with.

Tell me about the techniques that you employ to package the information to suit you customers.

Sourcing environmental information

With reference to a task or activity that you have done in the past, tell me about sourcing environmental information. Include the steps that you went through, the problems encountered and how they were overcome.

Making presentation

Tell me about making presentations

Tell me about the selection of the topics of presentation including the objectives

Tell me about gathering information for presentation

Tell me about the aids (technological or otherwise) in the preparation and actual making of the presentation

Writing a proposal

Tell me about writing a proposal requiring funding for a project that has some environmental consequences.

Tell me about the information sought.

Tell me about compiling and presenting the information to ensure the success of the proposal

Participation in meetings, committees, workshops, seminars and conferences

Think about your latest participation in a meeting where an environmental issue was discussed.

Tell me the exact tasks and activities that you performed in the meeting.

Tell me about getting environmental information and using it to perform those tasks.

Tell me about your participation in the committees.

Tell me about the role you play as a member of those committees.

Tell me some of the exact tasks and activities that you perform as a member of those committees.

Tell me about getting environmental information and using it to perform those tasks

Tell me about workshop that you participated in the recent past.

Tell me about the roles, tasks and activities that you performed.

Tell me about getting environmental information to perform those roles task and activities.
Tell me about seminars, conferences
Tell me the roles, tasks and activities that you performed.
Tell me about gathering and using information to perform those tasks.

Driving force

Tell me about your emotional involvement in the tasks that require you to get environmental information and use it.
Tell me about things that trigger the environmental information tasks and activities in the human development projects.
Tell me about the ending of an environmental information activity

Components of environmental information

Tell about what you consider to be environmental information
Tell me about the composition of environmental information

Experience

Tell me about experience when you are considering environmental issues
Tell me about acquiring the experience
Tell me about using the experience
Tell me about the relationship between experience and environmental information

The strategies that guide the inclusion of environmental issue in the development planning process

Tell me about the guidelines to the inclusion of environmental information in the development planning process.
Tell me about using those guidelines.

Case examples of projects that have been successfully carried out

Tell me about the importance of seeing successful cases of similar issues to that you are doing
Tell me about locating and identifying these cases
Tell me about using these examples

Use of environmental information

Tell me about conscious use of environmental information
Tell me about unconscious use of environmental information

Using information to raise awareness

Tell me about making people to be aware of an environmental issue
Tell me about the environmental information activities that you carried out with the object of raising an awareness of an environmental issue

Using environmental information to provide guidance and counselling

Tell me about helping people involved in a project to understand an environmental issue.
Tell me about clarifying an environmental issue that seem not to be clear to people
Tell me about providing information to people so that they can make better choices regarding environmental issues
Tell me about producing and disseminating information for people to use when making choices regarding environmental issues.

Framework of operation

Tell me about the challenges that you face regarding the inclusion of environmental issues in the development planning process.
Tell me about the people and institutions that you interact with in the process that lead to using environmental information and including environmental issues in the human development projects.

Common sense

Tell me about the use of common sense as you work with environmental issues and human developments projects.

Third phase Interview schedule

I will be talking to you about using environmental information when you are dealing with human development projects. The discussion is motivated by the fact that environmental issues have to be considered or included in the planning and implementation of such projects and it requires the application of environmental information. I consider the local authority to be central in the integration of environmental issues in the development projects. Hence, you as the employees of council are therefore the key people who experience this phenomenon first hand even though the expertise in environmental issues rests elsewhere with the specialist departments with environmental sector mandates. The main activities are at council level and you are the people to ensure its success.

Please relate your response to some project(s) that you did

Orienting oneself

I take it that you often encounter unfamiliar situations that relates to environmental issues in development projects (Focus on orientating yourself)

Tell me about your experience when you encountered an environmental issue which you were not very familiar with.

Tell me about preparing yourself for further discussions of that issue with others

Tell me about the information pertaining to that preparation

Tell me about the tasks

Tell me about the level (or amount) of self-preparation which you did to competently address the issue satisfactorily

Tell about your experience when you had prepared yourself to your own satisfaction

Tell me about your experience when you still needed more preparation

Influencing others

I take it that the success of environmental issues rest with influencing people to come to a common understanding which you regard as the more feasible. (Focus on you intention to influence others)

Tell me about your experiences when you tried to influence others in a direction of an environmental alternative that in your viewpoint was the most feasible

Tell about gathering information for that task

Tell me about packaging information for that task

Tell me about the information sources you used

Tell about the communication channels that you used.

Tell about the amount (volume) of information that was available to you

Tell me about the information quality issues that you experienced

Tell me about the strategies and tactics that you used to influence those people

Fourth phase Interview Schedule

I will be talking to you about using environmental information when you are dealing with human development projects. The discussion is motivated by the fact that environmental issues have to be considered or included in the planning and implementation of such projects and it requires the application of environmental information. I consider the local authority to be central in the integration of environmental issues in the development projects. Hence, you as the employees of council are therefore the key people who experience this phenomenon first hand even though the expertise in environmental issues rests elsewhere with the specialist departments with environmental sector mandates. The main activities are at council level and you are the people to ensure its success.

In the last questions, I want to relate what I have found from analysing my initial data with what you perceive to be doing.

Please relate your response to some project(s) that you did

Role context

Tell me about your role in human development projects regarding the environmental concerns in the projects

Informational power

Tell me about information as a source of power in your involvement with environmental issues in the human development projects

Strategy for participation

Tell me about participation in a projects when issues that deal with the environment are considered.

Confirmation of the findings

The respondents will be asked to share their opinions and feelings in relation to what I will be presenting as the findings from the previous interviews

Environmental information conceptualisations

With reference to environmental concerns in human develop projects, relate to information as content, physical form and sources, knowledge and ideas.

Precursors to information use

Show the respondent the diagram of findings showing all the factors involved in the use of information and ask the respondents to relate it to what they do regarding using information during the consideration or involvement of environmental issues in the development process. (I will be leading the discussion focusing more on areas of disagreements)

Appendix C

Consent Form

Interview Code:

Participant's Name:

Participant's address:

Location of the interview

Time interview starts:

Time interview finishes:

I am a research student in the doctoral degree programme in Information Systems and National Development in the Faculty of Commerce at the University of Cape Town. I am interested in asking you a number of questions about your work pertaining to the use of environmental information. I hope this research will help me in understanding how environmental information is used in environmental planning.

Your participation in this project is completely voluntary and there will be no consequences whatsoever if you decide not to participate. The interview will last for about an hour to an hour and half at most.

If you wish, you may withdraw at any time and you will not be expected to give any reasons why. Whenever you feel you are not comfortable with a question, you can tell me that you do not wish to answer the question. You will not be expected to give a reason for that decision.

You should note that what ever we talk about during the interview is completely confidential. This means that no one except me would be able to identify or link your name to the things you tell me.

I will need your name, address or any other identifying information when I analyse the data or discuss the findings of this study. The reason for the contact information is that I will want to get back to you for clarification and/or subsequent interviews because my research method requires that I clarify my findings with the interviewees. Again, you need not provide clarification if you do not feel comfortable with that. I will need your consent for any follow up interviews or clarification. You are not expected to have to grant the follow up interviews by agreeing to the first one

I would also like to request your permission to tape-record the interviews. Again, if you are not comfortable if the interview is tape-recorded you are free to say so without giving any reasons whatsoever and the interview will not be tape-recorded. The tapes will not leave my possession for any reason and they will be destroyed after the research.

If you have questions or you want information from me before or after the interview, I will be very much willing to answer your questions. You can contact me at the following address.
University of Botswana, Department of Library and Information Studies, Private Bag UB00703, Gaborone. Cell phone number is 71554124. Email: Mutshewa@mopipi.ub.bw

Again, I would like to stress that your participation is strictly voluntary, and what you say will be protected with the strictest confidentiality

Please if you agree to participate in the study append your signature bellow.

Participant's Signature

Date;

Appendix D

Time table of Interviews

Interview Date	Code	Gender	Position	Start	Finish
March 11, 2003	PSSDC1	Male	Commercial Affairs Officer	1000	1056
March 12, 2003	PSSDC2	Male	Senior Technical Officer (Buildings)	0737	0829
March 13, 2003	PSSDC3	Female	Economic Planner	0745	0903
March 14, 2003	PSSDC4	Male	Physical Planner	0800	0905
March 14, 2003	PSSDC5	Male	Senior environmental officer	1125	1233
May 26, 2003	FCC1	Male	Principal Meat Inspector	0720	0830
May 26, 2003	FCC2	Male	Landfill Manager	0900	1015
May 26, 2003	FCC3	Male	Senior Environmental Officer	1400	1505
May 27, 2003	FCC4	Male	Environmental Health Technical Officer	0900	1015
May 27, 2003	FCC5	Male	Principal Environmental Health Officer	1400	1500
May 28, 2003	FCC6	Female	Environmental Health Technical Officer	1100	1140
May 30, 2003	FCC7	Male	Economic Planner	0800	0910
May 30, 2003	FCC8	Female	Principal Commercial Affairs Officer	1100	1150
May 30, 2003	FCC9	Male	City Engineer	1500	1555
June 05, 2003	FCC10	Male	Physical Planner	0800	0845
June 05, 2003	FCC11	Male	Senior Physical Planner	1400	1550
June 05, 2003	FCC12	Male	Architect	1630	1715
November 03, 2003	NWDC1	Male	Economic Planner	0730	0805
November 03, 2003	NWDC2	Male	Tourism Officer	0900	0930
November 03, 2003	NWDC3	Male	Principal Environmental Health Officer	1105	1205
November 03, 2003	NWDC4	Female	Principal Commercial Affairs Officer	1215	1245
November 03, 2003	NWDC5	Male	Technical Officer, Environmental Health	1455	1525
November 03, 2003	NWDC6	Female	Senior Environmental Health Officer	1600	1655
November 03, 2003	NWDC7	Male	Physical Planner	0800	0840
November 03, 2003	NWDC8	Male	Architect	1800	1850
November 03, 2003	NWDC9	Male	Water Engineer	0800	0835
November 03, 2003	NWDC10	Male	Principal Technical Officer, Sanitation	0900	0940
November 03, 2003	NWDC11	Male	Assistant Physical Planner	1400	1435
November 03, 2003	NWDC12	Female	Principal Technical Officer, Buildings	0800	0835
February, 02, 2004	SPTC1	Male	Environmental Health Officer	1115	1200
February, 03, 2004	SPTC2	Male	Senior Environmental Health Officer	0800	0835
February, 03, 2004	SPTC3	Male	Landfill Manager	1030	1110

February, 03, 2004	SPTC4	Male	Environmental Health Officer	1430	1500
February, 03, 2004	SPTC5	Male	Economic Planner	1510	1540
February, 04, 2004	SPTC6	Male	Physical Planner	0840	0910
February, 04, 2004	SPTC7	Male	Senior Technical Officer, Development	1400	1430
February, 04, 2004	SPTC8	Male	Senior Architect	1500	1535
February, 05, 2004	SPTC9	Male	Senior Commercial Affairs Officer	0830	0905
February, 05, 2004	SPTC10	Male	Senior mechanical Engineer	1100	1130
February, 05, 2004	SPTC11	Male	Town Engineer	1400	1440
March, 09, 2004	GCC1	Male	Physical Planner	0730	0815
March, 09, 2004	GCC2	Male	City Engineer	1530	1620
March, 11, 2004	GCC3	Female	Commercial Affairs Officer	0930	1010
March, 12, 2004	GCC4	Male	Principal Environmental Health Officer	1200	1235

Appendix E

Correspondences with the Funding Office and the Budget

Thursday, January 09, 2003

Manager, Training
Staff Training and Development
Private Bag 00022
Gaborone

Re: Request for Funding for the Empirical Research

This letter serves to request for funds for the empirical research part of my studies. The money is required for travel and accommodation when doing the fieldwork as well as procuring the equipment required for the collection and analysis of the data. The fieldwork will be done in Botswana during 2003. I am attaching the budget and other supporting documents to this letter for your consideration.

You will note from the methodology chapter attached to this letter that the data collection will be done in phases with subsequent phases determined by the outcome of the earlier phases. Again, you should note that the participants will have to be interviewed several times as the data collection and analysis process continues. Hence, the repeated visits to the same places as shown on the budget.

The budget requested for the research is **twenty five thousand eight hundred and twenty pula fifty thebe** (25820.50 BWP) This money will be required to cover the equipment required for data collection and analysis, transport and accommodation, stationery, telephone and fax.

Thank you

Athulang Mutshewa
Enclosures (5)



University of Botswana

HUMAN RESOURCES

Private Bag 0022, Gaborone, Botswana

Telephone: (267) 355-0000 Switchboard
Telephone: (267) 355 + Extension Fax: (267) 356 591
Telex: (267) 2429 8D Telegraph: University Gaborone

MEMORANDUM

Reference: UBP/650
To: Mr. A. Mutshewa
From: Deputy Vice Chancellor (Academic Affairs)
Date: 7th February 2003
Subject: Request for Research Project Fund

I am pleased to authorise the Director, Financial Services by copy of hereof, to disburse funds not exceeding the sum of **Nine Thousand, Five Hundred and forty five Pula (P 9 545.00)** to support your Ph.D. Research project work entitled -- "A Theory of the Use of Information For Environmental Planning: The Case of Botswana"

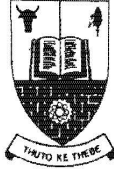
Kindly note that the grant will be administered by the office of the Director, Financial Services. You are accordingly advised to seek the assistance of the Director, Financial Services' office for details regarding the administration of your budget.

I wish to take this opportunity to wish you a successful period of data gathering, which should adequately prepare you for the final stage of writing and defending your thesis. Please keep this office informed about the progress of your work.

Thank you.

Prof. M.T. Oladiran
Acting Deputy Vice Chancellor, (Academic Affairs)

cc: Director, Financial Services
Manager, Staff Training and Development
Head, LIS



University of Botswana

ADMINISTRATIVE DEPARTMENTS

Private Bag 0022
Gaborone, Botswana

Telephone: (267) 355-0000 Switchboard
Telephone: (267) 355 + Extension Fax: (267) 356-591
Telex: (267) 2429 BD Telegraph: University Gaborone

MEMORANDUM

Reference: UBP/650
To: Mr. A. Mutshewa
From: Acting Deputy Vice Chancellor, Academic Affairs.
Date: 22nd October 2003
Subject: **Request for Funding for the Second Phase of Research**

Your request for the second phase of research funding has been approved.

The Director, Financial Services is authorised to disburse an amount not exceeding Thirteen Thousands Three Hundred and Eighty Two Pula (P13 382.00) to enable you to do the second phase of your data collection.

Kindly note that the grant will be administered by the office of the Director, Financial Services. You are accordingly advised to seek the assistance of the Director, Financial Services' office for details regarding the administration of your budget.

We wish to take this opportunity to wish you a successful period of data gathering, which should adequately prepare you for the final stage of writing and defending your thesis. Please keep this office informed about the progress of your work.

Thank you.

Prof. M.T. Oladiran
Acting Deputy Vice Chancellor (Academic Affairs)

cc: Director, Financial Services
Head, Library and Information Studies

Research Budget

ITEM DESCRIPTION	QUANTITY	UNIT COST (Pula)	TOTAL COST (Pula)
Materials and supplies			
Audiotapes (60 minutes)	75	14.95	1121.25
3.5" diskettes	10		30.00
Tape recorder and External recording microphone	1	549.00	549.00
Batteries	10	17.30	173.00

	packets. of 4 each		
Printing and paper	3R	27.00	81.00
Communication			
Phone	-	1000.00	1000.00
Fax	-	100.00	100.00
Email			
Travelling Costs			
(initial visits)			
Gaborone to Serowe	315 km	1.20	378.00
Serowe to Francistown	583 km	1.20	699.60
Francistown to Selebe Phikwe	151 km	1.20	181.20
Selibe Phikwe to Gaborone	402 km	1.20	482.40
(Final visits)			
Gaborone to Serowe (x2 for return trip)	2x 315km	1.20	756.00
Gaborone to Francistown (x 2 for return trip)	2x433km	1.20	1039.20
Gaborone to Maun (x2 for return trip)	2x 915km	1.20	2196.00
Gaborone to Selibe Phikwe (x2 for return trip)	2x402 km	1.20	964.80
Hotel accommodation			
Serowe	4 days	298.35	1193.40
Maun	5 days	640.30	3201.50
Francistown	7days (includes 1 day for the first visit)	654.00	4578.00
Selibe Phikwe	5 days	567.60	2838.00
Total			21562.35

Appendix F

Correspondences requesting for permission and letters granting permission

University of Botswana
Department of Library and Information Studies
Private Bag UB00703
Gaborone
January 7, 2003

Re: Doctoral Research – Request for Permission

I am a doctoral student in the Programme in Information Systems and National Development in the Faculty of Commerce of the University of Cape Town. My doctoral research leading to the PhD degree involves a project on “ A theory of the use of Information for Environmental planning: The Case of Botswana” I will need to conduct a research in Botswana to complete the empirical research component of the thesis during 2003.

This letter therefore serves to request your assistance with permission to carry out the research in Botswana. The empirical data will be collected by interviewing individuals involved in environmental planning both in the civil service and private practice in the country

Please find attached my detailed proposal and other supporting documents from the University of Cape Town

Thank You

Athulang Mutshewa

TELEPHONE: 3971405

TELEGRAMS: MEWAT

TELEX: 2674 BD

TELEFAX: 3912354

REFERENCE: EWT 1/3/4 I (2)



REPUBLIC OF BOTSWANA

MINISTRY OF ENVIRONMENT,

WILDLIFE AND TOURISM

PRIVATE BAG BO 199,

GABORONE

BOTSWANA

ALL CORRESPONDENCE MUST BE ADDRESSED TO

THE PERMANENT SECRETARY

16th January 2003

Mr. Athulang Mutshewa
Department of Library and
Information Studies
Private Bag UB00703
GABORONE

Dear Sir,

**PERMISSION TO CARRY OUT DOCTORAL RESEARCH IN
BOTSWANA**

Your letter dated 7th January 2003 to the Office of the
President refers.

I am happy to advise that permission has been granted to
you to carry out doctoral research in Botswana on the topic
specified in your application.

This permission is granted under the understanding that
you will comply with all the conditions set forth in the
Research Application Form and that the personal details
information required in Annexure I of the same form shall be
completed and submitted to this office.

Thank you.

Yours faithfully

L.P. Gakale, Ph.D.

PERMANENT SECRETARY

CC: Permanent Secretary to the President, OP
(Attention: Mr. B.C. Molomo)

NORTH WEST DISTRICT COUNCIL

Private Bag 01
Maun Botswana



Phone (+267) 660241/2/3/4
Faxes (+267) 660029
(+267) 663112 Supplies

REF: NW/A/56

14th February 2003

Athulang Mutshewa
University Of Botswana
Department of Library & Information Studies
Private Bag UB 00703
Gaborone

DOCTORAL REASERCH - REQUEST FOR PERMISSION

We acknowledge, with thanks and appreciation the receipt of letter of the 30th January 2003 in connection with the above subject matter.

You are granted permission to interview our below listed officers:

1. Senior Environmental Health Officer – Mr Mbiiza
2. Principal Economic Planner – Mr Selelo
3. Senior Economic Planner – Mr Kamara
4. Council Architect – Mr Paul Moses
5. Senior Water Engineer – Mr Muekenja
6. Commercial Affairs Officer – Ms I. Olatetse

Please contact them individually to get their voluntary consent.

Yours faithfully

GG.S Puie
COUNCIL SECRETARY



Central District Council

SEROWE-PALAPYE SUB-DISTRICT

Private Bag 0072
Palapye

Telegrams: CENDICO
Fax: 421541

Telephones:-
 Switchboard 42142/3
 Assistant Council Secretary 422554
 Principal Administration Officer 422561
 Education Secretary 421398
 Public Health 422245
 District Health Team 421563
 Senior District Medical Officer 421565
 Supplies 420215
 Lady Khama Centre 430411/266
 Abattoir 430327
 Matimela 420242
 Social & Community Development 420488
 Water Unit 430413

In reply please quote
Ref. No.

SP F/113 I

Department 20

26th February 2003

Mr Athulang Mutshewa
Private Bag UB 00703
Gaborone

Dear Sir,

Subject: DOCTORAL RESEARCH PROJECT - REQUEST FOR PERMISSION

Your letter dated 30th January 2003 refers.

Permission is granted to you to interview our staff for your school project.

By copy of this letter,

Senior Environmental Officer
Physical Planner
Economic Planner
Senior Technical Officer (Bldgs) and Commercial Affairs Officer are informed to attend you when you meet them.

Thanks.

.....
Z.M. Letshoo
for ASSISTANT COUNCIL SECRETARY

Cc: Snr. Environmental Officer
Physical Planner
Economic Planner
Snr. Technical Officer (Bldgs)

/gt - sp f

**CITY OF FRANCISTOWN**

PRIVATE BAG 40 TELEPHONE : 211050

F R A N C I S T O W N B O T S W A N A

REF: COP/47 IV(52)

14th May 2003

Athulang Mutshewa
University of Botswana
Department of Library and Information Studies
Private Bag UB00703
GABORONE

Dear Sir/Madam

RE: GRANT OF PERMISSION TO CONTACT OFFICERS

We are pleased to inform you that permission to contact officers at City of Francistown Civic Centre is granted. This permission allows you to contact Senior Environmental Health Officer, Physical Planner, Economic Planner, City Architect, City Engineer and Commercial Affairs Officer to assist you with information regarding your empirical research in the area of "A Theory of the use of Information for Environmental Planning. The case of Botswana."

This permit is valid for a period of two months effect from 19th May 2003.

Permission is granted subject to the following conditions:-

1. Copies of any report or findings made as a result of your research should be deposited to the City Clerk's Office.
2. You should conduct your research according to the particulars furnished in your application.
3. This permit does not authorise entry to any premises, private establishment or protected areas without consent.
4. Failure to comply with any of the above stipulated conditions will result in the immediate cancellation of permit.

Yours faithfully

L. D. K. Sebego
for/TOWN CLERK

SELIBE PHIKWE TOWN COUNCIL

Telephone: 2610570/2610266
2610790/2601344
2610951/2610952

Fax: 2614854

Telegrams: MEEPONG

REF: SPTC/D/45 III

5th March 2004

Mr Athulang Mutshewa
Private Bag UB 00703
GABORONE



Private Bag 1
Selebi Phikwe

SUBJECT: DOCTORAL RESEARCH PROJECT REQUEST FOR PERMISSION

I refer to your letter dated 23rd January 2004 on the above. Sorry for delay in responding to your request, but be assured that permission has been granted for you to interview the officer mentioned.

I thank you.

Yours faithfully

P. N. Nkoni
TOWN CLERK

Appendix G

Approval from ethics committee
UNIVERSITY OF CAPE TOWN



School of Economics

Don Ross
Professor

Deputy Dean
Faculty of Commerce

Leslie Social Science Building, UCT, Private Bag, Rondebosch, 7701 RSA
Telephone (021) 650-3393 eMail: dross@commerce.uct.ac.za

Athulang Mutshewa
By e-mail: MTSATH001@mail.uct.ac.za

November 30, 2002

Dear Mr. Mutshewa,

Having received your documentation associated with your project on 'A Theory of the Use of Information for Environmental Planning: The Case of Botswana,' I hereby give your project provisional approval (subject to ratification) on behalf of the Commerce Faculty Ethics in Research Committee.

Please note that if you make any substantial change in your research procedure as it impacts upon the experiences of your subjects, you must re-apply to the Committee for approval.

I wish you good success with your research.

Regards,

Don Ross
Deputy Dean, Commerce Faculty
Chair, Ethics in Research Committee