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ABSTRACT

Although there appears to be a broad recognition of the key role that Public Sector Information (PSI) can play in the development of societies, there are still significant gaps in our understanding of how PSI is actually being utilized and of its wider societal value, especially in developing countries.

The overarching goal of this dissertation was to analyze the PSI utilization process within the knowledge creation context and the factors and conditions that affect its value and usability from the user perspective. More specifically, the thesis investigates the PSI-related factors and conditions that facilitate or hinder the utilization process, as well as the PSI attributes that affect its usefulness and value in two organizations working on social and economic development issues in South Africa: the Human Sciences Research Council (HSRC) and the Development Bank of Southern Africa (DBSA).

The dissertation uses the information management process framework (Choo, 1995) and the information value-in-use framework (Repo, 1986) to guide the study's design, data collection, data analysis, and presentation of the results. Employing a qualitative approach, a single case study was used to gather data through in-depth, semi-structured interviews, informal interviews, and document review.

The study demonstrates that in their attempts to find and acquire the PSI needed for their work, the study participants faced a wide range of technical, institutional, and political obstacles and challenges. The study also demonstrates that several of the assumptions in the literature about PSI-related policies and resources were not applicable to a developing country. Despite these access challenges and issues related to PSI quality, the utilized PSI resources were still

instrumental to the knowledge creation processes at the study sites and to the overall socioeconomic development of the country.

The study concludes that in addition to the progressive legislation on information access and use in South Africa, effective PSI utilization for knowledge creation and development requires defined and clear national standards and mechanisms to ensure that the policies and guidelines are adhered to, and that the bureaucratic restrictions on information access and use are minimal. It also requires the development of an organizational culture that is sensitive to the value of its information assets and the effective management of relations with users. It is hoped that this effort can help PSI holders in South Africa and elsewhere to create more enabling environments so that the value of these resources can be maximized.

**UTILIZATION AND VALUE OF PUBLIC SECTOR INFORMATION FOR
KNOWLEDGE DEVELOPMENT: THE CASE OF SOUTH AFRICA**

By

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DISSERTATION

Submitted in partial fulfillment of the requirement for the degree of Doctor of Philosophy in
Information Science and Technology in the Graduate School of Syracuse University

June 2013

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DEDICATION

This work is dedicated...

To my late mother, Laila Sharif, for all the love, encouragement and inspiration she gave me.

To my wife, Safiyyah Ally, for her endless love, support and patience.

To my beautiful and considerate son, Adam Sharif, who filled my life with happiness when he joined our family several hours after I finished writing this dissertation.

To the three of you, I will be forever grateful.

ACKNOWLEDGEMENTS

I have been fortunate to be surrounded by many great people who provided support and encouragement throughout my doctoral studies. I would like to express my sincerest gratitude to all of those who played a role in this journey. Any omissions are due to my faulty memory and are not intentional.

My deepest appreciation goes to my adviser, Dr. Milton Mueller, for his support and advice. I would also like to thank my committee: Dr. Michelle Kaarst-Brown for her support and interest, Dr. Martha Garcia-Murillo for her insight and guidance, and Mr. Paul Uhlir (*JD*) for his friendship, mentorship, and detailed feedback on my work. Thanks also to my external reader, Dr. Ines Mergel, my internal reader, Dr. Ian MacInnes, and the chair of my dissertation defense, Dr. Stuart Thorson. I look forward to productive collaboration with all of you in the future.

Special thanks to my iSchool family for their friendship, mentorship, support and of course smiles. In particular, I would like to express my gratitude to Liz Liddy, Mike Nilan, Barbara Kwasnik, Jian Qin, Jeff Stanton, Kevin Crowston, Carsten Oesterlund, Bridget Crary, Sue Nemier, Maureen O'Connor Kicak, Jennifer Pulver, Ellen Hobbs, Susan Corieri, Peggy Brown, Jose Tavaréz, and of course Benjamin Addom and Todd Marshall. It has been truly a privilege being a member of such a great family.

This work would not have been possible without the support I received from many great people in South Africa while I was doing my fieldwork. I am very thankful to Dr. Lulama Makhubela, Ms. Faye Reagon, Dr. Paul Laughton and their families for their kindness and care. I would like also to thank my colleagues and friends at the Development Bank of Southern Africa

(DBSA), the Human Sciences Research Council (HSRC), and the Information and Knowledge Management (IKM) Department at the University of Johannesburg for their help and guidance. I am truly indebted to all of you for making my experience in South Africa rewarding and pleasant.

Finally, I am especially grateful to the unwavering support and encouragement that my family provided along the way. Thanks to my wife, Safiyyah, for always being there for me. Thanks to her family for their kindness and support. Thanks to my father and siblings half way across the world for always believing in me and for tirelessly supporting my goals and dreams.

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CHAPTER ONE: INTRODUCTION

1.0 Background and Rationale

This chapter provides a brief background to the dissertation content. I begin by discussing the importance of information and knowledge for addressing developmental challenges in the developing world as a broad context for my research. I then explain the ways in which Public Sector Information (PSI) can contribute to knowledge creation and consequently to social and economic development in general. The problem statement, the potential contributions of the study, the study's aims and objectives and the research questions that guide the dissertation are then outlined. This is followed by an overview of the conceptual framework, the method employed, the potential audience of the study, and the outline of the rest of the dissertation.

1.1 Information and Knowledge for Development

It is widely recognized that building and sustaining knowledge infrastructure is a critical ingredient for attaining sustainable social and economic development (Oyelaran-Oyeyinka & Sampath, 2010). In earlier times, success was based on such criteria as ownership and control of finance, physical resources, or food. Today, however, successful people and businesses are those who own knowledge and information and play an important role in its development, access, analysis, and presentation.

The World Summit on the Information Society (WSIS) Declaration of Principles (2003) maintains that a people-centered, inclusive and development-oriented information society is a society “where everyone can create, access, utilize, and share information and knowledge; enabling individuals, communities, and peoples to achieve their full potential in promoting their

sustainable development and improving their quality of life”¹.

There is also a growing consensus that achieving the Millennium Development Goals (MDGs) depends heavily on generating scientific (and other types of) knowledge, making it easily accessible, and translating it into effective actions. Take for example goal number six related to HIV/AIDS, Malaria, and other diseases. One would argue that after more than 30 years into the pandemic, there is a dynamic and continuously growing knowledge base of HIV/AIDS, especially about prevention, care, and treatment; yet we still experience a serious gap between what is known and what is done in practice in many developing regions (Pang et al., 2006). The authors argue that “in addition to the undeniable need for new knowledge, existing knowledge must be applied in ways that will improve health care, especially in underprivileged populations” (p. 284).

This is true in all areas of social and economic development. The UN Millennium Project study titled “Innovation: Applying Knowledge in Development” emphasizes that responding to challenges in areas such as health, education, economic productivity, gender inequality, agriculture, water and sanitation, environment, and participation in the global economy will require increased use of scientific and technical knowledge (UN Millennium Project, 2005, p.15; see also, Mokyr, 2002; and Rosenberg & Birdzell, 1986). Drawing on experiences of developing countries that dramatically alleviated poverty and grew their economies in the past two decades, especially those in the Asia Pacific region, the study found that in every case, scientific and technical knowledge was a crucial factor in their success. More specifically, it is argued that information and knowledge give people greater control over their destinies and can be a major enabling factor in creating healthy political, social, economic, and scientific environments.

To address the information problems and knowledge gaps in the developing world, the

¹ WSIS Declaration of Principles available at: <http://www.itu.int/wsis/docs/geneva/official/dop.html>

World Bank (1998) suggested that the developing countries need to be more active and effective in acquiring, creating, and communicating knowledge and information necessary to, for example, improving literacy, research capacity and flow of information for market and trade.

1.2 Public Sector Information: A Strategic Resource

Although it has always been an important asset to those who possess it, the importance of information (private or public) in the current knowledge society is magnified and the critical role it plays in our daily life has long been recognized and appreciated (see Stiglitz, 2000; World Bank, 1998; Mueller 1995; Machlup & Mansfield, 1983; Porat, 1977, Machlup, 1962).

At the same time, the public sector in most countries is the biggest single producer and owner of a large variety of information. Governments create, collect, manage, and store vast quantities of data and information and increasingly try to disseminate much of it online, especially in the more economically developed countries in the OECD (see Vickery, 2011; Uhler, Sharif, and Merz, 2009; Mayo & Steinberg, 2007; MEPSIR, 2006; PIRA International, 2000). The data and information that are produced by and for public sector bodies include, for example, health and education data, geographic data, financial reports, social and economic statistics, legislation and judicial proceedings, food and water resources data, and many other kinds of data and information, collectively referred to as public sector information.

PSI is believed to have some special attributes and characteristics (e.g., reliability, timeliness, and accuracy) that increase its importance and usefulness and hence PSI is considered by different stakeholders to have economic, social, political, and scientific value (see Vickery, 2011; EC, 2011; Sharif, 2009; Uhler, Sharif, and Merz, 2009; Longhorn & Blakemore, 2008; Aichholzer & Buekert, 2004; Uhler, 2004; Abd Hadi & McBride, 2000). These values make the

PSI a strategic resource, potentially important for groups such as public sector agencies, private businesses, academic and research organizations, civic organizations, and the general public (see Sharif, 2009, for a detailed review). In their 2007 review, Steinberg & Mayo emphasized the importance of PSI and argued that it “underpins a growing part of the [British] economy and the amount is increasing at a dramatic pace” (p.3). Their review, titled “The Power of Information”, maintains that “when enough people can collect, re-use and distribute PSI, people organize around it in new ways, creating new enterprises and new communities” (Mayo & Steinberg, 2007, p.3). Along the same lines, Aichholzer and Burkert (2004) emphasize that most of the PSI is essential to citizens and civic organizations for exercising their civic rights and enabling democratic participation.

These information resources are used broadly by public sector organizations themselves, through intra- and inter-governmental exchange of information (e.g., Sheriff, 2000; Abd Hadi & McBride, 2000); by private sector companies in general (as information users); by information industry firms in particular (as re-users to produce value-added information products and services) (UK OFT, 2006; Abd Hadi & McBride, 2000; Young, 1992); by research communities (e.g., geospatial data, statistics, and health and education information are being use for poverty mapping) (see Arzberger et al., 2004; CIESIN, 2006); and by individual users (e.g., for health and educational purposes and for making social and economic decisions) (see Sharif, 2009).

1.2.1 Potential Values of PSI to Societies

The economic value of PSI comes from the exploitation of this resource by different communities. Given the unique properties of the PSI generally (see Burkert, 2004; Hadi & McBride, 2000), successful exploitation of such resources by strong private, value-adding

industries can boost the economy and generate income to the country as well as expand its ability to compete internationally. An interesting aspect related to the economic value of PSI is that the economic synergy between many pieces of this information makes the whole of the information worth more than the sum of the individual pieces.

The social value of PSI relates to the value that citizens and civic organizations can derive from utilizing this information. For example, PSI can inform citizens of their rights and responsibilities, educate them and provide opportunities for life-long learning, and preserve cultural and historical information for the future. The “Policy Guidelines for the Development and Promotion of Governmental Public Domain Information,” a report prepared for UNESCO, shows that the U.S. weather information collected by the National Weather Service, and provided free of charge, has resulted in a large number of public users in the high school education and university research areas (Uhlir, 2004)². The availability of such information also enables citizens to make well-informed decisions related to, for example, how to dress on a certain day, when to plan a vacation to avoid rain, or even which month historically has the best weather for going fishing.

Expanding this principle across information sectors indicates that the availability of the different types of PSI will lead to a more knowledgeable society and therefore a smarter workforce, which will be able to leverage this information for the benefit of the nation as a whole (see Mayo & Steinberg, 2007; Bargmann, Pfeifer, & Piwinger, 2004; Uhlir, 2004; Weiss, 2003).

Furthermore, part of a nation’s PSI includes government information regarding policy creation, legislative actions, and decision-making processes. The political value of PSI means the ability of a government to use its collection of this information as a means for transparency and

² The report also maintains that this information has enabled the development of a strong private, value-adding weather information sector.

accountability. These principles refer to the practice of a government making available information about itself to its own citizens so they can understand how their government operates and hold it accountable whenever needed. In making this information public, a government is less likely to be able to hide corrupt or illegal political actions (see Sharif, 2009; Schartum, 2004; Uhler, 2004). Because of this, government collection and provision of PSI regarding its own practices sets a basis for citizens to trust their government and support future policy and legislation. The political value derived from this trust is important to the successful governance and prosperity of a nation (see Schartum, 2004; Gellman, 2004).

Finally, research communities benefits tremendously from the PSI as well, in both academic and policy research. Arzberger et al. (2004) argue that access to the raw data for research – not just the polished, published final product - is vitally important to furthering scientific progress. In particular, PSI value is magnified when used in important domains such as meteorological information for agricultural predictions, digital maps for responding to natural disasters, and in increasing research collaboration with the developing world.

The economic, social, political, and scientific uses and values of PSI all have the potential to enable a more effective and transparent government, a healthier and competitive economy as well as a more knowledgeable and responsible citizenry. Realizing this potential, however, requires better understanding of the PSI, its different values, government policies regarding its access and use, and the ways in which this resource is being actually utilized by the different stakeholders to add value to their decisions, activities, products, or services.

1.2.2 The Importance of PSI in the Developing Countries Context

All the potential values of PSI can be magnified in the context of the developing countries.

This is especially the case with the effective utilization of PSI (and other kinds of available information resources) in the efforts to address persistent development problems such as poverty, food security, water quality, employment, HIV/AIDS and public health, and environmental challenges that these countries struggle with and try to overcome.

Stein (2003) argues that progress in development is contingent not only on creating and sharing knowledge, but also on multiplying knowledge through synergies to generate usable knowledge that can inform public policy-making and ultimately contribute to the overall welfare of societies. Oyelaran-Oyeyinka and Sampath (2010) also emphasize the centrality of knowledge to the process of socioeconomic development and conclude that the growth of knowledge and the accumulation of capabilities influence the ability of a country to achieve economic prosperity and sustainable development.

Planning for, executing, managing, sustaining, and evaluating development activities all require different sources of current and historical data and information to ensure efficiency and effectiveness of these activities. Given that the financial resources available for development and aid activities are limited, these PSI resources can prove most useful in mapping out and prioritizing which communities or regions get appropriate attention, in which areas, when and how.

One of the lessons learned from the U.S. National Research Council (NRC) study “Down to Earth: Geographical Information for Sustainable Development in Africa” (2002) was that geographical information and technologies are central to achieving the successful transition from traditional environmental and resources management practices to sustainable development due to their integrative quality (e.g., linking social, economic, and environmental data together) and their place-based quality (i.e., addressing relationships among places at local, regional, and

global scales). For example, poverty maps have proved to be a very useful tool to better understand the relationship between poverty and geographic factors such as climate conditions, elevation, access to transportation networks, exposure to natural disasters, and other important factors (CIESIN, 2006).

They also are seen as permitting more effective targeting of poverty eradication efforts by enabling decision makers and the public to visualize the problems they are attempting to solve and facilitating more precise delivery of disaster relief services to vulnerable populations. Another example comes from the Nigerian census of year 2006. Data recorded for the 2006 census were used to identify patterns of poverty in different regions of the country (Ogunbodede, 2006). These results were then used to develop specific recommendations to local governments to address local poverty.

Finally, geographic and weather data also have significant implications for the ability to respond to natural disasters. For example, the Mexican government's National Center for Disaster Prevention (NCDP) began a project in 2002 to collect geospatial data in order to develop a system to assess risks from various natural disasters, particularly in identifying vulnerable populations and infrastructure (Totolhua et al., 2008).

To conclude, the use and integration of different types of PSI (e.g., geospatial, health, unemployment, foreign aid, and education information) and the resulting knowledge and applications could have a significant and direct impact on a wide range of sustainable development efforts in the developing world.

1.3 Problem Statement

While members of the Organization for Economic Co-operation and Development (OECD) have engaged in serious initiatives and policy discussions in the last two decades regarding access to and utilization of PSI and its potential impact on societal development, efforts in the developing world are generally negligible. As a result, the studies, applications, and recommendations that currently appear in the PSI literature are mainly focused on the situation in developed nations. There is an absence of similar literature from and about the developing world, where PSI could help to save lives and create opportunities and efficiencies that do not currently exist. This makes this study the first of its kind in the developing world.

Moreover, little systematic academic research has been done to produce empirical evidence about access to and utilization of the PSI and its various benefits to the communities using it. The current approach to PSI research is largely dominated by practitioner literature that is mainly focused on the outcomes of the PSI utilization process (e.g., reports and recommendations, in-car navigation systems, digital maps, specialized databases and mobile applications) and their application in different contexts. The utilization process itself (e.g., issues related accessibility and quality of the PSI, value-adding processes) is ignored. As a result, Uhler, Sharif, and Merz (2009) emphasize the need for further academic and empirical research to supply what is lacking in these studies. In particular, the authors recommend employing strong theoretical foundations, a multidisciplinary or multidimensional approach, and robust data collection techniques to improve the breadth and reliability of such research (p.66).

Furthermore, most of this policy-oriented research has been focused on the commercialization aspects of the PSI such as pricing and cost policies, applications development and commercialization, quantifying the impact of PSI and assigning monetary value to its

outcomes and impact. While this work has been illuminating and instrumental to our growing understanding of the potential value of PSI, it has not been able to draw the big picture of the overall value and impact of PSI to societies. The non-commercial aspects of PSI utilization, as well as its non-monetary contributions to societies are still missing from the literature.

Finally, there is no evidence that this stream of research has ever examined the utilization of PSI by research communities working on development issues in the developing world and its impact on their work and effectiveness. The need to focus on such communities stems from the assumption that, given the assumed special properties of PSI (e.g., diversity in types and volumes, accuracy, comprehensiveness, timeliness), this source of information can be of special importance to these communities' knowledge creation efforts and their overall development work in areas such as poverty eradication, public health, employment, environmental protection, and other social and economic problems. We still do not know how these communities utilize PSI and transform it from a source of unorganized raw data and information to a source of useful and strategic knowledge with actual value to their work.

1.3.1 The Context of South Africa

While enjoying some signs of development and noticeable progress as one of the fast emerging economies in the world, South Africa finds itself battling serious social and economic problems such as poverty, overpopulation, and high crime and unemployment rates, accompanied by severe skills shortages, HIV/AIDS, mass urbanization and immigration, and resource shortages. Furthermore, South Africa has a uniquely diverse population, with different races, tribes, cultures, religions, and levels of wealth. This diversity adds some difficulty to effectively addressing the social and economic problems that the country faces.

To deal with these problems and confront the related challenges effectively, policy makers in South Africa need relevant information and analytical tools in order to create and enforce more evidence-based policies (Strydom et al., 2010; Funke et al., 2008; Erasmus et al., 2002). As explained earlier, PSI represents a resource with the potential to create knowledge that can support the development of such tools and help the country effectively address its developmental challenges. A number of strategic steps have been taken to promote access to information in South Africa after its transformation to democracy in 1994. For example, section 32 of the South African Constitution of 1996 states that “Everyone has the right of access to – (a) any information held by the state”³ Also, sections 15 and 46 of the South African Promotion of Access to Information Act (PAIA) that was passed in 2001 recommend that some data be made available to the public by government departments and other institutions, such as Statistics South Africa and the South Africa Data Archive.

This study takes a critical look at the process of utilizing PSI at two leading South African organizations working in the area of socioeconomic development research and activities: the Human Sciences Research Council (HSRC) and the Development Bank of Southern Africa (DBSA). Building on the well-known thesis that knowledge growth is synonymous with economic growth and development (Nelson 2004; Machlup, 1962), the study identifies and discusses the factors and conditions associated with the process of utilizing PSI and transforming it to knowledge that can be used by different communities to advance development goals in the country. It is hoped that this study will open the door for more investigations focused on the conditions and needs of the developing countries and the ways in which PSI can be effectively utilized to address these needs.

³ South Africa Constitution available at: <http://www.info.gov.za/documents/constitution/1996/index.htm>

1.4 Significance of the Study at Theoretical, Methodological, and Practical Levels

Although there appears to be a broad recognition of the key role that PSI can play in the development of societies, there are still significant gaps in our understanding of how PSI is actually being utilized. There is little systematic analysis of the utilization process that offers comprehensive and detailed empirical data. Therefore, rather than focus primarily on the outcomes of the PSI utilization process, this study examines the utilization process itself, and the factors and conditions that affect this process from the user perspective. I am particularly interested in identifying and investigating the PSI-related factors and conditions that could facilitate or hinder the utilization process, as well as the different PSI attributes that might increase or decrease its usefulness and value in each stage of the knowledge creation process in organizations working on socioeconomic development issues in South Africa. It is important to identify and understand these factors and conditions to be able to effectively address them and to draw lessons that can be transferred to other communities or situations.

Furthermore, research on the non-commercial aspects of PSI utilization as well as its non-monetary contributions to societies is still missing from the literature. By combining theoretical frameworks from organizational studies (i.e., knowledge creation), and economics of information studies (i.e., value of information), I am able to undertake a systematic investigation that is built on strong theoretical and methodological foundations to understand the ways in which PSI is contributing to knowledge creation and overall development in South Africa. This responds to Uhilir, Sharif, and Merz (2009) findings that: (1) there is a lack of strong theoretical foundation and robust data collection approaches in the study of the social and economic value of PSI; and that (2) there is an insufficiency of multidisciplinary studies in this area.

Also, this study focuses on the user (demand) rather than the producer (supply) perspective on access to and utilization of PSI. This is consistent with Blakemore and Craglia (2006) proposal that “the focus of the PSI debate needs, first and foremost, to move away from an agenda articulated primarily through the power of the PSI producers, and more toward an agenda that is clearly based on the citizen/consumer needs ”(p.20). This is also consistent with te Velde’s (2009) suggestion that we must change the way we measure the value of PSI and that we should focus on civic society and the individual users of PSI.

The study is intended to provide policy makers in South Africa and other developing countries with strong evidence about the importance of making more PSI easily and freely available, especially online. The lessons learned from this study should also help and motivate other communities working in the socioeconomic development field in South Africa and elsewhere to take full advantage of the available PSI.

Finally, the findings of this study could have some implications for funding agencies and international organizations addressing developmental challenges in the developing world, particularly by encouraging these organizations to explore the ways in which they can help build government agencies’ internal capacities so that these agencies become more effective in creating and supplying quality PSI.

1.5 Research Objectives and Questions

It is possible that PSI can be highly valuable for knowledge-creation organizations, especially those focused on socioeconomic development. However, there are different PSI-related factors and conditions that can facilitate or hinder the utilization process. More specifically, there are different characteristics and attributes of the PSI that may increase or

decrease its usefulness and value at the different stages of the knowledge creation process. Thus, the main objective of my study is to identify and understand these aspects within the knowledge production context from the user perspective. More specifically, the study has three objectives:

- To develop more systematic knowledge about the utilization of PSI in South Africa.
- To better understand the ways in which PSI is actually utilized and how it does or does not contribute value to the organizations using it.
- To understand how the features of PSI affect its utilization and value; i.e., what makes it easier or more difficult to use, and what makes it more useful to the task at hand.

Research Questions

From these objectives, I derived the following research questions:

Stage One: Seeking PSI Resources

- Why did the study participants seek PSI resources?
- What are the PSI-related factors that affected its discovery and acquisition?

Stage Two: The Knowledge Creation Process

- How do the study participants evaluate the overall quality of the acquired PSI?
- In what ways did the acquired PSI contribute to the knowledge creation process at the study sites?

Stage Three: Knowledge Outcomes and Application

- How do the study participants evaluate the overall importance of the utilized PSI to the created knowledge and its consequent benefits to society?

1.6 Conceptual Framework

The overarching goal of the study is to develop an understanding of the PSI utilization and value within the knowledge creation context, and the factors and conditions that affect this process from the user perspective. By knowledge creation I mean the work where the acquisition, processing, and communication of information play a major role. To address this goal, I first position my research within the broad context of information and knowledge for development. I then draw upon two streams of literature to build the study's conceptual framework: (1) knowledge creation, and (2) value of information. My aim is to develop a framework for identifying and investigating the PSI-related factors and conditions that could facilitate or hinder the utilization process, as well as the different PSI attributes that might increase or decrease its usefulness and value in each stage of the knowledge creation process in organizations working on socioeconomic development issues in South Africa.

Choo's (1995) information management process framework (as model for knowledge creation) provides a comprehensive and systematic step-by-step approach to investigate the utilization process and value of PSI to the users while they are performing their knowledge-work task. The model suggests viewing management of information as the management of a network of processes that acquire, create, organize, distribute, and use information.

This process model allows us to thoroughly investigate some important factors that affect the value of information such as access issues (e.g., availability and accessibility), technical issues (e.g., data formats, presentation format, interoperability, etc), and issues related to PSI quality (e.g., accuracy, comprehensiveness, timeliness, etc). The fewer the barriers to accessing and acquiring this information, the lower the technical problems associated with it, and the

higher its quality and relevance, the greater the value of this information to organizations' knowledge creation process and overall effectiveness.

Following Repo's (1986) information value-in-use framework, my starting point here is the hypothesis that the user of information gives value to the piece of information when the information is used. This takes place in relation to a knowledge-work process (e.g., a research project, where identifying, acquiring, manipulating, and using information is involved). This therefore means that the information must first have expected value-in-use to trigger the interest of the user, who actually decides whether to use the information or not.

This is called subjective expected value-in-use (Repo, 1986), and can be determined at the stages of identifying and acquiring information in Choo's process model. According to Repo (1986), actual value-in-use can be identified if it is possible to trace the role of information for a knowledge-work task. This is called subjective value-in-use and can be studied at the stages of information storage and organization, development of information products and services, and dissemination of information. The value of real effects the information has had on a task and its results is called objective value-in-use. This can be best studied at the last stage of the process model of information management proposed by Choo (1995), which is information use.

1.7 Methodology

Based on the research objectives, questions, and conceptual framework, I summarize the method used in this study. The study uses in-depth semi-structured interviews as the primary data elicitation technique. Informal interviews and review of historical and archival data are primarily used to provide broader overview and to understand the context of the projects and cases covered in this study.

This approach helped me to develop a close empirical understanding of the conditions, variables, and relationships involved in the PSI utilization in knowledge creation processes. It helped me understand why and how the PSI is recognized to have value for the users, what were the characteristics and conditions of the PSI that facilitate or hinder these processes, and finally, what was the users' evaluation of the overall importance and contribution of PSI to their work.

The case study approach (Yin, 1984) is considered to be one of the powerful and frequently used research methods in social science, sociology, and social work (Gilgun, 1994). The use of the case study method is well-recognized for studies where the context is important (Yin, 2003). This method “seeks to understand the problem being investigated ... and provides an opportunity to delve into issues for richness; to understand the nature and complexity of a given phenomenon that is contemporary and not yet thoroughly researched” (Yin, 1984, p. 13).

1.8 Research Audience

The audience for this study and its findings includes both researchers and practitioners. The research audience includes academicians in the fields of economics of information, development studies, and information and communication policy. In particular, scholars working on aspects related to information and knowledge for development, open government data, freedom of information, and value of information will benefit from the outcomes of this research. Furthermore, researchers interested in institutional bureaucracy, sociocultural obstacles, and social networks, in relation to accessibility and usability information and knowledge, will especially find the study results interesting and useful.

The main practitioner audience of the research includes government officials and policy makers, PSI holders, and managers and consultants from the private sector. It also includes

members at funding agencies, development banks, and local, regional, and international development organizations.

1.9 Outline of the Rest of the Dissertation

Chapter two provides a comprehensive review of the relevant literature on the definitions and categories of PSI, the value of PSI to different communities, measurement of PSI value, gaps in the literature, and the potential value of PSI for socioeconomic development in the developing world. The first part of chapter three positions the research within the broad context of knowledge for development. The second part of the chapter develops the conceptual framework for the study by reviewing two streams of literature related to knowledge creation and value of information. Chapter four starts with a description of study design, including the case study method, the study settings, case selection strategy, and an overview of the two organizations selected in the study: the Development Bank of Southern Africa (DBSA) and the Human Sciences Research Council (HSRC). The chapter concludes with an explanation of the unit of analysis, sampling strategy, approaches used in data collection, and data management and analysis. Chapter five presents and discusses the results of the study. Chapter six summarizes the study findings, discusses the study contributions to the literature, the study's limitations, and concludes with recommendations and suggested areas for future research.

CHAPTER TWO: PUBLIC SECTOR INFORMATION: POLICIES, USE, AND VALUE

In this chapter, I provide a critical review of Public Sector Information (PSI) and its potential usefulness and value to different communities. I start with an overview of the definitions and categories of PSI. This is followed by a discussion of the different models of government policies related to PSI, as well as the different approaches to disseminate it. I then provide an overview of the potential value of PSI to different communities including government agencies, private sector businesses, the general public, and research communities. The last section of this chapter reviews the research on PSI utilization and value, especially on the main difficulties associated with these efforts, and concludes with an identification of the gaps in this stream of literature.

2.1 What is PSI?

The data and information that are produced by or for the public sector bodies includes, for example, health and education data, geographic data, financial reports, social and economic statistics, legislation and judicial proceedings, food and water resources data, and many other kinds of data and information, collectively referred to as “public sector information”. The OECD (2006a) defines PSI as having characteristics of being dynamic and continually generated, directly produced by the public sector, associated with the functioning of the public sector (e.g., meteorological data, business statistics), and readily useable in commercial applications. Also, the OECD distinguishes “public sector information” from “public content”, which is characterized as being static (i.e., it is an established record), held by the public sector rather than

being generated by it (e.g., cultural archives, artistic works where third-party rights may be important), not directly associated with the functioning of government, and not necessarily associated with commercial uses but having other public good purposes (e.g., cultural, historical, and educational).

Vickery (2011) explains that there is no standard international terminology for the whole public information/content area and its subsets. In Korea, for example, reference is made to “public knowledge information resources”, and in the U.S. the terms “public information” and “government information” are widely used. The author further argues that PSI may also be used as an umbrella term for all information and content produced and held by public bodies, but there may also be some exclusions⁴ (Vickery, 2011).

2.2 Categories of Public Sector Information and Content

Main categories of public sector information and content include: economic and business, social, legal, geographic, meteorological, transport, environmental, agricultural and fisheries, cultural, and political data and information. Examples of each category are presented in table [1] below. It should be emphasized, however, that this list is neither exhaustive nor are individual domains exclusive.

⁴ For example, while the OECD *Recommendation of the Council for enhanced access and more effective use of Public Sector Information* [C(2008)36] includes all information and content generated and/or held by public bodies, the EC Directive on the re-use of public sector information (2003/98/EC) excluded information and content generated and held by cultural and educational institutions, and public sector broadcasters.

Table 1: Public sector information and content domains with examples

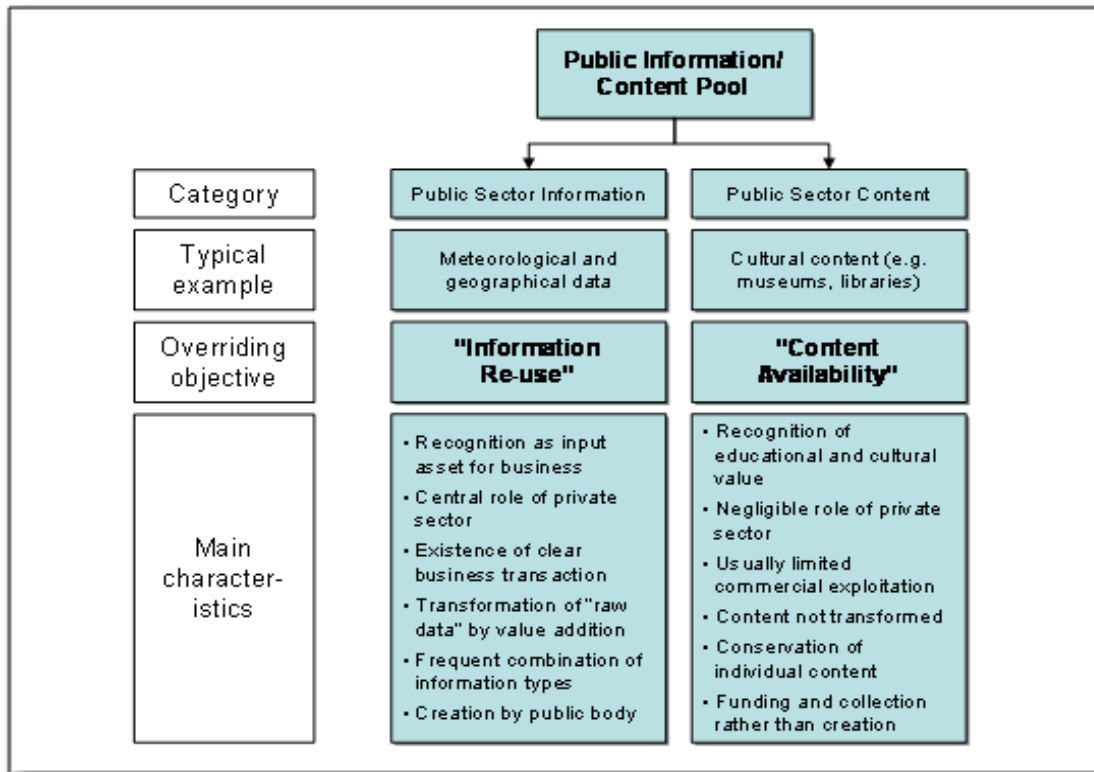
	Category	Example
Public Sector Information	Geographic Information	-cartographic information -land use information -spatial data/geographic coordinates -topographical information -elevation data
	Meteorological & Environmental Information	-oceanographic data -hydrographic data -environmental/atmospheric data -meteorological (weather) data
	Economic & Business Information	-financial information/economic statistics -company information -industry & trade information
	Social Information	-demographic information/attitude surveys -data on health/illness -education & labor statistics
	Traffic & Transport Information	-transport network information -traffic information -transport statistics -car registration data
	Tourist & Leisure Information	-hotel and restaurant information -tourism statistics -entertainment information
	Agricultural, Farming, Forestry & Fisheries Information	-cropping/land use data -farm income/use of resources -fish farming/harvest information
	Natural Resource Information	-biologic & ecologic information -energy resource/consumption information -geological/geophysical information
	Legal System Information	-crime/conviction data -laws/information on rights/duties/legislation -patent/trademark information
	Scientific Information & Research data	-university research -publicly-funded research institutes -governmental research
	Educational Content	-academic papers/studies/ lecture material
	Political Content	-governmental press releases -local/national proceedings of governments -green papers
	Public Sector Content	Cultural Content

Adapted from PIRA (2000), MEPSIR (2006), and OECD (2006a)

PSI can also be divided into administrative and non-administrative information (MEPSIR, 2006; Blakemore & Craglia, 2006). Administrative information relates to the government and the administration itself (e.g., laws and governmental policies). Non-administrative information is information gathered during the execution of tasks by government departments, such as collection of weather conditions and industrial research and development. Finally, this information can also be categorized according to its potential for commercialization and the type of industries to which it is likely to be useful. For example, the public sector information category may be the basis for producing increasingly sophisticated and pervasive products and services, such as location-related applications accessed from smart-phones. Information-intensive industries utilize the raw PSI data to produce such products and services.

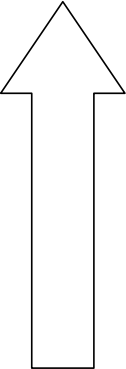
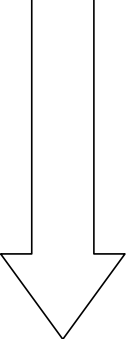
The second category, the public sector content, is usually employed to meet government objectives and goals. This creates a continuum of uses and applications (e.g., geo-spatial information with very high commercial use, and cultural archives with limited commercial interest, but very high value to some users), with different main objectives of re-use at the two ends of the spectrum (see also Vickery, 2011). This is explained further through figures [1] and [2], which are adopted from previous studies.

Figure 1: Categorization and characterisation of the public information pool



Source: OECD (2006a)

Figure 2: Public sector information domains and potential for commercialization

<p>Commercial re-use of PSI</p> 	Geographic Information	cartographic information
		land use info (cadastral data)
		spatial data/geographical coordinates
		administrative and political boundaries
		topographical information
	Meteorological and Environmental Information	elevation data
		oceanographic data
		hydrographic data
		environmental (quality) data
		atmospheric data
	Economic and Business Information	meteorological (weather) data
		financial information
company information		
Social Information	economic and statistics	
	industry and trade information	
	demographic information	
	attitude surveys	
Traffic and Transport Information	data on health/illness	
	education and labour statistics	
	transport network information	
	traffic information	
Tourist and Leisure Information	transport statistics	
	car registration data	
	hotel information	
Agricultural, Farming, Forestry and Fisheries information	tourism statistics	
	entertainment (local and national)	
	cropping/land use data	
	farm incomes/use of resources	
Natural Resource Information	fish farming/harvest information	
	live stock data	
	biologic and ecologic information	
Legal System Information	energy resource/consumption information	
	geological and geophysical information	
	crime/conviction data	
	laws	
	information on rights and duties	
	information on legislation	
	information on judicial decisions	
patent and trademark information		
Scientific Information and Research data	university research	
	publicly-funded research institutes	
	governmental research	
Educational Content	academic papers and studies	
	lecture material	
Political Content		
	governmental press releases	
	local and national proceedings of governments	
Cultural Content	green papers	
	museum material	
	gallery material	
	archeological sites	
	library resources	
	public service broadcast archives	
other public archives		
<p>Making available PSC</p> 		

Source: OECD, 2006a, adopted from PIRA, PSINet and other studies.

The categorization of PSI based on the above parameters would have a considerable bearing on the pricing, intellectual property rights, and data protection laws of the different types of PSI⁵.

2.3 PSI Government Policies

Maxwell (2003) defines information policies as social, political, legal, economic, and technological decisions regarding the role of information in a society. These decisions operate at two levels: at a societal level when applied to national and international policy, and at instrumental level as they impact the creation, dissemination, use, and preservation of information. The author notes that this definition underscores some of the complexity inherent in the information policy arena (Maxwell, 2003).

Hill (1995) argues that “government information policies are designed to meet the needs and regulate the activities of individuals, of industry and commerce, of all manner of organizations and institutions, and of local and national government” (p.279). These policies may regulate the ability and freedom to acquire, own, use, and transmit information. The author further explains that these policies encourage socially and economically desirable practices and discourage or penalize undesirable ones. Furthermore, they may define the responsibilities of the various parties for the proper stewardship of the information they hold (Hill, 1995).

Different nation states in the OECD, and indeed throughout the world, treat ownership and access of PSI in rather different ways. This in turn has resulted in different approaches and policies regarding access to and use of PSI. Access and use policies vary from fully open to restricted, freely available or with various access fee charges; and ranging from unrestricted use

⁵ For further details see the EC PSI Homepage at: http://ec.europa.eu/information_society/policy/psi/index_en.htm.

to a broad range of use restrictions. Moreover, the variations on access and use policies and conditions vary not only across national governments, but also in many cases within each country at the state and local levels (Uhlir, Sharif, and Merz, 2009).

In the United States, for example, the federal information policy is based on the premise that the economic benefits to society are maximized when publicly funded data and information are made available freely and as widely as possible (Weiss, 2003). This, of course, excludes sensitive and confidential data such as personal and health information, as well as national security and trade secret information. This policy is expressed in the Paperwork Reduction Act of 1995, in the Office of Management and Budget Circular No. A-130 titled “Management of Federal Information Resources”, and in the Freedom of Information Act⁶. The U.S. policy promotes the broad use of these PSI resources at no more than the marginal cost of dissemination (free online) and without copyright or other intellectual property restrictions. In general, it actively encourages the development of a strong and sustainable information industry where more information products and services based on the use of PSI are created and commercialized.

In the European Union (EU), there was a major change in the way European states thought about and treated PSI in 2003. Before 2003, PSI resources were treated by government agencies in most European countries as a proprietary commodity. Many public institutions applied the “cost recovery” policy to many PSI categories, where citizens, the private sector, and even other government agencies needed to pay in order to have access to these information resources. Under this policy, use and reuse, for both individual and industrial purposes, was expensive or limited. The logic behind asserting this kind of monopoly control on certain categories of PSI was to recover the costs of its management, sometimes including even the costs of its generation, although in most cases such information policies prohibit the government entity

⁶ Respectively, 44 United States Code Chapter 35, 61 Federal Register 6428, and 5 United States Code 552.

from generating a profit on the PSI that they license. Such a cost recovery policy was intended to bring higher value PSI products and services directly from the government sources, rather than relying upon the private sector to re-use that PSI to provide them.

The major development in 2003 in this area was the birth of the EU Directive on the re-use of PSI (EU Directive 2003/98/EC, 2003⁷). The EU sought to ensure the economic benefits of PIS re-use through this Directive, which sets minimum rules for PSI re-use and encourages European countries to move towards more openness of their PSI.

According to Europe information society portal⁸, as of May 8th, 2008, all 27 Member States notified implementing measures to the Commission. However, implementation of the PSI Directive differs from one State to another. For example, as of May 2008, twelve countries have adopted specific PSI re-use measures, three other countries have used a combination of new measures specifically addressing re-use and legislation predating the Directive, eight countries have adapted their legislative framework for access to documents to include re-use of PSI, and four countries have notified the Commission only of measures predating the Directive, with no specific re-use provisions⁹. These results are not surprising given that some commentators in the field saw the EU Directive as woefully ambiguous (i.e., has get-out clauses such as "where possible and appropriate") and poorly understood. For example, currently the Directive does not require public agencies to actually open up their data, but requires them to have an explicit policy about how public data can be. Also, although the Directive was meant to be broad in

⁷ The spirit of the Directive was to minimize the implementation costs both on the public sector bodies themselves as well as the potential PSI re-user through simplifying the processes involved and as a result maximizing the potential of businesses to develop the knowledge economy through the re-use of PSI rapidly. See also "Time to adopt the American model?" at

<http://www.guardian.co.uk/technology/2006/jun/15/guardianweeklytechnologysection3>

⁸ Available at: http://ec.europa.eu/information_society/policy/psi/rules/ms/index_en.htm

⁹ For a detailed analysis of the implementation of the PSI Directive in each country, please see: http://ec.europa.eu/information_society/policy/psi/rules/ms/index_en.htm

scope and to include all kinds of information from all public bodies, there are explicit exceptions for data from publicly funded cultural heritage institutions and research bodies.

As a result of this situation, the EU called for feedback in late 2010 on how the PSI Directive could be improved. This call generated hundreds of responses from across Europe, with many suggesting that the Directive should be expanded and should place more explicit requirements on public bodies to open up their data. In response to this feedback, some new proposals have been put forward by the European Union's Digital Agenda Commissioner Neelie Kroes on December of 2011 that will make all EU countries obliged to make their public data available in digital formats. "We are sending a strong signal to administrations today. Your data is worth more if you give it away. So start releasing it now: use this framework to join the other smart leaders who are already gaining from embracing open data. Taxpayers have already paid for this information, the least we can do is give it back to those who want to use it in new ways that help people and create jobs and growth," said Kroes at the launch of the initiative¹⁰.

According to Kroes, the EU PSI assets could be worth 40bn euros (\$52bn, £33.6bn) a year. If approved by the European Parliament and the Member States, the proposal is likely to come into effect in 2013. Member States would then have 18 months to implement it into their national legislation.

It is important to note that at the time of completing this dissertation (April 2013), most of the European countries were still applying a hybrid model regarding access and use of PSI, where they apply aspects from both the open access and the cost-recovery policies. Countries like Netherlands and Sweden are leaning more towards more openness than cost recovery, while countries like Italy is still closer to the cost-recovery model.

¹⁰ Available at:
http://www.pcworld.com/businesscenter/article/246026/eu_to_make_all_public_data_available_in_digital_formats.html

The situation outside the OECD group, and especially in the developing countries, is quite different. Although more than 35 developing countries have either adopted or in the process of adopting a Freedom of Information Act¹¹, which could be seen as a step closer to opening government data, there is a serious lack of concrete government policies to enforce these acts, and much less to make their PSI more openly available to the public. With only a few exceptions, policy discussions of the importance of PSI and efforts to take full advantage of this strategic resource are almost absent in the developing countries. This is very ironic given that PSI has the potential to be of unique importance to these countries, especially in their fight against poverty, in improving public health and other socioeconomic problems.

Kenya is one of those few exceptions. On July 8th, 2011, President Mwai Kibaki launched the Kenyan Open Data Initiative, making key government data freely available to the public through a single online portal. Among the first datasets to be released were the 2009 census, national and regional expenditures, and information on key public services. Tools and applications have already been built to take this data and make it more useful than it originally was. This makes Kenya the first developing country to have an open government data portal¹².

A similar initiative is taking place in Moldova. The Moldova open data website --the first in that region -- was launched with 67 data sets from five agencies, with each agency providing a minimum of three data sets per month to create a pipeline of data. By October 2011, the number of data sets was more 250, covering full public disclosure of expenditures¹³. Other developing countries that are working on some similar initiatives, according to the World Bank (2011), include Mongolia and Rwanda.

¹¹ See <http://www.freedominfo.org/>

¹² See <http://data.worldbank.org/news/kenya-leads-on-opendata-in-dev-countries>

¹³ See <http://data.worldbank.org/news/kenya-moldova-lessons-for-dvlpng-countries>

It is important to note that most of these initiatives are part of what is called the “Open Government Partnership (OGP)” launched on September 2011, with eight founding governments: Brazil, Indonesia, Mexico, Norway, Philippines, South Africa, the United Kingdom and the United States. According to the partnership website, the OGP “is a global effort to make governments better... it is a new multilateral initiative that aims to secure concrete commitments from governments to promote transparency, empower citizens, fight corruption, and harness new technologies to strengthen governance” (OGP, 2013).¹⁴

To become a member of OGP, participating countries must meet a number of requirements including embracing a high-level Open Government Declaration; delivering a country action plan developed with public consultation; and committing to independent reporting on their progress going forward (OGP, 2013).

2.4 Dissemination of PSI

Public sector agencies, the private sector, the general public, and research communities access PSI in a number of ways, with online government portals and public libraries being the main sources of access.

Much of the current and potential growth of the PSI market is related to the growth in the information and communication technology (ICT) industries. Vickery (2011) notes that two main technological developments have radically influenced access to and dissemination of PSI. These are: i) technologies that enable the digitization of public resources as they are produced, and retrospectively for public resources already existing; and ii) deployment of broadband

¹⁴ See <http://www.opengovpartnership.org/about>

technologies that enable better access and find-ability of PSI and much more rapid dissemination of it.

Traditionally, PSI has been delivered in a wide variety of formats such as maps, brochures, and paper-based records (and some of it will probably continue to be offered in this way). These delivery mechanisms and formats, however, did not allow for maximum utilization of the PSI resources due to practical, financial, and other factors. Now, thanks again to ICTs, once born digital or digitized, information becomes more easily storable, transportable and exchangeable, bringing countless new opportunities for different potential user communities. As a result, there is a growing momentum to put more of this information online, thereby maximizing the use and value of PSI. This is exemplified most clearly in the various manifestations of e-government that are taking place around the world, but especially through the more focused and well-organized open data initiatives.

By the end of 2011, at least 16 countries have undertaken major open data initiatives, mostly in the form of websites that make datasets available to potential users, especially researchers and developers¹⁵. Other initiatives by state and local governments can also be found all over the world, especially in the OECD region¹⁶. These approaches do not necessarily provide all information themselves; rather, they offer meta-information and indices from various sources and points of view (Bargmann et al., 2004).

ICTs have also been attributed to generating a greater global interest in PSI. For example, in addition to its impact at a national level, information that is placed on the Internet goes beyond

¹⁵ Jesse Lichtenstein. *Why open data alone is not enough*. *Wired*. Available at: www.wired.com/magazine/2011/06/st_essay_datafireworks/. Also note that, according to the open government partnership website, by early 2013 the OGP has welcomed the commitment of 47 additional governments to join the Partnership and engage in different open government data activities (<http://www.opengovpartnership.org/about>). Example of such portals include the USA portal at <http://www.usa.gov/>, the Austrian portal at www.help.gv.at, the French portal at www.data.gouv.fr, and the British portal at www.data.gov.uk.

¹⁶ Examples include Vancouver, New York State, and Washington DC.

a country's borders to become part of an international pool of knowledge. Countries that partake of this global PSI can benefit economically and socially, which could help in the reduction of the digital divide (Uhlir, 2004). Clearly, PSI and ICTs have a strong interdependence on each other that produces great value for each.

In addition to the dissemination of PSI through the web and government portals, there needs to be other access points for those who are not able to use or afford some of the technologies required to access this information on the web. Public libraries help in filling this gap and play an important role in the dissemination of information and in the creation of knowledge. For example, the U.S. Federal Depository Library Program (FDLP) is a federal project to facilitate citizen's access to government information. The FDLP program turns libraries into receivers, catalogers, and preservers of government information. One of the benefits of the FDLP is that depository libraries receive the information free of charge, and the libraries provide local, no-fee access to government information (U.S. Government Printing Office, 2008).

Also, recently a new United Kingdom legislation titled the "Public Libraries' Access Scheme" has been set into law, which hopes "to improve citizen's access to legislative and other official publications"¹⁷. This will make it easier for the average person to access valuable information like property transactions, local regulation changes, and the proceedings of the local government. This, in turn, will help the population to keep up to date with new laws and the legal goings on within their local township.

¹⁷ See <http://www.opsi.gov.uk/official-publications/public-library-access-scheme.htm>

2.5 Value of PSI to Societies

Public sector information represents an important asset with vast social and economic potential¹⁸. It is an important element in the existence of a robust knowledge economy. These information resources are used broadly by public-sector organizations themselves, through intra- and inter-governmental exchange of information (e.g., Sheriff, 2000; Abd Hadi & McBride, 2000); by private-sector companies in general (as information users); by information industry firms in particular (as re-users to produce value-added information products and services) (UK OFT, 2006; Abd Hadi & McBride, 2000; Young, 1992); by research communities (e.g., employment information is now used extensively in the social sciences and policy making; data from public health organizations play a growing role in the advancement of life sciences; and geospatial data, statistics, and health and education information are being used for poverty mapping) (see Arzberger et al., 2004); and by individual users (e.g., for health and educational purposes and for making social and economic decisions).

According to Horton (2002, p.3) diffusing public information and knowledge resources efficiently and effectively is essential to:

1. “Sustaining the competitive competency of the country’s businesses and industries, in both domestic and global marketplaces;
2. Attaining the highest levels of educational excellence for all the nation’s children and adults in a lifelong learning context;
3. Enabling citizens to participate more effectively in all facets of a democratic society;
4. Informing public officials at all levels of government so that they can enact better laws, formulate and enact enlightened public policies, monitor the programs they

¹⁸ Although this information is ascribed no power in its own right, however, it is a very valuable in the way it supports development of organizations and societies.

- authorize effectively, and govern fairly, equitably, and wisely; and;
5. Enhancing the quality of life of all a country's citizens, including responsibility to the special government information needs of disadvantaged and disabled individuals.”

Also, in a more recent study by the Australian State of Victoria on access to and use of the State's PSI in 2008–2009, the study found that the overall potential for economic and social returns from PSI were seen as positive. The study predicted that if access to PSI is improved, new businesses and markets would emerge (EDIC, 2009). The study also provided detailed discussion of various potential efficiency improvements as a result of better access to PSI. These include, for example, government efficiencies through better coordination, resource allocation and more informed policy and decision-making, commercial efficiencies and greater innovation through the re-use of PSI, as well as the potential for improved transparency and social inclusion and engagement, including freedom of expression and improved democratic processes (EDIC, 2009)¹⁹.

Below, I provide detailed discussions and examples of the potential importance and value of PSI to different communities in the society²⁰.

2.5.1 Value of PSI to Governments

According to Pierre and Peters (2005), there are two key variables in determining a State's capacity to govern. First, is the authority of the State, referring to its ability “to make and enforce binding decisions on the society” (p.46). Second, is the State's ability to gather and process information. The authors argue that the State must act in concert with society to gather

¹⁹ See also “Europe to make all public data available in digital format”. Available at: http://www.pcworld.com/businesscenter/article/246026/eu_to_make_all_public_data_available_in_digital_formats.html

²⁰ It should be noted that the value of certain types of PSI is easier to grasp than the value of other types [see Cragila & Blakemore (2004) on meteorological information and Hannapi-Egger (2004) on cultural information]

information about it, and must also be “open to a wide range of information, including much that is uncomfortable and dissonant, if it is to be successful in governing” (2005, p.46). Hill (1995) argues that “if government wants its well-researched and sensible policies to be accepted, therefore, it must not be willing merely to provide full and clear information about the issues and the expected consequences of its proposed policy; it must take every reasonable step to ensure that the electorate is given that information” (p. 280).

The wealth of information generated by the government holds great value to the government itself and to the nation. The public sector, while it is the collector and creator of PSI, it is also one of the primary users of this information. Governments can use these resources in creating policies, dealing with everything from education to public health to environmental protection.

Below I detail the areas and some specific examples of the potential value of PSI to governments.

2.5.1.1 PSI for Public Sector Efficiency Improvement

PSI can greatly improve the efficiency of many public agencies and functions. Public agencies use their own information or information from other public sector bodies (and from other sources, of course) for many objectives, including to craft policies; maintain, evaluate, and improve relevant government operations; plan for the future; inform the public; and ensure the vitality of the economy. Basically, government agencies use PSI to make informed decisions in every aspect of government. For example, the U.S. government uses census data and economic data to calculate minimum wages and the cost of living for the country (U.S. Bureau of Labor,

2008²¹). Other examples may include making decisions about where and how many schools, hospitals, nursing homes, prisons and roads to build based on information the government collects from the public. Governments also plan and prepare for natural disasters by using such information as geospatial, health, and population data.

Moreover, governments exchange scientific and technical information to foster excellence in scientific research and to ensure effective use of federal research and development funds. To that end, public agencies use PSI to determine appropriate funding to areas where further development is needed. For instance, health and medical information collected by the government can be one of the important deciding factors in decisions related to funding of medical research organizations and universities. Also, governments can use traffic and population data as their basis for approving funding for the construction of new transportation systems and businesses.

Finally, access to and sharing of PSI within these agencies can eliminate work duplications, promote faster services and better coordination. The importance of government information sharing is clearly shown in the Intellipedia project²² within the U.S. intelligence agencies. This is a small-scale model of the types of results that can be obtained when different agencies and organizations share information and results with each other. Intellipedia is a web 2.0 tool to share information and thoughts horizontally within the intelligence community. It is a wiki-based setup, where people from different intelligence agencies can look over information and share their own thoughts or add further information to a topic. Some of the core principles behind Intellipedia are: (1) work at the broadest audience possible, and (2) think topically not organizationally.

²¹ Available at: <http://www.bls.gov/>

²² For more information see <https://www.cia.gov/news-information/featured-story-archive/intellipedia-marks-second-anniversary.html>

In thinking topically, governments may find themselves better able to communicate across boundaries, thus eliminating duplication of effort and information. If agencies are not wasting time in recreating another agency's information, they can better apply their funding to use this data and information to develop higher-level activities and applications.

2.5.1.2 PSI for Direct and Indirect Financial Gain

The last two decades or so have witnessed a noticeable increase in governments' awareness of the commercial value of PSI (Vickery, 2011;Uhlir et al., 2009; MEPSIR, 2006; Weiss, 2003; Hadi & McBride, 2000). According to Hadi & McBride (2000), issues and developments that affected this increased awareness include:

- “increasing commercial pressure for access to government information;
- the expansion of the information industry;
- increasing dependence on information by many organizations and the expansion of information of information intensive industries;
- increasing use of the Internet and electronic exchange of data;
- the development of electronic access to government departments; and
- a push by governments towards identifying new means of income generation” (p.553)

Governments can benefit from the PSI through generating some direct and indirect financial gains. Because of the strong potential for re-use, some public bodies, especially from countries that still follow the “cost recovery” model, may use the PSI they collect to develop products and services on their own (see the UK OFT, 2006). Under the same policy approach, other agencies may sell or license PSI to other public bodies, to commercial entities, or to a commercial “arm” of the government (UK OFT, 2006 ; Weiss, 2003). For example, revenues to

the UK government from the sale and licensing of PSI were around 340 million pounds, and the total market for PSI stood at 590 million pounds per year (UK OFT, 2006). The OFT study estimated that this could double to one billion Pound per year if reforms are implemented (see also Cross, 2007). Approximately half of the income came from businesses, 45% from other public sector bodies and the rest from the general public.

On the other hand, in countries that follow the open access model such as the US, the public sector benefits indirectly through the increased financial rewards generated by open and free access to PSI. By increasing the revenues that the private sector generates from commercializing the freely available PSI, the government increases the tax base that the government can draw upon when funding future activities and projects (Weiss, 2003).

By making the information available at little or no cost, the public sector also develops good relationships with the private sector, which may allow for joint projects in the future. The private sector may also be able to use the PSI to create new uses that will enable the government sector to carry out their missions more efficiently. A good example would be the local and state governments that share data with Google Earth and receive a significant value-added piece when Google Earth provides back to local governments a broad-based, very user-friendly interface that local jurisdictions use for their own internal research and as a template to present their taxation and home valuation data to the public (Domenico, 2007).

2.5.1.3 PSI for Awareness Raising and Democratic Values

Finally, PSI has increasingly been seen and used as an instrument to educate citizens and raise their awareness regarding many social, economic, and political dimensions of their lives, which subsequently can speed up the social development of the country (see Thomson, 1999). Also, one major value that affects government's performance and reputation is transparency of

governance and promotion of democratic ideals: equality, accountability, inclusion, and openness. The more information that is accessible from the government, the less likely it is to create corruption. Furthermore, if the PSI is easily and readily accessible, then all people have the opportunity to obtain the desired information and pursue their democratic rights (Uhlir, 2004).

The transparency of government and public information prevents discrimination of access and use, which fulfills citizens' right to freedom of information. This was well articulated in the recent EU proposal to open their data in digital format. The proposal argues that "open data is a powerful instrument to increase transparency in public administration, improving the visibility of previously inaccessible information, informing citizens and business about policies, public spending and outcomes" ²³.

The establishment of a society with well-informed citizens, who participate actively in the economic, political, and social development and improvement of their country can help sustain a healthy economy (Mayo & Steinberg, 2007; Hadi & McBride, 2000). Moreover, transparency and access to the information produced by the government can make it easier for the public to understand the legislative, economic and social processes that take place in the country.

2.5.1.4 Value of PSI to Government: Summary

In conclusion, PSI contributes value to the government through social, political and economic aspects. The open availability of this information promotes a healthy economy. It provides essential services to the public and helps to preserve the culture and history of the society. These aspects greatly add to the smooth functioning of a democracy. More specifically,

²³Available at:
http://www.pcworld.com/businesscenter/article/246026/eu_to_make_all_public_data_available_in_digital_formats.html

through the dissemination of PSI, the government can gain such social and political benefits as promoting national law and order as well as strong and peaceful global relationships. Access to and use of PSI promote better health and overall life-style choices of citizens and reduces some potential costs. Furthermore, enriching the educational and cultural knowledge of citizens can improve the economic well being of citizens and thus the country and its government.

The government that provides open and easy access to PSI to all interested parties can gain the trust, respect, and support from both the public and private sectors, which in turn will ensure the prosperity of the country in general. Also, there could be some financial benefits from the direct or indirect utilization of PSI by different communities. However, the benefits in saving time, effort, delivery systems, and other functionalities should not be overlooked. If agencies can share their information rather than duplicate it, they increase their ability to use this information and develop new applications and uses.

Finally, governments can also be innovative in using the PSI for non-commercial purposes. The BBC is frequently cited as an innovator in this area (see Mayo & Steinberg, 2007). In 2005, the BBC launched a project called BBC Backstage to encourage non-commercial re-use of various types of information usually unavailable to outsiders²⁴.

As part of Backstage project, the BBC provides content such as traffic reports, weather data and the TV programming guide. According to Mayo and Steinberg (2007), the site has a development community of around 1,300 users and has resulted in a number of innovative projects in the UK, including a mobile phone traffic news system called mtraffic.

²⁴ See more information about the project at <http://backstage.bbc.co.uk/>

2.5.2 Value of PSI to the Private Sector

The variety of PSI resources is not only significant in administration, control, evaluation and policy-making processes; it also has a great potential commercial value. Hadi & McBride (2000) argue that the commercial value of the PSI arises in part from its unique properties such as comprehensiveness, continuity, and accuracy. Some more specific qualities of the PSI that are becoming essential with the increasing reliance on informational resources include:

1. PSI has usually been collected over a long period of time, which makes it useful for time series analysis.
2. PSI is seen as collected by a neutral guardian. While there may have been changes in information collection for political reasons, as in the field of unemployment statistics, the criteria for such changes have at least been made public, at least in a democracy. So in general, PSI is equated with trustworthy information.
3. PSI enjoys the assumption of reliability. The public sector has the means to enforce information collection. Reliability is increased because in many cases providing correct information is on the best interest of the information subjects if such information is, for example, necessary to obtain a specific legal status.
4. The PSI collection enjoys the assumption of sustainability. At least discontinuing information services could be turned into a public policy issue (Buekert, 2004, p. 7-8).

The last two decades or so have witnessed a growing awareness within the private sector of the reuse and commercial value of PSI. The private sector understood that this source of information has a number of inherent qualities that are vital for the information market and could not simply be left to the public sector and their associated private enterprises (Buekert, 2004).

Although much of the collected PSI was not initially intended for commercial purposes, businesses are continuously discovering that there are many potential commercial applications for this raw PSI. In such a process, the private sector plays an intermediary role between the publicly funded and created PSI and the end-user, through adding value to the raw PSI. This has created unprecedented possibilities to combine data from different sources to create “added value products and services” using PSI²⁵. A noticeably successful example in this area is the meteorological information industry in the US. This industry has grown to hundreds of million of dollars a year through “value-adding” products and services (Arzberger, 2004; Weiss, 2003).

The private sector can use certain types of PSI such as demographics, macroeconomic indicators (e.g., national and per capita income, interest rate, inflation, exchange rate, unemployment rate), labor laws, trade and tax policies and other government regulations in order to make sound decisions, define their investment strategies, and improve their innovative capacities and competitiveness. According to the OECD (2006a), some of the products and services that the private sector can produce using PSI include in-car navigation systems, digital online maps, weather forecasts for different platforms (e.g., mobile phones), enhanced legal text databases for research, location-based information on doctors and pharmacies, and location-based tourist recommendations including weather conditions, attractions, and directions.

In general, there are two distinct uses of this information within the private sector: dissemination and creation of value added products and services (UK OFT, 2006). Publishing companies, web design firms, and broadcasting networks are in the business of disseminating PSI. Many of these companies do nothing more than taking the information and making it viewable to the general public through print, television and the Web. However, companies that provide value-added products and services transform and present this information in different

²⁵ For more details see the EC PSI page: http://ec.europa.eu/information_society/policy/psi/index_en.htm

ways so that consumers can use it more easily to make decisions and to manage their lives. These companies come from the information intensive industries. ICTs consulting firms, research database providers, insurance firms, and legal service providers are all part of these industries. For example, Weiss (2002) noted that “information retrieval and database industries are highly dependent on the open and unrestricted availability of government information” (p.129).

According to the U.K. Office of Fair Trading (2006), there are three ways to utilize PSI in the private sector:

1. Own business use: this includes using PSI to make improvements within a business, such as developing an inventory system for a retailer and using PSI to identify patterns to maximize sales and services is another application.
2. Produce products for consumers: this includes the use of PSI to produce, for example, car navigation systems, hiking maps and genealogy services.
3. Produce products for industry: this includes the use of PSI to develop products for an industry such as training manuals, radar or autopilot maritime systems. (p.29)

According to the U.K. OFT survey (2006), 39% of businesses in the UK use PSI for their own purposes, 28% use it to produce products for consumers, and 44% use it as an input to produce products for industry. The following are some specific ways in which the private sector can benefit from the PSI:

- Meteorological information can be used in making weather forecasts, which could be used as a key input for various airline companies.

- Weather risk management, which makes use of meteorological data for planning and making predictions for specific industries (e.g., transport, insurance, farming etc.), is another important area.
- Insurance companies use PSI to better assess their risk, or perhaps even allow people to know the level of danger associated with living in certain areas. They can also use public data about mortality rates, health risk factors, and crime rates to determine how much consumers pay for their services, and whether a consumer will be eligible for their services at all.
- Private map makers have always relied on PSI for map creation. Digital maps can be used to develop systems to facilitate disaster or freight management.
- IT consulting and computer programming firms often make a great deal of profit by using geospatial data to create value added products. Google has created one of the most popular mapping services in the world in Google Maps/Google Earth. Using PSI, Google has given its users the ability to type in an address or city name and see satellite images of the location that they have specified. Google is also using traffic data along with geospatial data to allow users to see what the traffic volume is at a specific location.
- Tourism information can be used for mobile tourist service with description of main monuments, hotel information, car rental, restaurants, shopping centers, etc. For example, the European Waterways Tourism Development Service is planning on enhancing the tourism industry by using geospatial PSI to provide “visitors, in particular boaters, with quick and easy access to up-to-date information about where to go, what to see and about the waterways themselves”²⁶.

²⁶ Available at http://ec.europa.eu/information_society/activities/eten/cf/opdb/cf/project/index.cfm?mode=detail&project_ref=ETEN-029390

- Financial records, such as company registrations and property transactions, can be mined to determine a portion of someone’s credit history, or whether or not they qualify for loans.

The ePSIplus portal²⁷ provides some specific examples and best practices of exploiting PSI in different European countries. For example, the Krediidiinfo Company²⁸, which is located in Estonia and whose primary purpose is to provide credit information services, relies on the re-use of PSI in its business activities. The company compiles information available in various public sector databases, adds value to the information by combining it with their own private sector information. Creating such services, the company “offers its clients with a one-stop shop for their information needs”²⁹. Krediidiinfo’s clients can get the information needed for their businesses for some reasonable fee and save a lot of time through obtaining the information in a fast and efficient way. In the weather information area, Weather Solutions for Insurers, based in the United States, organizes weather information from government sources and sells uncertainty estimates to insurance companies so that they can plan more strategically with increased lead-time and greater forecasting accuracy to help identify exactly where exposures exist³⁰. Other specific examples are provided in table [2] below:

²⁷ Available at <http://www.epsiplus.net/>

²⁸ Available at <http://www.krediidiinfo.ee/index.php?m=11&lang=I>

²⁹ Ibid

³⁰ Available at <http://www.wsi.com/>

Table 2: Examples of businesses using PSI to produce products and services

Name	URL	Brief Description
AMEE, based in the UK	www.amee.com	Aggregates and automates access to the world's environmental and energy information so that customers can gain insight and grow their businesses with environmental intelligence everywhere.
GeoVelo, based in France	www.geovelo.fr	Helps users to calculate cycle routes, taking into account their preferences.
OpenlyLoca, based in the UK	http://openlylocal.com	Provides information on all 434 UK councils, with detailed information on over 160, and over 14 Billion British Pounds of spending data.
Dobini, based in Ireland	http://dobini.eu	Develops products and services based on geographic data, in particular from the openstreetmap project.
HusetsWeb (Web of the house), based in Denmark	www.husetsweb.dk	Provides an energy improvement calculator for house-owners which analyzes how various types of improvement can help save energy. The calculator is based on PSI from various public agency sources as well as house-owners input.
Euroalert, based in Spain	http://euroalret.net/en	Aims to fix information about public contracts. They are building a pan-European platform to aggregate public procurement data and deliver commercial services to SMEs powered by open data.
uSwitch, based in the UK	http://www.uswitch.com/	Allows people to compare prices of utility providers based on public information.
Cadcorp, based in the UK	http://www.cadcorp.com/	Develops and supplies industry leading geographic information systems (GIS) and web mapping software.

In their study about the commercial use of public information, which considered 300 businesses that buy/license PSI from public sector information holders, the U.K. OFT survey (2006) found that among businesses generating products from PSI, 98 % ranked PSI as an important or very important input to their products. Moreover, three out of four stated that they would not be able to continue production in the absence of PSI. In a more recent survey of PSI holders and re-users (supplemented by case studies) across the EU 27 countries about the use of

geographical, meteorological and legal information sectors, the main conclusion of the survey was that there is dynamic growth in the three areas (Fornefeld, 2009). The following are some of the specific findings of the study:

1. The geographic information market is growing and income of 66% of the re-users who responded is increasing.
2. In the meteorological information sector, the market for private weather services is also growing. The volume of meteorological data procured from the public sector between 2002 and 2007 had increased for 74% of the companies.
3. The market for legal and administrative information is growing, with the majority of re-users indicating increasing income, and those that add value to PSI reported exceptional growth rates (Fornefeld, 2009).

2.5.2.1 Value of PSI to Private Sector: Summary

In the information age, the state has entered into new and dynamic relations with business enterprises (Sigurdson, 2003). PSI is one of the raw materials that fuel this relationship, allowing businesses to reduce their research and development overhead and becoming more innovative and competitive through the production of new products and services. The open and free access to PSI has the potential to increase the number of information services, increase the market size of information industry, and thereby expand the potential job market in the future. For example, Weiss (2003) claimed that open access to the Dutch Federal Geographic Data by lowering the price of their data by 60% would lead to a 40% annual turnover growth plus employment growth of approximately 800 jobs. The MEPSIR report (2006) also states that the information industry in Europe will grow from €10 to €48 billion in coming five years.

These kinds of positive externalities that result from access to and re-use of PSI create wealth and stimulate the economy, and are responsible for “enriching the population” (Uhlir, 2004). As timely information is required on an ongoing basis, new digital formats of information are being used and many companies involved in the information and communication industry survive and thrive through their involvement in the collection, processing, and transmission of PSI. This leads to substantial income generation from sales of hardware, software, and consultancy products and services (OECD, 2006a).

2.5.3 Value of PSI to the General Public

The unique characteristics of information in a free and democratic society are best expressed by Thomas Jefferson: “Information is the currency of democracy”. A democratic society requires free flow of information between the government and the public. As PSI relates to all spheres of life, the general public benefits from obtaining such information to improve their lives and be productive and knowledgeable citizens. PSI can inform citizens of their rights and responsibilities, educate them and provide opportunities for life-long learning, and preserve cultural and historical information for the future.

The general public can benefit from PSI directly and indirectly. Directly, the general public can get information and instructions related to, for example, parent, child, and elderly people social support, tax issues (e.g., domestic and international tax arrangements), education for children and adults (e.g., educational policy, special educational needs and additional support, workplace training and development), health services (e.g., hospitals, insurance coverage, compensations), housing issues (e.g., housing advice, housing finance, housing repairs

and renovation), and safety matters (e.g., civil emergencies, emergency response, emergency services, emergency planning, and emergency warnings).

The information on justice and legal rights is also important to the public. This information includes civil and human rights, consumer rights, crime and law enforcement (including crime prevention information) employment rights, firearms, law and justice system (e.g., legal services, prisons, probation, coroners, youth justice), and security (including data security, national security and security of equipment)³¹.

PSI also includes information on leisure time and culture (e.g., arts, entertainment and events, children's activities, parks and gardens, sports and recreation facilities, tourism and young people's activities) that could help people make decision on different vacation-related aspects. The information on transportation and infrastructure (e.g., air transport, community transport, commuting, public transport, road transport, parking, road safety and traffic management, roads and highways, structures and installations, transport for disabled people, transport planning and water transport) can explain which means of transport is good to travel at a given time or a season.

Moreover, information on government and public administration is also important to the general public. This category includes information on central government, constitution, democracy and elections, local government (including council procedures, councils, local government committees and structure), and public administration (including public bodies, public consultation, public services, public service agreements and standards in public life).

With access to such PSI resources, the general public can make personal decisions about where to live, where to go to school, what career to pursue, where to go for a vacation, where to

³¹For more examples see www.Info4local.gov.uk

invest, and who to vote for. For example, the European Commission points out the great importance of PSI for the mobility of workers, students, and retired people within the EU. A better knowledge of opportunities, circumstances and procedures in the EU can help citizens make more informed choices about mobility and take full advantage of the right to move to another EU countries (see EC, 2004).

One of the important examples of the value of the PSI to the public can be seen when people use public health information. The Power of Information report by Mayo and Steinberg (2007) highlights a few cases where the use of this information has greatly contributed to the health of the public. The authors state that the provision of food safety information has led to a 13.3% drop in food borne illness in Los Angeles. Medical studies have also proven that HIV/AIDS patients better cope with their disease and have a lower treatment cost when they better understand their condition (Mayo & Steinberg, 2007).

The public can also get some indirect benefits from the PSI. These benefits come from other sectors such as information industries and research community. As these sectors add value to PSI in their fields, the trickledown effect that was mentioned earlier occurs yet again. New advances or discoveries created by each sector circuitously affects the general public and allows them to reap new and additional benefits. For example, information industries make PSI more user-friendly by providing editorial content in domains that can be difficult for the general public to understand, such as legal information.

Also, businesses like Traffic.com³², the Weather Channel³³, and Yahoo!³⁴ provide portals loaded with different types of PSI to the general public. This in some ways confirms Uhler's (2004) argument that "information with the lowest barriers to access and use will potentially

³² Available at: http://www.traffic.com/?utm_source=google&utm_medium=cpc&utm_term=GS336FyCJio|crld|2246685225

³³ Available at: <http://www.weather.com/>

³⁴ Available at: www.yahoo.com

have the widest audience, and the positive effects of public domain information can be increased by enormous proportions when such information is placed on global digital networks” (p.10).

One of the primary benefits of easy access to PSI for the public is government transparency and increased democratic participation (As discussed in section 2.5.1.3). Transparency in government involves making information from projects and activities available to citizens, who then can hold the government accountable if anything goes wrong. PSI needs to be obtainable if “openness of administration is an underlying value” (Holkeri, 2001, p. 2). Easy access to PSI allows citizens to see all facets of the government policy-making process and helps increasing democratic participation (OECD, 2006b; Shane, 2004; EU, 2010).

2.5.3.1 Value of PSI to the General Public: Summary

Citizens can benefit tremendously from the utilization of PSI. At a very basic level, it is quite known that citizens may incur some losses because they lack information when making decisions, particularly monetary ones. These losses happen, for example, when citizens cannot obtain enough information to evaluate the quality of a good or service before purchase or investment (Mayo & Steinberg, 2007). For example, using the Internet to get customer reviews and other kinds of information (including PSI) increases customer knowledge and collective consumer power, ultimately leading to lower prices. Research in 2003 found that an average saving of 16% was achieved on electronic goods when price comparison sites were used (Baye et al., 2003).

Also, the value of PSI to the general public is in many ways parallel to the value of PSI to governments. Just as the government functions better with knowledgeable citizens, citizens are empowered and elect better governments with openly available information. The public needs to

have access to PSI, which can be a communication tool that explains publicly funded projects and activities to hold the government accountable. Furthermore, PSI is integral to the public's freedom of expression- a freedom that is one of the hallmarks of a democratic society. PSI has practical value to the general public as well. Either directly from a publicly funded agency or indirectly available through other communities, PSI impacts the general public by creating new products, stimulating sales, adding jobs, and contributing to wealth.

2.5.4 Value of PSI to Research Communities

Finally, research communities benefit tremendously from the PSI in both academic and policy research areas. The list of benefits to the community includes the promotion of interdisciplinary, inter-sector, inter-institutional, and international research (OECD, 2006b, Uhler 2004). Also, using PSI helps to avoid duplication of research; allows the verification of previous research results and promotes new type of research; reinforces open scientific enquiry; encourages diversity of analysis and opinion; and facilitates the education of new researchers. Furthermore, it supports studies on data collection methods and measurement, permits the creation of new datasets when data from multiple sources are combined, and helps the scientific community to maximize the research potential of new digital technologies and networks. Finally, once easy access to PSI is provided it can facilitate the transfer of information to different parts of the world and promotes research capacity building in developing countries (see Arzberger et al., 2004, Uhler 2004).

Arzberger et al. (2004) argue that access to the raw data for research – not just the polished, published final product– is vitally important to furthering scientific progress. Factual databases that are supported by government collections and funding are fundamental to the

progress of science, to the advancement of technological innovation, and to an effective educational system. The open availability of publicly funded scientific data is one of the cornerstones of basic research (Uhlir, 2004). Examples of the PSI that can be used in the scientific arena include general scientific research data, such as geographic information (e.g., aerial photos, geology, hydrology, or topography), meteorological information (e.g., climate data and weather forecasts), as well as some aspects of social data (e.g., health statistics for medical research) (MEPSIR, 2006).

Public geospatial data is one of the PSI categories that are heavily used by the research community. NASA satellite pictures, for example, have been used by archaeologists to identify undiscovered ruins (Hardin, 1998). The author points out that in Angkor, Cambodia, the relatively unknown irrigation system of a huge temple was studied using NASA's satellite pictures, which have the ability to cut through the dense forest overgrowth. Geospatial data can also be employed when studying climate change, water levels, and forest growth.

Furthermore, pharmaceutical companies such as DuPont³⁵ and Dow Chemical³⁶ may use the PSI to assist them in developing new technologies. For example, DuPont was able to use data and information from the armed forces and the Department of Defense to continue to develop applications of Kevlar® brand fiber, which is “an innovative technology from DuPont that combines high strength with light weight to help improve the performance of a variety of consumer and industrial products”³⁷.

³⁵ Available at http://www2.dupont.com/Chemicals/en_US/

³⁶ Available at <http://www.dow.com/>

³⁷ Available at http://www2.dupont.com/Kevlar/en_US/

2.5.4.1 Value of PSI to Research Communities: Summary

Similar to the use of PSI in other areas, its application to research and science holds many opportunities for public benefit and socioeconomic development. Its value is magnified when used in important domains such as using meteorological information for agricultural predictions, using digital maps for responding to natural disasters, and in increasing research collaboration with the developing countries. Most present-day applications of PSI in science can fall under the category of “e-Science” through using ICTs-driven change to “increase access...via the internet to distributed resources, global collaboration, and the intellectual, historical, analytical, and investigative output of a range of scientific communities” (Arzberger et al., 2004, p. 135).

2.6 Measuring the Value of PSI

The increasing recognition of the importance of PSI to the economy and society has led to a growing interest in finding ways to understand and measure the value of PSI as well as the impact of different PSI access and use approaches³⁸. This section presents and discusses a selection of reports on assessing the value of PSI. The main criterion for selecting these studies was their ability to represent a range of approaches that have been used by different research groups in different regions around the world. The list includes studies at regional, national and sectoral levels.

Published in the year 2000, the PIRA International study titled “Commercial Exploitation of Europe’s Public Sector Information: Final Report for the European Commission” provided the first extensive estimates of the economic value of PSI and stated that:

“Cost recovery looks like an obvious way for governments to minimize the costs related to public

³⁸ See for example the Office of the Australian Information Commissioner, Issues Paper 2- Understanding the value of public sector information in Australia (November, 2011). Available at:http://www.oaic.gov.au/publications/papers/issues_paper2_understanding_value_public_sector_information_in_australia.html

sector information and contribute to maximizing value for money directly. In fact, it is not clear at all that this is the best approach to maximizing the economic value of public sector information to society as a whole. Moreover, it is not even clear that it is the best approach from the viewpoint of government finances. [...] Estimates of the US public sector information market place suggest that it is up to five times the size of the EU market.” (P.11).

The study distinguished between government investment in public sector information (Investment Value) and the value added by users in the economy as a whole (Economic Value).

Here are the main findings of the study (Weiss, 2002):

Economic Potential of PSI in Europe and USA		
In Euros	EU	USA
Investment Value	9.5 Billion	19 Billion
Economic Value	68 Billion	750 Billion

After the PIRA study, the most comprehensive subsequent analysis of European PSI markets was provided in the 2006 MEPSIR study (the Measuring European Public Sector Resources Study). The study concluded that the PSI re-use market in Europe was worth potentially EUR 27 billion.

In a recent effort to summarize the findings of the available studies on PSI re-use, assess any changes or developments since 2006, and provide estimates of the value of PSI re-use in the EU, Vickery (2011) concluded that “there is emerging evidence that improving access and dramatically lowering prices of PSI have positive impacts on the number of users and development of new uses” (p.4). Some of the specific conclusions of the review include:

1. All studies reviewed show relatively rapid growth in PSI-related markets, and assuming annual growth of 7%, the direct PSI-related market would have been around EUR 32 billion in 2010. Considering re-use activities in domains not included in the studies analysed in the report (for example, where re-use is not a principal activity, or in

government and research activities) the market value of direct PSI re-use would be undoubtedly larger.

2. With easier access, improved infrastructure, and lower barriers, the aggregate direct and indirect economic impacts from PSI applications and use across the whole EU economy are estimated to be of the order of EUR 140 billion annually.
3. In terms of efficiency gains in existing operations, improving accessibility of information necessary for obligatory environmental impact assessments could potentially reduce cost by 20% or around EUR 2 billion per year in the EU. Open access to R&D outcomes could result in recurring gains of around EUR 6 billion per year, and if European citizens each saved as little as 2 hours per year as a result of more rapid and comprehensive access to PSI, this would be worth at least EUR 1.4 billion per year (p.3-4).

Vickery (2011) also provides some information about the PSI market and value at the national level. For example, France's PSI market was estimated at EUR1.54 billion in 2007 and 1.57 billion in 2008. In England, the 2006 UK Office of Fair Trading study found that in 2004–05, £400 million was earned from the sale, supply, and use of PSI, with a further £190 million derived from developments and reuse. The report estimated that, if the barriers to efficient reuse were removed, this value could double to over £1 billion. Other recent studies from the UK (see Pollock et al., 2008, Pollock, 2009, 2011a, 2011b) focused on potential welfare gains from the PSI market and found that the upper end estimates of gains from opening up access to PSI are approximately GBP 4.5-6 billion per year and the middle range estimates of approximately £ 1.6-2 billion per year. In terms of cost, the 2008 UK Capgemini Information Management Report

found that failure to properly exploit information assets was costing the UK private and public sectors a staggering £46 billion and £21 billion respectively.³⁹

In Germany, a study found that the market for geo-information increased rapidly from EUR 1 billion in 2000 to EUR 1.7 billion in 2009, with 50% of demand driven by the navigation market (Fornefeld, 2011). In Spain, the effort was focused on measuring the economic activity of a sample of 230 “infomediary” companies (defined as companies that create applications, products and/or added-value services for third parties, using PSI). The study found that business turnover directly associated with infomediary activities is EUR 550-650 million (for more details and exact findings see Aporta, 2011).

In the geospatial information sector, Vickery (2011) noted that economic benefits could be increased by some 10-40% in the EU by improving access, data standards, and building skills and knowledge. For example, Castelein et al (2010) studied the economic value of geospatial data in the Netherlands in terms of turnover, employment activities, and market size. The study estimated the economic value of the geo-information sector in 2008 at EUR 1.4 billion, or 0.23% of national GDP. Also, an Australian study of the aggregate economic impacts of spatial data on the national economy estimated that accumulated direct impact of spatial information on productivity of different sectors in the society in 2006-07 contributed to a cumulative gain of AUD 6.43-12.57 billion in GDP, equivalent to 0.6-1.2% of GDP (including the spatial information industry itself), increased household consumption by between AUD 3.57-6.87 billion on a cumulative basis, increased investment by between AUD 1.73-3.69 billion on a cumulative basis, and had positive impacts on trade and real wages (ACIL Tasman, 2008).

³⁹ Capgemini (2008) “Failure to exploit information loses UK economy £67 billion a year”. <http://www.uk.capgemini.com/news-centre/news/pr1605/>.

Another study of land information in New Zealand (see ACIL Tasman, 2009) estimated that as a direct result of the increasing adoption of modern spatial information technologies since 1995, the country's GDP increased by NZD 1.2 billion in 2008 through productivity-related gains.

2.6.1 PSI Value Measurement Difficulties

Most of the studies reviewed in the previous section (and other studies not covered here) highlight some practical and conceptual difficulties in measuring the market size of PSI and its social and economic values. Some difficulties are related to obtaining reliable and comparable data on the PSI market, as agencies do not always have readily available information on the sale and reuse of their PSI (see te Velde, 2009). In his review, Corbin (2009) reached a similar conclusion and noted that public agencies frequently did not have a strong understanding of their customer base or the uses of their information. The review also found that in some studies, there was reluctance among PSI users to provide information about the value of the PSI to their business for reasons of commercial sensitivity or fear of upsetting their relationship with the data-agency. Vickery (2011) emphasises that “at pan-European level, there is a continuing absence of robust quantitative data on: i) the size, growth and impacts of PSI-related activities; and ii) the economics of cost, pricing and distribution models of PSI and the socio-economic benefits and any related costs of improved access to public sector information held by cultural, educational and other non-market establishments and institutions” (p.8). Vickery (2011) also adds that the approaches taken in these studies indicate the difficulty of attributing economic value to a single component of an initiative or product.

Similarly, the difficulty to quantify the impact of PSI and to assign monetary value on this information was highlighted in the study on “socioeconomic impact of the spatial data infrastructure in Catalonia, Spain”. In this study, 70% of local authorities reported saving in time

and 60% a reduction in costs as a result of easier access to this data, however, only between 30% and 45% of respondents were able to quantify these savings (Garcia et al., 2008). This highlights the difficulty of quantifying impact, even when specific measures are supplied.

Add to these practical difficulties some conceptual issues related to, for example, how to define value and value to whom. Furthermore, the nature of PSI itself, as a broad category, can add more difficulties and complexity to the measurement processes. These difficulties and issues identified in the literature have led Uhler et al (2009) to suggest that the specific estimates and monetary value in these studies are of their nature imprecise and should be looked at with caution.

2.6.2 Gaps in the PSI Measurement Literature

Despite the global community's increasing interest in the PSI market and its potential value to the economy and society, reflected in the growing number of related studies, activities and policy discussions, the PSI literature in this area is still in its infancy with significant gaps, especially in the academic (as opposed to the practitioner) literature. This section takes a critical look at the existing literature and identifies areas that need further research and investigation.

Despite what might be seen as increasingly self-evident and growing benefits from improved access of PSI to users, as discussed in the previous section, there are conceptual and practical difficulties in measuring the benefits from PSI, as well as the size of related markets (Vickery, 2011; Uhler, Sharif, and Merz, 2009). Even in the geospatial information area, which is narrower and more easily defined category than the whole PSI, such difficulties remain. As Vickery notes, several studies (e.g., Genovese, 2010; de Vries, 2010; and Cromptoets, 2010) highlight the difficulty of measuring the "real value" of geospatial information.

Also, Uhler, Sharif, and Merz (2009) note that most of these studies do not explain in detail what was the methodology employed in the study and why a certain technique or approach was used. The authors also argue that the methodological approaches employed in these studies have several weaknesses (2009, p.65-66):

- a. The scope of these studies is limited. There is a need for country, regional and global scale studies, as well as more comparative analyses at different scales.
- b. There are a few longitudinal studies. This kind of studies is necessary to make comparisons across countries or over time (e.g., revenue generated from taxation of increased economic activity as a result of open PSI takes time to materialize).
- c. Some of the existing studies have often used top-down approach to determine the value of PSI markets, overestimating the value of PSI to the economy by ignoring the substitutes available in the absence of PSI. In effect, this approach can only demonstrate the value that can be linked with PSI rather than the actual value of PSI itself (See also the OFT study, 2006). For example, in the PIRA study (2000), the value of EUR 750 billion was estimated for the whole information sector in the US, despite the fact that it contains many activities unrelated to PSI.

There is also a problem with the inconsistency in the methodologies used by different studies, which makes any attempt to compare or verify the results of these studies difficult and challenging. For example, the two main studies, PIRA and MEPSIR, used entirely different approaches and estimation methods. The total amounts reported by PIRA study encompass all firms that are in one way or another related to PSI and was based on broad estimates using national accounts data. On the other hand, the MEPSIR study provided estimates that are based

solely on the surveyed added value by all first-order re-users, focusing on how much added value can be attributed to PSI re-users.

In reviewing some of the PSI assessment studies between 2000-2008, Uhlir et al (2009) identified as many as eight different approaches used in these studies:

1. Estimates of overall PSI market size based on estimates of respondents
2. Estimate of overall PSI market size based on turnover
3. Self reporting
4. International comparisons
5. Social surplus approach (difference between the willingness to pay for PSI minus the cost of supplying it)
6. Application of Bayesian decision theory
7. Projection, scenario analysis, expert opinion, and team consensus approach
8. General equilibrium model (p. 65)

In a similar effort, a review of the methodologies used in studies of the value of PSI between 2000-2008 conducted by Corbin (2009) identified three major research approaches employed by these studies. Four studies assessed the income generated by supplying PSI, while three studies examined the cost of procuring it. Three other studies considered the numbers of staff employed, the financial turnover of organizations and numbers of licenses granted.

Furthermore, the current approach to PSI research is largely dominated by practitioner literature that is mainly focused on the outcomes of the PSI utilization process (e.g., reports and recommendations, in-car navigation systems, digital maps, specialized databases, and mobile applications) and their application in different contexts. The utilization process itself (e.g., issues related accessibility and quality of the PSI, value-adding processes) is ignored. Such a process-

focused approach could be useful to identify and understand the challenges involved in the utilization process in order to suggest strategies and processes for solutions.

As a result, Uhlir, Sharif, and Merz (2009) emphasize the need for more academic and empirical research to supply what is lacking in these studies. In particular, the authors recommend employing strong theoretical foundations, multidisciplinary or multidimensional approach, and robust data collection techniques to improve the breadth and reliability of such research (p.66). Other studies from the geospatial information area (e.g., Genovese, 2010 and Cromptoets, 2010) also highlight the importance of establishing robust theoretical and empirical models for use and measurement. The OAIC study (2011) supports these recommendations and notes that both government agencies and researchers around the world are wrestling with the need to develop a methodology for valuing public sector information.

Another major gap in the literature is the primary focus on the commercialization and monetary value of the PSI. Vickery (2011) argues that the focus on commercializing PSI has received most attention until now. Corbin (2009) also notes that the focus in all of the studies he reviewed was on the monetary value of PSI, rather than the wider societal benefits. te Velde (2009) calls it “obsession with making money out of the PSI” and describes it as “short-sighted and probably damaging” (p.27). He explains that too much focus exclusively on this dimension of PSI may work against getting the most socioeconomic value out of this resource.

The issues related to the wider societal benefits from a more flexible PSI management approach were highlighted in some of the studies reviewed in the previous sections. For example, the Mayo and Steinberg report (2007) argues that the amount of money generated by direct sales of information by UK trading funds is much smaller than the wider value of PSI to the economy and society. Vickery (2011) also supports this argument and notes that “it is clear that new

applications and uses in a wide variety of goods and services and future innovations associated with easier access to PSI are more important than the direct PSI market, and emerging second-order uses can be expected to add further economic and social benefits to the EU economy (p.4). Uhlir, Sharif, and Merz (2009) suggest that more research should focus on non-monetary value and on individual re-use of PSI. For example, PSI providers may never know of the wide range of creative uses of their information or the social benefits that result from publication unless they are directly informed by the re-users of the new applications that have been created using their PSI.

Finally, there is an unfortunate absence of literature on access to, use, and value of PSI in the developing world. Most of the PSI literature reviewed in this chapter, especially the PSI utilization and value measurement studies, was focused on the OECD countries. Although this is not surprising given the level of attention and interest that the PSI is receiving in those countries, this major gap in the literature is a sad reality and requires some attention, especially that PSI can be of unique importance to addressing major challenges in the developing countries such as poverty, employment, public health, environmental issues and other socioeconomic development areas.

2.6.3 Addressing the Literature Gaps

Despite our obvious inability (as demonstrated in this literature review) to comprehensively and accurately answer questions such as: has the sharing of PSI by government produced measurable economic, social, and democratic benefits; can government information be shared more efficiently; and how do we measure those processes; we still should be asking such questions and making every effort to address the gaps in these areas. My study tries to contribute

to the three major gaps in the PSI utilization and value literature identified in the previous section: the need for stronger theoretical and methodological foundations, for studies on the non-monetary value of PSI, and for studies focused on the developing world.

According to te Velde (2009), there are three generations of studies on the market size and value of PSI. Before 2000, the first generation of studies was primarily focused on PSI holders (i.e., government agencies). The second generation of studies (2000-2010) was focused on private sector entities as re-users or value added providers of PSI.

The basic argument was that if we simply open up PSI, we will make a lot of money. However, with their exclusive focus on commercial re-use, what was lacking in these studies is the broader societal value of PSI (te Velde, 2009, p.27). Therefore, te Velde suggests that we must change the way we measure the value of PSI and that the third generation of studies (2010-) should focus on civil society and the individual users of PSI.

My study fits within this generation of studies that te Velde is calling for and uses two theoretical frameworks (i.e., knowledge creation and value of information) and a systematic approach to investigate PSI utilization and value within the knowledge production context, and the factors and conditions that affect this process from the user perspective. I focus on the PSI-related factors and conditions that could facilitate or hinder the utilization process, as well as the different PSI attributes that might increase or decrease its usefulness and value in each stage of the knowledge creation process in organizations working on socioeconomic development issues in South Africa.

2.6.4 Potential Value of PSI in the Development Field

The potential social, economic, political, and scientific values of PSI can be magnified in the context of the developing countries. This is especially the case with the effective utilization of PSI (and other kinds of available information resources) in the efforts to address persistent development problems such as poverty, food security, water quality, employment, HIV/AIDS and public health, and environmental challenges that these countries struggle with and try to overcome.

For example, one of the lessons learned from the U.S. National Research Council (NRC) 2002 study titled “Down to Earth: Geographical Information for Sustainable Development in Africa” was that geographical information and technologies are central to achieving successful transition from traditional environment and resources management practices to sustainable development due to their integrative quality (i.e., linking social, economic, and environmental data) and their place-based quality (i.e., addressing relationships among places at local, regional and global scale).

Furthermore, the growing interest in the potential role of spatial data (and other types of PSI) in sustainable development, especially in poverty reduction area, was clearly demonstrated by the organization of the 9th International Conference of the Global Spatial Data Infrastructure (GSDI) in Chile in November 2006, with the main theme of “Spatial Information: Tool for Reducing Poverty”⁴⁰. The conference highlighted specific issues such as applications related to poverty mapping and reduction, applications for disaster management and mitigation, and other applications related geospatial data for sustainable development.

⁴⁰ See the conference website: http://www.gsdiassociation.org/events/eventdetails.asp?event_id=97/

There was a general consensus that this kind of information will continue to play a critical role in eradicating poverty and improving poor people's lives. Some of the conference recommendations concerning spatial data and poverty reduction include:

1. "Spatial information is a technological resource which should be used by governmental authorities at all administrative levels, in order for them to know, have access to and use territorial information, thus taking decisions to benefit the population and its territory, being properly informed, in order to generate the tools for reducing poverty by determining the unsatisfied needs of the people that must be resolved as soon as possible...
2. Educational authorities should ensure that the future generations of the most highly educated people set to become the leaders of tomorrow... also studying relevant aspects such as measures in response to disasters, environmental protection, the acquisition of awareness of the social conditions involving poverty in the area studied, generating social measures to improve the quality of life among inhabitants, and gaining a real knowledge of the legacy and assets constituted by that territory.
3. Spatial Information becomes a real tool for reducing the poverty while the governments of the world create geo-referenced territorial information and statistics about the social, economic, cultural, institutional and environmental conditions of the territory and its population. Poverty is the major issue and scourge of our current society, leading in turn to other problems, for example the increase in crime, corruption, drug addiction, child abuse and so on" (GSDI Conference, 2006).

The logic behind the link between spatial data and poverty reduction is that the livelihoods of the majority of poor people around the world depend heavily on agriculture and natural

resources, and that there are many pressing problems in these sectors that contribute to the level of poverty in these regions. Addressing these problems successfully in many cases requires better data and information, and more importantly, better ways to integrate these information resources and to analyze the relationships between human activities and the changes in these land and natural resources. For example, poverty maps have proved to be a very strong tool to better understand the relationship between poverty and geographic factors such as climate conditions, elevation, access to transportation networks, exposure to natural disasters, and other important factors (CIESIN, 2006). They also are seen as permitting more effective targeting of poverty reduction efforts by enabling decision makers and the public to visualize the problems they are attempting to solve, and facilitating more precise delivery of disaster relief services to vulnerable populations. For example, poverty maps in Mexico were the framework for selecting 22 locations in three states for on-farm work using innovative breeding techniques for maize. Also, the Bolivian government think tank UDAPE, together with the World Bank and INE developed poverty maps to report on poverty and inequality in municipalities (CIESIN, 2006).

Furthermore, the integration of health data and statistics in a relational database with a GIS interface is seen as enhancing health facility utilization, improving distribution of preventive care and response, and providing evidence-based rationales for targeted assistance and service delivery, among many other benefits. Also, this integration of information is seen as useful in cases such as: health trends, human and animal disease tracking, health facilities, location and asset management, tracking child immunizations, and epidemiology (Cromley & McLafferty, 2002).

Finally, the integration of environmental data and statistics in databases with a GIS interface can help in applications such as land-use management and planning, urban planning

and development, water and air quality assessments and enforcement, property assessment and tax policy development, and various agriculture-related services and systems modeling and forecasting (Clarke et al., 2002). The integration of these different types of PSI (e.g., geospatial, health, unemployment, donors information, education information, etc.) and the resulting applications could have a significant and direct impact on the poverty reduction and other development challenges in the developing world.

CHAPTER THREE: LITERATURE REVIEW

The overarching goal of the study is to develop an understanding of the PSI utilization and value within the knowledge creation context, and the factors and conditions that affect this process from the user perspective. By knowledge creation I mean the work where the acquisition, processing, and communication of information play a major role. To address this goal, I first position my research within the broad context of information and knowledge for development. I then draw upon two streams of literature to build the study's conceptual framework: (1) knowledge creation, and (2) value of information. Because these streams of literatures are voluminous, it is necessary to limit the literature review to just the most relevant. My aim is to develop a framework for identifying and investigating the PSI-related factors and conditions that could facilitate or hinder the utilization process, as well as the different PSI attributes that might increase or decrease its usefulness and value in each stage of the knowledge creation process in organizations working on socioeconomic development issues in South Africa.

This chapter reviews relevant research and theories in the knowledge for development, knowledge creation, and value of information areas. Section one provides an overview of the importance of information and knowledge for development as a broad context for my research. Section two is dedicated to the organizational knowledge creation literature. The section starts with a review of studies on knowledge and organizations, followed by a discussion of the theory of knowledge creation. I then discuss the information management concept in relation to knowledge creation and conclude with Choo's (1995) information management process framework.

Section three provides a brief overview of the economics of information field, which is home for most of the current research on value of information. This section covers concepts such as information as a public good, information as a resource, value theory, value of information, information attributes, and conceptual analysis of the value of information. The section concludes with Repo's (1986) information value-in-use framework.

In section four, I explain how Choo's (1995) information management process framework and Repo's (1986) information value-in-use framework complement each other. The section concludes with the study's specific research questions and a visual representation of the conceptual framework.

3.1 Broad Context

In this section, I provide an overview of the importance of information and knowledge for development as a broad context for my research. I start with a brief discussion of development in the 20th and 21st centuries. This is followed by a discussion of the critical role that information and knowledge can play in the social and economic development of societies.

3.1.1 Brief History of Development: The 20th Century

The decolonization wave that followed World War II led to the emergence of tens of new African, Asian and Caribbean countries. These new countries joined the already independent, yet still underdeveloped countries of Latin America. There is no agreement in the development literature on how to classify these countries (Dodds, 2002). As a result, several terms are used in the literature, but three are the most common: 'The Third World', 'The South', and 'The Developing World/Countries'. While these terms are "at best merely shorthand expressions, used

primarily for convenience” (Haynes, 2008 p.7), and that all of them have been challenged in the literature, the term ‘The Developing World/Countries’ seems to be the most used term in the literature (see Haynes, 2008; Fawcett & Sayigh, 1999; and Bayart, 1991). Haynes (2008) acknowledges the wide differences between these countries’ economic, social, cultural, developmental, and political positions and justifies using the term developing world/countries because it is favored by most governments of these countries themselves, as well as by global institutions such as the United Nations (UN) and the World Bank. Following Haynes approach and justification, I shall use both terms synonymously in this dissertation.

Unlike the issue of classification, there is near consensus that development is a key dimension of personal life, social interactions and relations, political and economic environments, and culture in many countries in Africa, Asia, Latin America and the Caribbean. The lives of most people living in these regions are characterized by extreme poverty, low literacy rate, short life expectancy, lack of political power and voice, and extreme vulnerability to ill health, economic dislocation, social violence and natural disasters (UNDP, 2006).

The focus on the economic, political, cultural, developmental, and social characteristics and challenges of these emerging countries has led to the birth of formal study of development. Scholars and practitioners wanted to study the causes of poverty, and underdevelopment in general, in a more systematic and sustained way.

In the period immediately following World War II, development economics, building on previous colonization economics studies, dominated this area of study. By the 1960s, however, an increasing number of development economists felt that economics alone could not address the different aspects and dimensions of development (Haynes, 2008). As a result, development studies initially aimed at integrating ideas from economics and politics and since then it has

become an increasingly inter- and multi- disciplinary subject, involving a variety of social sciences fields (Kothari, 2005).

According to Haynes (2008), the study of development “has over time involved the focus on various issues, notably political, economic, social and cultural concerns” (p.8). Politically, Haynes argues, the spotlight was on “comparative political cultures, problems of nation building and construction of stable and workable political and public institutions and administration” (p.8). Economically, the main question revolved around what did developing countries need to join the ranks of the developed countries? Human development and how to achieve it was the core of the social aspect of development. Finally, whether different cultures were more conducive to development than others was the main focus of the cultural aspect (Haynes, 2008, also see Barr, 2002).

To address these challenges, both theoretically and practically, the last 60 years witnessed the birth and use of a wide range of theories, approaches, and policies. These include modernization and dependency theories in the 1950s and 1960s. Modernization theory focused primarily on the significance of domestic factors, especially the relationship between state and the society (see the work of Rostow, 1960; David Apter, 1965; and David McClelland, 1961). Dependency theory, on the other hand, focused on external factors, mainly the workings of the international economic system (see the work of Gunder Frank, 1971,1984, 1994; Walter Rodney, 1972; and Samir Amin, 1987).

In the 1970s and 1980s, the basic needs approach called for fulfilling the basic needs of people in the developing world, including sufficient food, clean water, shelter and functional sanitation, primary health care, and at least elementary education (Stewart, 2006). During the same period, related approaches such as Sen’s capabilities approach emerged and placed special

emphasis on functional capabilities such as people's ability to live to old age, engage in economic transactions, or participate in political activities (Sen, 1999 and 2001).

In the 1990s, countries and organizations in the more industrialized and wealthier North, especially the U.S. government, the IMF, and World Bank, developed a set of standards and policy recommendations to promote economic development in the developing world, known as the "Washington Consensus" (Weisbort & Baker, 2002). The core of the Washington Consensus was that in order to have real development gains, developing nations should adopt a set of good policies and have good institutions that would facilitate and promote improved economic and developmental performance. Good policies, according to Haynes (2008), include "stable macroeconomic policies, a liberal trade and investment regime, privatization and deregulation of state-owned assets" (p.32). As for good institutions, this includes democratic and transparent governments, independent and transparent financial institutions, and protection of property rights.

In summary, the field of development in the 20th century has proceeded through different stages, with each stage characterized by preference for specific and influential theories, approaches and policies, which over time were superseded by others (Haynes, 2008). Overall, the author asserts, "no particular theory or policy was seen to work, as broad-based development across the regions of the developing world remained elusive (p.19).

3.1.2 Development in the 21st Century

By the beginning of the 21st century and after nearly 60 years of pro-development policies, programs, and initiatives, the overall results were disappointing, to say the least (See the World Bank, 1998; HDR, 2006). Haynes argues that these efforts had collectively "done little to

reduce development imbalances in the developing world (2008, p.36). Similarly, the UN concluded that at the beginning of the new century, the global development picture was characterized by rising global poverty and polarizing inequality (HDR, 2006). For example, by the end of the 20th century there were still over a billion people in the world living on less than \$1 a day, more than 2 billion people, mainly from the developing world, did not have access to clear water, and hundreds of millions lacked adequate health care or basic education (HDR, 2006).

These concerns and the widespread failure among different developing countries to attain an acceptable level of development were the main reasons to consider a new way to think about development and how to achieve it. This process of evaluation and reflection involved: (1) questioning the dominant role of government in achieving development, (2) realizing that it is necessary to start with local communities rather than via international or even national-level, state-led initiatives, in order to achieve real development gains, and (3) the shift from the primarily focusing on economic growth to a wider view about human development that takes into consideration not only economic but also social welfare, political, cultural and environmental aspects (Haynes, 2008; Stewart, 2006; HDR, 2006).

The sad reality about the status of development at the end of the 20th century and the gradual change in our thinking about development practices and solutions necessitated a more practical, comprehensive, and collaborative way to address developmental problems. To that end, and after years of consultation and a series of reports and policy documents, the United Nations organized the Millennium Summit in year 2000. During the Summit, 192 countries and at least 23 international organizations adopted what is now known as the UN Millennium Deceleration. One of the main outcomes of this Declaration was the adoption of the Millennium

Development Goals (MDGs): (1) Eradicate extreme poverty and hunger; (2) Achieve universal primary education; (3) Promote gender equality and empower women; (4) Reduce child mortality; (5) Improve maternal health; (6) Combat HIV/AIDS, Malaria, and other diseases; (7) Ensure environmental sustainability; and (8) Develop a global partnership for development.

While it might still be early to fully judge whether any, some, or all of the MDGs will be achieved by the 2015 deadline, and despite some improvement in some areas targeted by the MDGs, at the time of completion of this dissertation (April, 2013) there were many concerns among scholars, practitioners, governments and international organizations that the MDGs would fail to deliver their promised developments and improvements. These concerns seem legitimate given that some of the recent indicators about development in the developing world still paint a dark picture.

The following statistics compiled in the 2010 version of the World Development Indicators (WDI) Report⁴¹ issued by the World Bank reflect such a bleak picture:

- The number of people living in extreme poverty is estimated to still be around one billion people⁴² (World Bank, 2010). Related to this figure, the Food and Agriculture Organization (FAO) estimates that the number of people who receive less than 2,100 calories a day worldwide rose from 873 million in 2004-2006 period to 915 million in 2006–2008 period and could rise further in the next two years (FAO, 2009). As a result, about 25% of children in Sub-Saharan Africa and two-fifths in South Asia were underweight. Also, children in the poorest areas in developing world are more than twice as likely to be underweight as those in the richest households.

⁴¹ The full report available at: <http://data.worldbank.org/data-catalog/world-development-indicators/wdi-2010>

⁴² Defined as average daily consumption of \$1.25 or less. Extreme poverty means living on the edge of subsistence.

- As of 2006, an estimated 72 million children worldwide were not attending school and about half of them will have no contact with formal education in the future (World Bank, 2010).
- In all developing regions except Latin America and the Caribbean, boys are more literate than girls⁴³, a difference seen most starkly in South Asia and Sub-Saharan Africa. Cultural attitudes and practices that promote early marriage, the seclusion of girls, and the education of boys over girls continue to present formidable barriers to gender parity (World Bank, 2010).
- In 2006, the number of children who died before their fifth birthday was close to 10 million. In many countries in Sub-Saharan Africa, one in seven children dies before the fifth birthday (World Bank, 2010).
- Only 40 % of poor children are immunized, compared to more than 60 % of children from wealthier households (World Bank, 2010).
- Every year, more than 500,000 women die from complications of pregnancy or childbirth, 99% of them in developing countries. For each woman who dies, 30–50 women suffer injury, infection, or disease. Pregnancy-related complications are among the leading causes of death and disability for women ages 15–49 in developing countries (World Bank, 2010).
- About half of maternal deaths occur in Sub-Saharan Africa, and about a third in South Asia. Together the two regions accounted for 85 % of maternal deaths in 2005 (World Bank, 2010).
- More than 52 million pregnancies in the developing world end in abortion annually. About 13 % of maternal deaths are attributed to unsafe abortions, and young women are especially vulnerable (World Bank, 2010).

⁴³ The UNESCO Institute of Statistics defines literacy as the ability to read and write with understanding a short, simple sentence about everyday life.

- Worldwide, around 34 million people—two-thirds of them in Sub-Saharan Africa and most of them women—are living with HIV/AIDS (World Bank, 2010).
- An estimated 370,000 children younger than age 15 became infected with HIV in 2007. Globally, the number rose from 1.6 million in 2001 to 2 million in 2007. Most of these children (90 %) live in Sub-Saharan Africa (World Bank, 2010).
- In 2008, some 17.5 million children had lost one or both parents to AIDS worldwide, nearly 14.1 million of them were in Sub-Saharan Africa (World Bank, 2010).
- The World Health Organization (WHO) estimates that in 2006 there were 190–330 million malaria episodes, leading to nearly 1 million malaria-related deaths. Ninety percent of malaria deaths occur in Sub-Saharan Africa, and most are among children under age 5 (as cited in World Bank, 2010).
- In 2007 there were 13.7 million tuberculosis cases globally and in 2006, 1.3 million infected people died (World Bank, 2010).
- More than 1.5 billion people lack access to toilets and other forms of improved sanitation, a number that has barely changed since 1990. Even as countries try to improve their sanitation systems, 18 % of the world’s population lack any form of sanitation. They practice open defecation, at great risk to their own health and to that of others around them (World Bank, 2010).
- UN-HABITAT estimates that more than 825 million people are now living in dwellings that lack access to an improved drinking water source, improved sanitation facilities, sufficient living area, durable structure, or security of tenure. In Sub-Saharan Africa, more than half the urban population lives in slum conditions (as cited in World Bank, 2010).

It is clear from the above figures that there is still a lot of work to be done to address these persisting challenges in the developing world. There is a real and urgent need for a renewed and sustained global commitment to dramatically reducing poverty, hunger, disease, and inequality. This will require coordination and collaboration at local, regional and international levels. It will also require effective communication between and among the different stakeholders involved in these efforts such as governments, international organizations, academic institutions, civil society organizations and the public.

Moreover, stakeholders involved in these development efforts, both from the North and the South, should ensure that they are effectively utilizing and maximizing the value of the financial, human, technical, knowledge, and any other resources they possess in order to achieve real development gains.

3.1.3 Information and Knowledge for Development

“Knowledge is like light. Weightless and intangible, it can easily travel the world, enlightening the lives of people everywhere. Yet billions of people still live in the darkness of poverty—unnecessarily. Knowledge about how to treat such a simple ailment as diarrhea has existed for centuries—but millions of children continue to die from it because their parents do not know how to save them.” (The World Bank, 1998)

It is widely recognized that building and sustaining knowledge infrastructure is a critical ingredient for attaining sustainable socioeconomic development (Oyelaran-Oyeyinka & Sampath, 2010). In earlier times, success was based on such criteria as ownership and control of finance, physical resources, or food. Today, however, successful people and businesses are those who own knowledge and information and play an important role in its development, access, analysis, and presentation. Mueller (1995) argues that “we live in a time...when information,

knowledge and technology are considered to be the bases of wealth, power, and economic growth” (p.462).

Although this recognition has widened and gained significant momentum in the last decade or so, its roots go back to the Sixties when Machlup (1962) argued that knowledge and knowledge industries were very important contributors to the United States economy (see also Porat, 1977; Machlup & Mansfield, 1983; Stiglitz, 2000). In the late Eighties, the International Development Research Center (IDRC) also made a strong argument about the centrality of information to the development in Africa.

“ Heavy financial investments in Africa do not ensure sustainable development in the absence of information infrastructure and services. Information is a vital tool for sustainable development. African decision-makers and policy formulators need pertinent, accurate and timely information in order to make informed decisions. Furthermore, scientific information is of paramount importance to the enhancement of production and consumption patterns and to the development of local technologies; a bedrock for the Continent’s economic development” (IDRC, 1989,p. 1)

Furthermore, the World Summit on the Information Society (WSIS) Declaration of Principles (2003) maintains that a people-centered, inclusive and development-oriented Information Society is a society “where everyone can create, access, utilize and share information and knowledge, enabling individuals, communities and peoples to achieve their full potential in promoting their sustainable development and improving their quality of life”⁴⁴.

There is also a growing consensus that achieving the MDGs depends heavily on generating scientific (and other types of) knowledge, making it easily accessible and translating it into effective actions. Take for example goal number six related to HIV/AIDS, Malaria and other diseases. One would argue that after more than 30 years into the pandemic, there is a dynamic and continuously growing knowledge base of HIV/AIDS, especially about prevention, care and treatment; yet we still experience a serious gap between what is known and what is done in

⁴⁴ Available at: <http://www.itu.int/wsis/docs/geneva/official/dop.html>

practice in many developing regions (Pang et al., 2006). The authors emphasize that knowledge is the enemy of disease. They also argue that “applying what we know already will have a bigger impact on health and disease than any drug or technology likely to be introduced in the next decade” (p. 284). But if disease is to be defeated, the authors further argue, “in addition to the undeniable need for new knowledge, existing knowledge must be applied in ways that will improve health care, especially in underprivileged populations. There are huge gaps in knowledge application, and a link is needed between knowledge and effective decision-making and health-policy development” (p. 284).

This is certainly true in all areas of social and economic development. The UN Millennium Project study titled “Innovation: Applying Knowledge in Development” emphasize that responding to challenges in areas such as health, education, economic productivity, gender inequality, agriculture, water and sanitation, environment, and participation in the global economy will require increased use of scientific and technical knowledge (UN Millennium Project, 2005, p.15, see also, Mokyr, 2002; Rosenberg & Birdzell, 1986). Drawing on experiences of developing countries that dramatically alleviated poverty and grew their economies in the past two decades, especially those in the Asia Pacific region, the report found that in every case scientific and technical knowledge was a crucial factor in their success.

More specifically, it is argued that knowledge gives people greater control over their destinies. Individuals can benefit tremendously from the knowledge that is available and easily accessible to them. For instance, better knowledge about nutrition can mean better health, even for those with little to spend on food. Also, individuals can use the available information and knowledge to make informed decisions about important aspects of their lives such as where to live, who to vote for, and even when and where to go for a weekend vacation. Furthermore,

knowledge about how to prevent the transmission of HIV/AIDS and other diseases can save millions from debilitating illness and premature death.

Environmentally, public disclosure of information about industrial pollution can lead to a cleaner and healthier environment. It is also argued that economic improvement is largely a result of knowledge application in productive activities and the associated adjustment of social institutions (Mokyr 2002; Rosenberg & Birdzel 1986). Knowledge illuminates every economic transaction, revealing preferences, giving clarity to exchanges, and informing markets (World Bank, 1998).

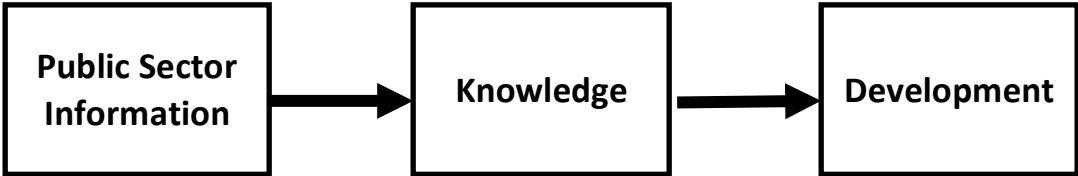
To sum up, the World Bank report (1998) emphasizes that “approaching the development from a knowledge perspective... focuses our attention on needs that have sometimes been overlooked: scientific and technical training, local research and development, and the critical importance of institutions to facilitate the flow of information for effective markets” (p. 2). The same report further argues that capital is not the only factor that differentiates poor countries/individuals from the rich ones, knowledge is an equally important factor-- poor countries have less knowledge because it is costly to create knowledge and as a result much of it is created in the rich countries.

To address the information problems and knowledge gaps in the developing world, the World Bank suggests that the developing countries need to be more active and effective in acquiring, creating, and communicating knowledge and information necessary to improving literacy, research capacity and flow of information for market and trade. The example of Ghana and South Korea is most relevant here. In the 1950s, the two countries had virtually the same income per capita. By the early 1990s, however, Korea’s income per capita was six times higher

than Ghana's. According to the World Bank (1998), "some reckon that half of the difference is due to Korea's greater success in acquiring and using knowledge" (p.1).

In this study, I investigate the ways in which PSI contributes to the knowledge creation and consequently development in South Africa. Rather than focus primarily on the outcomes of the PSI utilization process, I take a step back to look at the utilization process itself, and the factors and conditions that affect this process from the user perspective. I am particularly interested in identifying and investigating the PSI-related factors and conditions that could facilitate or hinder the utilization process, as well as the different PSI attributes that might increase or decrease its usefulness and value in each stage of the knowledge creation process in organizations working on socioeconomic development issues in South Africa. It is important to identify and understand these factors and conditions to be able to effectively address them and to draw lessons that can be transferred to other communities or situations.

Figure 3: PSI for Knowledge Creation and Development



3.2 Knowledge and Organizations

In this section, I briefly review studies on knowledge and organizations, followed by a discussion of the theory of knowledge creation. I then discuss the information management concept in relation to knowledge creation and conclude with Choo's (1995) information management process framework.

3.2.1 Knowledge and Organizations: Brief Overview

Interest in the topic of knowledge as it relates to organizations and value creation for organizations (e.g., knowledge management, knowledge sharing, knowledge creation, etc.) has increased dramatically in the last two decades, in both the popular and scholarly literature (see for example, Spaeth, Stuermer & von Krogh, 2010; Tsai 2001; Sippings, 2007; Bock, Zmud, & Kim, 2005; Wasko & Faraj, 2005; Argote, McEvily & Reagans, 2003; Helfat, 2001; von Krogh, Ichijo, & Nonaka, 2000; Argote et al., 2000; Cohen & Sproull, 1996; Spender & Grant, 1996).

One could argue that the arrival of the information society and the rapid move toward the knowledge-based economy are among the important factors that highlighted the importance of knowledge to organizations and the need to strategically and effectively manage information and knowledge resources.

The debate surrounding the definition of knowledge itself is an old one. Alavi and Leidner (2001) note that these debates have occupied the minds of philosophers and scholars since the classical Greek era. It is not the intention of this study to engage in similar debates to probe, question, or reframe the term "knowledge". Alavi and Leidner (2001) justify this approach and argue that "such an understanding of knowledge was neither a determinant factor in building the knowledge-based theory of the firm nor in triggering researcher and practitioner interest in

managing organizational knowledge” (p.109). It is, however, useful to adapt a definition in this dissertation for the sake of clarity and consistency. For the purposes of this study, I adopt the definition provided by Davenport et al (1998) that knowledge is information combined with experience, context, interpretation, and reflection; a high-value form of information that is ready to apply to decisions and actions.

Other definitions found in the literature include Davenport and Prusak (1998) description of knowledge as “a fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information. It originates and is applied in the minds of knowers. In organizations, it often becomes embedded not only in documents or repositories but also in organizational routines, processes, practices, and norms” (p. 5). Alavi and Leidner (2001) describe knowledge as “information possessed in the mind of individuals: it is personalized information (which may or may not be new, unique, useful, or accurate) related to facts, procedures, concepts, interpretations, ideas, observations, and judgments” (p.109). Others (e.g., Huber 1991; Nonaka 1994; Nonaka & Takeushi, 1995) define knowledge as a justified belief that increases an entity’s capacity for effective action.

Drucker (1993) posits that in the post industrial society that we are living in, knowledge and creativity have replaced labor and capital as the source of value. Nonaka et al (2001) agree with this argument and emphasize that “ knowledge is undoubtedly an indispensable resource to create value for the next generation of society, industries, and companies” (p.13). Geus (1988) also argues that the only sustainable competitive advantage of an organization is its ability to share knowledge and learn, as knowledge and learning are considered central to success in our complex environment (see also Wasko & Faraj, 2005). Sancheze and Heene (1997) reinforce this

notion and explain that the search for competitive advantage requires organizations to become more effective in using their knowledge to the greatest strategic advantage (see also Alhawamdeh, 2002). Knowledge relevant to organizations would include facts, opinions, ideas, theories, principles, models, experience, values, contextual information, expert insight, and intuition (Mitri, 2003).

According to Argote et al (2003), research on organizational learning and knowledge management focuses on a fundamental set of questions about how organizations create, retain, and transfer knowledge (see also Nonaka, 1994). These questions include, for example, how do organizations create knowledge and what factors influence that process; how do organizations retain the knowledge they create; where is knowledge embedded in organizations and how do those repositories affect its retention and subsequent use; how is knowledge transferred within organizations and what factors facilitate (or inhibit) its transfer; and do the factors that facilitate transfer inside the organization promote transfer across organizational boundaries (Argote et al., 2003; see also Argote & Ingram, 2000; Helfat, 2000; Kogut & Zander, 1996).

3.2.2 Theory of Organizational Knowledge Creation

Since the publishing of the organizational knowledge creation theory developed by Nonaka and his colleagues, numerous books and articles have been written documenting organizations' practices to try to capitalize on the value that knowledge management and knowledge creation promise (Nonaka 1994; Nonaka & Takeuchi 1995; Nonaka et al., 1994, 1996, 2000, 2001a, 2001b; Nonaka & Toyama, 2002 and 2003).

In their book titled "The Knowledge Creating Company", Nonaka and Takeuchi defined organizational knowledge creation as "...the capability of a company as a whole to create new

knowledge, disseminate it throughout the organization, and embody it in products, services and systems” (1995, p. 3). Some scholars emphasize the value adding aspect of knowledge creation and define it as a process of value addition to previous knowledge through innovation (see Duffy, 1999; Narayanan, 2001). Others (e.g., Lapre & van Wassenhove, 2001; Uzzi & Lancaster, 2003) prefer a simpler definition and define it as recombining old information to produce new knowledge. Although initially created by individuals, Nonaka and Takeuchi (1995) argue that this individual knowledge ultimately becomes organizational knowledge. The authors described two dimensions of organizational knowledge creation: epistemological and ontological.

The epistemological dimension: Following Polanyi (1967), the authors divide this dimension into tacit and explicit knowledge. Tacit knowledge is a personal form of knowledge, which individuals can only obtain from direct experience in a given field or domain. It is based on experience, thinking, and feelings in a specific context, and is comprised of two components: technical and cognitive. The technical component mainly refers to concrete know-how and skills that apply to a specific context. As for the cognitive component, it consists of beliefs, ideals, values, schemata, and mental models (Nonaka & Takeushi, 1995). The explicit dimension of knowledge, on the other hand, is articulated, codified, and communicated using symbols (Nonaka & Takeushi, 1995, see also Collins, 2001). The explicit dimension may also be classified as object based or rule-based (Popadiuk & Choo, 2006). The authors explain that “knowledge is object-based when it is codified in words, numbers, formulas, or made tangible as equipment, documents, or models. It is rule-based when the knowledge is encoded as rules, routines, or standard operating procedures” (p. 306).

The ontological dimension: This dimension ranges from the individual at one end and moves from there to team, group, organization and beyond on the other end. According to

Popadiuk and Choo (2006), “individual knowledge is created by and exists in the individual according to her beliefs, attitudes, opinions, and the factors that influence her personality formation. Social knowledge is created by and resides in the collective actions of a group. It involves the norms that guide intra-group communication and coordination” (p.307).

Nonaka & Takeuchi (1995) identified four modes of knowledge conversion through which knowledge is converted from one type to another. These modes of knowledge conversion include:

1. Socialization: The process of converting tacit knowledge to tacit knowledge.
2. Externalization: The process of converting tacit knowledge to explicit knowledge
3. Combination: The process of converting explicit knowledge to explicit knowledge
4. Internalization: The process of converting explicit knowledge to tacit knowledge.

Such dynamic process of knowledge creation can enhance the capability of organizations to fulfill their strategic objectives and achieve favorable performance such as effectiveness, improvement, or innovation (Teece, 1998; Droge et al., 2003; Chia, 2003; Lee & Choi, 2003; Wasko & Faraj, 2005)). In addition to (and to some extent building on) Nonaka and Takeuchi knowledge creation theory⁴⁵, several models of organizational knowledge creation have been discussed in the literature (see for example, Probst et al., 1997; Heisig 2000; McElroy, 2002; Sabherwal & Becerra-Fernandez, 2003).

For example, Alavi and Leidner (2001) address four basic processes of creating, storing, transferring, and applying knowledge. As explained in Tsai and Li (2007), “these major processes subdivide into creating internal knowledge, acquiring external knowledge, storing knowledge in documents versus storing knowledge in routines (Teece, 1998), as well as updating

⁴⁵ And other similar important models e.g., Polanyi 1967

the knowledge and sharing knowledge internally and externally” (p. 372). Tannembaum and Alliger (2000) and Rastogi (2000) see knowledge management and creation from a more static perspective. Instead of defining the different stages of organizational knowledge creation process, they assert that there are four major aspects of knowledge creation and management that collectively determine its effectiveness: knowledge sharing, knowledge accessibility, knowledge assimilation, and knowledge application. Other processes found in the literature include knowledge identification, mapping, capturing, acquiring, storing, sharing, applying, and creating (Rastogi, 2000); knowledge gathering, organizing, refining, representing, and disseminating (Oluic-Vukovic, 2001); knowledge identification, acquisition, development, distribution, utilization, and preservation (Probst et al., 2002); and knowledge creation, storage, distribution, and application (Heisig, 2001).

Although the above models (and other models that can be found in the literature) use slightly different terminology to describe knowledge creation processes in organizations, these models basically describe similar building blocks of the knowledge creation process that can be summarized as follows:

1. **Acquiring knowledge:** The process whereby knowledge, new or old, is identified and acquired.
2. **Integrating knowledge:** The process whereby knowledge, once acquired, is integrated into organization’s total body of knowledge.
3. **Using/applying knowledge:** The process whereby the new knowledge is applied to the challenges or opportunities identified by the organization. For most activities, knowledge must be used before there are economic and social returns.
4. **Disseminating knowledge:** communities only get maximum benefit from knowledge that has been successfully applied, when it is widely disseminated.

3.2.3 Knowledge Creation and Information Management

The different stages of the knowledge creation process identified in the previous section closely resemble the information life-cycle processes, suggesting a set of interrelated aspects of knowledge creation and information management. This is consistent with Bouthillier and Shearer (2002) suggestion that the creation of new knowledge may be accomplished in two different ways: (1) internal knowledge may be combined with other internal knowledge to create new knowledge, and (2) information may be processed and analyzed to create new knowledge (i.e., the process of managing and adding value to information so that it is able to produce action). It is also consistent with Pawlowsky (2001) view that there are arguably two types of approaches in the study of organizational learning and knowledge management: knowledge as a product and knowledge as a process. The knowledge as product approach focuses mainly on how knowledge is shared, used, and stored. Knowledge as process, however, focuses on how knowledge is created, used and recreated, as well as the dynamics associated with these processes. Through this process view, organizations are thought of as information processing and knowledge generating systems (Grant, 1996).

Information management can be defined as “the practice of improving information usage and flow to add value while simultaneously acting as its steward, thus improving analysis, accuracy, systemic management, and quality so that information may act as a catalyst for decision-making” (Ellis & Desouza, 2009, p.258). Choo (1995) argues that information is the organization’s strategic resource that enables the effective utilization and combination of other factors of production. The focus here is on information as a resource with an emphasis on access to new data and information, and making these resources useful and usable. Choo explains that in order for information to be considered strategic for an organization, it has to be galvanized

into knowledge that can guide action. For the author “this transformation of information into knowledge is the goal of information management” (1995, p.xi). Choo (2002) further states that information management is key for sustaining knowledge creation and application in organizations and should lead to the intelligent organization.

3.2.4 Choo (1995) Information Management Process Model

Choo’s model suggests viewing management of information as the management of a network of processes that acquire, create, organize, distribute, and use information. This process model forms a continuous and regenerative loop, which underpins the organization’s learning and adaptability capabilities. The different stages of this model are further explained below (Choo, 1995):

Identifying Information Needs. In this process, members of the organization recognize the need for new (internal or external) information to make sense of a certain situation, to take decisions, and/or to solve problems.

Information Acquisition. The process of seeking information is driven by the information needs identified by organization members. In this process, existing sources of information have to be evaluated regularly, new sources have to be assessed and the matching of resources to needs has to be frequently re-examined.

Information Organization and Storage. To develop an active repository of organization’s knowledge and expertise, the new data and information that are produced or collected need to be structured in away to reflect the information needs and interest of the organizations and its members.

Information Products and Services Development. This process involves packaging the structured data and information in different ways that respond to the expectations and needs of different stakeholders. This process also involves adding value to the incoming data and information in order to enrich its quality and “improving the fit between the information and the needs and preferences of the users” (Choo, 1995, p. 25).

Information Distribution. Sharing the new structured or packaged information among and between the organization’s different stakeholders is the main task in this process. The main benefit from sharing this information is to create new insights and knowledge about difficult situations and problems, and ultimately facilitate organizational learning process.

Information Use. The creation and application of new knowledge is at the heart of this process. According to Choo (1995), this is usually done through interpretive and decision-making processes. He explains that “information use for interpretation involves a social construction of reality, and information representation and delivery should support the multilevel interaction with social discourse. Information use for decision making involves the selection of alternatives, and information provision and content should accommodate the kinetic and non-linear nature of the decision process” (p.25).

3.3 Economics of Information

This section provides a brief overview of the economics of information field, which is home for most of the current research on value of information. This section covers concepts such as information as a public good, information as a resource, value theory, value of information, information attributes, and conceptual analysis of value of information. The section concludes with Repo’s (1986) information value-in-use framework.

3.3.1 Economics of Information: Brief Overview

Nilsen (2007) argues that the failure of neoclassical theory to account for information led to the development of an economics of information. Citing Braman (2006), the author explains that originally avoiding informational problems by neoclassical economic thought resulted in inconsistencies, paradoxes and failures, which in turn led over the course of the 20th century to a new stage of theoretical development as “economists working from the neoclassical perspective began to acknowledge that differences in kinds and amounts of information available, and who has access to that information, are so important that they could not be ignored” (Braman, 2006, p.6).

Lamberton (1994) also attributed the emergence of economics of information to “recognition of the deficiencies of economic theory that relied on unrealistic assumptions about the richness and sureness of information available to decision makers” (p.5). The author adds another two factors that led to the emergence of the field: reactions to failure of governments and business policies, and “the spectacular advent of intelligent electronics with its greatly enhanced capacities for communication, computations and control” (p.5).

Braman (2006) explains that economics of information deals primarily with issues related to understanding of information creation, processing, flows, and use from economic perspective. Despite the fact that the field of economics of information is relatively young, its influence on the way we think and behave has been significant. Stiglitz argued that the field changed the way economists think, noting that “the key question is one of dynamics: how the economy adapts to new information, creates new knowledge, and how the knowledge is disseminated, absorbed, and used throughout the economy” and that “information economics has gone beyond simply destroying the old results: it has provided explanations for phenomena and institutions for which

the standard theory provides no explanation” (Stiglitz, 2000, p. 1469-70).

Stiglitz adds that the fundamental breakthrough in the economics of information was the recognition that information was fundamentally different from other commodities. Although it could be a private good, “it possesses many of the properties of a public good- its consumption is non-rivalrous, and so, even if it is possible to exclude others from enjoying the benefits of some piece of knowledge, it is socially inefficient to do so; and it is often difficult to exclude individuals from enjoying the benefits” (Stiglitz, 2000, p.1448).

When analyzed by economists, according to Parker and Houghton (1994), information is mostly viewed as a private good. However, Repo (1986,1989) and Benkler (2006) consider most information to be of the public good type.

3.3.2 Information as a Public Good

As explained in the previous section, public goods are those goods that are non-rivalrous and non-excludable. In his paper on the theory of public expenditure, Samuelson (1954), who is credited with developing the theory of public goods, defines collective consumption goods as “goods which all enjoy in common in the sense that each individual’s consumption of such a good leads to no subtraction from any other individual’s consumption of that good” (p. 387). Those two critical properties of a public good argued by Samuelson explain why the public sector produces many public goods⁴⁶.

Common examples of public goods include national security, roads, and public libraries. According to Herzog (2006) and Stiglitz (1994 and 2000) information also is a public good.

Herzog (2006) wrote “Information is not a good that is destructible by its recipient; it is diffused

⁴⁶ However, others (e.g., Nilsen 2007 and Touffut 2006) suggest that public goods need not necessarily be produced by the public sector (e.g. Newspaper)

and enriched by interactivity” (p.80). Stiglitz (2000) also argued that because it is usually impossible to exclude others from enjoying all of the benefits, and therefore impossible to appropriate a fraction of the benefits (the property of excludability), information and technological change have to some extent both of the attributes of public goods. Repo (1989) explains that despite the attempts to privatize information (through, for instance, patents and copyrights), still most of the stock of the available information is produced and/or financed by governments.

The type of information, whether it is a private or a public good, plays a big role in determining its value. As a private good, similar to other traditional goods, the value of information may increase as a function of scarcity and demand. Many other factors can influence the value of information as private good such as reputation of the author, relevance, validity, and reliability (Parker & Houghton, 1994). However, as a public good, the value of information increases as the number of users increases. According to Moody and Walsh (1999), information exhibits increasing returns to use: information that is not used has no value; only when it is used it becomes valuable. Furthermore, McGee and Prusak (1993) argue that unused information is an economic liability.

3.3.3 Information as a Resource

Definitions of information as a resource are popular and appear in different bodies of literature (Braman, 1989). For example, the models to measure information flow and value provided by economists such as Jonscher (1982) and Madec (1981) emulate those developed for physical resources. In the mass communication area, scholars such as Lazarsfel et al (1986) also treated information as a resource. One of the reasons for this popularity is that this kind of

definition is general in nature. For example, Oettinger (1980) argued that information resources can be any information content, represented in any way, in any format and can be handled by any physical processor. For Machlup (1980), the basic informational unit is “anything that is known by somebody” (p.7).

Among the advantages of using this definition is the emphasis it places on how and why people use information (Ravault, 1981). Furthermore, Braman (1989) argues that it is among the strengths of this definition that it is relatively easy to comprehend. She continues “as a concept, the notion is easily grasped, widely applicable and open to extended applications in a number of different settings. As a metaphor, the definition of information as a resource has a great power” (p. 236).

3.3.4 Value of Information

Bryson (2001) notes that in the global information society, the identification and management of the different value propositions from a financial, political, corporate, social, cultural, personal, and community values perspective is becoming very important to exploit the total worth of information and knowledge age. To look at value from all these different viewpoints requires to first return to value theory itself.

3.3.4.1 Value Theory

Repo (1986) adopts Croft’s (1977) definition of the value concept as “an enduring belief that a specific mode of conduct or end-state of existence is personally or socially preferable to an opposite or converse mode of conduct or end-state of existence” (p. 375). Both philosophers and economists, from as far back as Aristotle, have explored theories of value and utility. The major

debate has always been around whether value is inherent in things, or is a function of human desires. For example, Plato considered value as inherent in a commodity, while Aristotle attributed it to a commodity's utility, and argued the standard of value lies in wants⁴⁷.

Within the political economy theory context, early pioneers such as Adam Smith (1723-1790), David Ricardo (1772-1823), John Stuart Mill (1806-1873), Karl Marx (1818-1883), Alfred Marshall (1842-1924), and John Neville Keynes (1852-1949) are credited of making important contributions to the development of the value theory. Generally speaking, value theory tries to explain why and how people place positive or negative values on things or concepts, and the reasoning behind their evaluation.

Value theory is normally associated with two other economic theories: utility theory and decision theory. On a practical level, according to Fishburn (1968), “utility theory is concerned with people’s choice and decisions. It is concerned also with people’s preferences and with judgment of preferability, worth, value, goodness, or any of a number of similar concepts” (p. 335). Decision theory is concerned with identifying the values, uncertainties, and other issues relevant to a decision that is being made. The theory is further divided into a normative decision theory (i.e., how decisions should be made), and a descriptive theory (i.e., how decisions are actually made) (Edwards, 1961).

Longhorn and Blakemore (2008) explain that value theory tends to differentiate between moral and natural goods. Moral goods are those relating to conduct of persons or organizations, and natural goods are basically objects. The authors then argue that “information is the sort of hybrid good that can be treated as a natural good (e.g., as an information product, such as a book or a map), and as a moral good (e.g., if information is used

⁴⁷ Why Are Theories of Value Important? By Lindy Davies. Available at: <http://www.politiceconomy.org/value.htm>

to praise someone or enable creation of a public good, or misused to defame a person or prevent the course of justice” (p.34).

Repo’s (1986) analysis of the value of information has a philosophical background. He sees values as “phenomena, which make a man aim at a certain goal instead of other alternative goals” (p. 375). For the author, values can be divided into two main categories: philosophical (or intrinsic) values, and practical (or instrumental) values. The philosophical values have intellectual or emotional meaning to a person, but are very hard to specify--sometimes it is possible only to name them. Emotional, ethical and spiritual values are examples of philosophical values (Repo, 1986). The practical values can further be divided into: value-in-use (or use values), and exchange values. Briefly, value-in-use means the degree to which information was instrumental for a decision or a task, in other words, its usefulness or utility; and exchange value refers to the monetary value ascribed to information (Repo 1986 and 1989, see also Raban, 2007).

3.3.4.2 Measuring Information Value

There is near consensus in the literature that determining or measuring the value of information is an extremely challenging task (Longhorn & Blakemore, 2008; Longley et al., 2001; Repo, 1989 and 1986). The same information can have different values depending on the different ways it is being used by or for different people, in different formats, at different times, or when used for other purposes other than the ones for which it was initially collected or created. Longhorn and Blakemore (2008) also argue that the meaning of the word “value”, in relation to worth, is “another indication that it may be extremely difficult, if not impossible, to assign any one value to something as multifunctional and multifaceted as information” (p.23). They

discussed the following meanings of value (p. 23-24):

Term	Definitions
Value (noun)	Worth; intrinsic worth or goodness; recognition of such worth; that which renders something useful or estimable; relative worth; high worth; price; the exact amount of a variable quantity in a particular case (Larousse English Dictionary, 1997).
Value (noun)	The importance or worth of something for or to someone; how useful or important something is; the amount of money that can be received for something (Cambridge Advanced Learner Dictionary, 2005).
Value (noun)	A fair return or equivalent in goods, services, or money for something exchanged; the monetary worth of something, e.g., a market price; relative worth, utility, or importance; a numerical quantity assigned to something or determined by calculation or measurement (Merriam-Webster Dictionary Online, 2007).

Monetary value is one of the many types of value that can be assigned to information, and in many circumstances this value is not appropriate or applicable. For example, if an information product or service is sold for a fixed monetary amount, for the seller, the value may be mainly financial, usually calculated in a way where the sale price will cover all cost plus an acceptable return on investment or profit margin. However, for the buyer or the user of, depending on the nature of the use, the value might be financial, social, cultural, economic, political, or just personal (Bryson, 2001).

At a personal level, there is a wide range of ways in which using information can generate value. At the most basic level, information can add simple convenience to the user by helping him/her find restaurants or other places more easily. Information helps also in making more strategic decisions such as where to live or to go to school, when and where to go for a vacation, or how and when to invest.

Longhorn and Blakemore (2008) and Bryson (2001) also discuss cultural and political values of information. The cultural value of information stems from its ability to preserve the

norms, attitudes, and history of a certain society. Information “defines cultures, imparting a sense of identity, sovereignty, principles, and rights to those in a specific society, and also separates subcultures” (Longhorn & Blakemore, 2008, p. 27).

As for the political value of information, it is derived from the usefulness or importance of information in communicating ideas, principles, and commitments, as Bryson (2001) proposes.

The socioeconomic value of information refers to the value of information in achieving societal goals, typically through impact on quality of life, improved decision-making, better governance, or improved economies at a macro level. Similar to the cultural and political types of values, the socioeconomic value of information is much harder to quantify than the monetary value. According to Longhorn and Blakemore (2008), this is because of “the myriad uses to which the same information product or service can be put in regard to a wide range of societal goals or economic targets” (p.26). Hill (1995) supports this argument and states that when information is published on an ongoing basis over a long time, it operates at a macro-level to influence ideas of populations and at a micro-level to influence personal behavior.

Bates (1988) also stresses the fact that information goods generate social costs or benefits that are not reflected in price. They are externalities. Stiglitz (2000) explains that externalities “occur whenever an individual or firm undertakes an action that has an effect on another individual or firm, for which the latter does not pay or is not paid” (p.216). Externalities may be negative (i.e., one individual’s actions impose a cost on others, e.g., pollution) or they may be positive (i.e., one individual’s actions impose a benefit on others, e.g., medical research).

3.3.4.3 Information Attributes

The lack of clarity regarding what is it about information that users really value has led to a rich literature on information attributes and characteristics (e.g., Longhorn & Blakemore, 2008; Raban 2007; Eaton & Bawden, 1991; Repo 1989 and 1986; Cleveland, 1982). As discussed earlier, information has the characteristics of both a public and a private good and in some cases it can be a hybrid good (Bates, 1989; Connolly & Thorn, 1990; Fulk et al., 1996). Also, information can be a raw material, intermediate or final product; it may be tangible or intangible; it may be confused with code or data or the systems delivering it, and the same information can be presented or versioned differently (Raban, 2007). The table below lists the various characteristics of information itself that influence its value as an economic good and provides examples for each characteristic or facet. Each facet listed here can influence the intrinsic value of information as well as the consumers' perception of the value of information.

Table 3: A summary of information characteristics

Facet of information	Forms	Example	Reference
Authorship	Single expert or group collaboration	Authored book or Wiki Project	Benkler (2006)
Tangibility	Tangible or intangible	Book or electronic file	Cleveland (1982)
Transparency	Experience good	Most types of information	Shapiro and Varian (1999)
Degree of processing	Raw, intermediate, final product	Raw data, management or market research report	
Degree of reuse	Primary, secondary, tertiary, etc.	Scientific article, abstracting service, review article	
Exclusivity	Original or copy	Exclusive tailored report of shelf study	Raban and Rafaeli (2006)
Confidentiality	Internal document or public domain	Corporate documents or government publications	
Application	Use or exchange	Management report or music album	Bates (1989); Repo (1986,1989)

Transfer	Sell/buy or share	Counseling or advice	Benkler (2006)
Presentation	Text, audio, video, graphics	Transcript, sound track, film, photos and charts	Tufte (1986, 1990)

Adopted from Raban (2007)

Raban (2007) further explains the market characteristics that are unique to information. In Raban's own words "the value of information as an economic entity is characterized by additional peculiarities"(p.308). Although some of these unusual attributes may seem contradictory, they are not. Information comes in various forms, physical and digital, proprietary and public, formal and personal, etc. Each form may be influenced by some of the attributes listed below, not necessarily by all (Raban, 2007, p.308):

- Information is costly to produce but cheap to reproduce, especially in digital formats. As a result, it is difficult to assess its value using conventional economic methods such as calculating marginal cost (Barlow, 1993; Shapiro and Varian, 1999).
- Despite the high production costs, information is often given away for free, especially in the Internet (Kaser, 2000).
- Despite the enhanced freedom to publish and collaborate, studies of collaborative information spaces indicate that they are far from symmetrical (Barabasi et al., 2002; Jones et al., 2004; Ravid & Rafaeli, 2004). Market asymmetry is likely to have a significant impact on value perception.
- Unlike the production of physical market goods, information production is circular: information is its own raw material (Benkler, 2006). This form of production can result in adding value as well as the degradation of information during the process.
- In contrast to other goods, the quantity of information does not affect its price or value (Ahituv, 1989; Van Alstyne, 1999).
- The transfer of information occurs both via market and non-market mechanisms:

information is bought, sold, and given away (Bates, 1989).

- Many goods offer variety. Information takes variety to an extreme and offers virtually infinite variety (Shapiro & Varian, 1999).

Moody and Walsh (1999) identified a number of general principles that can be used as a basis for information valuation. They call these principles “Information Laws”:

- Information is sharable. This means that information can be shared between and among people and organizations without loss of value to any party.
- The more information is used, the more value it has. Unlike many other resources where value decreases when they are used, information exhibits increasing returns to use. Information that is not used has no value; only when it is used it becomes valuable. Moody and Walsh (1999) argue that a prerequisite for using information effectively is to know that it exists, to know where it is located, to have access to it and to know how to use it. According to McGee and Prusak (1993), information must be valued in a context of specific users and decision makers. They also state that only the user of information determines its value.
- The value of information increases with accuracy. In general, the more accurate information is the more useful it is to an organization or individual users and therefore the more valuable. On the other hand, inaccurate information can have negative impact on organizational operations and decisions-making processes. As Haebich (1998) argues, decision-makers knowledge of the level of accuracy (or inaccuracy) of the information they are using allows them to incorporate a margin for error into their decisions.
- The value of information increases when combined with other information. The

ability and flexibility to combine and compare different information resources generally increases its value. Combining information is generally necessary when decision makers are dealing with situations that have different dimensions (e.g., social, political, economic, cultural, etc)

- Information is not depletable. In the case of most other resources, the more you use the less you have. Information however is self-generating as Glazer (1993) explains. This means that the more you use it, the more you have. The fact that most new information is often created as a result of summarizing, analyzing or combining different information sources together means that the original information remains and the new or derived information is added to the existing asset base. This is why information is not a scarce resource.

Blumberg and Sparks (1999) state that the most important criteria for the value of information are reliability and objectivity of the source of information. Other scholars, such as Nichols (1987), argue that valuable attributes embedded within the nature of information include: relevance, timeliness, availability, comparability, objectivity, sensitivity and quality. Nichols (1987) further elaborates on the quality dimension and argues that validity, accuracy, and precision are the most important quality attributes.

Finally, although conventional wisdom typically equates good or quality information with accurate information, such information, as discussed in this section, should also be timely, reliable, relevant, free of error, objective, and complete and include attributes such as accessibility, security, ease of manipulation, interoperability and other attributes that work together to produce high quality information.

3.3.4.4 Conceptual Analysis of Information Value

Discussions of frameworks and approaches to assess the value of information can be found in the literature. Repo (1986) identified four groups of studies on the value of information: studies using statistical or mathematical models, studies using classical economic approach, surveys on willingness to pay and time savings, and studies using examples. Ahituv and Neuman (1986), Ahituv (1989), and Saracevic and Kantor (1997) discussed three ways to assess the value of information: normative, realistic, and subjective. In Raban (2007), the author argues that normative and realistic approaches belong to the broad framework of rational methods of evaluation and offer either “ex ante” or “ex post” evaluations. However, subjective assessment belongs to the broader framework of behavioral methods of evaluation and expresses perceptions, which are “ex ante” evaluations.

One of Raban’s (2007) main conclusions is that we still know very little about users’ information evaluation practices. The author explains that prior behavioral research teaches us that value is in the eye of the beholder, and is often different than the objective value inherent in the information itself. Therefore, to inform daily consumption patterns of information, “the focus of research should be on users’ subjective evaluation of information” (Raban, 2007, p. 317). This is consistent with Repo’s observation that “the value-in-use of information is taken as a basis for the value consideration of information by many information scientists and practitioners” (1986, p.375. See also King et al., 1982).

3.3.4.5 Repo (1986) Information Value-in-Use Framework

As explained earlier in this chapter, Repo (1986) divided values into two main categories: philosophical (or intrinsic) values, and practical (or instrumental) values. He further divided

practical values into value-in-use (or use values) and exchange values.

In a later review of the economic and management sciences research on the value of information, Repo (1989) concluded that the research in these areas was mainly theoretical and that there were two approaches that could be considered to valuing information. First, the “exchange value” of information products and service. This type of value refers to the monetary value ascribed to information, and “should be studied using classical economic methods” (p.81). Second, the “value-in-use”, which means the degree to which information use was instrumental for a decision or a task and the effect of the use. According to Repo, this value should be studied using the “cognitive approach, which takes the user, the use, and the effects of the use of the information into consideration” (Repo, 1989, p.81; see also Raban 2007). Alavi and Leidner (2001) also argue that hoards of information are of little value and that only information which is actively processed in the mind of an individual through a process of reflection, enlightenment, or learning can be useful.

Repo (1986) further elaborates on the value-in-use of information and divides it into three parts, each of which has a particular role in assessing the value of information in practice:

1. “Subjective expected value-in-use of information. This valuation takes place when an individual decides whether to seek and use the information product or service or not. The valuation is based on past experiences and/or expectations of the information products and services that are available.
2. Subjective value-in-use of information. Opinions of individuals of the value of information while used in their work. Reduction of uncertainty is a commonly used expression of this value.
3. Objective value-in-use of information. This refers to “the value of real effects the

information has had on a task and its results” (p. 375-376). Raban (2007) calls this type of value “experience value”. For Raban, experience value refers to the value of information revealed to the user after use. She argues that this type of value is “believed to be an important antecedent in the formation, and possibly the moderation, of the subjective value of information in subsequent decision points” (2007,p.315).

3.4 How can Information Management Process and Information “Value-in-Use” Frameworks Complement Each Other?

It is clear from the discussion of information value in previous sections that measuring the value-in-use of information in practice is a demanding and challenging task. Given that it is almost impossible to achieve an objective measurement of value-in-use of information, the best we can do is to get some insights and indicators from the users of this information that can demonstrate its importance, usefulness and value, usually through the ways in which this information contributed to tasks and results. Repo himself (1986,1989) favors this approach and argues that the value-in-use of information “can only be stated by the user of information while he is performing his knowledge-work task and from the results of the task.” (p.381). This is also consistent with McGee and Prusak (1993) argument that information must be valued in a context of specific users and decision making contexts.

Choo’s (1995) information management process framework (as model for knowledge creation) provides a comprehensive and systematic step-by-step approach to investigate the utilization process and value of PSI to the users while they are performing their knowledge–work task. This approach also helps minimize subjectivism. In Repo’s words, “in order to avoid subjectivism, the basis for determining the value of information even from an information use

viewpoint has to be in the knowledge-work itself' (1986, p.382). Furthermore, this process model allows us to thoroughly investigate some important factors that affect the value of information such as access issues (e.g., availability and accessibility), technical issues (e.g., data formats, presentation format, interoperability, etc), and issues related to PSI quality (e.g., accuracy, comprehensiveness, timeliness, etc). The less the barriers to accessing and acquiring this information, the less the technical problems associated with it, and the higher its quality and relevance, the greater the value of this information to organizations' knowledge creation process and overall effectiveness

Following Repo (1986 and 1989), my starting point here is the hypothesis that the user of information gives value to the piece of information when the information is used. This takes place in relation to a knowledge-work process (e.g., a research project, where identifying, acquiring, manipulating, and using information is involved). This therefore means that the information must first have expected value-in-use to trigger the interest of the user, who actually decides whether to use the information or not. This is called subjective expected value-in-use (Repo, 1986) and can be determined at the stages of identifying and acquiring information in Choo's model. According to Repo (1986), actual value-in-use can be identified if it is possible to trace the role of information for a knowledge-work task. This is called subjective value-in-use and can be studied at the stages of information storage and organization, development of information products and services, and dissemination of information in Choo's model. The value of real effects the information has had on a task and its results is called objective value-in-use. This can be best studied at the last stage of the process model of information management proposed by Choo (1995), which is information use.

3.4.1 Research Objectives and Questions

The main objective of this study is to develop an understanding of the PSI utilization and value within the knowledge production context, and the factors and conditions that affect this process from the user perspective. More specifically, the research questions guiding this study are outlined below:

Stage One: Seeking PSI Resources

- Why did the study participants seek PSI resources?
- What are the PSI-related factors that affected its discovery and acquisition?

Stage Two: The Knowledge Creation Process

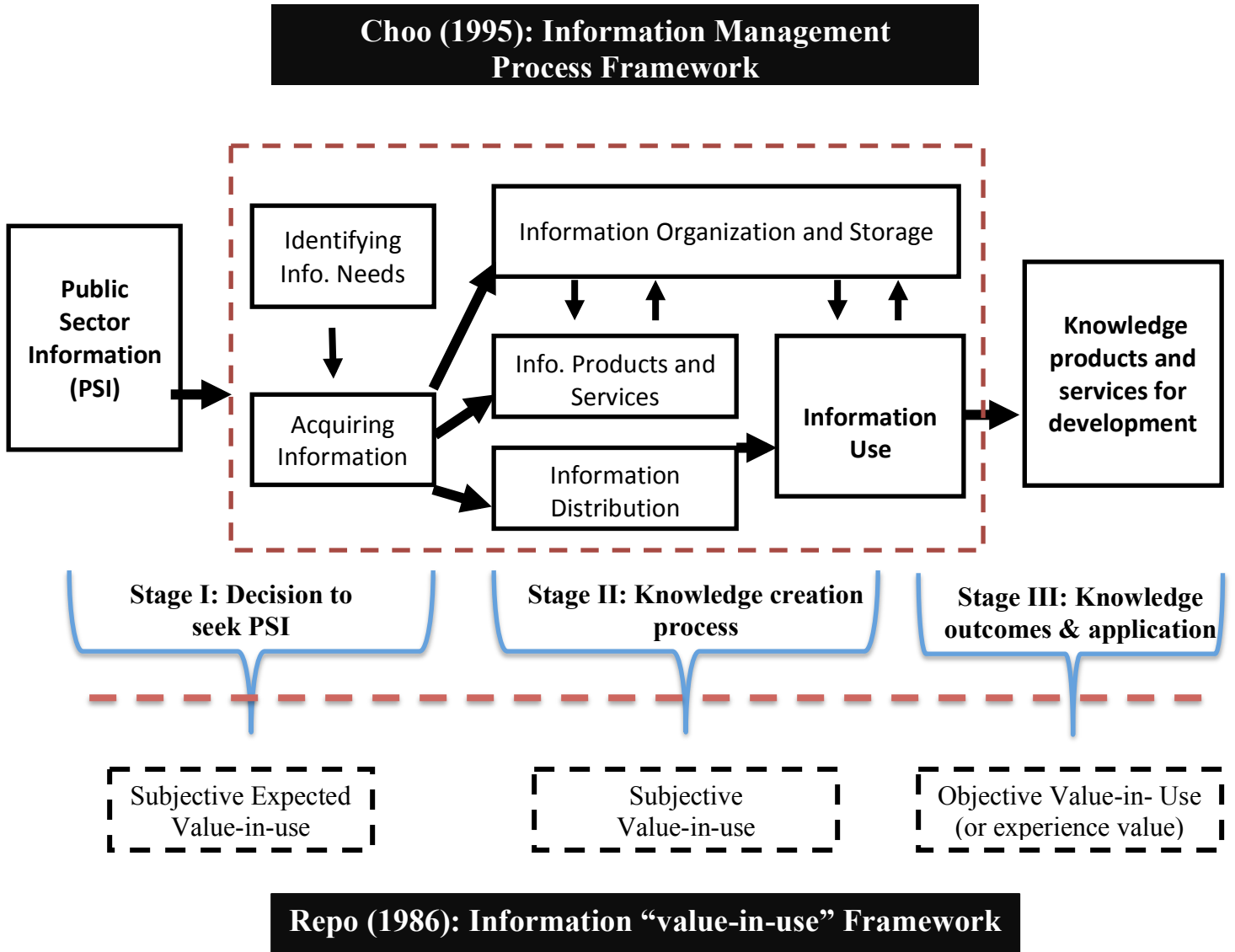
- How do the study participants evaluate the overall quality of the acquired PSI?
- In what ways did the acquired PSI contribute to the knowledge creation process at the study sites?

Stage Three: Knowledge Outcomes and Application

- How do the study participants evaluate the overall importance of the utilized PSI to the created knowledge and its consequent benefits to society?

In order to answer these research questions, the study draws upon the information management process and the value-in-use frameworks. This process is visualized below:

Figure 4: Visual representation of the study’s conceptual framework



In conclusion, using these two different views and their relationships, the conceptual framework explained above forms the bases for identifying and understanding the PSI-related factors and conditions that could facilitate or hinder the utilization process, as well as the different PSI attributes that might increase or decrease its usefulness and value in each stage of the knowledge creation process in organizations working on socioeconomic development issues in South Africa. Unlike the positivist view that places the theory at the beginning of investigation (i.e., verification, testing), or the grounded theory approach where the theory is the end product, this approach positions theory in the middle of the design. Therefore, my two theoretical concepts will act as overall orienting lens and guiding instruments in such a way that they do not constrain the design and data collection process (Lincoln & Guba, 1985; Neuman, 2000; Creswell, 1994).

CHAPTER FOUR: RESEARCH METHOD

4.1 Introduction

This study was undertaken to develop an understanding of the PSI utilization process within the knowledge production context and the factors and conditions that affect this process from the user perspective. It is possible that PSI can be highly valuable for knowledge-production organizations, especially those focused on socioeconomic development. However, there are different PSI-related factors and conditions that can facilitate or hinder the utilization process. More specifically, there are different characteristics and attributes of the PSI that may increase or decrease its usefulness and value at the different stages of the knowledge creation process. I am especially interested in identifying and thoroughly investigating these aspects. More specifically, the research questions guiding this study are outlined below:

Stage One: Seeking PSI Resources

- Why did the study participants seek PSI resources?
- What are the PSI-related factors that affected its discovery and acquisition?

Stage Two: The Knowledge Creation Process

- How do the study participants evaluate the overall quality of the acquired PSI?
- In what ways did the acquired PSI contribute to the knowledge creation process at the study sites?

Stage Three: Knowledge Outcomes and Application

- How do the study participants evaluate the overall importance of the utilized PSI to the created knowledge and its consequent benefits to society?

The rest of the chapter explains the design of the study and describes the research strategy and procedures adopted to address the research objectives and questions. It begins with a discussion of the case study approach, including a description of the case study method and an illustration of why it is appropriate for this study. The study sites, how access to the sites and the participants was secured, the unit of analysis, and the sampling strategy are then discussed. This is followed by a description of the data collection and analysis procedures, including the different types of data collected and the techniques used to collect and analyze these data. The chapter concludes with the measures taken to ensure the validity and reliability of the data and the results.

4.2 Study Design

I conducted a qualitative study to achieve the above stated objectives and to answer the research questions. As Punch (1998) explains, the main objective of qualitative studies is to “look at something holistically and comprehensively, to study it in its complexity, and to understand it in its contexts” (p.192). In keeping with the qualitative studies tradition, this study was designed as an exploratory single-case study using in depth semi-structured interview as the main data collection instrument. In addition, informal interviews and document review and analysis were also included.

4.2.1 Why the Case Study Method?

According to Yin (1984), the choice of research design is guided by a) the type of research question, (b) the extent of researcher’s control over events, and (c) the focus of the research, i.e., contemporary versus historical phenomena. When the research questions are

focused in “how” and” why” types of question, the researcher has no or little control on the events being studied, and when the study focuses on a contemporary phenomena within its real-life context, Yin (2003) recommends the use of the case study approach in such situations.

The case study approach is considered to be one of the powerful and frequently used research methods in social science, sociology, and social work (Gilgun, 1994; Yin, 2003). According to Punch (1998), if case studies are conducted properly, especially in situations where “our knowledge is shallow, fragmentary, incomplete, or non-existent” (p.155), they have a valuable contribution to make in several ways. In particular, only in-depth case studies can provide rich understanding of “a new or persistently problematic research area” (Punch, 1998, p.156). The author further explains that this is particularly true when the research involves complex social behavior. The author notes that “discovering the important features, developing an understanding of them, and conceptualizing them for further study, is often best achieved through the case study strategy” (Punch, 1998, p.156).

Yin (2002) defines the case study approach as “an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident” (p.13). Also, Yin (1984) notes that the case study approach refers to a group of methods that emphasize qualitative analysis. In this approach, data are usually collected from a relatively small number of actors through methods such as participant-observation and in-depth interviews. The approach seeks to obtain more details about the issues being investigated and hence provides an opportunity to get richer description and understanding of these issues. In Punch’s (1998) words, “the general objective of the case study approach is to develop as full an understanding of that case as possible” (p.150). The case study approach proved to be applicable to study, among others, complex issues and processes; little-

known phenomena or innovative systems; and research that can not be done experimentally for practical or ethical reasons (see Yin, 1984 and 2003; Eisenhardt, 1989; Trochim, 2006). A case in this regard can be an individual, a role, a small group, an organization, a community, or a nation. It also could be a decision, a policy, a process, an event or an incident.

According to Yin (1984), depending on the goal of the research and its specific questions, case studies can involve either single or multiple cases. Promoting the use of in-depth case study as the most appropriate method for conducting empirical research in the interpretative tradition, Walsham (1995) also explains that the single case study approach is appropriate if the objective of the research is to explore a previously un-researched subject. Yin (1984) explains that there are three main features for single-case studies: (1) they are revelatory cases, i.e., situations previously inaccessible to scientific investigation, (2) they represent critical cases for testing well-formulated theory, and (3) they are extreme or unique cases. While the multiple case study approach has more advantages over the single study design because it allows the researcher to make comparisons within and between cases, therefore providing strong evidence and greater generalizability, the single case approach enables the researcher to undertake a more in depth study using multiple sources of data and, as a result, to reach richer understanding of the phenomenon under investigation (Yin, 2003; Walsham, 1995; Benbasat et al., 1987).

Since the purpose of this study is to develop an in depth and holistic understanding of the PSI utilization process and value within the knowledge creation context and the factors that affect this process from the user perspective, this dissertation employs an in-depth, single-case design. It is an exploratory case study and is expected to include some aspects of a descriptive case study (Yin, 2003) in my write up as I explain the processes, factors, and the relationships involved in the value and utilization of PSI at the study sites in South Africa.

4.3 Description of the Study Setting

In this section, I describe the study settings. I first describe the context of South Africa then explain the case selection strategy. This is followed by a description of the study sites and explanation of how my access to the study sites came about.

4.3.1 The Context of South Africa

While enjoying some signs of development and noticeable progress as one of the emerging economies in the world, South Africa finds itself battling with serious social and economic problems such as poverty, overpopulation, high crime rate, and high unemployment rates; accompanied by severe skills shortages, HIV/AIDS, mass urbanization and immigration, and several resource shortages. For example, inherited from the apartheid era, poverty remains one of the biggest challenges facing the democratic South Africa (Desai, 2005; Bond, 2006). According to a survey conducted in 2005/2006 by Statistics South Africa, the consumption levels of 33.2% of all South African households were below the "lower-bound" poverty line (~ \$40⁴⁸ per capita per month in 2000 prices). This percentage increases to 53.3% when using the "upper-bound" poverty line (~ \$76 per capita per month in 2000 prices) (Statistics South Africa, 2008).

More recently, the DBSA Development Report (2011) titled “ Prospects for South Africa’s Future” notes that despite some progress made in a number of developmental goals, many challenges remain. For example, the report explains, “the nature and form of economic development have not been sufficient to address high levels of poverty and inequality, and the effectiveness of the South African state is still hampered by significant capacity gaps-even after more than a decade of reform” (p.2). Furthermore, South Africa has a uniquely diverse

⁴⁸ Based in exchange rate in Feb. 1, 2012 (\$1=7.884 ZAR) from <http://fx-rate.net/ZAR/>

population, which represents different races, tribes, cultures and subcultures, religions, and income levels. This diversity makes it more difficult to effectively address the above social and economic problems that the country faces.

Erasmus et al (2002) suggest that in order for South Africa to deal with these problems and confront related threats, decision makers need “analytical tools that can be used to explore potential intervention policies for their efficacy, desirability, and inadvertent consequences in non- target sectors” (p.91). Such tools, the authors add, “should adequately address uneven spatial development across environmental, economic and social sectors over intermediate time scales” (2002, p. 91). Strydom et al (2010) also emphasize the importance of evidence-based policy in order to tackle social and economic challenges effectively in South Africa (See also Funke et al., 2008). Campbell et al (2007) explain that the benefits of having policies that are based on evidence rather than policies constrained by time and political processes include better informed, more effective and less expensive policies. The authors further explain that policies based on evidence, which can play an important role in the policy agenda setting, formulation and implementation stages, give policymakers confidence in the decisions that they take because the evidence exposes them to a wider range of validated concepts and experiences (Campbell et al., 2007).

As explained earlier, PSI represents a resource with the potential to create knowledge that can support the development of such tools and help the country effectively address its developmental challenges. A number of strategic steps have been taken to promote access to information in South Africa after its transformation to democracy in 1994. For example, section 32 of the South African Constitution of 1996 states that “Everyone has the right of access to – (a)

any information held by the state”⁴⁹ Also, sections 15 and 46 of the South African Promotion of Access to Information Act (PAIA) that was passed in 2001 recommend that some data be made available by government departments and other institutions, such as Statistics South Africa and the South Africa Data Archive.

Building on the well-known thesis that knowledge growth is synonymous with economic growth and development (Nelson 2004; World Bank, 1998; Machlup, 1962), the study identifies and discusses the factors and conditions associated with the PSI utilization process and transforming it to useful knowledge that can be used by different communities to advance development goals in the country.

4.3.2 Case Selection Strategies

Case selection is an important aspect in case studies research. The case may be selected to replicate previous cases, to extend emergent theory, or to fill theoretical categories and provide examples of different types (Eisenhardt, 1989). Denzin and Lincoln (2005) also add that cases should be chosen according to what could be learned the most out of them. Pettigrew (1988) supports this argument and notes that given the limitations on the number of cases that can be usually studied, it makes sense to choose cases in which the process of interest is transparently observable.

The issue of boundaries is also important in case selection. Therefore, researchers should clearly identify the boundaries of their cases (Punch, 1998; Yin, 2003). The case in this study is bounded geographically by the territory of South Africa and is limited to two important players in development research and activities in the country (The HSRC and the DBSA). Moreover, the

⁴⁹ South Africa Constitution available at: <http://www.info.gov.za/documents/constitution/1996/index.htm>

case is restricted to PSI utilization processes and practices within the context of knowledge creation at these organizations.

The selection of the study sites was based on theoretical criteria as well as pragmatic considerations. Theoretically, the organizations selected as study sites had to be working in the broad area of socioeconomic development in South Africa. Also, both organizations had to be similar in terms of their relationship to PSI access and use. More specifically, from reviewing previous works and publications of both organizations, there is enough evidence to suggest that PSI has been an important source of information for both these organizations. Additionally, individual researchers and practitioners working at these organizations had to have some previous PSI access and utilization experience. Since this study is focused on the PSI-related conditions and factors that can affect its utilization and value in the knowledge creation process, having experience in identifying, acquiring, and utilizing PSI resources is key to providing meaningful answers to the research questions. Finally, in terms of their mandate and structure, both study sites are considered public institutions. Because of these similarities, which will be explained further in section (4.3.4), these two study sites are grouped together as a single case study of PSI utilization in South Africa.

Also, there was a pragmatic factor in the study sites selection process. Obtaining access to these sites was a very important deciding factor in the selection process. I wanted to be sure that I would have the support from the top-level management at the study sites, as well as the required cooperation from the potential study participants. To achieve this goal, I used personal connections in South Africa that developed as explained below.

4.3.3 Access to the Field

Through my work with the Board on Research Information and Data (BRDI)⁵⁰ at the US National Academies and the international CODATA⁵¹, I have established connections with a rich network of academics, policy makers, and civil society activists in many regions around the world. As a result, I was able to identify and obtain access to organizations working in the area of development research and activities in South Africa.

My starting point was emailing the Executive Director of the Knowledge Management and Evaluation Department at the National Research Foundation (NRF) of South Africa, and the Director of the Intellectual Capital Unit at the Development Bank of Southern Africa (DBSA). My NRF connection then introduced me to the chair of the Information and Knowledge Management (IKM) department at the University of Johannesburg and to the director of the Information Services unit at the Human Sciences Research Council (HSRC). After several rounds of communication with these connections, I managed to get a research fellowship at the Intellectual Capital unit at the DBSA, as well as a visiting researcher arrangement at the IKM department, the University of Johannesburg. I was also able to secure the approval from the top-level management of the DBSA and the HSRC to use their organizations as my study sites.

4.3.4 Description of Study Sites

This study took place at two organizations working in the broad area of socioeconomic development research and activities in South Africa. In this section, I describe these organizations and other aspects related to the local settings.

⁵⁰ Available at: <http://sites.nationalacademies.org/PGA/brdi/index.htm>

⁵¹ Available at: <http://www.codata.org/>

4.3.4.1 The Human Sciences Research Council (HSRC)⁵²

The Human Sciences Research Council is a non-partisan, public-purpose organization that generates scientific knowledge through its research and analytical work in the social and human sciences areas. With the vision to serve as a knowledge hub for research-based solutions to inform human and social development in South Africa, the African continent, and the rest of the world, the HSRC undertakes and promotes research that is often large-scale, multi-year, policy-relevant, and collaborative in nature. It produces high-quality scientific evidence to inform further analysis, debate, advocacy and decision-making by role players in government, the media, academia, and community-based groupings.

The HSRC responds to the needs of vulnerable and marginalized groups in society through its research. It develops and makes available datasets underpinning research, policy development and public discussion of developmental issues. Through this work, the HSRC aims to inform policy development and good practice, thereby seeking to make a difference to the lives of people in South Africa and in the mother continent. The HSRC usually works in collaboration and partnership with key constituencies, including government, other research organizations, multinational agencies, universities, non-government organizations, and donor and development organizations.

The HSRC has a staff of almost 500 employees, consisting of professional researchers, technicians, and administrative support staff, based in six offices in four different provinces across South Africa. Through its six multi-disciplinary research programs and centers, the HSRC is well equipped to respond flexibly and comprehensively to current and emerging community needs. The following units make up the HSRC:

⁵² Available at <http://www.hsrc.ac.za/en>

Research programs	Education and Skills Development
	Economic Performance and Development
	Population Health, Health Systems and Innovation
	HIV/AIDS, STIs, and TB (including the Africa-wide research network, SAHARA)
	Democracy, Governance and Service Delivery
	Human and Social Development
Centers	Centre for Science, Technology, and Innovation Indicators
	Centre for the Study of Social and Environmental Determinants of Nutrition

During the time I spent at the HSRC, I was hosted by the Information Services unit, which is home for the HSRC’s library in Pretoria. The head of the unit was instrumental to obtain access to the research subjects. After discussing my research purpose and questions with her, she emailed the HSRC director and explained my research objectives. She also asked the director for permission to conduct my research at the HSRC and to get access to research participants for interviews. The director approved my request and sent instructions to all departments and research programs encouraging them to cooperate with me and to provide whatever assistance I needed to complete my research.

4.3.4.2 The Development Bank of Southern Africa (DBSA)⁵³

The Development Bank of Southern African is a development finance institution, wholly-owned by the South African government. The overall goal of the DBSA is to accelerate

⁵³ Available at <http://www.dbsa.org/Pages/default.aspx?AspxAutoDetectCookieSupport=1>

sustainable social and economic development and improve the quality of life of the people of the region through funding physical, social, and economic infrastructure.

More specifically, the DBSA’s strategic objectives are to:

- Promote broad-based economic growth, job creation, cooperation, integration and prosperity.
- Build human and institutional capacity.
- Co-deliver social and economic infrastructure.
- Serve as a center of excellence for development financing, effectiveness and good governance.
- Engender sustainability, externally and internally.

In that regard, the DBSA plays multiple roles in developing the necessary infrastructure in key development areas such as water and sanitation, energy, education, health, transport, and housing. These roles are summarized below:

Financer	Contribute to the delivery of basic services and promote economic growth through infrastructure funding – loans, equity investments, co-funding, grants, development expenditure, etc.
Advisor	Build institutional, financial and knowledge capacity for development – external training, subsidized lending, technical assistance grants, etc.
Partner	Leverage private, public and community stakeholders in the development process – co-funding, mobilize funding to clients, etc.
Integrator	Originate and facilitate key interventions for building capacity and providing development solutions.
Implementer	Mobilize and link stakeholders, resources and initiatives for sustainable development outcomes.

The scope of the DBSA’s work covers the Southern African Development Community (SADC) region, which includes 14 countries: Angola, Botswana, Democratic Republic of

Congo, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, South Africa, Swaziland, Tanzania, Zambia and Zimbabwe. The DBSA work strategy in the region is underpinned by two major themes:

- Generating investment in assets that serve the poor, directly and indirectly, and that support broad-based wealth creation (infrastructural and productive capital);
- Mobilizing, developing, applying and sharing knowledge in support of greater development effectiveness, innovation and an enabling development environment.

The work at the DBSA is done through twelve key divisions, including the Development Planning Division (DPD). This division is considered the research arm of the DBSA and was home of the DBSA staff who participated in this study. Through its research, information, intellectual capital, and policy units, the DPD provides research expertise, data, information, and knowledge resources; and policy development support to other divisions at the DBSA, as well as to government agencies in key development priority areas such as health, education, service delivery, tourism, water and sanitation, energy, transport, and housing.

As a research fellow at the DPD, the division provided me with a working space, a computer, and access to the DBSA's library. Also, I was allowed to attend the division's general meetings. These arrangements were very helpful and allowed me to get to know the work environment and my colleagues there better. To get access to research participants, I arranged for a meeting with the DPD director. I presented my research and discussed with him the potential value of this research to the DBSA and to South Africa in general. The director was very supportive and sent email to his division staff encouraging them to help me with my research and find sometime to talk to me if I were to request an interview.

4.3.5 Unit of Analysis

Deciding on the unit of analysis is an important part of the study design. As a general guideline, Yin (2003) suggests that the unit of analysis be related to the way the initial research questions are defined. According to Trochim (2006), examples of unit of analysis include individuals, groups, artifacts (e.g., books, photos, newspapers), geographical units (e.g., town, state), and social interactions (e.g., divorces, arrests). In this dissertation, I studied the PSI utilization process and value within the context knowledge creation. In particular, I identified and analyzed the different PSI-related factors and conditions that may have any effect on its utilization and value in the different stages of the knowledge creation process.

Repo (1986, 1989) explains that the information value-in-use is best determined by the user of information, depending on the benefit this user obtains from using the information, as well as the effect of its use. This is consistent with Taylor's (1982) argument that information has a value only in context and that it is given value by a user who sees its "usefulness" because she sits in a particular environment and can relate the information to the tasks and problems of that environment. Following Repo and Taylor's arguments, the primary unit of analysis in this dissertation is the PSI utilization process at the level of individual user. Those users are researchers involved in different knowledge creation activities focused on the social and economic development of South Africa.

4.3.6 Sampling Strategy

To enhance our understanding of information-rich cases, qualitative research typically involves theoretical purposive sampling (Sandelowski, 2000; see also Eisenhardt, 1989). In this sampling strategy, participants are chosen for theoretical, not statistical, reasons (Glaser &

Strauss, 1967). Participants are chosen because they are supposedly knowledgeable about the issues being studied, and able and willing to freely engage in a discussion of these issues. Researchers will always go to individuals or groups they believe will maximize the possibility of obtaining more relevant data to their questions (Glaser, 1978). Since generalizability to a population is not the main objective of this study, theoretical purposive sampling was used. Participants were selected on the basis of criteria that, I as a researcher, thought were important (Patton, 1990).

The important criterion in this study was participants who have recently used or are currently using PSI in their work, and can freely communicate their knowledge and experiences related to these processes. The process of identifying these participants is explained further under the “informal interviews” section below. While I mainly relied on purposive sampling strategy, in some cases a number of participants were in a position to suggest other participants who might prove to be important source of information. This strategy is called “snowball” sampling.

4.4 Data Elicitation: Multiple Sources of Evidence

This section describes the various techniques used to collect data. According to Eisenhardt (1989), case studies typically combine different data collection methods and techniques such as interviews, archives, questionnaires, and observations. In keeping with the case study tradition and to increase the validity of my study, I used multiple data sources. These sources allowed me to have multiple data points when learning about factors, conditions, and relationships related to the PSI utilization process and value within the context of knowledge creation. I conducted document review, informal interviews, and semi-structured interviews. Using different sources of evidence, according to Yin (2003), allows researchers to “address a broader range of

historical, attitudinal, and behavioral issues” (p.98).

Furthermore, Yin (2003) encourages researchers to use multiple sources of evidence to achieve triangulation. The author suggests four types of triangulation: data triangulation, investigation triangulation, theory triangulation, and methodological triangulation. The author notes that among these types of triangulations, data triangulation is the most used type. Data triangulation, Yin (2003) further elaborates, addresses the construct validity issue by allowing the researcher to “collect information from multiple sources but aimed at corroborating the same fact or phenomenon” (p. 99).

Using multiple data sources to develop rich descriptions helped guard against threats to validity. This was of particular importance since I was the sole researcher. The following sections discuss the three main sources of evidence used in this study: the semi-structured interview as the primary source of evidence, and the informal interviews and documentations as the secondary source of evidence.

4.4.1 Semi-structured Interviews

Recognized as one of the main data collection techniques used in social sciences (Roulston et al., 2003), and as one of the most important sources in case study research (Yin, 2003), interviews were used as the main source of evidence in this study.

In-depth interviews, according to Walsham (1995), allow the researcher to best access to participants’ interpretations of actions and events, which have or are taking place. For Punch (1998), interviews are a very good way of “accessing people’s perceptions, meanings, definitions of situations, and constructions of reality” (p.174-5). Also, interviews give researchers the chance to probe more deeply into interesting ideas being raised, providing

valuable new insights on the issues discussed through points not previously thought of when planning the study (Varkevisser et al., 2003).

Depending on the research purpose and the specific research questions, interviews can be structured, semi-structured, or unstructured (Punch, 1998). Also, interviews can be conducted face-to-face, online, casual chatting, or via e-mail. In structured interviews, researchers decide on specific interview questions and follow them firmly during the interview. In this case, the interview itself does not attempt to go into great detail. On the other side of the spectrum, unstructured interviews are much more flexible and do not involve preplanned questions. In this case, researchers decide on some general themes or questions to guide the interview, and allow specific questions to emerge as the interview goes. Each type of interview has its own strengths and weaknesses. While the structured interview is usually associated with quantitative testing of an existing set of hypotheses, the unstructured or semi-structured interview is most useful for qualitative exploration of social structures, relationships and patterns (Platt, 2002).

In this study, in-depth semi-structured interviews were conducted to document participants experiences and perceptions related to the PSI utilization process and its value within the knowledge creation context. The first step was to develop an interview protocol. Initially, the protocol was developed based on the reviewed literature and the conceptual framework. However, some additional modifications (e.g., some questions were revised, other new specific questions were added, and others were removed) were introduced as a result of insights from the exploratory informal interviews and as the formal interviews itself unfolded. The full interview protocol is available in Appendix [B]. In addition to some general questions as warm-ups (e.g., demographic questions, questions about education background and work

experience), the main constructs covered by the interview protocol were: PSI discovery and acquisition, knowledge creation process, and knowledge outcomes and application.

Guided by the literature reviewed in Chapter 3 and the insights from the informal interviews, the PSI discovery and acquisition construct involved issues related to participants' motivation to seek PSI resources. It also involved PSI-related factors and conditions that affected its discovery and acquisition. As for the knowledge creation process construct, it involved the participants' evaluation of the quality of the acquired PSI and the ways in which PSI contributed to the knowledge creation process. Finally, the knowledge outcomes and application construct in this study focused on some tangible outcomes of the knowledge creation process and its potential or actual value to socioeconomic development in the country. It also involved researchers' evaluation of the overall contribution of PSI to these knowledge outcomes and the consequent benefits to the society.

In order to conduct the interviews, appointments were made to meet with the participants. At the beginning of each interview, I presented the informed consent form (see Appendix [A]) to the participant and encouraged them to read it. I also asked them if they had any clarification questions related to the nature and main purpose of the study before signing the form. All of the participants signed the consent form and permitted me to record the interviews.

This in-depth, semi-structured interview technique enabled me to gather information about the participant's point of view without imposing predetermined structure based on assumptions of what those points of view could be. Also, it allowed me to change the order of the interview questions to keep participants' flow of thoughts and ideas, and in some cases to provide a more casual tone of conversation. Furthermore, the open-ended nature of the questions gave participants the freedom to express in their own words their perspectives on the issues discussed

(Patton, 1990). The length of the interviews varied between 29 minutes and 75 minutes.

Interviews were digitally recorded and transcribed for analysis. Two trained research assistants who are South African were paid to do the interviews transcriptions. In order to minimize any negative effects of the transcription, the transcripts were randomly sampled by the researcher and one other independent researcher to crosscheck and confirm the audiotapes.

Table 4: Theoretical background for research and interview protocol questions

Theoretical Background	Research Question	Interview Protocol Question	Notes
Information Management Process Framework- Information Needs (Choo, 1995). Information Value- in-Use Framework- Subjective Expected Value-in-Use (Repo, 1986, 1989)	Why did the study participants seek PSI resources?	- Can you please tell me what types and sources of PSI you used/use for this project? - How and why were the PSI resources identified and recognized to have value for this project?	This is helpful to understand what types of PSI resources the interviewees seek and what are their motivations to seek these specific resources.
Information Management Process Framework- Information Acquisition (Choo, 1995)	What are the PSI-related factors that affected the discovery and acquisition of PSI?	- Can you please describe the factors that may have hindered or facilitated the discovery of the necessary PSI to the project? - Can you please describe the factors that may have hindered or facilitated the acquisition of the necessary PSI to the project?	This is helpful to understand the conditions (<i>this could include technical, legal, institutional, socio-cultural, or economic</i>) surrounding the availability and accessibility of PSI resources.
Information Management Process Framework- Information Acquisition (Choo, 1995). Absorptive Capacity (Cohen & Levinthal, 1990)		- Did you have any prior or related knowledge related to the needed PSI?	This is helpful to understand the relationship between prior knowledge or experiences and the identification and acquisition processes of PSI.

Information Attributes (Kahn et al., 2002). Information Value- in-Use Framework- Subjective Expected Value-in-Use (Repo, 1986, 1989)	How do the study participants evaluate the overall quality of the acquired PSI?	- How do you evaluate the quality of the acquired PSI resources in relation to the utilization process and to the overall usefulness and value of these resources to the project?	This is helpful to understand the different quality attributes (e.g., timeliness, reliability, and completeness) of the acquired PSI and their impact on the knowledge production process.
Information Management Process Framework- Information Organization and Storage and Information Products and Services (Choo, 1995). Information Value- in-Use Framework- Subjective Value-in-Use (Repo, 1986, 1989)	In what ways did the acquired PSI contribute to the knowledge creation process at the study sites?	- How did you use the acquired PSI resources and what kind of value did you add to it during the utilization process? <i>How easy/difficult was it to analyze/process or interpret this information? If difficult, why? What are the main reasons?</i> <i>How easy/difficult was it to integrate this information within existing internal or other sources of information? If difficult, why? What are the main reasons?</i>	This is helpful for understanding the issues involved in the process of utilizing the PSI resources, especially how easy or difficult is it utilize such resources, the ways in which the acquired PSI resources contribute to the knowledge creation process at the study sites, and the specific areas or domains of knowledge in which the utilized PSI contribute
		- What kind of value did the PSI add to your work in this project? How?	This is helpful to understand the strategies employed by the participants to deal with quality issues as well as the different kinds of value they add to this information in order to produce useful and strategic information products and services.
Information Management Process	How do the study	- In general, how would you describe the	This is helpful for understanding the

<p>Framework- Information Distributions and Use (Choo, 1995). Information Value- in-Use Framework- Objective Value-in-Use (Repo, 1986, 1989)</p>	<p>participants evaluate the overall importance of the utilized PSI to the created knowledge and its consequent benefits to society?</p>	<p>importance of PSI to this project and its outcomes? - <i>Who are the main audience of the outcomes?</i> - <i>What kind of value does it have for them? Why?</i> - <i>What are the immediate, short, and long-term impacts of such outcomes?</i></p>	<p>importance of PSI and its value to the kind of work the participants do in the project. It is also helpful for understanding the outcomes of the project and the importance of these outcomes to, and their impact (if any) on, certain communities, procedures, policies, or plans.</p>
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4.4.2 Informal Pilot Interviews

In this study, informal pre-interviews were conducted for three purposes. First, I needed to better understand the work environment at the study sites and to specify some aspects related to the three main constructs in my formal interview protocol presented in the previous section. For example, I needed to get an idea about the kinds of projects that utilize PSI at these sites and the extent to which these projects rely on these government resources. I also needed to get a general idea about the dynamics involved in the processes of identifying, acquiring, and utilizing PSI resources. To achieve these goals, I conducted exploratory informal interviews with key informants such as department chairs, research managers, and administrators at the two study sites. A snowballing sampling technique was used in this set of informal interviews.

The insights I gained from these interviews were very important to understand the local context and some cultural aspects related to my research questions, and proved to be very useful to conducting the formal interviews more effectively as it enabled me to probe more relevant questions. For example, these interviews enabled me to make adjustments to the main data collection instrument, modifying existing questions and adding some new ones to the interview

protocol. Such adjustments “allow the researcher to probe emergent themes or to take advantage of special opportunities which may be present in a given situation” (Eisenhardt, 1989, p.539).

For instance, I found through these interviews that the organizational questions I initially included in the interview protocol were either ignored by the interviewees or received vague and brief responses. I felt that some of the interviewees were uncomfortable discussing organizational factors (e.g., management support, organizational policies, and the availability of human, technical, and financial resources) that might have an impact on the PSI utilization and value. This could be a cultural issue or related to some organizational politics. In any case, I felt that these questions might create a tense environment during the interviews and as a result might affect the interviewees’ responses to other questions and the quality of the interview in general. Because of these issues and given that this research is mainly focused on the PSI-related factors rather than organizational factors, these questions were removed from the protocol that was used in the formal interviews.

Another example is related to the questions I initially had in the protocol related to the quality of the PSI resources used. Initially, I identified from the literature four specific PSI attributes (comprehensiveness, relevance, reliability, and timeliness) and was planning to ask the interviews to reflect on each of these attributes. For example, I was planning to ask the interviewees “how would you evaluate the acquired PSI resources in terms of comprehensiveness?” While I still received useful responses to such questions, I felt that this approach was constraining my interviewees and preventing them from speaking freely about any other attributes than the four I was asking about. I also felt that it would be more interesting and useful to ask the question in a more general way and see what kind of quality issues they bring up. So I changed my question to: “How do you evaluate the quality of the acquired PSI resources

and its impact on the utilization and value of these resources in the knowledge creation process?” and I would give one or two examples of such attributes. Whenever a quality issue is mentioned, I would ask more specific clarifying questions or simply ask the interviewee to elaborate on that issue.

Second, I used the informal interviews to identify participants. As I explained under the sampling strategy section above, I used a purposive sampling strategy in this study. At the end of each informal interview, I asked those participants to identify some current or recent projects that used PSI in their work. Once I got project suggestions, I followed up with this question: “who do you think I should speak to about these issues in your team/department?” As a result of the 18 informal interviews I conducted, I was able to identify 12 projects and 49 potential participants (the other 8 participants were identified using snowballing approach).

Third, I used this informal interviewing technique to follow-up with the subjects who participated in the semi-structured interview to ensure the validity of my interpretations of their responses during the formal interview. During these follow-up interviews, I asked the participants if my interpretations made sense to them and if they had anything to modify or add. For example, statements such as “I understood that the main reason you were able to get this information is because you had a personal connection at (agency name), would you agree with this assessment?” or “can you please provide more details?” Another example would be “When you said that PSI was vital for the project, did you mean that without this information it would have been difficult or impossible to finish this project?” Can you please elaborate?”. For the purposes of maintaining a relaxed environment, I felt that it was not necessary to record any of these informal interviews. Instead, memos were written during and after the conversations.

4.4.3 Document Review

Yin (2003) explains that documentary information is likely to be relevant to every case study. This information can be found in many different forms, such as letters, diaries, essays, institutional reports, minutes of meetings, formal studies, or evaluations of the site under study. (Punch, 1998; Yin, 2003). One of the main advantages of using this data collection method, according to Creswell (2002), is that it allows the researcher to access these documents at any convenient time and that these sources represent data that are thorough and, in most cases, well organized. Furthermore, this information is important for data triangulation purposes and, as Yin (2003) further explains, these documents can add three kinds of value: (1) they help to verify the correct spellings, titles or names of organizations that might be mentioned in an interview; (2) they can provide details to corroborate information from other sources; and (3) they can enable researchers to make inferences from documents.

In this study, government, media, institutional, and project reports gave a broader context to my research. Other documents used included organizational policy documents, meeting minutes, and letters between the organizations and government agencies. Such documents helped me to obtain knowledge about my study sites, participants, and other events, routines, and processes that seemed relevant to my understanding of the PSI utilization process and value within the knowledge creation context. Details from these documents were especially useful in the process of conducting the interviews.

4.5 Data Analysis

As mentioned earlier in this chapter, mainly qualitative data (rich oral descriptions and text) were obtained in this study. Following the qualitative data analysis tradition, I tried to make

sense of this data (Punch, 1998) and hence the analysis process involved finding patterns and themes from the narratives obtained from the open-ended questions in the interviews. According to Boyatzis (1998), there are three approaches to developing themes systematically. These are theory driven, prior data or prior research driven, and inductive. The inductive approach was the main approach used in this study. More specifically, the analysis of this data followed guidance from Miles and Huberman (1994). This process consisted of three concurrent flows of activity as follows:

1) Data reduction: Data reduction refers to the “process of selecting, focusing, simplifying, abstracting, and transforming the data that appear in writing-up field notes or transcriptions” (Miles & Huberman, 1994, p.10). The authors explain that the purpose of data reduction is to simplify and code the data so that it can address the research questions in a clearer way. Punch (1998) notes that data reduction happens throughout the analysis process. In the early stages, “it happens through editing, segmenting, and summarizing the data” (p.203). In the middle stages, data reduction is associated with coding and memoing, and other related activities such as finding themes and patterns. In the later stages, it happens through conceptualization and explanation of the data (Punch, 1998).

2) Data display: This stage refers to the process of organizing the data in a more systematic way. According to Miles and Huberman (1994), systematically assembling the organized information from the data reduction stage into an immediately accessible and compact form to facilitate the process of drawing conclusions is the main purpose of data display. Forms of data display can include matrices, networks, tables, graphs, networks and other instruments that allow researchers to make comparisons across data.

3) Conclusion drawing/verification: This stage is important to drawing conclusions through

“noting regularities, patterns, explanations, possible configurations, causal flows, and propositions” (Miles & Huberman, 1994). Punch (1998) states that it is possible to note some conclusions early in the analysis. The author further explains that these early conclusions are “held tentative pending further work, and sharpened during it” (p.204). These conclusions are finalized once all the data have been analyzed.

After omitting identifiable information and information that was not relevant to the study, such as introductions and conversations about other topics, I followed Miles and Huberman (1994) processes described above. Consistent with the authors’ suggested approach, these three processes did not follow a simple linear progression, rather, the process of data analysis were continuous and iterative, with a back and forth alteration between coding and interpretations. This process is further explained in the following section.

4.5.1 Coding and Memoing

Coding and memoing were an integral part of my data analysis. According to Babbie and Benaquisto (2002), coding refers to “the development of concepts and categories in the recognition and ordering of themes” (p.381). The development of these concepts and categories is key to bringing coherence and making sense of a mass of data. In keeping with qualitative data analysis tradition, I also used “memos” throughout the process of generating and analyzing the data, especially during the coding process. While the memos I recorded during the data collection process were mainly simple descriptions of any thoughts, interpretations, questions, and directions for further data collection as they evolved while I was collecting the data, the memos I recorded during the data analysis process were more substantive and theoretical (Punch, 1998). These substantive and theoretical memos were instrumental in suggesting deeper concepts

and higher levels of coding. As Punch (1998) explains, these kinds of memos “ help the analyst move from the empirical to the conceptual level” (p.207).

The inductive process that I followed involved continuous reading (and sometimes listening to the recorded interviews⁵⁴) and coding of the data to identify, label, and revise categories, patterns, and themes. For Krippendorff (2004), this iterative process involves recontextualizing, reinterpreting, and redefining the research until some level of satisfactory interpretation is reached.

With feedback from a study partner, I did most of the inductive part of the coding process. I started with identifying some open or basic codes. Strauss and Corbin (1998) explain that open coding is the means by which concepts are discovered. The authors further elaborate and note that broadly speaking, “during the open coding, data are broken into discrete parts, closely examined, and compared for similarities and differences. Events, happenings, objects, and actions/interactions that are found to be conceptually similar in nature or related in meaning are grouped under more abstract concepts termed categories” (p.102-03). According to Emerson et al (1995), at this stage of open coding, the researcher is not concerned with how these ideas or themes will be used or how they maybe related to one another, instead, the researcher “entertains all analytic possibilities” trying to identify “ as many ideas and themes as time allows” (p.151).

At this stage, I was mainly interested in seeing the big picture that the data paint. As I read through the data, I noted a large number of initial codes and wrote many preliminary memos. I started this process by highlighting key phrases and text segments that corresponded to my research questions and noted others that seemed important but unexpected. For example, the magnitude of relying on personal connections as one of the main facilitating factors to access and acquire PSI resources was unexpected, yet extremely important. As I continued to closely look

⁵⁴ This was useful to make sure that I capture all elements of speech such as tone level, sarcasm, jokes, etc.

for repetitions, metaphors, and analogies, and to check my growing interpretation of answers to my research questions against the documents and notes, I started selecting more focused or advanced codes. According to Babbie and Benaquisto (2002), this is the stage when the researcher “considers the utility of the themes and how they maybe related” (p.382). The process of grouping, reconciling or creating new codes continued until no new codes emerged.

This was the end of phase one in my coding. Phase two involved taking a random sample of the transcribed interviews (17 out of 57) and repeating the same coding process I followed in phase one. The main objective of this task was to ensure consistency in my coding approach. After I was done with the coding of this random sample of transcripts, I compared the results I got in phase two with the results from phase one. There was no major differences in the themes emerged and in the focused codes. Finally, I took another random sample of 17 transcripts and sent it to my study partner. This step was taken to ensure validity of my data analysis approach. Results from the study partner’s coding process were then compared to both my results from phase one and phase two of coding. Similarly, there were not any major differences between the study partner’s results and my results.

4.6 Threats to Validity and Reliability

Despite its popularity in different fields, the case study approach presents unique concerns with respect to validity and reliability. Since my study sites are in many ways similar to other organizations working in the development field in South Africa, it can be expected that my findings can help to shed some light on PSI utilization processes and practices in other organizations in South Africa. However, I was a single researcher in the field, and my interpretations and analyses were filtered through my own world-view. Nevertheless, this is not

unusual in studies that use inductive approach to coding and analysis. The inductive coding process, according to White and March (2006), assumes a single researcher because the process necessitates the development of codes based on a close reading of the text and constant checking of the codes against the research questions. Since it is the responsibility of the researcher to make decisions related to the codes that are likely to emerge throughout the inductive process (e.g., reconcile or adjust the emerged codes with the existing ones), it is therefore acceptable that coding to be done by the researcher (White & March, 2006, see also Guarnaccia et al., 2001).

Also, being a single researcher does not mean that my interpretations and analyses were completely subjective. While I cannot claim that this work was bias-free, I made sure to employ different measures throughout the process of designing and conducting the study to ensure that I produced knowledge that can be useful outside of this case study. This goal was accomplished through different strategies. First, while I was still in the field, I frequently discussed my interpretations with participants and gave them the opportunity to refute and correct these interpretations. While I tried to have this kind of follow-up informal interview with all the participants, I managed to do that with almost half of them. The fact that I had a relatively large number of participants (57) located in four different provinces around South Africa, and that most of them had very demanding jobs, made it very difficult to do it with all of them. Also, a fellow Ph.D. student who is not involved in this study but has relevant experience in similar contexts was frequently asked to check the interview transcripts. The results did not reveal problems in the transcripts. Also, I continuously reviewed my coding process and results with the same colleague. Again, while I cannot claim to have knowledge that is free from bias, the involvement of these parties helped to ensure some degree of shared knowledge or what Kvale (1996) called “intersubjective knowledge”. Second, using multiple sources of evidence was a

very important measure to maintain the validity of the study (Tashakkori & Teddlie 1998). It was especially useful in checking, as I kept comparing what I found from the different sources against each other (Kvale 1996). Apart from that, I also tried to maintain a chain of evidence (Yin, 1994).

In this study, data from semi-structured interviews were triangulated with data from secondary sources including informal interviews and document review. Maintaining a chain of evidence implies that the researcher needs to make the links between the research questions, the data collected, and the subsequent conclusions explicit so that the reader can follow the line of reasoning. This chain of evidence can also help in making arguments more convincing (Yin, 1994).

Another concern related to the credibility or reliability of the data collected through the formal semi-structured interviews was about the procedure of identifying the factors and conditions that might affect the usability and value of the acquired PSI resources. By mainly relying on what participants specifically say to identify the relevant factors and conditions, some levels of bias might be introduced, especially as a result of individual perceptions and previous experiences. It is possible that there are important factors that people take for granted or for some other reason are unable or unwilling to identify in an interview.

To address this concern and reduce its potential risk, further discussions of these factors were the main focus of the follow-up informal interviews I managed to conduct with the participants. If other specific factors were identified at this stage, I would ask the participant to elaborate on them and would incorporate the new information into the transcript of the formal interview. If no other specific factors were identified, it might be that the participant did not consider them as important factors (at least in this context). Also, data triangulation (especially

with documents review) was used to further investigate if any other relevant factors were identified in these documents. In most cases, the results from the triangulation suggested that no other relevant factors were identified.

Another concern is whether the participants' statements in the interview reflect what they actually do or feel in relation to the topics discussed. In some cases, trust between the researcher and the participant is a big factor. In other cases, politics and/or organizational dynamics might prevent participants from exposing their true feelings. To address this issue, it is important first to realize that it is an inevitable problem in interviews since "it is not the obligation of a subject to be objective and to tell us the truth" (Berry, 2002, p.680). However, the qualitative research literature provides a number of ways to minimize such risk, including prolonged engagement with the participants, observation over time, triangulation, and peer debriefing (Ball, 1967; Lincoln & Guba, 1985; Berry, 2002). In this study, I used prolonged engagement and triangulation to minimize that risk. First, having spent a relatively long time at each study site (three months at the HSRC and three and a half months at the DBSA), and the fact that I worked to gain the trust of the participants both helped me to determine whether to question what participants said in the interview.

As I spent more time in their working environment and sometimes attended their formal meetings and social gatherings, I noticed that participants became more candid with me. I also think that assuring the interviewees at the beginning of each interview that their answers would not be tracked back to them but would be aggregated, helped in establishing some level of trust. Second, as I mentioned above, I used data from other sources (i.e., documents review) to check the reliability of the data obtained through the interviews.

The data collection process ended when saturation was reached. While the rule of the

thump suggests anywhere between 5-25 participants as adequate to reach saturation (Kvale, 1996), meeting the “information redundancy” criterion (Lincoln & Guba, 1985) was the main deciding factor in this study. Therefore, saturation in this study was reached when I found that I did not continually get new insights, but instead found that variations of the same core issues and themes were repeated and fit into overall similar pattern. Participants repeatedly described similar experiences and issues related to the PSI utilization process and value aspects.

Generalizability is another important issue in the case study research. This involves ensuring that the results are generalizable outside of the individual case (Punch, 1998). There are two types of generalizability: statistical and analytical (Miles & Huberman 1994; Johnson & Christensen 2005). Statistical generalization, which means generalizing from sample to population, was not a big concern to me because I did not conduct a statistical survey. Instead, I was more concerned with analytic or theory-connected generalization and transferability. Transferability here refers to a judgment about whether findings from one context are applicable to another (White & March, 2006, Firestone, 1993).

Since the study builds on the participants’ own understanding and views of the processes in which they were engaged, the case study approach enables me to make analytical generalization, where results are generalized to a broader theory as opposed to populations. Therefore, I believe that my study is generalizable to other case studies using the literature from value of information and knowledge creation theories. This literature informed my design of the study as well as my data analysis process. As for case-to-case knowledge transfer, as I mentioned earlier, given that the organizations studied in this dissertation represent in many ways other organizations working in the socioeconomic development field in South Africa, it can be expected that the findings of

this study can help to shed some light on PSI utilization process and value in other organizations in South Africa.

Finally, establishing reliability involves ensuring that the study results could be replicated by other researchers (Babbie, 2003). I kept careful notes of the things I did and the decisions I made. This note-taking helped me develop a case study protocol that could be used by later researchers, which is an important contribution of my study (Miles & Huberman 1994). While the contexts may differ and the rapport between a different investigator and the participants might differ, other researchers should be able to follow my procedures and achieve similar results. If not, they should be able to understand the contextual factors that differed based on my write-up.

Having addressed the methodological issues, in the next chapter, I will discuss the results obtained from the study.

CHAPTER FIVE: RESULTS AND DISCUSSION

This chapter presents and discusses the main findings of the study. The first part presents the general demographic information of the participants from the two study sites. The rest of the chapter is dedicated to discussion of the findings in response to the five research questions. The discussion of the results starts by addressing what types of the PSI users at the study sites are utilizing, motivations for seeking these resources; the factors that affect the discovery and acquisition the needed PSI; the participants' evaluation of the PSI quality; and PSI contribution to the knowledge creation process at the study sites. This is followed by a discussion of the participants' overall evaluation of the importance of the utilized PSI to the created knowledge and its consequent benefits to the society. The chapter ends with a summary of the findings.

5.1 General Demographic Information of the Study Participants

In this study, 57 participants from the two study sites were interviewed including development economists, labor economists, demographers, policy analysts, urban planners, statisticians, data analysis and modeling officers, and specialists from areas such as food security, Geographic Information Systems (GIS), education and skills assessment, health care delivery, technology and innovation, water and sanitation, transportation, leadership, service delivery, and local governance. The participants were mainly involved in different levels and types of development research activities. Below is the demographic information on the age range, gender distribution, education background, and level of experience of the participants.

Table 5: Demographic Information: Participants Age

Age	Number of Participants	Percentage of Participants
21-40 years	21	37%
41-60 years	34	59%
Over 60 years	2	4%

Table 6: Demographic Information: Gender Distribution

Gender	Number of Participants	Percentage of participants
Female	21	37%
Male	36	63%

Table 7: Demographic Information: Education Level

Education Level	Number of Participants	Percentage of Participants
Ph.D. Degree	27	47%
Masters Degree	17	30%
Bachelor /Honors Degree	13	23%

Table 8: Demographic Information: Work Experience

Experience	Number of Participants	Percentage of Participants
More than 21 years	17	30%
16-20 years	14	25%
11-15 years	8	14%
6-10 years	12	21%
Less than 5 years	6	11%

Projects covered in the interviews: At the time of the interview, the participants were either working or just finished working on research projects covering a wide range of development areas including public health, education, employment, food security, housing, local governance, national innovation systems, transportation, energy, water and sanitation, and other service delivery related areas.

5.2 PSI Utilization for Social and Economic Development

Most of the existing literature about the utilization of PSI by different communities focuses primarily on the final outcomes of the utilization process, and their potential for commercialization. In this study, rather than focusing primarily on the outcomes of the PSI utilization process, the main emphasis is on the utilization process itself and the wider societal (as opposed to the monetary) benefits and value of the utilized PSI. I particularly investigated the PSI-related factors and conditions that could facilitate or hinder the utilization process, as well as the different PSI attributes that might increase or decrease its usefulness and value in each stage of the knowledge creation process in organizations working on socioeconomic development issues in South Africa. It is important to identify and study these aspects in order to be able to effectively address them and to draw lessons that can be transferred to other communities or situations.

Below I present and discuss the findings of this study in relation to the research questions. For each area, I provide a summary indication of the various responses that the participants offered, as well as a set of selected quotes to indicate the tenor of their responses. To ensure that the participants' identity will remain anonymous, I gave each participant a unique label containing a letter representing his/her organization and a numeric number representing each of them (e.g., A-15).

5.3 Stage One: Seeking PSI Resources

In order to position PSI utilization and value within the knowledge creation process of organizations working on socioeconomic development issues, the study participants were first asked to briefly describe the nature and main objectives of their work. Although the participants

have different academic backgrounds and levels of experience, and their work focuses on different fields in the development area, almost all of them reported that the ultimate goal of their work is to positively contribute to the sustainable development of their society and to improve South African people's lives.

“As a development organization, all what we do ultimately is supposed to contribute to the bigger picture, i.e., the development of South Africa”⁵⁵

“Ultimately, contributing to the DBSA primary goal for sustainable development. More specifically:

- i) To ensure that we invest appropriately
- ii) To ensure that we manage programs for improved outcomes
- iii) To ensure that we provide correct advisory services
- iv) To enhance our ability to inform policy development
- v) To enhance our ability to inform capacity building programs”⁵⁶

“To strengthen monitoring and evaluation systems, because we have good legislation, good policies and it is there, but implementation is a huge problem for us”⁵⁷

Some participants were more specific and emphasized the importance of their work to specific fields or sectors such as education, health, and information and communication technologies (ICTs).

“To help improve the education system in a very changing and transformatory period in South Africa”⁵⁸

“To see the DBSA contributing to a functional health system. To ensure that the Bank makes informed decisions about investing in the health sector – be it health infrastructure, health capacity, health research, health program management, etc.”⁵⁹

“The work I am doing goes beyond the borders of my organization to the policy formulation and development at provincial and national levels. Municipalities and sometimes certain government departments use the information I produce [about the ICT field] to help them formulate their policies”⁶⁰

⁵⁵ Participant A-7

⁵⁶ Participant A-2

⁵⁷ Participant B-26

⁵⁸ Participant B-18

⁵⁹ Participant A-5

⁶⁰ Participant A-13

To achieve these goals, the study participants placed special emphasis on using evidence-based research and results to influence the policy-making process and the relevant stakeholders, and ultimately to bring about change in the socioeconomic development of the country.

“We are in the business of doing evidence-based policy research for policy makers to help them plan well for the future”⁶¹

“... to provide evidence based information to government [agencies] for improving decision-making... and to enhance the whole policy dialogue process based on evidence”⁶²

“Policy change is a main objective for the HSRC’s work-- influencing both policy and politicians”⁶³

Similar to the work of other research communities, the study participants’ daily jobs involve activities such as proposal writing, literature reviews, project conceptualization, research design, developing research questions and hypotheses, data collection and analysis, report writing, results presentation, and other research-related tasks. For this kind of work, participants consume and produce large volumes of information. As will be explained below, PSI is one of the sources of information that was heavily used by the study participants. In the following section, I present examples of the different types of PSI that were used by them.

5.3.1 Types of PSI Resources Sought

In the area of PSI utilization for commercial purposes, there are certain types of PSI resources that are mostly used. As discussed earlier in this dissertation, geographic and meteorological information are clear examples. When it comes to the utilization of PSI resources for knowledge creation and socioeconomic development, however, the study findings show that

⁶¹ Participant B-1

⁶² Participant A-1

⁶³ Participant B-9

almost all types of PSI, from different government levels (e.g., national, provincial and municipal), are being actively sought and utilized. Here are some examples provided by the study participants:

- The general households survey, the community survey, the income and expenditure survey, and the labor force survey.
- Employment and unemployment status data (e.g., demographic information, what sectors are people employed in, income data, work conditions data, etc.)
- Record of Expanded Public Works Project (EPWP) projects in the Northwest province. These records consist of data on each project over a period of three financial years. It records, for example, the name of the project, which department was responsible for which project, how many beneficiaries there were of each project, how many jobs were created because of the project, the total expenditure of the project, and various other fields of information.
- Strategic plans and official policy documents from sector departments: education, health, housing, treasury, water affairs, public works, transport, and energy.
- Acts, speeches, legislations, historical documents, and other official documents from the presidency and government archives.
- Data on urban transport, rural transport, rail, ports, and airways transport from the national department of transport.
- Data on household connectivity of cellphones, fixed lines, computers, Internet, radio, and TV.
- Data on food pricing, nutrition, consumption, land use, and official policy statements and documents on food security.

- Patent data, publications and research at university level, R&D investment levels, and GDP by sector.
- Data on active entities such as close corporations, public companies, private companies, non-profit organizations, and co-operatives. Data on company liquidations, companies dissolved, close corporations liquidations, etc.
- Variety of tax information such as income tax, value added tax and turnover tax.

There are two main observations that can be drawn from this list of the PSI resources used by the participants at the study sites. First, the list indicates that a wide variety of types and levels of PSI are being actively produced by government agencies in South Africa. Second, the list also suggests that, despite some issues related to the availability and quality of PSI resources, as we will see later in this chapter, the PSI is still being actively sought and used by the participants to meet their work objectives and specialized needs.

“In every social research we do, even if we do not cite it [government sources], it is there. Even if we do not cite it, it still structures the way we think”⁶⁴

“The work on governance and service delivery in this project relied a lot on government information”⁶⁵

“Whatever government is doing, you have to take it. It is a base, it is a source that you’ve got to use even if you disagree with certain things in their methodologies, but you’ve got to use it”⁶⁶

Another general observation is that from all the sources of PSI used by the study participants, information resources from Statistics South Africa were the most frequently sought and used across all sectors.

⁶⁴ Participant B-23

⁶⁵ Participant A-20

⁶⁶ Participant B-7

“Practically, Statistics South Africa is your one-stop-shop for such data”⁶⁷

“I would say 90% of the data we needed for this project was from Statistics South Africa”⁶⁸

“Statistics South Africa is often the only information on certain topics related to population”⁶⁹

“For example, Statistics South Africa is a custodian of data of all kinds: socio-economic data, profiles of the population, employment and all that”⁷⁰

According to the study participants, Statistics South Africa provides two levels of data:

(1) Public release of the datasets, which is basically a summarized version of the raw data. This form of data, which is usually available online, “is very good for basic comparative purposes and for the general public, not for someone who is an expert or specialist”⁷¹, and (2) The raw data itself, which is usually not available online, “is very useful for advance research and data analysis purposes by, for example, econometricians and demographers”⁷².

5.3.2 Motivations of Users for Seeking PSI Resources

This section presents and discusses responses to the following research question: *Why did the study participants seek PSI resources?*

Information needs, especially from external resources, arise from the problems, ambiguities, and uncertainties encountered by organizations in specific situations or experiences (Choo, 1995). Repo (1986) argues that in the knowledge-work process (e.g., a research project), information sought from outside resources first must have expected value-in-use to awaken the interest of the user, who ultimately decides whether to seek it or not. In other words, if this

⁶⁷ Participant B-2

⁶⁸ Participant A-18

⁶⁹ Participant A-10

⁷⁰ Participant B-31

⁷¹ Participant B-14

⁷² Participant B-14

subjective evaluation results in a decision to seek a particular source of information, this means that the user recognizes the potential value and usefulness of this information to his/her work, and that there is some sort of expectation that it will satisfy the user's needs.

The study findings revealed that there was a wide range of motivations for the study participants to seek government information. For example, most of the participants reported that before starting any project or activity in the socioeconomic development field, PSI resources are very useful to understand the status quo, the landscape, and the conditions related to the issues they are investigating. This is consistent with Choo's (1995) description of organization members who recognize the volatility of the environment around them and seek information in order to make sense of the situation, and to have the necessary information to make decisions, take actions and solve problems.

“It is almost like an initial understanding of the landscape, if you wish. It was necessary for us to know what does government information tell us about the state of play in the area of food security in South Africa. We wanted to know for example how do people access food, do they go the market or produce their food. We also wanted to study the nutrition aspects of food security”⁷³

“I looked at the poverty, income, and labor data for each district and local municipality in South Africa in order to understand the current situation in these areas”⁷⁴

“I used that information almost like as an orienting exercise to understand the landscape, understand the issues, and understand the whole domain”⁷⁵

Another related motive that was reported by the study participants is that government information is usually instrumental in the design of their research projects, especially in the conceptualization, development of research questions, and sampling stages.

“The main purpose [of using government data] was to conceptualize the study. That is to pitch, you know, to understand the research problem and to pitch the research questions

⁷³ Participant B-14

⁷⁴ Participant A-17

⁷⁵ Participant A-19

at the right things, so that one does not re-invent any wheels, so that you do not aim too far off target. Then, we decided on some of the survey variables based on documents from the government, so they were also helpful to us to design the survey”⁷⁶

“I wanted to get the grips –what do the numbers tell us about service delivery chains over time from 1996-2007? I needed to go myself to check Statistics South Africa census and non-census data in order to be able to design my project, write a proposal and give instructions to my team”⁷⁷

“All in all, the entire project design was informed by the previous findings within the Department of Education, especially regarding aspects of literacy-- the current problems that the department was encountering and also the kinds of strategies that had been put into place to kind of deal with problems”⁷⁸

Moreover, some participants emphasized the usefulness of PSI resources in order to understand the government’s current thinking, vision, and future plans and actions in relation to the issues they are investigating.

“We wanted to understand what is government thinking and doing, how they are analyzing problems, what their beliefs are? How are they understanding what needs to be done in order to resolve a problem or challenge? So basically the information is often used to help us understand how they are thinking about all these issues. Of course we are able to do two things here: we are able to get a sense of how they are constructing or analyzing problems - is that a useful way, is it contradictory, is it just a wish list...that is the first thing. And two, we would say ok, so they got the policy but are they actually doing anything and is what they are doing consistent with what they’ve analyzed previously”⁷⁹

“You need to know what is out there and you need to understand what do people know or think about food security, especially government. That is why you definitely need to use government information”⁸⁰

Finally, some participants reported that they sought and used this information simply because there was no other relevant sources of such information on which they could rely.

“... the Free State provincial government is the only Free State government so it becomes your main source whether you agree with their data or not. I can’t say ok if I can’t use

⁷⁶ Participant B-15

⁷⁷ Interviewee A-18

⁷⁸ Participant B-30

⁷⁹ Participant A-3

⁸⁰ Participant B-17

their data I will use something else. So I had to rely literally on what they were saying. So they basically informed my entire project”⁸¹

“Well, there was no other source of data that could help us with this project. That simple”⁸²

“Speaking from a health and education background, there is absolutely no other information you can use”⁸³

These findings demonstrate what Repo (1986) calls “subjective expected value-in-use”. The author notes that when a knowledge worker is faced with a situation or a problem, he or she will first shape some kind of understanding of the issue and its environment. This understanding is usually influenced by the worker’s background knowledge, beliefs and values, and previous experiences. These same factors also influence what kind of information the worker decides to seek in order to respond to the issue at hand. In such a situation or “information environment” as Taylor (1982) calls it, the criteria for determining the value of information arises out of the process of seeking it (Repo, 1986).

This is consistent with Taylor’s (1982) argument that information has a value only in context and that it is given value by a user who sees its “usefulness” because he sits in a particular environment and can relate the information to the tasks and problems of that environment. In this context, usefulness means that a person has chosen a particular type or source of information in order to “(a) make some immediate use of it, or (b) to store it in some way because he sees potential utility in the future” (Taylor, 1982, p.343). This view is consistent with Repo’s (1986) description of the subjective expected value-in-use of information, the valuation that takes place when a user decided whether to seek and use certain information or not to make decisions or solve problems.

⁸¹ Participant B-9

⁸² Participant B-13

⁸³ Participant A-16

5.3.3 Factors Affecting the Discovery and Acquisition of PSI Resources

Before getting to the specific PSI-related factors that affected the discovery and acquisition of PSI resources, the study participants were asked about their general observations and views regarding the availability of government sources of information in South Africa. In answering this question, the participants raised several important issues that can be summarized as follows.

First, the participants indicated that there are some types or levels of PSI that are simply not available either online or in paper format, that there are PSI resources that are only available in paper format, and that there are some types of PSI that might be available, but inaccessible.

Participant (A-10) best described these issues:

I think that there are data that people do not collect and capture, data that exist and only a few people know about, and data that exist but people are not willing or comfortable to share it with you.

Another important observation reported by the participants was related to the types of PSI resources that are available online vs. offline, and the ways in which they seek the offline PSI resources. Basically, policy documents and reports are generally available online and it is relatively easy to get them. However, raw data, specific figures, trends, and similar statistical information is rarely available online and trying to get them usually involves personal contacts and going through bureaucratic procedures, as will be detailed later.

“The top stuff, the policies, the acts, the laws, the discussions in parliament, and the budget are incredibly good online. It is when you want to get to the actual statistics of usage, conditions, trends, that you have to start going down to individual people”⁸⁴

“Policy documents are always online and it is not a problem to get it. However, when it gets to figures, the hassle starts. For example, if you want to get statistics on service delivery, then you have to go personally and get it”⁸⁵

⁸⁴ Participant A-20

⁸⁵ Participant B-3

“I normally visit the Department of Transport website and only policy and strategy documents are available online. If you need statistics or figures, you have to request from them and sometime go personally to get it”⁸⁶

The last general observation about the availability of PSI resources was related to the availability of such resources at the national vs. provincial and municipal levels. The participants described this situation as follows: the lower the level of information sought (i.e., from provinces and municipalities) the harder it is to discover and get this information.

“We do have good information about the national innovation systems but there was not information about what was going on at a sub-national level”⁸⁷

“If you go to provincial level, things are different. For example, if you go to the Eastern Cape province, there is absolutely zero information about expenditure and about where is the money going”⁸⁸

“Service delivery happens at a municipal level and this is where the data is required. We do have data but most of the time it is at a national level and does not help you much”⁸⁹

“Statistics South Africa usually provides the aggregate data that gives a picture about how the economy will look like in the near future, but this does not help much when you are working at a municipality level”⁹⁰

The rest of this section discusses responses to the following research question: *What are the PSI-related factors that affected its discovery and acquisition?*

5.3.3.1 Discovery of PSI Resources: Hindering Factors

The study participants identified several factors that hindered their efforts to identify and locate the PSI resources they needed for their work. These include:

⁸⁶ Participant A-11

⁸⁷ Participant B-22

⁸⁸ Participant A-9

⁸⁹ Participant A-20

⁹⁰ Participant B-4

a) Online vs. Offline Availability of the PSI Resources

As discussed above, whether the PSI resources were available online or not was an important factor in facilitating or hindering this process.

“The online available information is generally easily located, however, there are some more detailed data which I would like to include in the report, which is not really available and to date I haven’t been able to source that information”⁹¹

“So what is available [online] can be found. The big question is what is not available and what can we do about it?”⁹²

It is important to note that some participants believed that the unavailability of certain types of PSI was simply due to the lack of human or other technical resources necessary to make sure that this information is made available and accessible.

“They have the information, I know that, perhaps it is just a matter of having someone to focus on it and do the work”⁹³

“We have not, I think, invested as much as we should have in building information management capacity in the government. Sometimes even when people have the information, they do not know how to use it strategically, you know, to share it or [figure out] what to do with it”⁹⁴

Other participants, however, highlighted the issue of intentionally hiding the data so it cannot be found or accessed. For example, one of the participants (A-12) was very frustrated with the intentional hiding of the data he needed. He indicated that in his case, he believed that there were some political reasons to hide PSI resources.

“The statistics on schools that have or do not have water and sanitation and other facilities are not readily available because they are not particularly proud to tell you that those people don’t have these services and facilities”.

⁹¹ Participant A-11

⁹² Participant A-4

⁹³ Participant A-8

⁹⁴ Participant B-15

In another case, a researcher (B-5) knew from her personal contacts that the information existed, but she could not find it anywhere. In this case, she did not know exactly what was the reason to hide the information, but she was sure the information was sitting somewhere. She said:

“I knew this information existed and I so much hunted that information but it was nowhere to be found. I believe this information sits somewhere but, for some reason, nobody wants to take responsibility and accountability over that information. That is the reason why it is hidden somewhere, I think”.

b) Usability of Government Websites

According to International Organization for Standards (ISO), usability of a website is the extent to which specific users can achieve their specific goals with effectiveness, efficiency, and satisfaction in a specific context of use (ISO, 1998). For Cappel and Huang (2007), web usability generally means that websites are clear, simple, consistent, and easy for users to use. Easily accessed and used government websites are very important to increase the effectiveness of communication between users and the agencies. The study findings revealed that the lack of user-friendly websites of the South African government agencies was a hindering factor to find and access the required PSI.

“Some of the government websites are badly designed that even if they have online stuff, it is difficult to locate it and download it”⁹⁵

“⁹⁶To find and access these documents, you often need to navigate through a website that is not neatly organized, so your food security information will be tucked away in a place where other people can’t find it”

“The Department of Water Affairs has some data online, but if you do not know how to use the online system, in most cases you will miss it out. You will need someone to tell you where to click and where to find information”⁹⁷

⁹⁵ Participant A-16

⁹⁶ Participant B-15

⁹⁷ Participant A-12

It is important to note that these findings are not unique to South Africa as a developing country. In a comprehensive study of 1,667 government websites in 198 nations using 18 measures that mainly focus on usability, Africa ranked at the bottom of the list, with African countries receiving an average score of 26% (West, 2008). Furthermore, an evaluation of 17 websites of the government of Nepal by Parajuli (2007) showed that it was not so easy to navigate or search information on the government websites because only 35% of websites provided a site map and 29% provided a search engine. In a more recent study, Assimwe and Lim (2010) studied the usability of government websites in Uganda. The authors found that all websites studied “have clear and unique addresses but 6 out of 14 features were missing. These missing features are: zoom options, page content sharing tools, audio content, sitemap, privacy policies, and terms and conditions of use” (p.8). To sum up, although there are international guidelines on webpage development provided by organizations such as World Wide Web Consortium (W3C, 2009) to help website administrators develop usable websites, these guidelines are not often followed (See Gwardak & Pålshorp, 2007).

5.3.3.2 Discovery of PSI Resources: Facilitating Factors

In addition to the different hindering factors reported by the study participants, the study findings also reported a number of factors that acted as facilitators in the process of identifying and locating the necessary PSI resources. As discussed earlier, a major factor in this process was whether the PSI resources were available online or not. While the study participants generally complained that some types and levels of PSI (e.g., statistics, raw data, provincial-level data) are usually unavailable online, they also acknowledged that some other PSI resources are usually available on the web (e.g., legislation and policy documents, reports, speeches, etc), and as a

result it can be easily located and accessed. In this regard, the study participants emphasized the importance of some government websites that act as a portal for different government information resources. For example, participant (B-34) pointed to the Expanded Public Works Program website (www.epwp.gov.za) as a good source of PSI in the public works area:

“This is a national coordinating body with a lot of documentations there, so it is readily available. It has background documents, giving the objectives and how programs are implemented and managed. All the government bodies send reports to this national body and they post the reports on the Internet”

Another government source that was mentioned by the participants is the South African Data Archive (<http://sada.nrf.ac.za/>)⁹⁸:

“The South African Data Archive has some lists of datasets from Statistics South Africa and other sources. You can request to make certain data available online and they would put it on their website, then you can download it in different formats. For example, I would send an email or fill an online form on their website and I would say I would like to have the general household survey of 2007 and then I indicate what format I want the data and I submit the form. Then I receive an email from them within the next hour saying: go to this site within the next 24 hours and this is your code and password and you can download this information”⁹⁹

The participants also mentioned some non-governmental online sources. For example, the South Africa Polity website (<http://www.polity.org.za/>) is a privately owned website operated by Creamer Media. The website makes information about policy, law, economics and politics available in an attempt to deepen democracy through access to information.

“South Africa Polity is a website for information. I find it incredibly good on legislations and policies. It breaks down, though, when it comes to actual detailed information”¹⁰⁰

⁹⁸ The South African Data Archive (SADA) serves as a broker between a range of data providers (e.g. statistical agencies, government departments, opinion and market research companies and academic institutions) and the research community. The archive does not only preserve data for future use, but also adds value to the collections. It safeguards datasets and related documentation and attempts to make it as easily accessible as possible for research and educational purposes.

⁹⁹ Participant A-17

¹⁰⁰ Participant A-2

An important observation regarding the online availability of government information resources in South Africa was made by a prominent researcher with more than 20 years of experience in the food security area. This researcher acknowledged that a lot still needs to be done in this domain but she also recognized that there have been significant strides made in the country lately, where she finds that some of the information is generally put on the web.

a) Partnership with Government Agencies

Project collaboration with a government agency was another important factor that the study participants believed to be facilitating the process of identifying and locating the needed PSI resources. In such cases, given that the project was commissioned by government agencies, the government partners made the required PSI resources readily available to the participants.

“We originally had a planning meeting with the provincial government. We had agreed in advance, and it was placed in the contract, that the provincial government must make information available to us”¹⁰¹

“They are our clients and we are doing the work for them, so they gave us the data. The project was commissioned by the Department of Labor, so they tried to provide us with the required data”¹⁰²

“As I said earlier, this is a joint project. Because of this, we had contact persons within the Department of Education. So anytime we needed information we could contact those people and get the information”¹⁰³

b) Prior Knowledge and Experience

It has been argued that prior related knowledge could positively impact organizations and individuals' ability to recognize the value of external information, assimilate, and exploit this information for commercial purposes (Cohen & Levinthal, 1990). The authors describe this prior knowledge as various related knowledge domains, basic skills and problem solving methods,

¹⁰¹ Participant B-11

¹⁰² Participant B-31

¹⁰³ Participant B-18

prior experience, and shared knowledge. In other words, an individual is better able to locate, acquire, and use external information from areas in which he or she has some prior experience or related knowledge. The study findings confirm this pattern and show that, indeed, participants' previous work experiences and knowledge played a major factor in facilitating the process of identifying and locating the PSI resources they needed for their work. The participants emphasized the fact that if a person works in a particular sector for a number of years and interacts with government organizations, then this person would have a good idea of who does what and where to find information.

“I have worked in this field for more than 20 years now. I know all the Ins and Outs about demography”¹⁰⁴

“I think that identifying and locating the data was not difficult because I was involved in the Department of Education and I know of all their systems. Also, I usually attend the Education Management Information Systems (EMIS) meetings, where all stakeholders meet with the Department of Education on a regular basis”¹⁰⁵

In some cases, the participants reported that they actually worked for the government in the past and, as a result, they could either locate the required information themselves or they could use some contacts from their previous government workplace to help them with this task.

“I actually used to work for this Department before moving to this job and that is why I knew they were the custodians of this information”¹⁰⁶

“It is been easy because I have worked on this program when I was working for the government, so I know all the people and I know what's available and where to get it”¹⁰⁷

“For me, because I was previously working with CSIR [Council for Scientific and Industrial Research] and was seconded to work at DWAF [Department of Water Affairs] for two years as a consultant, I sort of know the inside of DWAF and I know people that are working with data, even though people change all the time”¹⁰⁸

¹⁰⁴ Participant A-10

¹⁰⁵ Participant B-36

¹⁰⁶ Participant B-23

¹⁰⁷ Participant A-19

¹⁰⁸ Participant A-12

In other cases, the study participants reported that it was not their own prior knowledge or experience that helped them to identify and locate the government information they were seeking; it was actually the prior knowledge and experience of a colleague at the same unit or organization.

“My team was very helpful. For instance, the data from the DPSA [Department for Public Services and Administration] were forwarded to me by another team member. He was very good with that, with identifying and sharing information, and I think it is because his discipline is public administration and that he has done lots of work with the public and government sector”¹⁰⁹

“My boss has been here for so many years, I think more than 10 years or so. And he has worked with the government for all these years. So, I mean, he was able to identify where was the information and help me get it”¹¹⁰

5.3.3.3 Acquisition of PSI Resources: Hindering Factors

The study participants reported a wide range of factors that hindered the acquisition of the required government information. The main theme that was emerging in this regard is that there is a lack of appreciation of the value of such information. There was a general agreement among the study participants that, in most cases, government officials do not recognize or appreciate the value and importance of the information that they have and as a result do not make enough effort to make it easily accessible.

“There is a culture of not appreciating the value of information because they [government officials] do not understand it... they did not understand the value of this information to our project”¹¹¹

“I do not think they really fully understand the value of what they have. I think that the way they are using information is quite ad hoc”¹¹²

“... there is not a culture of information, there is not a culture of valuing it, in terms of why we need information”¹¹³

¹⁰⁹ Participant B-13

¹¹⁰ Participant B-24

¹¹¹ Participant B-7

¹¹² Participant A-4

In a way, as indicated by the participants, this is part of a bigger culture of “obeying the rules”: government officials collect this information only to meet the administrative and legal requirements.

“They are in a culture where your job as a public servant is to come to work everyday and obey the rules. That is the most important thing. It is not about measuring what you produce or the cost of what you are producing, it is about whether or not you obeyed the rules. And this is how they understand their jobs...so there was a very strong sign to me that there is a very low level on the government side of awareness that this data is of value not just for legal and record-keeping purposes”¹¹⁴

“For them, they did not think of the value of this data. It was just a matter of meeting a requirement to feed up from the clinic to the district to the province and then to the national level”¹¹⁵

The study participants wished that government officials understood the role and impact of information on their work and how it could add value to products and services as well as improve quality of decision-making and reduce risks.

“The sad thing is that a lot of new budget controllers and decision makers do not necessarily have the same views on the importance of data. They do not regard it as important as they should”¹¹⁶

a) Fear of Criticism and Exposure

Government officials’ fear of criticism and exposure was another important factor that made it difficult to acquire the required PSI resources. Participants indicated that one of the main reasons for such fear is usually related to the fact that those officials did not do their jobs properly.

“Some [officials] gave us the information but not willingly because... they thought it was not up to date and they did not want to be caught”¹¹⁷

¹¹³ Participant A-7

¹¹⁴ Participant A-4

¹¹⁵ Participant B-7

¹¹⁶ Participant A-7

¹¹⁷ Participant B-12

“Why they did not share the data? They did not want to confess that only 60% of the municipalities are forwarding their information”¹¹⁸

“You see, bureaucrats want to control the information because if you come up with something peculiar and show it to them, they will say this is not good and they become defensive. Yeah, they develop some defensiveness about it ... because the data is not good”¹¹⁹

“Some public servants are a bit afraid because we are still, as with any public service, a very compliance-driven public service, and everyone is scared of the auditor general and everyone is scared of getting into trouble, so people are cautious”¹²⁰

“If a report makes it to the newspaper saying that this percentage of roads in a certain province or municipal area are not in good shape or do not meet the standards, this is a big danger for them”¹²¹

Because of these information-related problems, public servants are afraid that their work will be analyzed and exposed. This is especially true, as indicated by the study participants, when researchers or media professionals request such information.

“I would say that the difficulty in getting government information is the fact that immediately when you look for information for purposes of research, people always view you as a person who wants to critique what they are doing. So people in the government are very, very fearful of people coming from the outside looking for information”¹²²

“One of the issues is that people who have the information were concerned about the picture we will paint ultimately. They were scared”¹²³

“They [are] always suspicious and if they think that there is something that is going to make them look bad, then they hide it. They would say, oh no I’ve left it at home, oh, this and that”¹²⁴

“Those guys sit with the studies, but they are so afraid that something will jump out of them and that they can be named and shamed as persons”¹²⁵

¹¹⁸ Participant B-4

¹¹⁹ Participant A-6

¹²⁰ Participant B-32

¹²¹ Participant A-3

¹²² Participant B-15

¹²³ Participant B-8

¹²⁴ Participant A-8

¹²⁵ Participant A-5

“Government bureaucrats are not so easy, I do not want to say difficult, but they are not easy people to work with because they do not want to reveal anything that would embarrass the politicians. Because they think that embarrassment might be traced back to them which might cost them their jobs”¹²⁶

“And they sit with excellent reports with good details, but they refuse to make it available, even if we tell them we will sign whatever agreement or whatever, and that we will only use it for internal planning purposes, we won’t publish it, we won’t write to a newspaper. They are too afraid. They are afraid that it is going to expose them, that they are not doing a good job. They are very sensitive for these sorts of things”¹²⁷

The study participants reported that it usually takes a while to convince public servants that the requested information is going to be used for research purposes only and it is not going to expose anything about the way they do their work because they will remain anonymous. After going through this process, some public servants would agree to share such information.

“... before you get any data, you have to assure them of what are you going to use it for, and if you’ve reached this stage, I think, they will be able to give you data but if they are not sure what are going to use the data for, then they will not release the data”¹²⁸

b) Sensitivity of the Information Requested

Sensitivity of certain types of information is another hindering factor reported by the study participants. For example, participants who were looking for infrastructure data found it relatively easier than those who were asking about, for example, disease information.

“Well, like I said, HIV/AIDS is a very sensitive thing, because of the stigma, because of the issue of patient information confidentiality, which was a bit of a problem”¹²⁹

“If you start bringing in disease-specific or, you know, health specific information, the capacity constraints become clear, the cultural constraints become clear, and use of information for strategic planning is then affected”¹³⁰

¹²⁶ Participant B-35

¹²⁷ Participant A-3

¹²⁸ Participant B-23

¹²⁹ Participant B-7

¹³⁰ Participant B-6

c) Bureaucratic Procedures and Practices

The study participants reported several bureaucratic procedures and practices that acted as hindering factors in the process of acquiring PSI. For example, almost all participants complained about the hierarchical structure of government agencies and the emphasis on written memos or permissions from high-level officials to obtain information.

“It is very hierarchical. They can’t release information unless they have been told by their immediate boss to do that. Even if you say, well, we have had meetings, they still want absolute assurance that you have authorization. They won’t release it so that ... if something bad happens they are not responsible for it. So they want the assurance that they are being asked to do this to comply with instruction. It’s not them, they are not issuing it to you... so that should there be any fall out, it will not be their problem”¹³¹

“Institutional bureaucracy is a big issue in public institutions. It is usually about: did this person give you approval? Someone will tell you that this is the information that you are looking for, but I can’t give it to you until this person approves”¹³²

“Without anything written down from a senior official, for example, you will never get such information... the entire operation of government depends on memos”¹³³

Another bureaucratic nightmare was related to roles and responsibilities of public servants. When one requests information from public agencies in South Africa, it is very common that the employee will refer you to another, who will refer you back or to another servant. In some cases this leads to endless circle of references without getting the information.

“... some people do not know their roles and responsibilities in their positions, because when you contact them, they will send you to another person and when you call this person, they will refer you back and say no it is not me, it is the person that you were talking to is supposed to help you. So it takes a lot of time and becomes difficult for you to get what you want”¹³⁴

“There is a lot of bureaucracy involved in accessing this information. And also there is lots of politics involved in getting this information. And I sometimes got a sense that people are unsure about their rules in these government departments. I do not know if you

¹³¹ Participant A-2

¹³² Participant B-3

¹³³ Participant A-9

¹³⁴ Participant A-13

can classify it as inefficiency, because if people occupy positions which, you know, they are not well skilled to deal with, the tendency is that they will be scared because they don't know what kind of interaction they should institute with different people"¹³⁵

"It was very much problematic because if you work on projects like this, there are timelines that you have to adhere to. So if they send you from this corner to that corner, it compromises the quality of your work and it also has some impact on your timelines"¹³⁶

d) Technical Factors

The study participants also reported several technical factors that hindered their efforts to acquire PSI. These include:

1) Paper-based information

"Another factor was that information is not computerised and it is kept in piles of papers and some of this are not arranged in any order, so you have to go through a lot of piles before you get to a file...the main reasons for that [situation] is the lack of adequate human resources. They do not have people to deal with filing. So what happened is that we hired a research assistant and he is meticulous, he is very good with details, which is very important for this project. This guy physically went there and he took a laptop, in which we have set up the columns and fields of the data we wanted him to capture and he went and did that manually"¹³⁷

"I had some of my team members saying, we were just shown a pile of files and they say there is the information. So it was not easy. We had to go through a process of trying to extract some of the information"¹³⁸

As mentioned above, for some of the study participants, the reason for such a situation could be the lack of adequate human (or technical) resources. Other participants, however, thought that there was a statement being made. Here is what participant (B-6) noted:

"But I think that the other thing that we must understand is that there is a statement being made there [about giving information in paper format]. They are saying, look if we give this man this kind of information [in electronic format] then he is going to catch us, but if you give it to him in paper format, he may be lazy [and will not go and do the analysis himself]"

¹³⁵ Participant B-25

¹³⁶ Participant A-9

¹³⁷ Participant B-23

¹³⁸ Participant B-7

2) Format of the Electronic Files

If the PSI was already available electronically, another important issue that was reported by the study participants was related to the different formats of these files and the resulting compatibility issues.

“Sometimes they give it in SPSS format and not all researchers have SPSS”¹³⁹

“Well, most of the data that we will get from the government department is in PDF format. And when you get back to the office, you have to start retyping the data into excel format”¹⁴⁰

5.3.3.4 Acquisition of PSI: Facilitating Factors and Strategies

Luckily, the story of PSI acquisition is not all about the hindering factors. The study participants also reported some factors and strategies that helped facilitating this process. As explained in the previous section, both partnerships with government agencies and the availability of some PSI resources online were both reported as facilitating factors in the process to identify and locate the required PSI. They were also reported as facilitating factors in accessing and acquiring these resources. A number of participants emphasized the issue of partnerships with government and noted that this kind of arrangement is sometimes the best way to guarantee accessing and acquiring not only government reports and aggregate analyses, but also the raw data. In addition to these factors, the participants reported a number of strategies to overcome obstacles discussed in the previous section and facilitate the process of acquiring what they needed from government information. This senior researcher (A-10) best summarized those strategies as follows:

This is the 20th big project that I am working on, and you start foreseeing the actions that you can take that will avoid obstacles later. So networking and relationships, regular

¹³⁹ Participant B-19

¹⁴⁰ Participant A-15

contact, good will, common understanding through good communication, and those kinds of things definitely help

Another prominent researcher (B-14) reaffirmed this sentiment and emphasized trust as an additional important factor. She noted:

For the data that are not publicly available and for the detailed databases, networks and trust are extremely important to get such data.

a) Creating and Strengthening Personal Networks

This was one of the most interesting findings the study revealed, though it was not completely surprising. Most of the study participants emphasized that creating and strengthening personal networks was a crucial factor to access and acquire the needed PSI resources. In fact, this strategy was reported by every single interviewee and kept coming up throughout most of the interviews. Participants were very direct and honest in addressing this phenomenon.

Participant (A-18) said:

The availability of information almost depends on who you know. It is not what you know, it is who you know. People who worked on this project certainly used their networks.

Another participant (B-35) commented:

Well, the information I wanted was not available online, but because I worked for them [government] before, it was not difficult to get the information. I just called the person I knew there and she gave me all the information.

One of the participants (A-10) was very proud of his networks and his ability to reach out to any government agency. He didn't hesitate to share this feeling:

I was for years on the Demographic Society of South Africa and now on the Population Association of South Africa, and all these things help. I've got an elephant network [Laughter.] Generally, it is not difficult for me to get hold of such information because I have contacts in various departments and government agencies.

Similarly, previous work experiences with government agencies was emphasized by the study participants as an important factor in creating such networks and eventually getting the required information. Participant (B-17) explained:

I have worked quite a lot with people at the Department of Agriculture before I came here, and through those people I manage to get my information

Another way to create such networks was reported by another participant (A-19). She commented:

I have a good contact at the Department of Housing who helps me get the figures that I need. I was able to establish this contact by going personally to the department for a number of times. She would sometimes call me and say, we have got this new document that you may be interested in.

Furthermore, the study participants frequently emphasized the issue of trust as a way to create and strengthen such personal networks. Some examples include:

“I make presentations to the Department of Education; I keep them up to date on a regular basis. They know what is going on. Total trust is a big factor”¹⁴¹

“... sometimes I volunteer to sit in some of their committee in order to establish trust and be able to have access to the data I need. This involves me providing feedback and input on their work and then I can get the data”¹⁴²

“I always attempt to interact with the person who actually compiles the information and build up a relationship with them, not necessarily on the first visit but to explain to them what we intend to do. One of the crucial aspects is to get the trust and interpersonal relationships with the person who deals with that data. It is so interesting that immediately after you’ve build that rapport with a person you are talking to, that you find a very brilliant person working on issues which he or she is very competent and confident with, but before [that rapport] she couldn’t tell you anything”¹⁴³

An interesting observation related to this phenomenon is that in some cases, it actually affected the construction of project teams as well as the hiring of external consultants to work on

¹⁴¹ Participant B-18

¹⁴² Participant A-10

¹⁴³ Participant A-5

these projects. For example, a number of participants reported that information was acquired through the contacts of another team member. One of them (A-10) noted:

My colleague tried to get this information for more than three weeks but he couldn't and I finally sent it to him after I got it through my contacts.

Another participant (B-35) explained:

In this particular project, our consultant was well linked and knew where to go. He had worked for the Department of Education before and is now based at Wits University. So we appointed him partially because he had these networks himself.

b) Get Buy-in from the Government: Involve Them

The participants reported another strategy to make their quest for such information easier: they tried to get buy-in from different government stakeholders by involving them in the different stages of the project, especially the planning stage. This is how one of the participants (B-37) explained the involvement process:

For example, when we were developing the instruments for this project, we had a workshop and we had them [government officials] involved. We explained to them that when this project is done, it is being done in a manner to capacitate the department to take over this project. What we were going to develop are the models, the systems, and the structures, and when it is over we will hand it over and they'll continue with it. So basically they felt as a partner in this [project] from day one and as result, they felt comfortable giving us what we needed.

Other participants followed similar approaches. In fact, the issue of early involvement of government officials in these projects frequently came up in a number of the interviews:

“We had what we call information meetings with the district officials. When we briefed them about the study, we get permission to do the study and they would advise on how and where to collect which kind of data”¹⁴⁴

“We formed a reference group with the different stakeholders, including government, and before key stages start and key decisions are taken, we deliberately consulted with them... at those stages they provided lots of input”¹⁴⁵

¹⁴⁴ Participant B-36

5.3.4 Summary of Stage One: Seeking PSI Resources

The findings above indicate that a wide variety of PSI resources are being actively produced by government agencies in South Africa, and that these resources are being actively sought and used by the study participants to meet their work objectives and specialized needs. The study participants explained that they seek government information for different reasons, including:

- To understand the status quo, the landscape, and the conditions related to the issues they are investigating.
- To inform the design of their research projects and activities, especially in the conceptualization, development of research questions, and sampling stages.
- To understand the government's current thinking, vision, future plans and actions in relation to the issues they are working on.

In terms of PSI discovery, the participants identified two factors that hindered their efforts to identify and locate the needed PSI resources: (a) PSI resources are not available online, either due to lack of resources or as a result of the intentional hiding of the data, and (b) the absence of user-friendly websites of the South African government agencies. The participants also identified some factors that facilitated the process of identifying and locating the necessary PSI resources. These include: (a) project collaboration with government agencies, and (b) participants' prior knowledge and experience.

As for PSI resources acquisition, the participants identified a wide range of factors that either hindered or facilitated the process of acquiring PSI resources. These factors can be summarized as follows:

¹⁴⁵ Participant B-21

Hindering Factors:

- There was a general agreement among the study participants that in most cases government officials do not recognize or appreciate the value and importance of the information they possess, and as a result do not make enough effort to make it easily accessible.
- Government officials' fear of criticism and exposure.
- Sensitivity of certain types of information.
- Bureaucratic procedures and practices such as hierarchical structure of government agencies and the emphasis on written memos or permissions, and the lack of clarity concerning public servants' roles and responsibilities.
- Technical factors, including information availability only in paper format as well as issues related to the format of the electronic PSI files.

Facilitating Factors and Strategies:

- The participants emphasized the importance of partnerships with specific government agencies, and noted that this kind of arrangement is sometimes the best way to guarantee access to not only government reports and aggregate analyses, but also the raw data.
- The participants reported two strategies to help in the process of acquiring the PSI resources they needed for their work: (1) creating and strengthening personal networks, and (2) involving agencies in the project as early as possible to get their "buy-in".

5.4 Stage Two: PSI Utilization in the Knowledge Creation Process

As we have seen in the previous section, discovering and acquiring the PSI resources that the study participants needed for their work was a challenging task, to say the least. The process involved a wide range of obstacles, but also some factors and strategies to overcome these obstacles as much as possible. At the end, the study participants were able to get some PSI resources to utilize them in their work. In this section, I discuss the participants' evaluation of the overall quality of the acquired PSI resources and their impact on the knowledge production process, as well as the ways in which the utilized PSI contributed to the knowledge creation process at the study sites. First, I present and discuss the participants' responses to the following research question: *How do the study participants evaluate the overall quality of the acquired PSI?*

5.4.1 Quality of the Acquired PSI Resources

As discussed in chapter three, although quality information is usually equated with accurate information, such information should also be timely, reliable, believable, objective, and complete, and include attributes such as ease of use, interoperability, and other attributes that contribute to producing high quality information products and services. In responding to this research question, a wide range of PSI quality dimensions were frequently brought up. While the acquired PSI resources generally met the participants' expectations in terms of its relevance to their work, defined as the extent to which the information is applicable and helpful for the task at hand (Kahn et al., 2002), these resources fell short in many other dimensions of quality. Below I explain the issues and concerns voiced by the participants in more detail.

5.4.1.1 Completeness of the Acquired PSI

Completeness of information refers to the extent to which the information is not missing and is of sufficient breadth and depth for the task at hand (Kahn et al., 2002). This was a major area of concern to the participants. Their main argument, as noted below, is that there are very important or necessary information that is not being collected.

“It was good, yes, definitely, though it does not mean that we found everything that we were looking for in those documents. I mean there are a lot of people who would like additional information, for example, like the racial composition of kids in schools. I mean we would love to know how many kids go on to get jobs, you know, who go through a particular kind of course, we would love to know if teachers teach better after being through departmental workshops. So yeah, obviously there are all sorts of gaps”¹⁴⁶

“The Department of Higher Education has some data about scientific publications at the university level and they might provide the titles, but they wouldn’t have publications by field or sector, so we had to get this information ourselves from universities, and this was a nightmare, because not all universities have records of their publications”¹⁴⁷

“There was some health data that I really wished existed, especially national studies with exact figures about some epidemics. I think more needs to be done for us to know the assets that we have”¹⁴⁸

The second part of the participants’ argument regarding the completeness of the acquired PSI resources is that even if the information is being collected, in some cases it is not collected on a regular basis.

“I can’t tell you accurately how many people use commuter rails vs. how many people use buses, for example, because this information is not collected on a regular basis”¹⁴⁹

“A current challenge within any documentation around health infrastructure planning is always affected by the fact that we have not as a country been as regular about conducting audits of health facilities. And if you don’t know, you can’t gauge whether you’ve progressed as far as you could”¹⁵⁰

“Normally [HIV] patients migrate or move from one place to another and then because of

¹⁴⁶ Participant B-36

¹⁴⁷ Participant B-24

¹⁴⁸ Participant A-5

¹⁴⁹ Participant A-3

¹⁵⁰ Participant B-5

this the files remain with the clinic. When they move to the next clinic, they do not take their files with them and they open a new file. This [new] file will only have information starting then going forward but the history will not be there. That is why also it's important to consolidate patient information in computers so that when a patient moves from one clinic to another one you can just punch in the number and the information is there"¹⁵¹

"...and if they are collecting it [government information] systematically, I do not know if they are archiving it systematically"¹⁵²

One way to deal with this situation was relying on outside resources, such as the UN or the World Bank data and other organizations, to fill this information gap.

"For example, in the field of ICTs, the data we wanted was not available, and again you have to rely on sources far away such as the UN or the World Bank to let you know what is happening in your country, when your department is not doing that"¹⁵³

"We needed to know about the number of doctors, medical staff who left the country, brain drain, etc. That was very difficult to find. And that obviously was very important to evaluate the health service delivery in South Africa. It was surprising that the WHO had more stuff about our own health system than the Department of Health"¹⁵⁴

5.4.1.2 Timeliness of the Acquired PSI

Issues related to the currency of PSI resources were another concern to the participants. Currency or timeliness of information refers the extent to which this information is sufficiently up-to-date for the task at hand (Kahn et al., 2002). This includes publication, creation, and revision dates. Here are some examples of the concerns the participants voiced in this regard:

"That is where the problem is because most of the time you get information that is a year or a year and a half old. You do not get up-to-date information, you know"¹⁵⁵

"One specific example that comes to mind with the Abstract of Agriculture Statistics is that they rely on rather old data for basic things like how much urban land is there in the different provinces vs. rural land. The data that is on the most recent document come

¹⁵¹ Participant B-8

¹⁵² Participant A-11

¹⁵³ Participant A-13

¹⁵⁴ Participant A-5

¹⁵⁵ Participant B-2

from 1991 and you wonder why they publish such old and dubious information”¹⁵⁶

“For research organizations, it is not up to date, because we need timely information. There is always a time delay and we are aware of that”¹⁵⁷

“It is no use having the 2005 report in 2009 because there is a lot that has happened in this area”¹⁵⁸

“Well, for the service delivery information at the municipal level, we only had year 2001 data, which is really outdated in terms of where we are now”¹⁵⁹

“For example, most of the Municipalities Integrated Development Plans are outdated, so you have to call someone on that municipality and say, is this the latest one or not?”¹⁶⁰

“You know, I was looking at the Department of Communication the other day and found a report from 2004. The World Bank report that I found from 2007 is better than the 2004 report from our department”¹⁶¹

“The health data for example lags behind 2 years, so we now use 2007 data”¹⁶²

“I can tell you without reservations: Education data is a bit outdated”¹⁶³

5.4.1.3 Consistent Representation of the Acquired PSI

This area refers to the extent to which the information is presented compactly and in the same format (Kahn et al., 2002). For example, some participants reported the issue of inconsistency between two different government agencies because of the lack of interdepartmental co-ordination. Participant (A-13) commented:

Disparity between different sources of information is the main thing that I sometimes struggle with. You get two different sets of data from two different sources about the same issue.

¹⁵⁶ Participant B-16

¹⁵⁷ Participant B-30

¹⁵⁸ Participant A-6

¹⁵⁹ Participant B-1

¹⁶⁰ Participant A-14

¹⁶¹ Participant A-13

¹⁶² Participant A-16

¹⁶³ Participant B-20

Another participant (B-4) noted:

You know, I think that sector departments sometimes pick and choose what they include in their annual reports, in their data. There was one example where I didn't know whether the figure was based on total number of population or was it based just on one municipality. So, because sector departments choose what to include, and it is not consistent from one sector department to another, then, you know, the element of comparison, you lose out on that.

Still another participant (A-12) voiced a similar concern.

This consistency issue is mainly between national and provincial departments or between what Statistics South Africa publishes as compared to sector department's numbers. For example, if you take the data from Statics South Africa census and the community survey and compare it with data from DOAF, you will find two different statistics because obviously DOAF wants to blow their numbers.

In other cases, the participants reported inconsistency even within the same agency. Here are three examples that were provided:

"I used annual reports, internal reports, and other documents from the same department, because they are supposed to say: for us to achieve this target, this is how much we need to achieve it, but the problem is that there is no consistency [in the different documents] ... and that is a challenge if you want to check change overtime for monitoring and evaluation purposes, that is the main challenge"¹⁶⁴

"In the housing sector, for instance, the figures jump up and down radically over the years, which is not likely. So we are always careful when we deal with such data—everyone is skeptical about the housing figures. Once you have exaggerated once, you can't go back, you have to exaggerate again. For example, if you say that you have subsidized building a million houses and then some new data suggest it was 800,000 houses, you can't just go back [and change the numbers]"¹⁶⁵

"They [Statistics South Africa] sometimes omit some categories from their surveys. For example, when they dropped the age item from the labor force survey, they did not provide any explanations. They just said, we are not giving you the exact age data; we will give you age groups instead. In another case, they have taken some questions out of the survey and no one knew why. To remove 5 or 6 questions from a survey is a big decision and one is wondering why did they do that. And at the moment there are no answers to why they've removed these questions. I mean, these are questions related to small scale farming in the country and they took them out, too. And that really made my colleagues and myself very nervous: How can we get such information?"¹⁶⁶

¹⁶⁴ Participant B-3

¹⁶⁵ Participant A-6

¹⁶⁶ Participant B-16

5.4.1.4 Interoperability of the Acquired PSI

The issue of inconsistency explained above was in many ways linked to the interoperability of PSI quality. This dimension refers to the extent to which the information is in the appropriate language, symbols, and the units and definitions are clear (Kahn et al., 2002). The participants reported having many issues regarding the different methodologies, definitions, and approaches used by different government agencies in South Africa:

“There is also a problem with the definitions used. For example, in the case of mobile subscribers, what is the definition of a subscriber? Is it the one who has a SIM card? What if she has more than one SIM card? What were the criteria used to collect the data?”¹⁶⁷

“...in the water and sanitation area, it is still not clear what free sanitation means. This, of course, links to bigger methodological issues”¹⁶⁸

“ Statistics South Africa itself is quite keen to change definitions. Sometimes they change things to the extent that you are totally unable to do a trend analysis (e.g., the household survey)”¹⁶⁹

“It would be ideal if they use the same methodology. Or let’s go back to definitions, which is a main problem in all sector departments. How do you define a backlog in this department versus another sector department? In the areas I’ve dealt with in the water and sanitation, electricity and energy fields, these are common problems”¹⁷⁰

5.4.1.5 Ease of Use and Manipulation of the Acquired PSI

This quality dimension refers to the extent to which information is easy to manipulate and apply to different tasks. The examples below indicate different levels of difficulty in using the acquired PSI in their work.

“The data I received from the 23 branches of the same government agency were all in different formats. They sent it to me in a word file, for example, and you know if you have to convert a word file into a database friendly format, it has to be in columns and

¹⁶⁷ Participant A-13

¹⁶⁸ Participant A-12

¹⁶⁹ Participant B-16

¹⁷⁰ Participant A-8

rows. So I had to re-format some of these documents. I did a huge job trying to standardize the data we got from these branches. What added more problems to the issue of lack of standardization of the data is that some of them had outsourced this task to private sector companies who had all sorts of different formats and standards”¹⁷¹

“For example, if I get 2007 data, I get everything in one spreadsheet, so if I want to go to a certain municipality within the whole spreadsheet, it takes time. So I am going to group data into provinces and then to district municipalities and local municipalities”¹⁷²

“Some of the data was not compatible with my systems, so I had to do some cleaning and re-categorization of the data myself to make it work, and this really took a long time”¹⁷³

“To get to understand the format, fields and calculations, it took me a couple days, which is a long time given the assignment I was working on. But time was not really the main challenge; the main challenge is that I did not feel absolutely confident that I got my interpretation and analysis right”¹⁷⁴

5.4.1.6 Believability of the Acquired PSI

Believability or validity of information refers to the extent to which the information is regarded true and credible. Below I present some examples of what the participants had to say in this regard.

“Service delivery data from government is not very credible”¹⁷⁵

“For example, they are supposed to provide figures about houses that are already completed, but these figures do not reflect the reality most of the time, because they include houses in progress and those that are not completed yet”¹⁷⁶

“Look, if you get a three paragraphs report for a public meeting that was supposedly five hours long, if I get a page even for a meeting that was supposedly three or four hours long attended by so many people, then you know that they are bull*****ing”¹⁷⁷

¹⁷¹ Participant B-37

¹⁷² Participant A-17

¹⁷³ Participant A-15

¹⁷⁴ Participant B-4

¹⁷⁵ Participant B-1

¹⁷⁶ Participant A-14

¹⁷⁷ Participant B-9

5.4.1.7 Objectivity of the Acquired PSI

The issues of believability of the data are closely related to its objectivity. Objectivity refers to the extent to which information is unbiased, unprejudiced, and impartial (Kahn et al., 2002). This includes, for example, the issue of self-evaluation, the use of persuasive language, the source's presentation of other viewpoints, and its reason for providing the information. Issues related to objectivity of the acquired PSI were strongly present in most of the interviews. The participants' high level of concern about these issues was demonstrated through the relatively large number of examples they provided. Below I share some of these examples:

“I was very skeptical and suspicious about the data in the sense that most of it is about departments evaluating themselves and reporting on themselves. And therefore, I was suspicious about how robust was it... Yeah, I was suspicious of the data”¹⁷⁸

“I will give an example. The Department of Health was talking about the primary care system and how they have got these mobile clinics working. So the quantities suggest that there was some progress and that they are accessing remote communities. So at one level it is giving a very good quantitative outline but when you start interrogating that data and unpacking it, this is when you see the different shades. So this was a particular version of events, a political one”¹⁷⁹

“Now this [government] report tends to provide a much more prettier picture of the government and yet it is rubbish. I was to learn later that scholars have identified lots of methodological issues in the report and think of it as rubbish”¹⁸⁰

“The government documents were mainly PR [Public Relations] material. If somebody was doing a real serious investigative study, I suspect it would have been a very different picture”¹⁸¹

“In this project, we realized that the provincial government departments are so busy portraying themselves in a positive light. Actually, what I found surprising is that there was an attempt to manipulate this very data at the province level so that it can fit to the political goals of the province”¹⁸²

“You will always notice that data is always political, you know, and of course sector department will have vested interest in either inflating the numbers or deflating the

¹⁷⁸ Participant B-1

¹⁷⁹ Participant B-7

¹⁸⁰ Participant B-22

¹⁸¹ Participant A-1

¹⁸² Participant A-9

numbers based on their objectives—either they want more money from Treasury or they want to show that they have been doing a lot of activities”¹⁸³

“When I start seeing information coming out of the EPWP [Extended Public Works Program] about how much employment is created on road maintenance, I have to be very dubious because those are figures that are important to politicians, and so the whole system feeding in that information is probably biased on the positive side. There are roughly just 2.5 million jobs and employment opportunities created through this program. Now we know that president Zuma is saying he wants another 500 000 jobs by the end of the year. My belief is that this is impossible to achieve. So we will have to see what happens. But if I start seeing numbers suggesting 3 million jobs at the end of the year, I’ll have a huge question mark in my head on the reliability of that information”¹⁸⁴

“The question arises, why was this report issued in the first place? There are probably many reasons, but one of the reasons is almost certainly associated with the politics in the provincial government. The premier wanting to leave some kind of legacy - this is a way of leaving a legacy”¹⁸⁵

One important issue related to the objectivity of government information that was reported by the participants is regarding the use of private consultants to collect government data and to write their reports. Here is what two participants had to say about this issue and how it affects information objectivity:

“As I said, one of my concerns arises because a lot of government information is not collected by government [people] themselves; it is often collected by consultants. And I do not know what methodologies or tools they are using. So when I see data in government documents, my first question is to say, what are the sources?”¹⁸⁶

“One of the problems is that often documents about government projects are written by consultants, not the people at the department, and in my opinion this affects the quality and outlook of such information”¹⁸⁷

¹⁸³ Participant A-18

¹⁸⁴ Participant B-32

¹⁸⁵ Participant B-11

¹⁸⁶ Participant A-3

¹⁸⁷ Participant B-32

5.4.1.8 Verifiability of the Acquired PSI

This quality dimension refers to the extent to which the user is able to verify the validity and source of the information. Here are examples of what some participants had to say with this regard:

“There was no way of verifying the validity of this data because the methodology was not clear”¹⁸⁸

“This is a big issue in my work because I build economic models based on what I get [from government sources]. For example, in one incident we had to take out a section from our final report because the data that we used was questionable. And we couldn’t verify it on time, so we had to take it out”¹⁸⁹

“They told me, oh, we do not know anything about this information because the person [who knows about it] left. And then there was no way of verifying that information”¹⁹⁰

These findings and discussions regarding the quality of PSI seem inconsistent with Burkert’s (2004) arguments regarding the specific qualities associated with information from the public sector (see also Abd Hadi & McBride, 2000). For example, Burkert (2004) argues that this information “has usually been collected over a long period, which makes it useful for time series analysis”(p.7). As indicated above, the study participants had a number of concerns regarding the completeness and timeliness of the PSI they acquired, which affected their ability to conduct such analyses. Burkert (2004) also argues that in general, PSI is equated with trustworthy information. He explains that this information is seen as collected by a neutral guardian. He adds “ while they may have been changes in information collection for political reasons... the criteria for such changes have at least been made public” (p.7). This also seems inconsistent with the findings of this study. The study participants reported several issues related to the consistency and interoperability of the government information they acquired.

¹⁸⁸ Participant B-15

¹⁸⁹ Participant A-9

¹⁹⁰ Participant A-16

Furthermore, the author notes that government information enjoys the assumption of reliability. He supports this assumption by arguing that the government has the means to enforce information collection and that reliability is increased because “in many cases providing correct information is in the best interest of the information subject if such information is for example necessary to obtain a specific legal status” (Burkert, 2004, p.7). The above findings and discussion makes it obvious that this assumption was proven wrong, at least in the cases reported by the study participants. Concerns about objectivity and believability of government information in South Africa were strongly present in most of the conversations I had with the participants.

Finally, Burkert (2004) asserts that the PSI collection “enjoys the assumption of sustainability. At least discontinuing information services could be turned into a public policy issue” (p.8). This assumption was proven wrong as well. The study participants discussed different instances where some information were no longer collected or omitted without providing any explanations or justifications from the government agencies.

5.4.2 Strategies to Deal with PSI Quality Issues

It is clear that these quality issues affect the usability and reliability of the acquired PSI. To deal with these issues, the study participants emphasized that if someone wants to work with government information, they must get a very good understanding of the data, the interpretation of each field, as well as the reliability of each field. Users have to realize and accept the fact that some data will be of higher quality than others. Users also have to do a lot investigation, questioning, and verification before they can utilize it effectively, as was pointed out by participant (B-15):

The important thing is that you have to have a critical eye...because you come into the environment knowing what to expect and anything out of the ordinary raises your eyebrows and you know this is bull**** kind of thing or this is thorough, this is comprehensive, etc.

Most of the specific strategies and approaches reported by the study participants involved processes of evaluation, verification, and crosschecking.

“The data that is available is suboptimal, as data usually is, but you do what you can with what you have. Insofar as the data is not as good as it should be, I get our guys to fully evaluate what is available before we pass judgment on anything”¹⁹¹

“With this data of course, when you get it, one of the things that you ask yourself, is this reliable information that I can really use? So what you try to do, for any particular piece of information, is to try and look at a variety of sources for the same thing. We do crosschecking to see if it is really valid or reliable, and to figure out what you can use”¹⁹²

“Sometimes you find some contradicting data on the same aspect. In these cases, you have to go deeper to confirm and verify, which most of the time means going to the Department and asking people there about these issues and how they can explain it”¹⁹³

“I sometimes had to enter data manually myself to verify the truth of what is reflected in the paper. For instance, the Treasury information I got from the Free State province came to me in tables already, because obviously this person wants to build a specific argument. So what I did then, I went to Statistics South Africa and got the same raw data and put the Treasury tables on one side and the spreadsheet I created from Statistics South Africa data on the other side to see if they correspond”¹⁹⁴

“The documentation and the coding tables were there, but it was not clear enough. So I did make an effort to find out more about that, and I tried phoning on a couple of occasions and tried emailing, which was frustrating, but I wanted to be absolutely sure about the figures and results”¹⁹⁵

“For example, two difference surveys would be showing very different results [about the same issue]... and a lot of what we would be trying to do is to make sense of why that might be. To resolve this we look at the sampling, the structure of the survey, we look at the questions that were asked, in order to understand what was the difference and to make sense of it”¹⁹⁶

¹⁹¹ Participant A-18

¹⁹² Participant B-2

¹⁹³ Participant A-7

¹⁹⁴ Participant A-9

¹⁹⁵ Participant B-37

¹⁹⁶ Participant B-14

In some cases, the participants decided not to evaluate or verify the data. Instead, they simply provided the conflicting data sources side by side for the reader to be aware of the discrepancies.

“For instance, if there are conflicting numbers coming from Statistics South Africa as compared to the Department of Health, what we have tended to do is to provide both sources of data and provide footnotes and explain that there were differences”¹⁹⁷

In addition to the strategies employed by the participants to deal with the above quality issues, the study participants also discussed the different kinds and levels of value they added to this information in order to produce useful and strategic information products and services. These processes are discussed in more detail below.

5.4.3 PSI Contribution to Knowledge Creation

In this section, I present and discuss responses to the following research question: *In what ways did the acquired PSI contribute to the knowledge creation process at the study sites?*

I first discuss the ways in which the study participants added value to the acquired PSI resources in the process of creating information products and services, and then I discuss the specific domains of knowledge to which the utilized PSI contributed.

As mentioned earlier in this chapter, the study participants were involved in a number of different research projects covering a wide range of aspects related to socioeconomic development in South Africa (e.g., service delivery, food security, employment, health, education, and the like). There was near consensus among the study participants that the utilized PSI resources were instrumental to the knowledge creation process in these projects.

¹⁹⁷ Participant A-5

The participants provided a long list of the information products and services to which the utilized PSI contributed. These include, for example, policy reports, provincial and municipality profiles, case studies, journal publications, toolkits, GIS maps, databases, and other kinds of awareness raising and educational materials used in workshops and community meetings. Choo (1995) explains that organizations create such information products and services to target different user groups and information needs. The author adds that this process is not a passive repackaging of the incoming data and information; rather, these products and services have to add value “by enhancing the quality of the information and improving the fit between the information and the needs or preferences of the users” (p.25).

The study participants reported different ways to add value to the acquired PSI in the process of creating these information products and services, ranging from basic data cleaning and analysis to building models and scenarios for planning and future actions. Below I discuss these processes and the resulting information products and services in more detail.

a) Basic Analysis

This process mainly involved adding value through, for example, data cleaning, reformatting, categorization, crosschecking, adding descriptions, and basic visualization in tables and diagrams.

“You know, when you get raw data, a lot of information and relations can be hidden, but when you put it together and analyze it, you start seeing new things. This is exactly what we did”¹⁹⁸

“We categorized the data into area-specific with greater details that you would not find readily available from any government agency”¹⁹⁹

“The data that we got was is at a national level, but because this project is at a provincial level, we had to extract all the relevant data about this province and put it together in a more coherent and meaningful way”²⁰⁰

¹⁹⁸ Participant A-17

¹⁹⁹ Participant A-12

“I got the data that was not organized and I then classified it by province, industry, manufacturer, etc.”²⁰¹

“Adding description to data and to the analysis so regular people can understand the figure and graphs”²⁰²

Related to these processes, some participants also reported performing basic interpretations of the data.

“Well, we tried to explain why something did not happen or happen, trying to give it [a] context. Because data is quite raw, it does not really give you much. You have to give it life; it has to become a story. I wrote the story, I gave it life.”²⁰³

“We interpreted the data and information, and fortunately we had a very good client who welcomed that interpretation. We did a review that was analytical, and therefore we were able to say things like, you might be planning on the basis of unreliable data”²⁰⁴

b) Comparative Analysis

The study participants also reported adding value to the acquired PSI resources in order to perform comparative analysis between and among different levels of government organizations.

“Then we did some comparisons to see the big picture, to see how the province looks like in relation to the national situation and how the province looks like in relation to other provinces, if possible”²⁰⁵

“So through our comparative analysis, we were able to see what municipalities were doing well and in what areas vs. the ones that had some problems and also in what areas”²⁰⁶

“We took the data, observed trends, and then analyzed what these trends may mean. After that we did some comparisons between the different schools”²⁰⁷

²⁰⁰ Participant B-29
²⁰¹ Participant A-19
²⁰² Participant A-14
²⁰³ Participant B-34
²⁰⁴ Participant B-10
²⁰⁵ Participant B-27
²⁰⁶ Participant A-15
²⁰⁷ Participant B-29

c) Building Databases

Another way to add value to the acquired PSI resources was through building more comprehensive, integrated, and comparable databases.

“We combined the two unemployment datasets from Statistics South Africa and the EPWP into one database. We then added our own poverty data from 2006 and gave our clients the integrated dataset”²⁰⁸

“Using different sources, I built three datasets of energy data going back to 1996 and made them comparable”²⁰⁹

“I am now creating a database for water and sanitation for all municipalities in the country using government sources”²¹⁰

“I am mainly working on building a comprehensive database about the population that includes a lot of variables such as HIV AIDS, mortality rate, life expectancy, orphans, some diseases, etc. I also did a time series analysis and explained why numbers and percentages increased or decreased”²¹¹

“We created a baseline database of the learners and trends related to learnership and gave it to the department. We first wanted to develop this database to help us sample the learners and get the population of the study, but when we saw the hidden value of such a database, we decided to make it a product of this project. For the first time of the history of these SETAs, we had one organized and centralized database of all the learnerships and all the learners in the country”²¹²

d) Creating GIS Maps

Visualizing development data through tools such as GIS maps is useful for better understanding of interconnected development issues, and for prioritization and planning purposes. This was another method reported by the study participants of adding value to the acquired PSI resources.

“We also did some visualization and produced 12 maps representing the unemployment data over a 3-year period”²¹³

²⁰⁸ Participant B-33

²⁰⁹ Participant A-8

²¹⁰ Participant A-12

²¹¹ Participant A-5

²¹² Participant B-37

²¹³ Participant B-31

“They just gave us the data in a spreadsheet format and we had to geo-code it and import it into our GIS system. We then had to aggregate the data to the municipality level”²¹⁴

“We first put the data in electronic format. We then combined together data from patents, R&D data, and economic activities for each province then represented it spatially”²¹⁵

e) Building and Testing Models

Building economic and social models was an example of a higher level of value adding performed by the study participants. Here are some examples:

“My main work is to use datasets from Statistics South Africa (e.g., the general household survey) and other organizations to develop models related to efficiency, effectiveness, and equity”²¹⁶

“And we then tested the model we developed in purely financial and economic terms of the budget. For example, the model tells us if we were to invest 50% more into transport infrastructure as opposed to energy infrastructure, what would the economic impact be?”²¹⁷

“We came up with a model that focuses on the three core areas that we thought made a difference to education. These were: what happens in the classroom, what is the administrative support to the school, and what is the social impact of poverty on schools? All the information was arranged around these areas and we could show, for example, that teachers do not spend a lot of time in class, the problems with teacher knowledge, and the problems with teacher qualifications”²¹⁸

f) Other Forms of Advanced Analysis

The study participants reported other forms of advanced or deeper analysis as examples of high-level value adding to the acquired PSI resources. Here are some of these examples.

“It was important to know what does government information tell us about food security in South Africa. At one point, we took 7-8 different surveys produced by Statistics South Africa and other government agencies and checked how useful were the questions they are asking. Are they telling us anything about food security in South Africa? From our analysis, we have identified two specific gaps for further work: we do not have full

²¹⁴ Participant A-15

²¹⁵ Participant B-25

²¹⁶ Participant A-17

²¹⁷ Participant A-3

²¹⁸ Participant B-30

understanding of how social grants [the state's social grants and social security systems] links up with food security-- existing official data sources do not help us to understand these relationships. Also, the existing official data sources on food pricing is not helping us to analyze the local household dynamic on how food pricing dynamics filter through to the household food budget and food consumption patterns. The existing official datasets do not capture pricing data in rural areas, so it is really hard for you to get very accurate understanding of movements of food prices and what is happening in rural areas”²¹⁹

“What I did from looking at those reports, by analyzing them and also manipulating the underlying data -- I have been able to develop some benchmarks and so I am going to assess what is happening in the North-West [province] against those benchmarks”²²⁰

“A lot of analysis has been done. We did analysis of the skill shortages in South Africa to see to what extent and through what means and ways we could devise to build up the skills in the country. We came up with a long list of public sector institutions who were contributing to filling the shortage of skills in the construction sectors, those who were partially contributing, and those who were not. Our analysis was very time-related and demand-driven. It was about identifying the real areas of skills shortage rather than the assumed areas. Then we correlated this information with other resources from universities and technical institutes”²²¹

“The value I think I added was in highlighting possible, I would say, contradictions or inconsistencies between the reports and interviews with officials, or problematizing some of the claims. Highlighting inconsistencies or suggesting errors that are worth exploring, really”²²²

“But I think that the kind of value that we are trying to add is to integrate everything together and try to make sense of it and come up with a story that says: this is the situation regarding HIV/AIDS in South Africa. This is how we are adding value, because this information is there but it is all over the place. Because of that, we are able to look at the delivery models and say what models work or won't work”²²³

“Almost 50% of this publication was literature review and information about the infrastructure situation in South Africa. This included identifying themes, clustering and prioritization. The other 50% was completely new. Each chapter had some scenarios at the end. Eight sectors had scenarios in them and we did that analysis and scenario planning by getting experts around the table. Then we built scenarios: If nothing happens, how [do] we address the situation? If we maintain the same status, what would happen? One of the scenarios, for example, is that the population will have negative growth rate by 2060 but this could be offset by immigration”²²⁴

²¹⁹ Participant B-15

²²⁰ Participant B-34

²²¹ Participant A-6

²²² Participant B-11

²²³ Participant B-7

²²⁴ Participant A-1

The above discussion suggests that government information was essential to the knowledge creation process at the study sites. The study participants emphasized that after dealing, as much as possible, with the PSI quality issues through the strategies discussed earlier, the utilized PSI was an integral component in the creation of a wide range of information products and services. The opinions and examples provided by the participants regarding the usefulness and value of the acquired PSI to create such information products and services clearly demonstrate what Repo (1989) calls “subjective value-in-use” of information. Repo defines this level of valuation as the opinions of individuals of the value of information while used in their work.

5.4.3.1 PSI Contribution to Specific Domains of Knowledge

When asked about some specific domains of knowledge to which the acquired PSI contributed, the study participants identified two main areas: monitoring and evaluation, and prioritization and planning domains.

a) Monitoring and Evaluation

Monitoring and evaluation can be effective tools to enhance the quality of project planning and management through improving understanding the different stakeholders’ perspectives, promoting learning, and ensuring accountability (Estrella & Gaventa, 1998). Monitoring helps interested stakeholders to understand whether the projects are progressing on schedule and to ensure that project inputs, activities, outputs, and external factors are proceeding as planned. Evaluation can be a tool to help project planners and managers assess to what extent the projects have achieved the objectives set forth in the project documents (Vernooy et al., 2003).

Monitoring: The study participants reported that the acquired PSI resources were utilized to monitor the implementation of some government policies, the progress of government projects against time, and resources and performance schedules. This knowledge was very important to identify lagging areas that require timely attention and action, and to enable a continuing critique of the project implementation.

“We have a national strategy, but it is being implemented differently. At the provincial level, I was interested to see whether the national strategy on HIV /AIDS is being implemented the way it is. This data allowed us know what is working, what is not working, what is the impact, where do we need to change, is it a problem of capacity, institutions, and so on. But what again was important for me is to see whether... the local implementation level had the same understanding of the strategy and that they are complying with some of these components”²²⁵

“We created a framework to monitor the education system. So we took the policy goals and created an analytical framework by which policy makers can monitor schools. We took the policy goals and defined the concepts, took the concepts and created indicators, took the indicators and developed questionnaires. We then provided these tools to them saying, for example, if you are looking at access, you must look at these three things. Using these tools, we also did train government [officials] on techniques and procedures, statistical procedures for developing indicators, and doing the analysis as well”²²⁶

“One of the purposes of this study was to understand whether what teachers, schools, and provinces are doing is consistent with this particular government policy on education”²²⁷

Evaluation: Utilizing PSI resources for evaluation purposes was another main area of the study findings. This involved analyzing the effectiveness, efficiency, and direction of some government activities, and involved making judgment about progress and impact of such activities.

“In South Africa we are having problems whereby the government policies get promulgated but when it comes to implementation there is always a disjunction between policy- making and implementation and what goes on the ground. So what we did in this study is that we reviewed the performance of Free State province, following the presidency’s 15 year review. For example, one of the focus areas was the impact of

²²⁵ Participant B-6

²²⁶ Participant B-20

²²⁷ Participant B-21

different policies and economic developments in the last 15 years on racial issues and transformation in the province”²²⁸

“We wanted to evaluate the effectiveness of the EPWP program, because that program is supposed to create employment opportunities for the unemployed. So what we are doing now is we are analyzing the data in comparison with employment data from Statistics South Africa to see if they are actually targeting the most needy areas, and to find out exactly the characteristics of employed and unemployed people in the province”²²⁹

“Our work is also important at the health facility level. Our findings act as a self-evaluation for each facility to say, here are our strengths and here are our weaknesses. Here is how we can be compared to another facility out there”²³⁰

“This was the first project to evaluate the impact of SETAs policies and strategies. Before this report, the SETAs had a lot of criticism. Everybody was saying it is not working and that the government spent a lot of money to do this. The report showed that they are actually doing a good job. Not the way everybody wanted but better than they expected. The fact that more than half of the learners found a job after the training and that their jobs were in fact related to the subject of the training shows that the program has some success. One of our recommendations was to the Ministry of Higher Education to standardize the process of capturing the data for the SETAs”²³¹

“We wanted to see what government has put in place and then evaluate against what we could find out ourselves. For example, in the National Skills Development strategy, there were some national targets and through this study we were able to see if those targets were achieved”²³²

“The general impression of provincial governments is that they are useless, inadequate, and ineffective. And I think that what our study does is that it gives an alternative view on provincial governments. This provincial government is clearly not ineffective-- it has capacity and in some areas it is clearly working better than in others. But I think the biggest lesson of the report is what reasonably can we expect from [the provincial] government, because I think in South Africa we have a very exaggerated sense of what [the] government can and should do. And I think this study goes some way to problematizing that notion...and I think it is time that South Africa starts having a realistic conversation about what is actually the ability of the provincial government, and more importantly its internal institutional capacity-- what we can realistically expect from them?”²³³

²²⁸ Participant B-9

²²⁹ Participant B-32

²³⁰ Participant B-5

²³¹ Participant B-35

²³² Participant A-6

²³³ Participant B-11

An important aspect that was emphasized by the study participants in relation to the processes of monitoring and evaluation was about identifying best practices and lessons learned from current and previous projects in order to be used in other future activities and decisions.

“But most importantly, to also look for best practices, those things that seem to work. Because remember, we are talking about the public sector here, and for me what is important is if I go to one site in the Eastern Cape [province] and I find that one, two, or three aspects are being done well, you know, there is an opportunity... why are they being done well and how? But the idea then is: how can we make sure that this information [about best practices] is used in Limpopo province so that they can also do things well? So it was more about looking at some of the best practices that can be shared across the country. And of course at the policy level, we can begin to say, look, your strategy is working here and these are the reasons”²³⁴

“We also think it is useful at a national level, because the Free State government has done certain things in terms of governance which are lessons for other provincial governments”²³⁵

b) Prioritization and Planning

There is often a shortage in financial resources when it comes to projects and activities in the development field. Therefore, it is always essential to prioritize investment and plan activities based on the urgency and potential impact, especially short and mid-term impact. The study participants indicated that the different information products and services created through their projects are/were used in different ways to achieve these goals.

“This study can definitely be used as a planning tool by policy makers. It allows us to say which ARV delivery model is highly effective and what are the cost implications if they [the government] want to scale it up because we see that some of the models work but they are never scaled up so we want to find out what would be the cost”²³⁶

“The main objective is basically to plan. We are helping the municipalities in terms of planning, so we would like to know in terms of water and sanitation what are the backlogs, so when we plan we know we are planning for the right for the correct backlogs”²³⁷

²³⁴ Participant A-9

²³⁵ Participant B-10

²³⁶ Participant B-8

²³⁷ Participant A-12

“My analysis of health and education information is used by the different DBSA units for planning, appraisal, and investment purposes. District and local municipalities also used my analyses for the same purposes, especially when they want to engage in new projects and need some indicators”²³⁸

“In general, the report will help the North-West Province make sure that in the future they create EPWP projects in areas where it is most needed and of course to create the right type of projects. The more area-specific and detailed analysis will be very helpful in planning and prioritization processes. This is also creating more inter-governmental pressure regarding the need for more of this kind of data because we really don’t have a lot”²³⁹

5.4.4 Summary of Stage Two: PSI Utilization in the Knowledge Creation Process

In responding to the question about the overall quality of the acquired PSI resources, the participants noted that while the acquired PSI resources generally met their needs and expectations in terms of its relevance to their work, they fell short in many other dimensions of quality including completeness, timeliness, consistency, interoperability, ease of use and manipulation, believability, objectivity, and verifiability. The limited understanding of the value of PSI within the government, as explained above, was seen as a reason for such quality problems.

To overcome these quality issues, the participants emphasized the need for an in-depth understanding of the data, its interpretation, and reliability. As for some specific approaches to overcome these issues, processes such as evaluation, verification, and crosschecking were reported. The participants also emphasized that the utilized PSI resources were instrumental in the creation of a number of information products and services (e.g., policy reports, municipality profiles, GIS maps, databases, and journal publications). The process of creating such knowledge resources involved a wide range of value-adding activities, ranging from basic and comparative

²³⁸ Participant A-16

²³⁹ Participant B-31

analyses to creating databases, maps, models, scenarios, and other forms of advanced analyses. When asked about some specific domains of knowledge to which the acquired PSI contributed, the participants identified two main areas: (a) monitoring and evaluation and (b) prioritization and planning.

5.5 Stage Three: Knowledge Outcomes and Application

In this section, I present and discuss the participants’ responses to the following research question: *How do the study participants evaluate the overall importance of the utilized PSI to the created knowledge and its consequent benefits to society?*

As explained earlier, Repo (1986) argues that the value of information is best determined by the user of information, depending on the benefit this user obtains from using the information, as well as the effect of its use. The last level of valuation in what Repo calls information “value-in use” is the “objective value-in-use” or “experience value”. Repo defines this valuation as “the value of real effects the information has had on a task and its results” (p. 375-376).

The last question of the interview was about users’ overall evaluation of the importance of the utilized PSI resources to the knowledge created through their projects and the actual or potential benefits of such knowledge to the society. First, the participants were asked to simply rate how important they thought the utilized PSI resources were to this process on the following scale: extremely important, important, of some importance, not important, and hard to say. The following table presents the results of the rating question:

Scale	Number of Interviewees	Percentage
Extremely Important	42	74%
Important	14	24%
Of some importance	1	2%
Not important	0	0%
Hard to say	0	0%

The participants then were asked to elaborate on their answers. The main theme that was emerging from participants' elaboration on their rating decisions was very powerful: this kind of work can not be done without government sources of information, and this information is vital.

Here are some examples of what the participants had to say:

"I would say extremely important because we depend on many government information resources to understand the status quo of our country's HIV/AIDS, you know. Without the information we used in this project, we would have never been able to produce such analysis and come up with these interesting findings"²⁴⁰

"Oh it is critical, extremely important. We can't do our work without it. It was very useful because it was the only point of entry to this project. Otherwise, I mean, you work in the dark"²⁴¹

"I think that without that part of their [government] data, I do not think that this exercise would have been possible, so for me I think they are the key"²⁴²

"I would say it was important. If you want to do an effective planning, let us say you want to establish a residential area, you also want to know from the Department of Energy side what are their plans for that area, you also need to know the plans from DOAF, so that information for planning purposes is important"²⁴³

"Important in a sense it kept us honest and focused. As I said earlier, I think the value was to give [us] a certainty that we are focusing on the right stuff, that we go about finding out more about the problems that need solutions, at the right places, in the right ways, and so on"²⁴⁴

"It is actually crucial. We could not have done it without the government information and obviously the Treasury information was crucial"²⁴⁵

"Extremely important. You can't really get anywhere without government information"²⁴⁶

"Extremely important because without Statistics South Africa, without information coming from the Reserve Bank, without information coming from [the] Treasury, because these are my three sources of information in terms of macro economics, these are extremely crucial"²⁴⁷

²⁴⁰ Participant B-5

²⁴¹ Participant B-15

²⁴² Participant A-7

²⁴³ Participant A-14

²⁴⁴ Participant B-20

²⁴⁵ Participant A-17

²⁴⁶ Participant B-3

²⁴⁷ Participant A-9

In the information management process model, Choo (1995) explains that “individuals use information to create knowledge, not just in the sense of data and facts but in the form of representations that provide meaning and context for purposive action” (p.45). When asked to reflect on the actual or potential importance of the created knowledge to the South African society, the study participants emphasized the fact that given the critical issues tackled in their projects, a wide range of stakeholders had already benefited or could benefit in a way or another from the knowledge created through these projects. This list includes national and provincial governments, municipalities, academic institutions, local, regional and international NGOs, faith-based organizations, and funding agencies. Below are a number of testimonies of these benefits:

a) At the National Level

“NACI (the National Advisory Council on Innovation) and other government organizations are now using it [the findings of the report] to focus on and guide provincial level studies. Because there is not any study at the provincial level, this study was extremely important and it was used by international organizations and the EU to fund some projects in South Africa. One of our recommendations was to have electronic databases for both scientific publications and patents. We also provided recommendations regarding more proper and systematic coordination between knowledge specialization and innovation areas, where the government can come in and play a major role”²⁴⁸

“This report gives them [the Department of Education] ideas and strategies on how to assess grade 9 students. It also gives them an idea of the schools that are doing well and the schools that are not doing well, and of course why those schools are not doing well. So I would say it is important for monitoring and planning purposes”²⁴⁹

“Education and health have been identified as national priorities, so documents like the [Infrastructure] Barometer gain further impetus because they give one a sense of what they sought to achieve in 1994, what they have achieved, what they have done wrong and what can they do differently”²⁵⁰

²⁴⁸ Participant B-23

²⁴⁹ Participant B-18

²⁵⁰ Participant A-4

b) At the Provincial Level

“This provincial review highlighted quite a lot of issues that initially the provincial government thought they were on top of but then they realized people had really different opinions all together. So this was like a wake up call to the province that there are these issues that they have not been aware of and that there are things that people are not happy about. The study also revealed that there was a shortfall in some of their planning. For example, they are building infrastructure in the areas that they know anecdotally that people are moving out of. So, I think that in their strategic planning this information will be very useful”²⁵¹

“As I said when we started, the province needed to know what is happening in the schools, so that the report can inform illiteracy strategy that they are busy working on. That was very important because the report was presented to the provincial representatives, all the curriculum advisers, and all the like. We made recommendations, and they also added on the recommendations. And then they said, given the findings [of our report], they had to come up with an action plan based on this report. Mostly long term impact”²⁵²

c) At the Municipal Level

“The results of analysis of each municipality profile will be sent out to the municipality itself so that can tell us whether our analysis reflects the real situation on the ground and what needs to be done. You know, DOAF and the Department of Municipal Affairs use their own methodologies to come up with these data about individual municipalities, but we want to hear from these municipalities, the ones who know the real situation. So we analyze and visualize all the data that we get and then leave it to them to decide what was correct and what did not reflect the actual situation. Phase one of the project produced detailed profiles of 26 municipalities. So I think for the municipalities, it will also help them in strategic planning and moving forward. For example, when the municipality has information about the different sectors (e.g., how a certain municipality is doing in terms of ICT access and use compared to the rest of the country), they will be able to prioritize and focus their efforts on the areas that need immediate attention. The same way the national government can benefit from it in terms of planning and allocation of resources”²⁵³

d) At the Organizational Level

“A lot is being thrown at local municipalities but nobody knows what is going on. So we wanted to use this data to guide us (the DBSA)--we wanted to see how service delivery performance actually changes at a local level. This will allow us to say that this is exactly what has happened in this local municipality, i.e., these were the problems and these were the good things. This will then help the advisory and operation units at the DBSA design

²⁵¹ Participant B-10

²⁵² Participant B-26

²⁵³ Participant A-12

their projects and guide their funding to help these municipalities-- this is what the research says about this local municipality, how can we assist them? How can we intervene? The municipalities will also benefit from the decisions that will come from this data because the DBSA will be deciding on areas of investment”²⁵⁴

“Whenever they [the DBSA units] want to motivate for projects in the service delivery they can use this report to back these motivations up using the analysis of the different backlogs, etc. It is key for the DBSA in projects appraisal, planning, and investment decisions. The Infrastructure Barometer is seen as vehicle to promote what the DBSA does, what it can do, and equally to upgrade the knowledge around the situation in the infrastructure”²⁵⁵

e) At the Regional and International Levels

“I can also see benefit [of our report] at the regional and international levels...HIV is a big thing, it is a regional problem, so whatever we do here will benefit other countries in the sub-region and other developing countries or countries that are affected by it. If anybody is serious about improving this field, they will pay attention to the sentiments expressed in the report”²⁵⁶

5.5.1 Summary of Stage Three: Knowledge Outcomes and Applications

When asked to rate how important they thought the utilized PSI resources were to the knowledge creation process in their projects, 74% of the participants said it was extremely important, 24% said it was important, and 2% said it was of some importance. The main theme that emerged from participants’ elaboration on their rating decisions was very powerful: this kind of work cannot be done without government sources of information, and that this information is vital.

In reflecting on the actual or potential benefits and value of the created knowledge to the South African society, the participants emphasized the fact that given the critical issues tackled in their projects, a wide range of stakeholders had already benefited or could benefit in some way from the knowledge created through these projects. This list includes national and provincial

²⁵⁴ Participant A-18

²⁵⁵ Participant A-2

²⁵⁶ Participant B-8

governments, municipalities, academic institutions, local, regional and international NGOs, faith-based organizations, and funding agencies.

5.6 Chapter Five Summary

The overarching purpose of this study was to develop an understanding of the PSI utilization process and value within the knowledge creation context and the factors and conditions that affect these issues from the user perspective. The study method broke down the utilization process into three stages (seeking PSI resources, knowledge creation process, and knowledge outcomes and application) and organized the survey results accordingly.

The survey data has demonstrated that in their attempts to find and acquire the PSI needed for their work, the study participants faced a wide range of technical, institutional, and political obstacles and challenges. The findings of the study also demonstrated that several of the assumptions in the literature about PSI-related policies and quality of such resources were not necessarily correct in the South African context.

Despite these access challenges and issues related to PSI quality, however, the findings demonstrated that the utilized PSI resources were still seen as instrumental to the knowledge creation process at the study sites and to the overall socioeconomic development of South Africa.

CHAPTER SIX: SUMMARY, CONTRIBUTIONS, AND CONCLUSIONS

This study was conducted to develop an understanding of the PSI utilization and value within the knowledge production context, and the factors and conditions that affect this process from the user perspective. I was particularly interested in identifying and investigating the PSI-related factors and conditions that could facilitate or hinder the utilization process, as well as the different PSI attributes that might increase or decrease its usefulness and value in each stage of the knowledge creation process in organizations working on socioeconomic development issues in South Africa. More specifically, the research questions guiding this study were:

Stage One: Seeking PSI Resources

- Why did the study participants seek PSI resources?
- What are the PSI-related factors that affected its discovery and acquisition?

Stage Two: The Knowledge Creation Process

- How do the study participants evaluate the overall quality of the acquired PSI?
- In what ways did the acquired PSI contribute to the knowledge creation process at the study sites?

Stage Three: Knowledge Outcomes and Application

- How do the study participants evaluate the overall importance of the utilized PSI to the created knowledge and its consequent benefits to society?

To answer these questions, I first positioned my research within the broad context of information and knowledge for development. I then drew upon two streams of literature to build the study's conceptual framework: (1) knowledge creation, and (2) value of information. These two theoretical concepts provided an overall orienting lens for the study. They helped shape the types of questions asked and provided a comprehensive and systematic step-by-step approach to collect and analyze the data and present and discuss the results.

In what follows, I present a summary of the main findings; the study contributions to the literature; the limitations of the study; the directions for future research; and the conclusion.

6.1 Summary of the Main Findings

The main findings of the study are:

- 1- A wide variety of types and levels of PSI are being actively produced by government agencies in South Africa.
- 2- These PSI resources are being actively sought and used by the study participants to meet their work objectives and specialized needs.
- 3- The study participants seek government information for different reasons. These include:
 - a- To understand the status quo, the landscape, and the conditions related to the issues they are investigating;
 - b- To inform the design of their research projects and activities, especially in the conceptualization, development of research questions, and sampling stages;
 - c- To understand the government's current thinking, vision, future plans and actions in relation to the issues they are working on; and
 - d- Because there were no other relevant sources of such information to rely on.

- 4- The participants' general observations and views regarding the availability of PSI in South Africa can be summarized as follows:
 - a- Some types or levels of PSI are simply not available, either online or in paper format. Other PSI resources are only available in paper format. Some types of PSI might be available, but are inaccessible.
 - b- Policy documents and reports are generally available online and it is relatively easy to get them. However, raw data, specific figures, trends and similar statistical information is rarely available online and trying to get them usually involves using personal contacts and going through bureaucratic procedures.
 - c- Availability of PSI resources varies at the national, provincial, and municipal levels of government. According to the participants, the lower the level of information sought (i.e., from provinces and municipalities) the harder it is to discover and get this information.
- 5- Participants identified two factors that hindered their efforts to identify and locate the PSI resources they needed for their work: (a) PSI resources are not available online, either due to lack of resources or as a result of the intentional hiding of data, and (b) the absence of user-friendly websites of the South African government agencies.
- 6- The study also identified some factors that facilitated the process of identifying and locating the necessary PSI resources. These include: (a) project collaboration with government agencies, and (b) participants' prior knowledge and experience.
- 7- The study participants identified a wide range of factors that either hindered or facilitated the process of acquiring PSI resources. These factors can be summarized as follows:

a. Hindering Factors:

- i. There was a general agreement among the study participants that in most cases government officials do not recognize or appreciate the value and importance of the information they possess, and as a result do not make enough effort to make it easily accessible. In a way, this disinterest in accessibility is part of a bigger culture of “obeying the rules”: government officials collect this information only to meet administrative and legal requirements.
- ii. Government officials’ fear of criticism and exposure.
- iii. Sensitivity of certain types of information.
- iv. Bureaucratic procedures and practices such as hierarchical structure of government agencies and the emphasis on written memos or permissions, and the lack of clarity concerning public servants’ roles and responsibilities.
- v. Technical factors, including information availability only in paper format as well as issues related to the format of the electronic PSI files.

b. Facilitating Factors and Strategies:

- i. The participants emphasized the importance of partnerships with specific government agencies, and noted that this kind of arrangement is sometimes the best way to guarantee access to not only government reports and aggregate analyses, but also the raw data.
- ii. The participants reported two strategies to help in the process of acquiring the PSI resources they needed from government agencies: (1) creating and

strengthening personal networks, and (2) involving agencies in the project as early as possible to get their “buy-in”.

- 8- In response to the question about the overall quality of the acquired PSI resources, the study participants highlighted a number of important issues. While the acquired PSI resources generally met their needs and expectations in terms of its relevance to their work, this information fell short in many other dimensions of quality including completeness, timeliness, consistency, interoperability, ease of use and manipulation, believability, objectivity, and verifiability. The limited understanding of the value of PSI within the government, as explained above, was seen as a reason for such quality problems.
- 9- To overcome these quality issues, the study participants emphasized the need for an in-depth understanding of the data, its interpretation, and reliability. As for some specific approaches to overcome these issues, processes such as evaluation, verification, and crosschecking were reported.
- 10- The study participants emphasized that the utilized PSI resources were instrumental in the creation of a number of information products and services. These include, for example, policy reports, provincial and municipality profiles, case studies, journal publications, toolkits, GIS maps, databases, and other kinds of awareness materials used in workshops and community meetings for education and raising awareness.
- 11- The process of creating such knowledge resources involved a wide range of value-adding activities, ranging from basic and comparative analyses to creating databases, maps, models, scenarios, and other forms of advanced analyses.

- 12- When asked about some specific domains of knowledge to which the acquired PSI contributed, the study participants identified two main areas: a) monitoring and evaluation and b) prioritization and planning.
- 13- When asked to rate how important they thought the utilized PSI resources were to the knowledge creation process in their projects, 74% of the study participants said it was extremely important, 24% said it was important, and 2% said it was of some importance.
- 14- The main theme that emerged from participants' elaboration on their rating decisions was very powerful: this kind of work cannot be done without government sources of information, and that this information is vital.
- 15- When asked to reflect on the actual or potential benefits and value of the created knowledge to the South African society, the study participants emphasized the fact that given the critical issues tackled in their projects, a wide range of stakeholders had already benefited or could benefit in some way from the knowledge created through these projects. This list includes national and provincial governments, municipalities, academic institutions, local, regional and international NGOs, faith-based organizations, and funding agencies.

6.2 Contributions to the Literature

This study fills some significant gaps in our understanding of how PSI is actually being utilized and valued by offering detailed analysis and empirical data about these processes. More specifically, rather than focusing primarily on the outcomes of the PSI utilization process, the study takes a step back to investigate what goes through such a process itself and the wider societal (as opposed to the monetary) value of the utilized PSI resources. Additionally, the study represents the first generation of research in this area that is primarily focused on the developing

world context. Finally, unlike most studies in this field, this research employs stronger theoretical and methodological foundations. Below I elaborate on these contributions.

6.2.1 PSI Utilization and Value: Process vs. Outcome

The results of the study suggest that more emphasis should be placed on the PSI utilization process itself, rather than focusing mainly on the outcomes of such a process (e.g., reports and recommendations, in-car navigation systems, digital maps, specialized databases, mobile applications) and their application in different contexts. This process-focused approach reveals both the obstacles and opportunities associated with the utilization process, as well as the different conditions and attributes of the PSI that may increase or decrease its usefulness and value throughout this process.

This approach might require greater time and effort to establish honest conversations with those who are using PSI resources to create knowledge, and to listen carefully while they narrate their own stories. However, such an approach is required to identify and understand the challenges in order to suggest strategies and processes for solutions. For example, the stories and examples shared by the study participants provide a clearer and more detailed account of participants' frustration with the state of access to information in South Africa than just descriptive statistics.

Though South Africa has some progressive pieces of transparency legislation, including the Promotion of Access to Information Act (PAIA), the actual implementation of such policies and laws remains a concern to many stakeholders (Razzano, 2012). According to the author, the PAIA legislation was seen as incredibly progressive at the time it passed in 2002. However, the author notes that "10 years on, there are many concerns in regard to the poor implementation of

the Act, especially in regard to the significantly high deemed refusal right amongst requests” (Razzano, 2012, p.7). The author also cites a 2011 report compiled for the Golden Key Awards, which revealed that 68% of requests made for information were met with no response at all – a statistic echoed by the PAIA Civil Society Network’s research.

While such general statements and statistics are useful, they fail to provide us with important details. For example, what were the precise reasons for the lack of response or outright refusal- was it a technical, financial, or human resources problem? Statistics also do not offer any insights into whether the requested information was sought and acquired through an alternate channel, and if so how. The study results, however, strongly suggest that issues related to public servants’ attitudes and practices towards the PSI and its potential users are among the main reasons for limited access to such information. As shown in chapter five, there were clear cases of public servants intentionally hiding important information so that it could not be found or, if such information was already found, there were sufficient obstacles to prevent users from accessing and acquiring it.

To put it simply, sharing such information was not in the best interest of bureaucrats for various reasons. In some cases, they were cognizant that they had not completed the work required in the appropriate manner, and as a result they were afraid of being criticized and exposed. So it was in their best interest to cover up the mess so they could save face and keep their jobs and positions. Such behaviors can be explained by the public choice theory (Buchanan & Tullock, 1962). The theory suggests that while public servants are supposed to rise above their own personal concerns and interests, faithfully carrying out the will of the people and promoting the common good, politicians and bureaucrats are often guided by their own self-interest, and their motivations are usually linked to advancing their own careers (Buchanan & Tullock, 1962).

These findings have specific implications on different groups within the government systems. While the study findings posit that PSI users have developed certain strategies to address such challenges, until an acceptable level of understanding and appreciation of the value of this information is achieved, much time and energy will be wasted, as users will continue to struggle in their attempts to take full advantage of such information. Below are some specific suggestions to achieve these goals.

Policy Makers

1. An important first step towards achieving these goals is for policy makers to acknowledge the wide range of problems and challenges related to PSI generation, access, and use, and to develop clear and specific measures to address them effectively. These issues include institutional and technical obstacles, political realities/dynamics, and socio-cultural challenges (e.g., tribal, racial, and language issues).
2. Then, policy makers need to develop a better understanding and appreciation of the great value that the PSI holds for the development of their country. This could be achieved through awareness raising campaigns organized by civil society organizations or PSI user groups. To be effective, such campaigns need to identify and highlight specific cases where the use of government information was instrumental to the success and impact of these cases. It would be ideal if similar campaigns were organized by the government itself targeting high level government officials, including ministers and their deputies, members of parliament, political advisors, and agency directors.
3. Policy makers and information managers need to make sure that the process of generating and accessing the information is more thoroughly institutionalized. In additions to making sure that the existing relevant laws are properly enforced, specific mechanisms and

guidelines need to be developed to promote and facilitate more effective generation, distribution, access, use, and archiving of these information resources. To that end, South Africa and other developing countries could benefit from the OECD policy principles for enhanced quality and access, and more effective use of PSI²⁵⁷. These principles cover important dimensions related to PSI such as conditions for access and reuse, quality, integrity, copyrights, and public-private partnerships. They also address different audiences including PSI holders, re-users, libraries, publishers, NGOs, etc.

Public Servants

1. The study findings also emphasize that for the value of the PSI resources to be maximized, an information-aware culture within the government must be developed. In addition to policy makers and high-level government officials, public servants also need to be aware of the value of the information beyond its use for administrative and regulatory purposes.
2. The development and sustainability of an information-aware culture also requires having an adequately skilled workforce. For example, specialized information management training workshops should be organized on a regular basis. Topics covered could include effective data collection and curation practices for public servants involved in the creation, collection, processing, storing and distribution of PSI to enhance its quality and reliability. Training on archiving, search and retrieval, and digitization technologies should be also considered. Another important area that requires training or awareness raising activities is related to legal issues. This could include issues related to intellectual property rights, national security, personal privacy, and sensitivity of certain types of information. Finally, training or awareness raising efforts geared towards developing a better understanding of the roles and

²⁵⁷ Available at: <http://www.oecd.org/sti/44384673.pdf>

responsibilities of public servants dealing with these information resources would be very valuable.

3. It is also important to make sure that the newly hired mid and top-level managers, especially information managers, have the necessary knowledge, skills, and attitude to promote and facilitate such culture.

6.2.2 PSI Utilization and Value: Monetary vs. Greater Societal Value

The existing literature on the utilization and value of PSI is mainly focused on quantifying the impact of PSI and assigning monetary value to its outcomes and impact. Vickery (2011) notes that the focus on commercializing PSI has received most attention until now. Corbin (2009) shares the same sentiment, writing that the focus in all of the studies he reviewed was on the monetary value of PSI, rather than on the wider societal benefits. te Velde (2009) calls this phenomenon an “obsession with making money out of the PSI” and describes it as “short-sighted and probably damaging” (p.27). He makes the argument that focusing exclusively on this dimension of PSI could work against extracting the greatest socioeconomic value from this resource.

This study breaks away from this obsession with commercialization of PSI and provides detailed insights on the ways in which this strategic resource contributes to knowledge creation and the overall development and well being of the South African society. Whether it is used for monitoring and evaluation or prioritization and planning purposes, the knowledge created as a result of utilizing PSI resources is instrumental to the effectiveness of a wide range of stakeholders working on pressing developmental issues related to public health, education, food security, employment, innovation, and other aspects related to the socioeconomic development

of the people of South Africa. These stakeholders include national and provincial governments, municipalities, academic institutions, local, regional and international NGOs, as well as funding agencies.

These insights should encourage future researchers who are interested in the usability and value of PSI to further investigate the non-monetary aspects of these strategic resources and the ways in which they contribute to the building and sustainability of societies.

6.2.3 PSI Utilization and Value: The Developing Countries Context

Most of the literature reviewed in chapter two, particularly studies on PSI utilization and value, was focused on the OECD countries. This created a significant gap in the literature and in our understanding of PSI utilization and value in the context of developing countries. Being the first of its kind, this study makes important contributions to the literature by offering a new perspective and showing how and why certain assumptions might not prove correct in the context of developing countries.

Most current research begins with the assumption that the studied developed economies enjoy clear and well-enforced information policies as well as a long-established, independent civil service and information collection institutions. The findings of this study, as explained above, paint a different picture, highlighting significant discrepancies between the policies on paper and their implementation. Similarly, inconsistent with arguments made by Abd Hadi & McBride (2000) and Burkert (2004) regarding some specific qualities associated with information from the public sector, such as currency, comprehensiveness, reliability, and sustainability, this study indicated that these assumptions were not necessarily true in the case of

South Africa. On the contrary, the study revealed a long list of quality issues associated with the utilized PSI.

However, the study findings also emphasize that, despite these access and quality problems, users have developed certain strategies to address such challenges, and that PSI remains an essential ingredient in the knowledge creation processes at the study sites and is of vital importance to the overall work in the field of socioeconomic development.

These findings have a number of practical implications for the following stakeholders:

Policy Makers

The above findings provide policy makers in South Africa and other developing countries with strong evidence about the importance of making more PSI easily and freely available, especially online. It is also hoped that highlighting the obstacles and problems facing PSI users will help improve PSI access and use policies. This is especially important as more developing countries (e.g., Kenya, Moldova, Ghana, and South Africa) are currently working on their own open government initiatives and policies. Policy makers should make sure to involve the different stakeholders, especially the potential users of government data, as early as possible in the planning and implementation of these initiatives.

PSI User Communities

The lessons learned from this study should help and motivate other user communities in South Africa and elsewhere to take full advantage of the available PSI. In particular, PSI users, especially from the research community, will find the strategies and best practices related to overcoming access and quality challenges of special importance. For example, in the absence of well-defined and properly enforced PSI access and use policies, PSI users are encouraged to create and strengthen the necessary social and professional networks to facilitate their efforts to

locate and acquire the PSI resources they need for their work. As discussed in chapter five, this strategy was strongly emphasized and recommended by the study participants. A related point that was revealed by the study participants is regarding seniority and experience: the more senior and experienced participants had bigger and stronger networks, and as a result their chances of locating and acquiring the necessary PSI were higher. Therefore, it is recommended that younger PSI users seek help and advice from senior colleagues and that senior users help them build their own networks through, for example, introductions or personal endorsements.

Also, the study identified a list of strategies and techniques used by the participants to overcome quality challenges and to add value to the acquired PSI resources so that it becomes more useful for the creation of different information products and services.

The issue of PSI quality and the value added by the study participants in a developing country context raise important questions regarding the concept and definition of PSI available in the literature. It was clear from the study findings that most of the information acquired from the government had a number of serious quality issues that affected its potential usability and value. By overcoming these quality issues through a wide range of strategies and value adding activities, the participants enhanced the usability of these resources and increased its value not only to their work, but also to other future users of this information. The important question then is: who is the actual producer of the usable and useful PSI? Is it the government or those re-users? While answering this question is beyond the scope of this study, future researchers are encouraged to build upon the findings of this study and delve deeper into this (and other similar) question(s).

Finally, whenever possible, research communities should consider partnering with government agencies or at least getting their buy-in by involving them in the different stages of

their projects, especially the planning stage, in order to make their quest for the necessary PSI easier. As discussed earlier in chapter five, some participants described these kinds of arrangements as effective ways to guarantee accessing and acquiring not only government reports and aggregate analyses, but also the raw data.

International Organizations

Finally, the findings of this study could have some implications for international organizations and funding agencies addressing developmental challenges in the developing world. The lessons learned and best practices identified in this study could particularly encourage these organizations to explore the ways in which they can help build government agencies' internal capacities so that these agencies become more effective in creating and supplying quality PSI.

6.2.4 PSI Utilization and Value: Stronger Theoretical and Methodological Foundations

This study represents a new generation of academic research on the utilization and value of PSI that is built upon strong theoretical and methodological foundations. Existing work in this area has been criticized for being largely dominated by practitioner studies that are rarely multidisciplinary and lack theoretical foundations and robust data collection and analysis approaches (Uhlir, Sharif, and Merz, 2009).

By combining theoretical frameworks from economics of information studies (i.e. Information value -in-use) and organizational knowledge creation studies (i.e., information management process), and employing a more systematic methodology, I was able to investigate the PSI utilization process and the ways in which PSI is contributing to knowledge creation and overall development in South Africa.

Choo's (1995) information management process framework provided a comprehensive and systematic step-by-step approach to investigating the utilization process and value of PSI to the users. For example, what Repo (1986) called "subjective expected value-in-use" in his information value-in-use framework was investigated at the identification and acquisition of information stages in Choo's model. Repo's "subjective value-in-use" was studied at the information storage and organization, development of information products and services, and dissemination of information stages in the model. As for Repo's "objective value-in-use", this was studied at the last stage of Choo's model, which is information use.

Furthermore, by combining those two frameworks, I was able to thoroughly investigate some specific factors that affect the usability and value of information such as access issues (e.g., availability and accessibility), technical issues (e.g., data formats and interoperability), and issues related to PSI quality (e.g., accuracy and timeliness).

Therefore, a central contribution of this study is the evidence it provides about the integration and theoretical fit of the two frameworks for investigating these aspects--when put together, these frameworks are able to describe the whole situation. However, a comprehensive, all encompassing theory still needs to be synthesized and this should be considered in future research.

Another important contribution of my study is the case study interview protocol that I developed, which could be used by later researchers in this area (Miles & Huberman, 1994). Furthermore, the coding scheme for the three stages investigated in this study (i.e., seeking PSI resources, knowledge creation process, and knowledge outcomes and application) is a unique contribution to understanding the conditions, variables, and relationships involved in the investigated processes.

Moreover, the findings of the study call for a paradigm shift from the current emphasis on supply to the demand of PSI resources. The current approach to PSI research is predominantly top-down, with input directly sought from the providers. However, PSI providers may never be fully aware and knowledgeable of the wide range of creative uses of their information or the social benefits that result from utilizing it unless they are directly informed by the users.

To sum up, the approach followed in this study could be easily transferable to other contexts. While the contexts may differ and the rapport between a different investigator and the participants might differ, future researchers should be able to follow the approach and achieve similar results. If not, they should be able to understand the contextual factors that differed based on this write-up.

6.3 Study Limitations

The single case study approach presents some concerns with respect to generalizability. In order to combat these limitations, I selected a setting that is typical of many development organizations. I also used multiple methods of data collection, including semi-structured interviews, informal interviews, and documentation. It is also important to note that the main goal of the study was to develop a good understanding of the phenomenon, hence the strong emphasis on detail.

Therefore, statistical generalization, which means generalizing from a sample to the population, was not of great concern to me because I did not conduct a statistical survey. Instead, I was more concerned with analytic or theory-connected generalization and case-to-case transferability. Since the study builds on the participants' own understanding and view of the processes in which they were engaged, the case study approach enables me to make analytical

generalization, where results are generalized to a broader theory as opposed to populations. Therefore, I believe that my study is generalizable to other research using the literature from value of information and knowledge creation theoretical frameworks. This literature informed the study design and the data analysis process, and the theoretical deductions made from the results of the study will eventually act as the basis for future research in this area.

As for case-to-case knowledge transfer, given that my case represents in many ways other organizations working in the development field in South Africa, it can be expected that my findings will help to shed some light on PSI utilization processes and value in other organizations in South Africa and other developing countries.

Another limitation is related to the sampling strategy. As explained in section [4.3.6], theoretical purposive sampling was used for two main reasons: (1) participants have recently used or are currently using PSI in their work, and (2) they can freely communicate their knowledge and experiences related to these processes. Faced with these two theoretical and practical considerations, I decided to adopt the purposive sampling technique. While this approach was convenient and appropriate for current study, it was in some ways vulnerable to selection bias. Future research should consider using probability sampling techniques (such as stratified random sampling) to retest the model.

Another concern is related to the fact that I was a single researcher in the field, and that my interpretations and analyses could have been filtered through my own world-view. However, being a single researcher does not mean that my interpretations and analyses were completely subjective. While I cannot claim that this work was bias-free, I made sure to employ different measures throughout the process of designing and conducting the study to ensure that I produced knowledge that could be useful outside of this case study. This goal was accomplished using

different strategies: (1) while I was still in the field, I frequently discussed my interpretations with participants and gave them the opportunity to refute and correct these interpretations, and (2) I used multiple sources of evidence to maintain the validity of the study (Tashakkori & Teddlie, 1998).

6.4 Future Research

As with any exploratory research, the researcher is usually left with more questions than answers. In this exploratory case study, I note that this is a subject ripe for additional research and see a number of important directions for further investigation.

First, there is a need for more studies using the theoretical framework developed here to confirm the results of this study. The same framework could be used in studies focused on the utilization and value of PSI in other organizations such as universities, NGOs, and international organizations. It could also be used to investigate the utilization and value of information produced by, for example, private sector, NGOs, and international organizations.

Second, comparative studies are also needed in this field. Studying the utilization and value of PSI across different types of organizations in the same country would enrich our understanding of the similarities or differences in the factors, conditions, and relationships involved in these processes at different organizations.

Third, there is a need for longitudinal studies that can track the specific ways in which the created knowledge as a result of utilizing certain types of PSI resources is contributing to social and economic development in the country.

Fourth, the coding schemes developed in this study are open for further investigation in other contexts to determine their reproducibility, validity, and applicability.

Fifth, this study was mainly focused on the PSI-related factors and conditions and their impact on its utilization and value. Our understanding would be further enriched by also investigating the organizational factors that might have an impact on these processes. Such factors may include management support, organizational policies, and the availability of human, technical and financial resources. Additionally, there is a need for increased understanding of public servants attitudes to information, its value, and its potential users.

Finally, the research I have conducted thus far has uncovered a number of interesting strategies and approaches the study participants employed to overcome challenges related to PSI acquisition and quality. Future studies could delve deeper into these strategies, exploring the factors that make them more or less effective and looking at ways in which they could be improved.

6.5 Conclusions

The overarching purpose of my research was to develop an understanding of the PSI utilization process and value within the knowledge creation context and the factors and conditions that affect these issues from the user perspective. In the course of this work, I sought to make contributions to the economics of information and knowledge creation fields.

Employing a qualitative approach, I used a single case study to gather data through in-depth, semi-structured interviews, informal interviews, and document review, over a six-month period.

This approach enabled me to identify and thoroughly investigate the PSI-related factors and conditions that facilitated or hindered the utilization process, as well as the PSI attributes that affected its usefulness and value at the various stages of the knowledge creation process in organizations working on socioeconomic development issues in South Africa.

This study has demonstrated that in their attempts to find and acquire the PSI needed for their work, the study participants faced a wide range of technical, institutional, and political obstacles and challenges. The study also demonstrated that several of the assumptions in the literature about PSI-related policies and quality of such resources were not necessarily correct in the context of a developing country.

However, the main argument brought forth by the study is that despite these access challenges and issues related to PSI quality, the utilized PSI resources were still seen as instrumental to the knowledge creation processes at the study sites and to the overall socioeconomic development of the country.

The study concludes that in addition to the progressive legislation on information access and use in South Africa, effective PSI utilization for knowledge creation and overall socioeconomic development requires defined and clear national standards and mechanisms to ensure that the policies and guidelines are adhered to, and that the bureaucratic restrictions on information access and use are minimal. It also requires the development of an organizational culture that is sensitive to the value of its information assets and the effective management of relations with users.

In summary, I would argue that this type of work is of paramount importance when considering how to develop and implement effective information policies at both the national and institutional levels. Such efforts could help PSI holders in South Africa and elsewhere to create more enabling environments so that the value of these resources can be maximized.

Appendix A: Informed Consent Form

The Utilization and Value of Public Sector Information for Knowledge Development in South Africa

My name is Raed M. Sharif and I am a Doctoral Student at Syracuse University's School of Information Studies. I am inviting you to participate in a research study that I am currently conducting. Involvement in the study is voluntary, so you may choose to participate or not. This sheet will explain the study to you. Please feel free to ask me any questions about the research, or to contact the Syracuse University Institutional Review Board at (email: ospoff@syr.edu) if you have any concerns that I cannot address.

I am interested in investigating the utilization process and value of Public Sector Information (PSI), defined as information that is generated by or for governments using public money, by South African organizations working in the development research and policy areas. For this purpose, I am selecting a number of projects from the Human Science Research Council (HSRC) and the Development Bank of Southern Africa (DBSA). There are many different approaches for projects and organizations to utilize these resources. My goal is not to critique, so much as to explore and learn from how the PSI is identified, acquired (including factors that facilitate or hinder access and acquisition), and utilized in these projects. I will investigate how the users transform the PSI from a source of potential value to a source of actual value to their work. The questions I will ask are related to these aspects.

If you agree to speak with me, I will ask you to sign this consent form. I will be asking you to consent to participate in this interview, which will be audio-recorded using a digital recorder.

The interview will take approximately 50-60 minutes of your time. After the use for data analysis, all recorded materials will be destroyed.

All information will be kept anonymous and confidential unless you otherwise indicate. This means that your name will not be associated with any specific answers or quotes. To protect anonymity in any articles written or presentations made at any conferences should the data prove useful, data will be aggregated around major themes.

If at any time you no longer wish to continue, you have the right to withdraw from the study, without penalty. A decision to stop participating will not reflect negatively on you or your institution, although I hope that you would refer me to someone else in your organization that could assist me.

All of my questions have been answered and I wish to participate in this research study.

I { } give / { } do not give my permission for interviews to be tape-recorded.

In the event that any of my quotes are used in publications,

{ } I would like my identity completely concealed and kept

{ } I would like my identity concealed, except for my institutional affiliation

{ } I give permission for my identity to be revealed, along with my institutional affiliation

Signature of participant

Date

Print name of participant and organization name: -----

Appendix B: Interview Protocol



Interview Protocol

Interviewer.....

Date..... Time: Begin..... End.....

“Informed Consent will be handed now”

If you agree to participate in this interview, please indicate so below. Thank you.

Do you certify that you are over 18-years of age and agree to participate in this interview/focus group discussion?

- a) No “Thank you for your time but feel free to let me know in case you change your mind”
- b) Yes “Thank you.” <<Proceed >>

Project Information:

Project Title:

Unit/Division/Center and Organization:

Year and Duration:

<< If necessary, verify this information with the respondent before starting the interview >>

<< Start interview now >>

SECTION ONE: Demography and Background Information

- Name
- Title/position/profession
- Education and Training
- Years of experience and number of years in this position
- Age
- Gender
- Area of research/expertise

Q1: Can you please tell me in some details what is your job at the << name of the organization/research unit>>? What does that entail?

<< Try to get the respondent to speak about activities s/he is involved in, objectives of these activities, and the different stakeholders involved in these activities>>

SECTION TWO: Utilization of PSI in <<XYZ>> Project

Excellent!

Q2: Let us now focus on the utilization of PSI in the << XYZ>> project.

As you know, PSI includes data and information that is generated either by government agencies (at national, provincial or municipal levels) or for government agencies (through a 3rd party) using public funds.

I am interested in the processes of identifying, acquiring, and utilizing the PSI in this project, including any challenges faced during any of these processes.

Let us start by the different types and sources of PSI you used/use for this project. Can you

please tell me what are the:

- Types of information <<this category could include any information the national government, provincial government, municipalities, or any other public institutions >>.
- Sources of these resources <<this category can include names of organizations, people in charge at these organizations, emails, URLs, etc.>>

Q3: Great! At this stage, I am interested in information related to how the relevant PSI resources were identified, accessed, acquired, and then utilized by in project.

Areas to focus on at this stage are:

a) How and why was the PSI resources were identified and recognized to have value for this project?

- Brief description of the motivations to seek PSI resources? For what purposes were they used?

<<Ask for elaboration on each motive reported>>

- Brief description of the factors that may have hindered or facilitated the discovery of the necessary/relevant PSI to the project.

<< Factors can be technical, legal, institutional, socio-cultural, or economic>>

<<Ask for elaboration on each factor identified>>

<<Read factors and repeat what you are writing down as respondent speaks>>.

- Brief description of the factors that may have hindered or facilitated the acquisition of the necessary/relevant PSI to the project.

<< Factors can be technical, legal, institutional, socio-cultural, or economic>>

<<Ask for elaboration on each factor identified>

<<Read factors and repeat what you are writing down as respondent speaks>>.

b) Did you have any prior or related knowledge related to the needed PSI?

<< Ask the respondent to elaborate here, especially the relationship between prior knowledge/experiences and the identification and acquisition processes of the PSI>>

I am now interested in aspects related to the quality of the acquired PSI resources:

c) How do you evaluate the quality of the acquired PSI resources in relation to the utilization process and to the overall usefulness and value of these resources to the project?

- Give the respondent some examples of information attributes such as accuracy, relevance, timeliness, etc.
- Allow sometime for the respondent to reflect on the attributes reported and ask for elaboration when necessary.
- Also ask about approaches employed to deal with quality issues

d) Let us now focus more on the utilization process itself.

- How did you use the acquired PSI resources and what kind of value did you add to it during the utilization process?

<<Ask for elaboration if necessary>>

Probe questions may include:

- How easy/difficult was it to analyze/process/interpret this information? If difficult, why? What were the main reasons?

- How easy/difficult was it to integrate this information with your internal or other sources of information? If difficult, why? What were the main reasons?

- In what ways did the acquired PSI contribute to the knowledge creation?

<<Ask for elaboration if necessary>>

- What specific areas or domains of knowledge did the utilized PSI contribute to?

<<Ask for elaboration on each domain identified>>

Probe/alternative questions may include:

- What kind of value did the PSI add to your work in this project? How?
- Overall, how would you describe the usefulness of the acquired PSI to the knowledge creation process in this project?

<< Ask for elaboration if necessary>>

SECTION THREE: Importance of the utilized PSI

Q4: In general, how would you describe the importance of PSI to this project and its outcomes?

Extremely important	
Important	
Of some importance	
Not important	
Hard to say	

Q5: Can you please elaborate a bit about this description? Please tell me anything related to the importance of PSI and its value to the kind of work done in this project.

Q6: Great! Now I would like you to tell me in some details what are the outcomes of this project?

I would like you to focus more on the importance of these outcomes to, and their impact (if any) on, certain communities, procedures, policies, or plans.

- Who are the main audience of these outcomes?
- What kind of value does it have for them? Why?
- What are the immediate, short, and long-term impacts of such outcomes?

<< Ask for elaboration if necessary>>

That is great. Thanks!

Finally, is there anything else that you would like to share with us about this issue that we have not talked about?

Do you have any questions for me, or would you like clarification about anything that we have discussed?

<< Thank you very much>>

--End of Interview--

Appendix C: Codes, Definitions, and Examples

Category	Code	Definition	Example
Motivations to Seek PSI Resources	Understanding of the overall situation	PSI used to understand the status quo, the landscape, and the conditions related to the issues the participants are investigating	I looked at the poverty, income, and labor data for each district and local municipality in South Africa in order to understand the current situation in these areas.
	Research design	PSI used in research design including conceptualization, development of research questions, and sampling stages.	All in all, the entire project design was informed by the previous findings within the Department of Education, especially regarding aspects of literacy-- the current problems that the department was encountering and also the kinds of strategies that had been put into place to kind of deal with problems.
	Understanding government actions and plans	PSI used to understand government current thinking, vision, future plans and actions in relation to the issues the participants are investigating	We wanted to understand what is government thinking and doing, how they are analyzing problems, what their beliefs are? How are they understanding what needs to be done in order to resolve a problem or challenge? So basically the information is often used to help us understand how they are thinking about all these issues.
	Lack of other relevant resources	No other relevant information sources that the participants could rely on	Speaking from a health and education background, there is absolutely no other information you can use.
Discovery of PSI Resources: Hindering Factors	Online availability of PSI	Whether PSI resources were available online or not	So what is available [online] can be found. The big question is what is not available and what can we do about it?
	Usability of government websites	The extent to which government websites are user-friendly and easy to	Some of the government websites are badly designed that even if they have online stuff, it is difficult to locate it and download it.

		navigate	
Discovery of PSI Resources: Facilitating Factors	Partnerships with government agencies	The ways in which collaboration with government agencies helped to find the needed PSI	As I said earlier, this is a joint project. Because of this, we had contact persons within the Department of Education. So anytime we needed information we could contact those people and get the information.
	Prior knowledge and experience	The ways in which participants' prior knowledge and/or experience helped to find the needed PSI	I actually used to work for this Department before moving to this job and that is why I knew they were the custodians of this information.
Acquisition of PSI Resources: Hindering Factors	Fear of criticism and exposure	Government officials fear of criticism and exposure	If a report makes it to the newspaper saying that this percentage of roads in a certain province or municipal area are not in good shape or don't meet the standards, this is a big danger for them.
	Sensitivity of the topic	The degree of sensitivity of the sought PSI	Well, like I said, HIV/AIDS is a very sensitive thing, because of the stigma, because of the issue of patient information confidentiality, which was a bit of a problem.
	Bureaucratic procedures and practices	Procedures and practices that hinder the acquisition of the sought PSI resources	Without anything written down from a senior official, for example, you will never get such information... the entire operation of government depends on memos.
	Technical factors	Paper-based vs. computerized information, format of the electronic files, etc.	I had some of my team members saying, we were just shown a pile of files and they say there is the information. So it was not easy. We had to go through a process of trying to extract some of the information.
Acquisition of PSI Resources: Facilitating Factors and	Personal networks	Creating and using personal connections to get the needed PSI	Well, the information I wanted was not available online, but because I worked for them [government] before, it was not difficult to get the information. I just called the person I

Strategies			knew there and she gave me all the information.
	Get buy-in from the government	Involving government agencies at the different stages of the project, especially at the planning stage.	We had what we call information meetings with the district officials. When we briefed them about the study, we get permission to do the study and they would advise on how and where to collect which kind of data.
PSI Quality Evaluation	Completeness of the acquired PSI	The extent to which the information is not missing and is of sufficient breadth and depth for the task at hand	A current challenge within any documentation around health infrastructure planning is always affected by the fact that we have not as a country been as regular about conducting audits of health facilities. And if you don't know, you can't gauge whether you've progressed as far as you could.
	Timeliness of the acquired PSI	The extent to which the information is sufficiently up-to-date for the task at hand	Well, for the service delivery information at the municipal level, we only had year 2001 data, which is really outdated in terms of where we are now.
	Consistent representation of the acquired PSI	The extent to which the information is presented compactly and in the same format	Disparity between different sources of information is the main thing that I sometimes struggle with. You get two different sets of data from two different sources about the same issue.
	Inter-operability of the acquired PSI	The extent to which the information is in appropriate language and symbols, and that units and definitions are clear	There is also a problem with the definitions used. For example, in the case of mobile subscribers, what is the definition of a subscriber? Is it the one who has a SIM card? What if she has more than one SIM card? What were the criteria used to collect the data?
	Ease of use and manipulation of the acquired PSI	The extent to which the information is easy to manipulate and apply to different tasks	To get to understand the format, fields and calculations, it took me a couple days, which is a long time given the assignment I was working on. But time was not really the main challenge; the main challenge is that I did not feel absolutely confident

			that I got my interpretation and analysis right.
	Believability of the acquired PSI	The extent to which the information is regarded true and credible	Look, if you get a three paragraphs report for a public meeting that was supposedly five hours long, if I get a page even for a meeting that was supposedly three or four hours long attended by so many people, then you know that they are bull****ing.
	Objectivity of the acquired PSI	The extent to which the information is unbiased, unprejudiced, and impartial	In this project, we realized that the provincial government departments are so busy portraying themselves in a positive light. Actually, what I found surprising is that there was an attempt to manipulate this very data at the province level so that it can fit to the political goals of the province.
	Verifiability of the acquired PSI	The extent to which the user is able to verify the validity of the information	There was no way of verifying the validity of this data because the methodology was not clear.
PSI Contributions to Knowledge Creation: Information Products and Services	Basic analysis	Cleaning, categorization, crosschecking, basic visualization in tables and diagrams	We categorized the data into area-specific with greater details that you would not find readily available from any government agency.
	Comparative analysis	Comparative analysis between and among different levels of agencies, projects, or policies	So through our comparative analysis, we were able to see what municipalities were doing well and in what areas vs. the ones that had some problems and also in what areas.
	Creating databases	Creating comprehensive, integrated, and comparable databases.	Using different sources, I built three datasets of energy data going back to 1996 and made them comparable.
	Creating GIS maps	Visualizing development data through tools such as GIS systems	We also did some visualization and produced 12 maps representing the unemployment data over a 3-year period.
	Building and testing models	Building and testing social and economic models	My main work is to use datasets from Statistics South Africa (e.g., the general household survey) to develop

			models related to efficiency, effectiveness, and equity.
	Other forms of advanced analysis	Other forms of advanced analysis	...Our analysis was very time-related and demand-driven. It was about identifying the real areas of skills shortage rather than the assumed areas. Then we correlated this information with other resources from universities and technical institutes.
PSI Contributions to Knowledge Creation: Specific Domains of Knowledge	Monitoring and evaluation	Specific domains of knowledge in which the acquired PSI contributed to	One of the purposes of this study was to understand whether what teachers, schools, and provinces are doing is consistent with this particular government policy on education.
	Prioritization and planning	Specific domains of knowledge in which the acquired PSI contributed to	This study can definitely be used as a planning tool by policy makers. It allows us to say which ARV delivery model is highly effective and what are the cost implications if they [the government] want to scale it up because we see that some of the models work but they are never scaled up so we want to find out what would be the cost.
Importance of Knowledge Outcomes	National level	How and why the created knowledge is important at the national level	Education and health have been identified as national priorities, so documents like the [Infrastructure]Barometer gain further impetus because they give one a sense of what they sought to achieve in 1994, what they have achieved, what they have done wrong and what can they do differently.
	Provincial level	How and why the created knowledge is important at the provincial level	As I said when we started, the province needed to know what is happening in the schools, so that the report can inform illiteracy strategy that they are busy working on. That was very important because the report was presented to the provincial representatives, all the curriculum advisers, and all the like.

			<p>We made recommendations, and they also added on the recommendations. And then they said, given the findings [of our report], they had to come up with an action plan based on this report. Mostly long term impact.</p>
	Municipal level	How and why the created knowledge is important at the municipal level	<p>...For example, when the municipality has information about the different sectors (e.g., how a certain municipality is doing in terms of ICT access and use compared to the rest of the country), they will be able to prioritize and focus their efforts on the areas that need immediate attention. The same way the national government can benefit from it in terms of planning and allocation of resources.</p>
	Organizational level	How and why the created knowledge is important at the organizational level	<p>Whenever they [the DBSA units] want to motivate for projects in the service delivery they can use this report to back these motivations up using the analysis of the different backlogs, etc. It is key for the DBSA in projects appraisal, planning, and investment decisions. The Infrastructure Barometer is seen as vehicle to promote what the DBSA does, what it can do, and equally to upgrade the knowledge around the situation in the infrastructure.</p>
	Regional and international levels	How and why the created knowledge is important at the regional and international levels	<p>I can also see benefit [of our report] at the regional and international levels...HIV is a big thing, it is a regional problem, so whatever we do here will benefit other countries in the sub-region and other developing countries or countries that are affected by it. If anybody is serious about improving this field, they will pay attention to the sentiments expressed in the report.</p>

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PROFESSIONAL PROFILE

- Accomplished career demonstrating 12 years of consistent success as a professional, researcher, educator, and activist.
- Seasoned professional in public policy and international development, with special focus on information, science and technology public policies and their impact on scientific and socioeconomic development, locally and internationally.
- Extensive background in developing, implementing and evaluating activities in the areas of open data, information, and knowledge for development and social change, e-governance, open participation, open ICT4D, and open collaboration and innovation.
- Effective communicator with excellent planning, organizational, team-building and negotiation strengths as well as the ability to lead, reach consensus, establish goals, and attain results. Recognized as resource person, problem solver and creative leader.
- Excellent track record in teaching undergraduate and graduate students. Consistently receiving outstanding evaluations from my students.

EDUCATION

- 2013 **Ph.D. in** Information Science and Technology Program, the School of Information Studies at Syracuse University, Syracuse, New York, USA.
- 2000-2002. **Masters in Business Administration (MBA, with distinction)**. Concentration on Strategic Management and Planning. Birzeit University, West Bank, Palestine.
- 1993-1999. **Bachelor in Economics with double minors in Political Science and Business Administration**. Birzeit University, Palestine.

TEACHING EXPERIENCES

Fall 2006-Present: Adjunct Professor at the Information School, Syracuse University

Courses I regularly teach:

Strategic Management of Information Resources (Graduate Level)

Seminar. Integration of previous learning on the various components of management, user needs, and technologies. In-depth review and use of case studies on a range of critical information resources management areas.

Strategic Planning in Information-Based Organizations (Graduate Level)

The course focuses on linking information needs and technology support to organizational goals as a critical skill for professionals. It discusses how to develop a strategic planning process for information resources, identify strategic issues, link strategic planning with organizational mandates and mission, write a strategic plan with appropriate performance measures, implement the strategic planning process, and evaluate the planning system and outcomes.

Survey in Telecommunication and Information Policy (Graduate Level):

This course discusses public policy issues of the digital environment, including freedom of expression, intellectual property rights, economic regulations, privacy, security, access, standards, and dissemination of public information. The course applies economic, legal, and political science concepts to policy formulation, analysis, and evaluation.

HIGHLIGHTS OF PROFESSIONAL EXPERIENCES

- **Sept. 2006-Present:** Adjunct Professor at the Information School, Syracuse University

- **Sept. 2009-Present:** Independent Consultant
 - **October 2012-Present:**
 - **Projects Mentor:** IDRC/Web Foundation Program on “Exploring Emerging Impacts of Open Data in the Developing Countries”

 - **July 2011- August 2012:**
 - Editor: a workshop report on “*The Future of Knowledge Discovery in Open Networked Environments*”. Commissioned by the US National Academy of Science.
 - Editor: a workshop report on “*The Case for International Sharing of Scientific Data: A Focus on Developing Countries*”. Commissioned by the US National Academy of Science.
 - Editor: a workshop report on “*Developing Data Attribution and Citation Practices and Standards*”. Commissioned by the US National Academy of Science.

 - **June- August 2010:** Authoring a background paper titled “*Collaborative Innovation and Development for Building and Sustaining Knowledge Societies in the Arab World.*” Commissioned by IDRC Regional Office in Cairo.
 - **August-October 2009:** Co-authoring a professional report titled “*Building and Sustaining Knowledge Societies in the MENA Region: Mainstreaming ICT4D Research and Activities into IDRC Development Agenda (2011-2015)*”. Commissioned by Birzeit University for an IDRC Research Supported Project .

- **Research Positions and Fellowships**
 - **April-Sept. 2009:** Research Fellow at the Intellectual Capital Unit, the Development Bank of Southern Africa, South Africa.

 - **April-Sept. 2009:** Visiting Researcher at the Information and Knowledge Management Department, University of Johannesburg, South Africa.

 - **Sept. 2005- December 2007: Research Associate (Part Time)** at the Office of International Scientific and Technical Information Programs (ISTIP), now the Board on Research Data and Information (BRDI), the U.S. National Academies.
Main Tasks:
 - Conduct science and technology policy research
 - Proposal writing and fund raising
 - Projects implementation and evaluation
 - Workshops and Meetings Organization:

- OECD- U.S. National Academies Workshop on Measuring the Social and Economic Cost and Benefits of Access to and Use of Public Sector Information (PSI). Paris, France. Feb. 4-5, 2008.
 - Japan-U.S. Cooperative Science Program: International Workshop on Designing Global Information Commons for Innovation in Frontier Sciences. Nov. 8-10, 2007. Tokyo, Japan.
 - An International Workshop: Strategies for Permanent Access to Scientific Information: Focus on Health and Environmental Information for Sustainable Development: South Africa, Sept. 5-7, 2005, Brazil, May 5-9, 2007, and South Africa, May 12-16, 2007.
 - U.S. – China Roundtable on Scientific Data Cooperation. October 2006, Beijing, China, and October 2007, Washington DC, USA.
 - InterAcademy Panel on International Issues: Program on Promoting Access to and Use of Digital Knowledge Resources and Infrastructure: Focus on Countries with Developing and Transitional Economies. Regional planning meetings in Brazil, May 10, 2007, South Africa, May 17, 2007, and Beijing, China, Dec. 6, 2007.
- **June–August 2005:** Research Fellow at the Office of International Scientific and Technical Information Programs (ISTIP), the U.S. National Academies.
I worked on the “Science in Information Society Project” which was presented during a side event workshop at WSIS II in Tunis in November 2005.
<http://www7.nationalacademies.org/biso/>
- **August 1999- August 2004: The Birzeit University Information Technology Unit (BIT). Birzeit University, Palestine.** www.birzeit.edu
 - Business Development Manager (2002-2004)
 - Information and Telecommunication Technologies (ICTs) Training Programs Manager (2000-2002)
 - Community Outreach Officer (1999-2000).

Previous Consultancy Experiences:

- A UNESCO Study. "The Use of Information and Communication Technologies (ICT's) in the Palestinian Education System. (Sept.- Dec.2003).
- The Knowledge Center Project at Birzeit University. Funded by USAID. Worked with a team of local and international consultants to develop the feasibility study for establishing a Knowledge Center at Birzeit University (Sept.2003-August 2004)
- ICT in Palestine, a Strategic Framework. UNDP, Jerusalem. Worked with a team of local researchers and consultants on the development of an ICT implementation strategy for the UNDP country office in Jerusalem. (June 2002- May 2003).
- MEDFORIST Project (Euro-Mediterranean Network for sharing IST learning resources). 2002-2004.
- MID-Library Project: A joint project between the European Commission and Birzeit University Library & the Information Technology Unit (BIT). (2003-2004)
- Virtual University Project: A joint project between the European Commission and the Birzeit University Information Technology Unit (BIT). 2003-2004.

INTERNATIONAL PROFESSIONAL ACTIVITIES AND MEMBERSHIPS

- **March 2009-Present:** Co-Chair, CODATA Young Scientists Working Group.
- **May 2008- January 2011:** Steering Committee Member, InterAcademy Panel on International Issues Program on Digital Knowledge Resources and Infrastructure in Developing Countries.
- **May 2008- January 2011:** Member, Task Group on Promoting Access to and Use of Digital Knowledge Resources in Developing Countries, the InterAcademy Panel on International Issues Program on Digital Knowledge Resources and Infrastructure in Developing Countries.
- **January 2008- May 2010:** Co-chair, the Young Scientists Forum (YSF) at the UN GAID Community of Expertise on Enhancing Access to and Application of Scientific Data in Developing Countries (*e-SDDC*).
- **March 2007- Present:** Executive Committee Member: The UN GAID Community of Expertise on Enhancing Access to and Application of Scientific Data in Developing Countries (*e-SDDC*).
- **September 2006-Present:** Member, CODATA Task Group on Preservation of and Access to Scientific and Technical Data in Developing Countries.
- **May 2009-present:** Member, the International Association for Social Science Information Service and Technology (IASSIST).
- **December 2007- Present:** Member, the World Academy of Young Scientists (WAYS).
- **May 2008- Oct. 2008:** Steering Committee Member. CODATA Young Scientists.

PUBLICATIONS

Professional Reports/Papers

- **Sharif, Raed, M.** Collaborative Innovation and Development for Building and Sustaining Knowledge Societies in the Arab World. Working Paper Commissioned by IDRC Regional Office in Cairo. July 2010.
- **Sharif, Raed M. (Main Author)** , Tarazi, M., Kholi, A. (Contributors). **Building and Sustaining Knowledge Societies in the MENA Region:** Mainstreaming ICT4D Research and Activities into IDRC Development Agenda (2011-2015). Commissioned by Birzeit University for an IDRC Research Supported Project .
- Uhlir, Paul. F., **Sharif, Raed. M.**, Merz, Tilman. (2009). Measuring the Social and Economic Costs and Benefits of Public Sector Information Online: Review of Literature and Future Directions. In the NRC Report titled “*The Socioeconomic Effect of Public Sector Information on Digital Networks*”. Available at: http://www.nap.edu/catalog.php?record_id=12687
- **Sharif, Raed. M.** , Uhlir, Paul. F. (2009). An Inventory of Resources for Creating an Open Institutional Repository. A Toolkit prepared for the InterAcademy Panel on International Issues Program on Digital Knowledge Resources and Infrastructure in the Developing Countries. Published at: <http://www.interacademies.net/>
- Lange Canhos, D. A., Perez Canhos, V., Anderson, W., Uhlir, P. F., Carroll, B. C., **Sharif, R. M.** & Kishor, P. (Eds.) (2007). Strategies for open and permanent access to scientific

information in Latin America: focus on health and environmental information for sustainable development. Workshop report. Atibaia: CRIA. Available at:

http://www.cria.org.br/eventos/codata2007/report/Brazil2007_workshop_report.rtf

- **Sharif, R.M.** (2003). The use and utilization of Information and Communication Technologies (ICT's) in the Palestinian Education System. Unpublished paper. UNESCO.

Papers, Book Chapters, and Posters

- **Sharif, Raed M.** (2009). Maximizing the Value of Public Sector Information for Scientific and Socioeconomic Development in Africa. The Proceedings of the 3rd Biannual Knowledge Management Africa (KMA) Conference. Dakar, Senegal, May 4-7, 2009. Available at: <http://isivivane.com/kmafrica/?q=group.governance.maximizing.the.value.of.public.sector.information.for.scientific.and.socioeconomic.development.in.Africa>
- **Sharif, Raed M.** (2009). The Value of Public Sector Information as a Strategic Resource to Civil Society Organizations' in South Africa: Evidence from the Fight to Eradicate Poverty. Poster presented at the iSociety: Research, Education, Engagement Conference, the University of North Carolina at Chapel Hill, Feb. 8-11, 2009.
- Paul Wouters, Christine Hine, Kirsten A. Foot, Steven M. Schneider, Subbiah Arunachalam, **Raed M. Sharif**, (2006), "Promise and Practice of Open Access to e-Science". In: W. Shrum, K. R. Benson, W. E. Bijker & K. Brunnstein (Eds.), Past, Present, and Future of Research in the Information Society: Reflections at the Occasion of the World Summit on the Information Society, Tunis 2005. New York: Springer, pp. 159-172.
- Qin, J. & **Sharif, R.M.** (2006). Metadata research: Models, schemas, and realities. Proceedings of the ASSIT Annual Conference, November 3-8, 2006, Austin, Texas.
- Cogburn, D.L., Johnsen, J.F., Bhattacharyya, S., **Sharif, R.M.**, Howison, J. (2006). Distributed Deliberative Citizens: Exploring the Impact of Collaboratories on Transnational NGO Network Participation in WSIS. Paper presented at the "Uniting the Americas: Technology, Intercultural Communication, and Public Affairs Conference". A special joint conference presented by the University of Saint Martin de Porres (Lima, Peru), ICA, and the American Communication Association (ACA). August 3-5, 2006.
- **Sharif, R.M.** (2005). Scientific Communities' Access to Publicly Funded Scientific Information in Latin America: A Conceptual Framework. Paper presented at a Pre-WSIS conference: The Past, Present and Future Research in Information Society. Tunis, Tunisia. November 13-15, 2005.
- **Sharif, R.M.** (2005). Harnessing Science and Technology Research in Developing Countries: Empowering the Bottom-Up Approach. Poster presented at the Strategies for Permanent Access to Scientific Information in Southern Africa: Focus on Health and Environmental Information for Sustainable Development. An International Workshop. The CSIR Convention Centre, Pretoria, South Africa, 5-7 September 2005.
- McKnight, L., Wijngaert, L., **Sharif, R. M.** (2005). Wireless Grids: Assessing a New Technology from a User Perspective. The Proceedings of the International Federation for Information Processing (IFIP)-Working Conference on Designing Ubiquitous Information Environments. Cleveland, Ohio, August 1-3, 2005.
- Guzman, I. R., **Sharif, R. M.**, Blanchard, T. J., Ellis, G. S., & Stanton, J. M. (2005). What attracts women to the IT field? The First Process of Occupational Socialization. The Proceedings of the 2005 Americas Conference on Information Systems (AMCIS), Omaha,

Nebraska, USA, August 12-15, 2005.

- **Sharif, R.M.** (2005). It's a Man's World: The Accommodation Process of Women to IT Occupational Subculture in the US. The Proceedings of the Connections 2005: The 10th Great Lakes Information Science Conference at McGill University, Montreal-Canada, May 14-15, 2005.

Invited Sessions, Panels, and Presentations

- **Keynote Speech:** "The Power of Information and Digital Networks: New Paradigms and Expectations for Socioeconomic Development". **At the 9th Annual Information & Knowledge Management Conference, Johannesburg, South Africa. July 10th, 2009.**
- Session Co-organizer. ***"An overview of the Open Knowledge Environment (OKE) Concept, Rationale, and Potential Value"***. CODATA 23rd International Conference: Open Data and Information for a Changing Planet. **Taipei, October 28-31, 2012.**
- Session Co-chair and presenter. Follow-up Meeting on ***Management of an Open Knowledge Environment (OKE): Content Management and Dissemination Policies, Practices, and Licenses***. Technical Meeting on Open Access and Dissemination of Scientific Information in Central America and the Caribbean. **Kingston, Jamaica. December 5-6, 2011.**
- Session Co-chair and presenter. ***Management of an Open Knowledge Environment (OKE): Content Management and Dissemination Policies, Practices, and Licenses***. Technical Meeting on Open Access and Dissemination of Scientific Information in Central America and the Caribbean. **Kingston, Jamaica. January 17-19, 2011.**
- Invited Presentation (with Paul Uhler) "***Overview of UNESCO Policy Guidelines on Governmental Public Domain Information***" at the Pan African Conference on Access to Information, **Cape Town, South Africa, September 18-20, 2011.**
- Invited Presentation. ***The Use of Public Sector Information in Socioeconomic Development in South Africa***. A Seminar at the Development Bank of Southern Africa (DBSA), **Midrand, South Africa. August 18th, 2009.** **Audience:** the DBSA staff.
- Invited Presentation. ***Maximizing the Value of Public Sector Information: New Paradigms and Expectations for Socioeconomic Development***. A Seminar at the Human Sciences Research Council (HSRC) **Pretoria, South Africa. August 11th, 2009.** **Audience:** HSRC staff, government and private sector representatives, faculty, graduate students.
- Presentation. ***What is in the Public Sector Data and Information for Scientific and Socioeconomic Development in the Developing World?*** IASSIST's 35th annual conference: Mobile Data and the Life Cycle. **Tampere, Finland, May 26-29, 2009.**
- Invited Presentation. ***Maximizing the Economic Value of Government Information to the Private Sector's Growth and Competitiveness in South Africa***. The Department of Information and Knowledge Management at University of Johannesburg monthly public seminar. Johannesburg, **South Africa, May 21st, 2009.** **Audience:** Government and private sector representatives, faculty, graduate students.
- Invited Presentations. ***"The Open Institutional Repositories' Inventory of Resources" and "The IAP Member Academies Survey and Summary Analysis Documents: An Overview"***. The InterAcademy Panel on International Issues Program on Digital Knowledge Resources and Infrastructure in Developing Countries: 2nd Steering Committee and 1st Task Groups Meeting. **Pretoria, South Africa, May 11-12, 2009.**
- Organizing and Co-chairing a session titled ***"The Social and Technological Issues in***

Scientific Data Management: Awareness, Facilitation, and Access” at the 21st CODATA International Conference, Scientific Information for Society- from Today to the Future, [Kyiv, Ukraine, 5-8 October, 2008.](#)

- Presentation. *The Role of Young Scientists in the Open Access Movement.* International Workshop on Open Access Models for Science Dissemination, organized by the Abdus Salam Center for Theoretical Physics. [Trieste, Italy, July 7-16, 2008.](#)
- Invited Presentation. *The Role of the e-SDDC Young Scientists Forum (YSF) in Creating a Young Scientists Network for Digital Knowledge Resources and Infrastructure.* The InterAcademy Panel on International Issues Program on Digital Knowledge Resources and Infrastructure in Developing Countries Regional Meeting. [Shanghai, China, May 28-29, 2008.](#)
- Invited Presentation. *Creating Open Knowledge Environment: Available Tools and Technologies.* The InterAcademy Panel on International Issues Program on Digital Knowledge Resources and Infrastructure in Developing Countries Regional Meeting. [Shanghai, China, May 28-29, 2008.](#)
- Invited Presentation. *Measuring the Social and Economic Cost and Benefits of PSI online: Review of the Literature and Future Directions.* OECD- U.S. National Academies Workshop, OECD, [Paris, France, February 4-5, 2008.](#)
- Invited Presentation. *The Global Information Commons for Science and Innovation from the Developing Countries Perspective.* Japan-U.S. Cooperative Science Program: International Workshop on Designing Global Information Commons for Innovation in Frontier Sciences. [Tokyo, Japan, November 8-10, 2007.](#)
- Invited Presentation. *The Role of Young Scientists in Maximizing the Value of Science in the Information Age.* Global Scientific Challenges: Perspectives from Young Scientists. An international conference celebrating 75 years of ICSU. [Lindau, Germany, April 4-6, 2007.](#)
- Organizing and chairing a session with invited speakers, including myself, titled: *“Maximizing the value of science in the information age: Young scientists and the new exciting opportunities”.* Middle East Frontiers of Science and Engineering (FOSE). [Seville, Spain, March 19-21, 2007.](#)
- Presentation: *Metadata and Multilingualism: The Case of Access to Scientific data and Information.* At the panel on “Supporting Sustainable Access to Scientific Data through Metadata “. The 20th CODATA International Conference: Scientific Data and Knowledge within the Information Society. [October 23-25, 2006 Beijing, China.](#)
- Presentation. *Access to and Use of Publicly Funded Geospatial Data for Health and Environmental Applications in Latin America: A Focus on Poverty Reduction and Sustainable Development (A Study Design).* The 9th Global Spatial Data Infrastructure international conference: Spatial Information: Tool for reducing poverty. [November 6-10, 2006 Santiago, Chile.](#)
- Invited Panelist. *Internet Governance after WSIS.* Panel organized by Syracuse University School of Law, February 21, 2006.
- Invited Panelist. *CODATA and the Global Information Commons for Science Initiative.* A panel Organized by CODATA International as a side event at WSIS II Conference. [Tunis, Tunisia, November 17th, 2005.](#)
- Invited Presentation. *Harnessing Science and Technology Research in Developing Countries: Empowering the Bottom-Up Approach.* University of Western Cape Town, [Cape Town, South Africa. Sept. 10, 2005.](#)

- Invited Presentations: *“The E-Phenomenon” & “What is E-Commerce?”*. The Ministry of Planning and International Cooperation (MOPIC). **Ramallah, Palestine. June 2002.** Audience: Palestinian Trade Attaches.
- Invited Presentations. *“Do we really need e-government in Palestine?” and “Is Palestine ready for e-government? Questions without answers!”* The Ministry of Trade and Economy (MOTE). Gaza and Ramallah, **Palestine. April 2004.** Audience: The Minister and the ministry staff.
- Invited Presentation. *“National Strategies for ICT: Lessons Learned”*. The Palestinian ICT Strategy Task Force. **Ramallah, Palestine, July 2004.** Audience: Representatives from the Ministry of ICT, the Palestinian Information Technology Association (PITA) www.pita.ps, the ICT private sectors and international organizations.

HONORS AND AWARDS

- Full sponsorship to present at the IASSIST 2009 Conference in **Tampere, Finland. May 26-29, 2009.**
- Full sponsorship to present at the 3rd Biannual Knowledge Management Africa (KMA) Conference in **Dakar, Senegal. May 4-7, 2009.**
- Syracuse University Outstanding TA Award **2009**
- Half sponsorship to attend the International Workshop on Open Access Models for Science Dissemination organized by the Abdus Salam Center for Theoretical Physics. **Trieste, Italy, July 7-16, 2008.**
- Full Sponsorship to present at the Global Scientific Challenges: Perspectives from Young Scientists. An international conference celebrating 75 years of ICSU. **Lindau, Germany April 4-6, 2007.**
- Full Sponsorship to present at the Middle East Frontiers of Science and Engineering (FOSE) meeting. **Seville, Spain, March 19-21, 2007.**
- Full sponsorship to attend Oxford Internet Institute Doctoral Students Program, **Oxford University. Oxford, England, July 2006.**
- Christine Mirazyan Science and Technology Policy Graduate Fellowship, the National Academy of Sciences, USA. **Summer 2005.**
- A letter of recognition personally signed by Kofi Annan, Secretary-General/United Nations as a special appreciation in recognition of my service as United Nations Volunteer, 2002.

LANGUAGES

- Arabic and English: Fluent
- Hebrew: Fair