

Identifying Information Quality Mechanisms:

A Comparative Case Study of Professional Bureaucracies

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This Master's Thesis is carried out as a part of the education at the University of Agder and is therefore approved as a part of this education. However, this does not imply that the University answers for the methods that are used or the conclusions that are drawn.

Preface

This master thesis was conducted during spring 2011, at Department of Information Systems, Faculty of Economics and Social Sciences, at the University of Agder.

The purpose of this study has been to answer a call for research on empirical studies analyzing Information Quality practice in context. We respond to this call by identifying underlying mechanisms affecting Information Quality and its impact in a complex organizational setting, by comparing two professional bureaucracies.

We would like to thank all the twelve informants in both organizations for their willingness to participate in this study. We hope this research will help leveraging the focus on Information Quality and contribute to improved practices.

A special thanks to our supervisor, Professor Bjørn Erik Munkvold, for his constructive feedback, guidelines and reflections, not only during the progress of this study, but also through the course of IS-404 'Research methods in Information Systems', which formed the basis for this thesis. Further, we would like to thank Associate Professors Øystein Sæbø and Eli Hustad for facilitating the course IS-408 'Advanced Research Project' enabling us to thoroughly elaborate the topic of Information Quality through a literature review.

Geir would like to thank his employer, Head of Division, Anders Wahlstedt, for making completion of the master's program possible, by facilitation and work arrangements. A special thanks to my dearest, Marianne, Emma and Martine, for enduring these three years, culminating in five months of almost complete absence in mind and body. I am really looking forward to move all focus back to the family - re-energized and full of commitments.

Marcus would like to thank his employer, represented by Director of Department, Jakob Larsen, for job arrangements, making completion of the master's program possible. A special thanks to my father Knut, for wise advice during studies, and a warm thank to my dearest Veronika for endless support.

Kristiansand, June 1st 2011

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Abstract

There has been increasing attention to active management of Information quality (IQ) the later years, due to the severity of the impacts of IQ facing organizations. Still, while large organizations are typically aware of problems related to information and data, they consistently underestimate the extent of the problem and are unaware of the potential and opportunities of IQ management. One reason for difficulties in raising awareness is related to the complex nature of the concept of IQ; IQ is perceived individually and is context-sensitive. IQ research the past two decades has been extensive, where the main focus has been on designing attributes and perspectives in order to assess IQ. Several of these research efforts have emphasized the need for a deeper understanding of IQ, by using different theoretical approaches, in order to develop context-specific IQ models.

This thesis aims to identify the underlying mechanisms and the impacts of IQ in a complex organizational context; professional bureaucracies. This context is particularly interesting, characterized by difficulties in assessing service quality; quality is hard to assess in general for the organizations, and particularly for the clients. These characteristics fundamentally challenge the extant IQ research calling for a consumer-centric viewpoint, based on the assumption of clients to be the best evaluators of service quality.

Since mechanisms of IQ in professional bureaucracies can be characterized as an emerging research area, we chose to investigate in two stages; 1) a literature review, and 2) a qualitative inquiry. Data was collected qualitatively by conducting twelve semi-structured interviews in two professional bureaucracies; a general hospital and a university. The informants were representing different parts of the organizations, in order to gain both depth and breadth of the data.

Our research identifies six distinct underlying mechanisms in professional bureaucracies; 1) *Awareness of IQ*, 2) *Bureaucratization*, 3) *Individual contingencies*, 4) *Locus of power*, 5) *Complexity*, and 6) *Perceptions of IQ*. Further, this thesis concludes with four distinct grand themes of IQ impacts in professional bureaucracies; 1) *Client impact*, 2) *Organizational impact*, 3) *Personal impact*, and 4) *Service impact*.

We conclude these mechanisms to be integral parts of IQ in professional bureaucracies by shaping and affecting the state of IQ. For practice, knowledge of these mechanisms, and the relating impacts, enables professional bureaucracies to target initiatives aimed at leveraging IQ. This thesis contributes to research by presenting up-to-date summary of IQ dimensions, perspectives of IQ and by presenting a context-specific research framework.

Keywords: *Information quality, context, mechanisms, impact, professional bureaucracy, case study*

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1. Introduction

“Assuring the quality of information is both important and difficult. But achieving high-quality information is a battle that is never really won, in part because what constitutes victory is not clear, as different parties have differing views as to the definition of success. Yet all concerned agree that striving to achieve or acquire high-quality information needs to be a high priority, as the consequences of not having it can be devastating” (Ballou, Madnick, & Wang, 2003, p. 10).

Information quality (IQ) can be defined as ‘fitness for use’. Companies are experiencing IQ issues to be causing large losses in money, time and missed opportunities. The cost of poor IQ is usually hidden and not obvious to those not looking for it. A fair characterization of the state of IQ awareness and responsiveness for the typical large organization is as follows (Olson, 2002):

- They are aware of problems with data/information
- They consistently underestimate, by a large amount, the extent of the problem
- They have no idea of the cost to the corporation of the problem
- They have no idea of the potential value of correcting the problem

More recently, organizations have recognized the importance of IQ and the need for active management of IQ. Quality of information can only be assured by continuous quality assessment and information management. The classic problem within IQ research is assessment of quality and agreement upon definitions of IQ and criteria of desired quality. IQ is perceived individually, and the perceptions of ‘good’ and ‘useful’ are dependent on stakeholders’ needs, roles, and agendas (Klischewski & Scholl, 2006; Price & Shanks, 2005; Price, Shanks, & Neiger, 2008; Stvilia, Twidale, Smith, & Gasser, 2008).

Research has shown that IQ cannot be described, measured, or assured in a single model, since the attributes of IQ are varying and dependent on the context. Thus, IQ must be assessed within the context of its generation and use (Katetattanakul & Siau, 1999; Knight & Burn, 2005; Shanks & Corbitt, 1999; Stvilia, et al., 2008).

Within this topic, Stvilia et al. in 2008 called for further research: *“There is a need for empirical case studies of IQ work in different systems to develop a systematic knowledge that can then inform and guide the construction of context-specific IQ models”* (Stvilia, et al., 2008, p. 983). In order to move research forward, Lee (2003) stated the critical need for including more managerial and theoretical underpinnings in actual organizational settings (Lee, 2003).

In order to expand research on contextual IQ, this thesis attempts to increase the insights of IQ in complex organizational settings.

1.1 The Research Question

Research has divided organizations into three distinct value-creating configurations; value chain, value shop and value network. *Value shops* are characterized by solving complex client problems and being technology intensive, where information retrieval and evaluation are critical steps in the value-creating process. Typical organizations of value-shops are general hospitals and academic institutions (Stabell & Fjeldstad, 1998).

Furthermore, hospitals and universities are often referred as *professional bureaucracies*. Professional bureaucracies are characterized by having bottom-up decision-making processes. The operating core, performing the value-creating processes, consists of autonomous personnel (Mintzberg, 1983).

We regard IQ in the context of professional bureaucracies to be particularly complex and interesting. This thesis aims at identifying the underlying mechanisms and the impacts of IQ in a complex organizational setting, by investigating the following research questions:

RQ1: Which mechanisms affecting IQ can be identified in professional bureaucracies?

RQ2: What IQ impacts can be identified related to these mechanisms?

1.2 Motivation

Our motivation for this study is based on our interest in this particular research area. We started approaching the topic of IQ on an early stage of the master's program since we both experienced this topic to be both important and challenging on a daily basis in our professions. Furthermore, we found several IQ articles in various courses interesting, but still had problems to relate most of this research to a real life setting and own experiences in certain contexts. This gave us the academic motivation leading us to believe that contextual IQ was an area of research in need for further investigations.

In addition to this curiosity of the research area, we also believed that further insights would be favorable knowledge for organizations in general, and the two investigated in particular. For the organizations investigated, we hope this insight will highlight the importance of IQ, and its impact.

On a more general basis, our motivation is founded on the gap in research, and the missing focus on this topic in information systems education programs.

1.3 Thesis Structure

This thesis has a traditional structure starting with introduction in chapter 1. In chapter 2, we review and present prior research significant for this topic. In chapter 3, we present the design of this research, including our worldview, strategy of inquiry, data collection, and data analysis. The analysis of the collected data is presented as mechanisms and grand themes in chapter 4, including the related findings. In chapter 5, we discuss the analyzed data against prior research, where the derived conclusions and implications for practice and research, are presented in chapter 6. The thesis structure is graphically presented in figure 1.

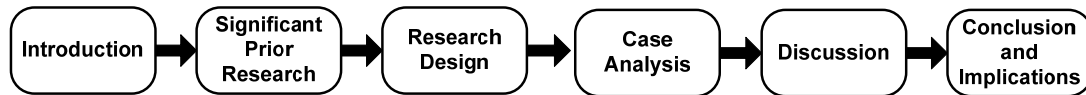


Figure 1 - Thesis structure

2. Significant Prior Research

In this chapter we present significant prior research addressing our topic of research. In order to achieve a solid body of knowledge, a literature review on previous IQ research was conducted.

This chapter is organized as followed, depicted in figure 2; first, we present our method used for reviewing the literature. Second, we summarize the past literature concerning our research. Third, we present the gaps in literature affecting our research. Fourth, we scope our research by presenting additional theories putting our research in perspective according to our research topic. Fifth, we present our preliminary research framework based on the literature review



Figure 2 - Structure chapter 2

2.1 Literature Review Method

A literature review is defined as: *”the use of ideas in the literature to justify the particular approach to the topic, the selection of methods, and demonstration that this research contributes to something new”* (Hart, 1998, p. 1). According to Creswell (2009), all research efforts should be initiated by a literature review, in order to determine whether the topic is worth studying, and to present the previous research related to this topic (Creswell, 2009).

Levy and Ellis (2006) divide the method for conducting a literature review into three steps; Input, Processing and Output, where the processing step is further broken down into six sub-activities; 1) know the literature, 2) comprehend the literature, 3) apply, 4) analyze, 5) synthesize, and 6) evaluate the literature (Levy & Ellis, 2006).

Before embarking the literature review, we decided to perform a feasibility study, in order to verify appropriate access to the relevant databases for data collection, and to identify databases to ignore and therefore reduce the time to collect data. We agree with Levy and Ellis (2006) that only searching a few databases will reduce the validity of the data collected and probably omit data sources in forms of articles and conference proceedings that are of importance to the research topic (ibid.). Access to databases was essential, where absence was considered a show stopper. Thus, a feasibility study was important in the initial phase.

Thus, our method for conducting the literature review, shown in figure 3, included a feasibility study prior to embarking Levy and Ellis’ (2006) agenda.

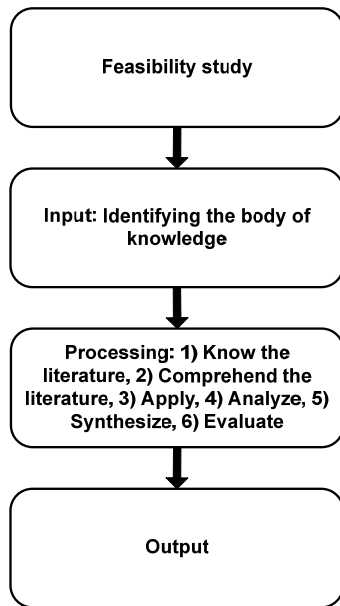


Figure 3 - Literature review strategy, adapted from (Levy & Ellis, 2006)

In order to verify acceptable access to literature databases, covering articles and conference journals, Levy and Ellis’ (2006) matrix was used, covering top ranked MIS journals and MIS conferences (Levy & Ellis, 2006). Initially, we included the top ten ranked journals, but decided to include the eleventh journal, in order to cover European research, since the top journals was dominated by North-American research journals.

By knowing what databases University of Agder provided, accessibility to relevant databases was identified. Table 1 is based on Levy and Ellis (2006) matrix, showing what databases we expected to find the top ranked MIS journals (Levy & Ellis, 2006). When identifying the available databases, we found ISI Web of Science accessible and decided to include this database in our study. The ‘X’ indicates a database where a journal is stored, but is inaccessible; an ‘A’ indicates a database where a journal is stored and accessible. Hence, we only conducted search in databases with ‘A’. Empty fields indicate that the journals are not found in the given database.

Rank	MIS Journals	Recommended databases										Other		
		ProQuest	Elsevier (Science Direct – Scopus)	INFORMS	IEEE	Wilson	Thomson	ACM	JSTOR	Blackwell(Synergy)	LEA Journals		EBSCOhost	Free full text web
NO	Journal name													
1	MIS Quarterly	A				X	X		A					
2	Information Systems Research	A		X			X				A			A
3	Communications of the ACM	A					X	A						
4	Management Science	A		X			X		A		A			A
5	Journal of MIS	A				X								A
6	Artificial Intelligence		A											
7	Decision Sciences	A								A				A

8	Harvard Business Review						X						
9	IEEE Transactions				A			A					A
10	AI Magazine	A				X	X						
11	European Journal of IS	A											

Table 1 - Top-ranked journals, adapted from (Levy & Ellis, 2006)

We believed our access to databases covered a satisfying share of high ranked journals. The only journal missed out was Harvard Business Review (ranked 8th). Further, the analysis showed our access to databases covered the majority of journals, including all the top five ranked MIS journals.

Table 2 is based on Levy and Ellis’ (2006) matrix, showing in what databases we can expect to find top five ranked MIS conferences (Levy & Ellis, 2006). The table must be interpreted equally as table 1. The analysis showed that our access to databases covered four of the five conferences – which we believe was acceptable.

Rank	MIS Conferences	Recommended databases				
		Elsevier (Science Direct – Scopus)	INFORMS	IEEE	ACM	Free full text web
NO	Conference name					
1	ICIS				A	
2	HICSS			A		
3	IFIP				A	X
4	DSS				A	
5	DSI					X

Table 2 - Top ranked MIS conferences, adapted from (Levy & Ellis, 2006)

In the *input* stage of the literature review, the main purpose was to identify the body of knowledge for this thesis. This was done in several steps, as illustrated in figure 4.

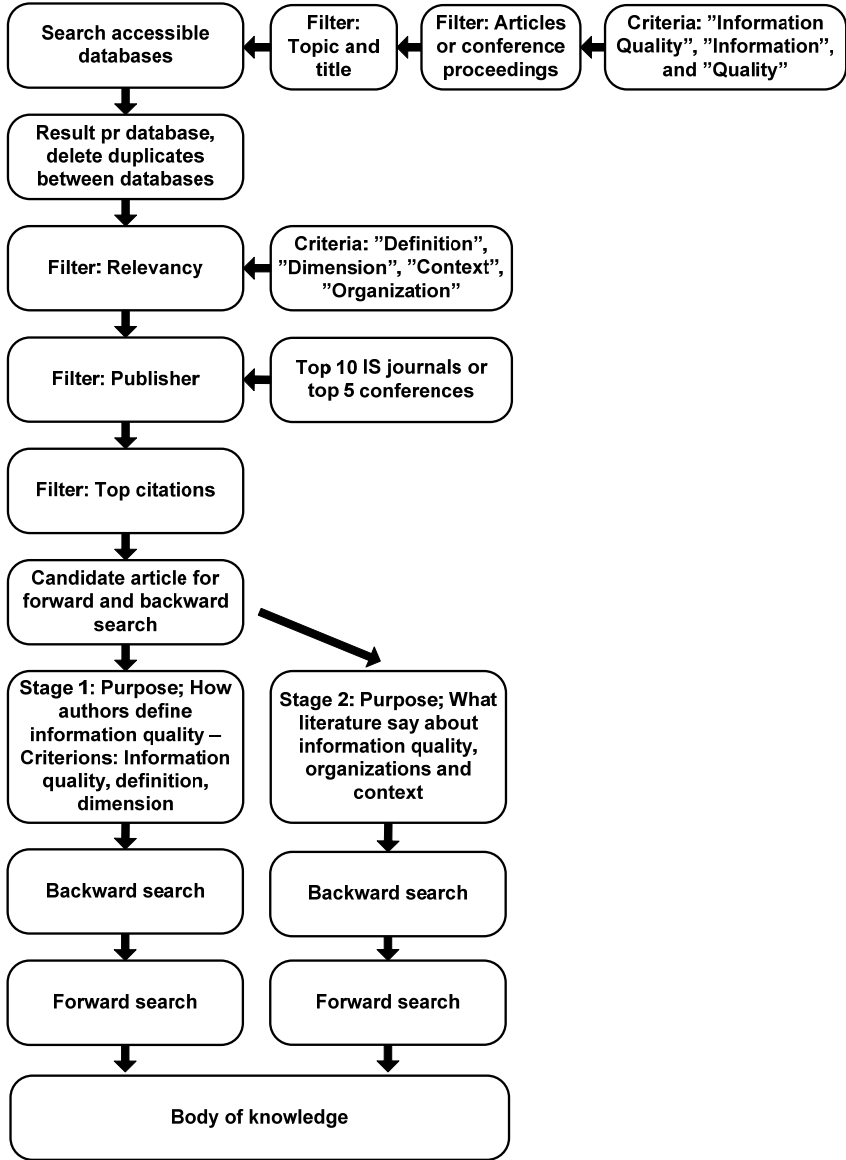


Figure 4 - Literature review method

First, all accessible databases were searched with the keywords ‘Information Quality’, ‘Information’, and ‘Quality’. The number of articles retrieved from each database is shown in figure 5.

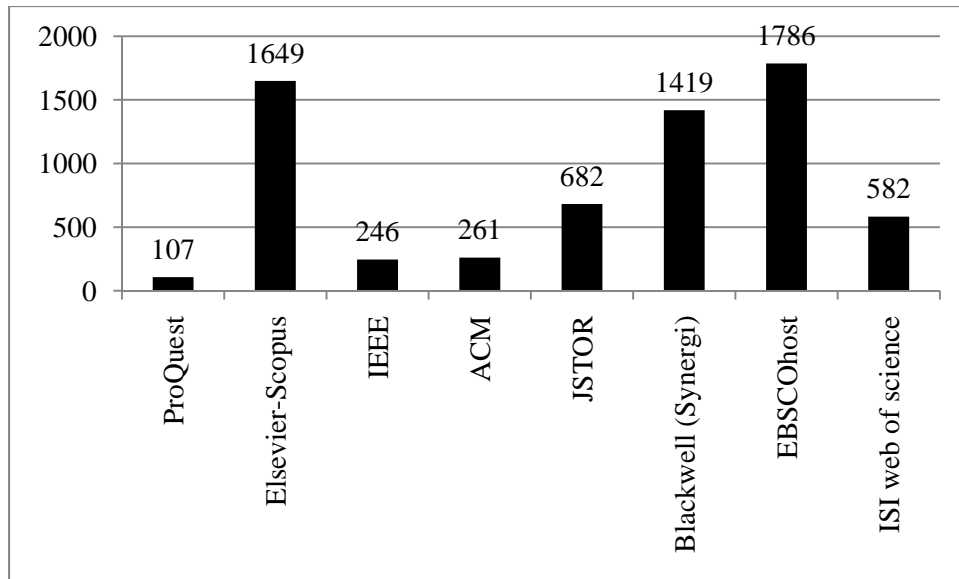


Figure 5 - Results of the initial search

The dataset was filtered to include only journal articles and conference proceedings, where duplicates were removed.

The next step involved filtering in order to exclude articles missing keywords like ‘Definition’, ‘Dimension’, ‘Context’, or ‘Organization’. Further, articles not published in top journals or top conferences (table 1 and table 2), were removed from the dataset. The result is shown in figure 6.

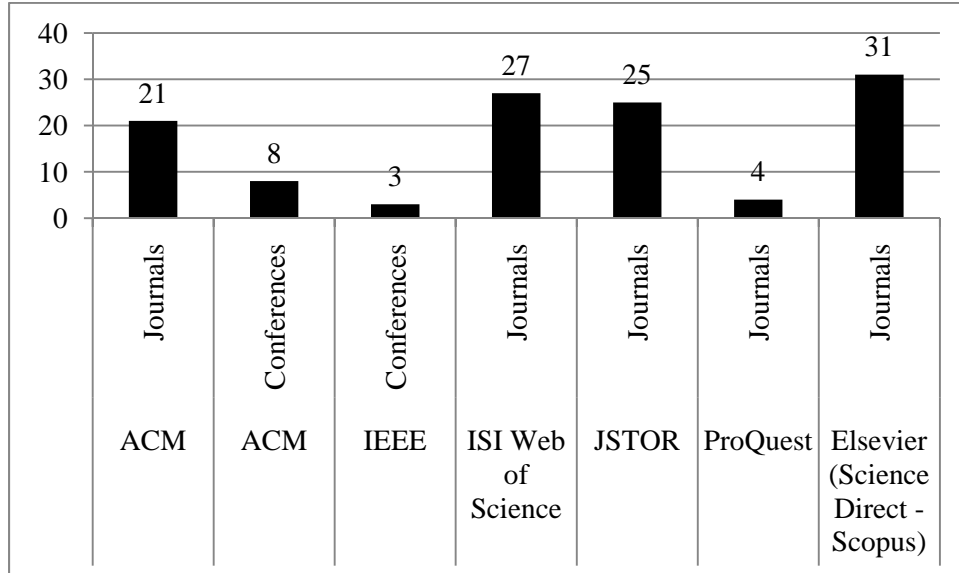


Figure 6 - Resulting number of hits after data reduction

In the majority of the articles, the abstract and conclusion part were carefully read, while the remaining parts were briefly examined. This was done due to the amount of articles, and in order to distinguish the relevant articles from the less relevant. For the relevant articles identified, the articles were carefully examined individually and compared. By this, we were able to identify our *reference article* – the most referred and acknowledged core article.

This reference article was our basis for a two-staged back- and forward search, illustrated by two stages in figure 4. The purpose of stage 1, was to identify how previous research defined IQ, by using keywords like ‘Information Quality’, ‘Definitions’, and ‘Dimensions’. The purpose of stage 2, was to identify previous research on IQ and context, with keywords like ‘Information quality’, ‘Organization’, and ‘Context’. After completion of forward- and backward search, we concluded the remaining dataset to be this thesis’ body of knowledge within the IQ research.

The *processing* step of literature, illustrated in figure 3, served two distinct purposes – our *output*; 1) to be able to justify the need for this research by presenting a gap in extant literature, and 2) as a basis for the thesis discussion, presented in the discussion chapter.

2.2 Literature Summary

As a result of the literature review, the Wang and Strong article ‘Beyond Accuracy: What data quality means to consumers’, published in Journal of Management Information Systems in 1996 (Wang & Strong, 1996), was identified as the *reference article* on IQ research.

As figure 7 shows, there has been an increasing number of research citing Wang and Strong’s article, hence we agree with Madnick et al. (2009) stating that IQ research has made significant progress in the past two decades, where the primary focus have shifted from conceptual constructs to empirical studies. Looking ahead, we agree with the anticipations stated by Madnick et al. that IQ research will continue to grow and evolve (Madnick, Wang, Lee, & Zhu, 2009).

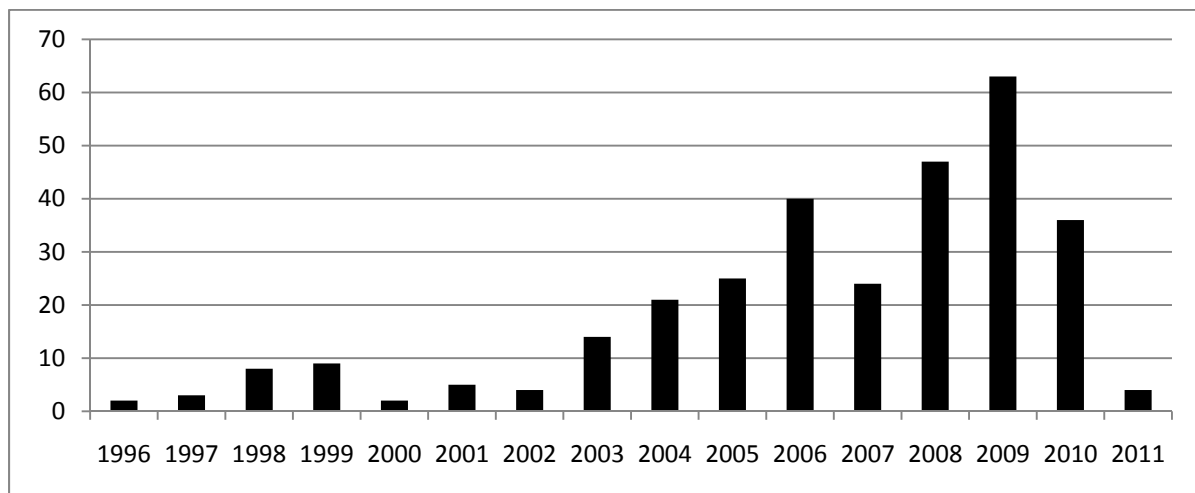


Figure 7 - Number of articles citing the work of Wang & Strong

Figure 8 shows the number of articles published in top-ranked journals or conferences, citing our reference article. Fifteen years after Wand and Wang’s article, IQ is still a hot topic and complex to understand. This illustrates the recognition of their work from 1996, and strengthens our choice of reference article.

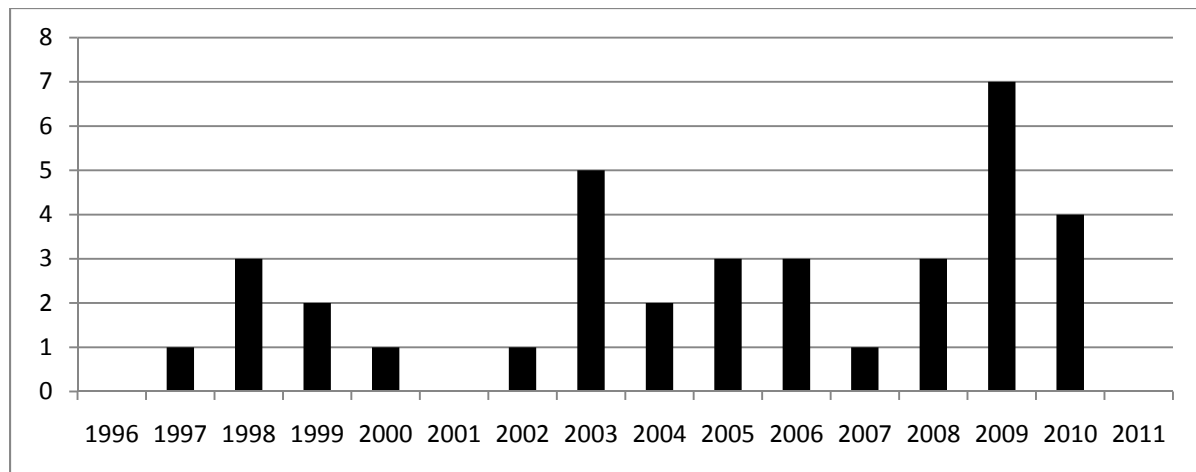


Figure 8 - Number of top-ranked articles citing the work of Wang & Strong

2.2.1 Major contributions

DeLone and McLean presented in their highly referenced study, ‘The quest for the dependent variable’ from 1992, a conceptual model for Information systems success (D&M model). The D&M model derived from various IS research from the 1970s and 1980s, through theoretical and empirical research (DeLone & McLean, 2003). The researchers divided previous attempts to classify IS success into two categories: 1) The quality of system performance, and 2) the quality of information produced by the system (DeLone & McLean, 1992). The primary purpose of the original DeLone and McLean paper was to synthesize previous research of IS success into a structured body of knowledge providing future research efforts a coherent direction (DeLone & McLean, 2003). DeLone and McLean suggested in their research that *“no single measure is intrinsically better than another: so the choice of a success variable is often a function of the objective of the study, the organizational context, the aspect of the information systems which is addressed by the study, the independent variables under investigation, the research method, and the level of analysis, i.e. individual, organization, or society”* (DeLone & McLean, 1992, p. 80). In 2003, the D&M model was updated to include a third perspective – service quality.

In their empirical study from 1996, Wang and Strong developed a framework of IQ dimensions perceived important by consumers. The reason for embarking such a study was the perception that initiatives by practitioners were mainly targeted at improving the accuracy dimension of IQ. There was no consensus on what constituted a good set of IQ dimensions, nor an appropriate definition for the individual dimension (Wang & Wang, 1996). The researchers believed information consumers to have a much broader IQ conceptualization than IS professionals realized (Wang & Strong, 1996). Wang and Strong stated that information systems researchers had chosen several different dependent variables for assessing information systems in general, and IQ in particular, with little empirical or theoretical foundation for their choice (ibid.). Their study emphasizes the importance of taking a consumer viewpoint of quality since they believed the consumers ultimately were the best judges whether or not a product was fit for use (ibid.).

2.2.2 Information quality dimensions and perspectives

Information quality (IQ) is most commonly defined as: ‘fitness for use’ (Calero, Caro, & Piattini, 2008; Eppler & Wittig, 2000; Ge, 2009; Helfert & Foley, 2009; Kahn, Strong, & Wang, 2002; Katetattanakul & Siau, 1999; Knight & Burn, 2005; Redman, 1998; Shanks & Corbitt, 1999; Strong, Lee, & Wang, 1997; Tayi & Ballou, 1998; Wang, 1998; Wang & Strong, 1996), implying that information considered appropriate for one user may be insufficient for another (Knight & Burn, 2005; Tayi & Ballou, 1998). Like the majority of IQ research, this thesis uses the term “information quality” interchangeably with “data quality” (Knight & Burn, 2005).

The concept of IQ is complex and composed by a variety of attributes, where several research efforts have attempted to operationalize this concept. The most common operationalization is to regard IQ as a construct of dimensions, where a dimension is defined as set of IQ attributes representing a single aspect or construct of IQ (Wang & Strong, 1996).

So far, research has not yet reached consensus on the dimensions characterizing IQ. This is illustrated in table 3, where the 25 most cited dimensions of the totally 103 identified dimensions describing IQ are summarized. The list of these dimensions including references to previous research is provided in appendix ‘A’. A complete list of all dimensions identified in the literature review is provided in appendix ‘B’.

Table 3 illustrates this lack of consensus by several overlapping dimensions. E.g. the dimensions of ‘Relevancy’ and ‘Useful’ are equally defined. The definitions given are illustrating one author’s definition of the particular dimension.

Dimension	Definition	Times cited
Accuracy	<i>“The degree to which information is correct, unambiguous, meaningful, believable, and consistent”</i> (Nelson, Todd, & Wixom, 2005)	28
Completeness	<i>“The extent to which information is not missing and is of sufficient breadth and depth for the task at hand”</i> (Kahn, et al., 2002)	28
Relevancy	<i>“The extent to which information is applicable and helpful for the task at hand”</i> (Kahn, et al., 2002)	24
Timeliness	<i>“The extent to which the information is sufficiently up-to-date for the task at hand”</i> (Kahn, et al., 2002)	24
Accessibility	<i>“The extent to which information is available, or easily and quickly retrievable”</i> (Kahn, et al., 2002)	21
Consistency	<i>“The extent to which information is presented in the same format”</i> (Kahn, et al., 2002)	20
Reliability	<i>“Concerned with the degree of accuracy, dependability, and consistency of the information”</i> (McKinney, Yoon, & Zahedi, 2002)	19
Understandability	<i>“The extent to which information is easily comprehended”</i> (Kahn, et al., 2002)	18
Security	<i>“The extent to which access to information is restricted appropriately to maintain its security”</i> (Kahn, et al., 2002)	15
Currency	<i>“The degree to which information is up-to-date, or the degree to which the information precisely reflects the current state of the world that it represents”</i> (Nelson, et al., 2005)	12
Reputation	<i>“The extent to which information is highly regarded in terms of its source or content”</i> (Kahn, et al., 2002)	12

Conciseness	<i>"The extent to which information is compactly represented"</i> (Kahn, et al., 2002)	10
Usefulness	<i>"The extent to which information is applicable and helpful for the task at hand"</i> (Knight & Burn, 2005)	9
Value added	<i>"The extent to which information is beneficial and provides advantages from its use"</i> (Kahn, et al., 2002)	9
Amount of data / information	<i>"The extent to which the volume of information is appropriate for the task at hand"</i> (Kahn, et al., 2002)	8
Believability	<i>"The extent to which information is regarded as true and credible"</i> (Kahn, et al., 2002)	8
Flexibility	<i>"The ease of modifying the presentation to suit different purposes"</i> (Price & Shanks, 2005)	8
Interpretability	<i>"The extent to which information is in appropriate languages, symbols, and units, and the definitions are clear"</i> (Kahn, et al., 2002)	8
Objectivity	<i>"The extent to which information is unbiased, unprejudiced, and impartial"</i> (Kahn, et al., 2002)	8
Usability	<i>"The extent to which information is clear and easily used"</i> (Knight & Burn, 2005)	8
Availability	<i>"Percentage of time an information source is 'up'"</i> (Naumann & Rolker, 2000)	6
Format	<i>"The degree to which information is presented in a manner that is understandable and interpretable to the user and thus aids in the completion of a task"</i> (Nelson, et al., 2005)	6
Correctness	<i>"The mapping of external IS state is such that the reverse mapping preserves original details of the external state"</i> (Price & Shanks, 2004)	5
Response time	<i>"Amount of time until complete responses reaches the user"</i> (Naumann & Rolker, 2000)	5
Suitability	<i>"The types of information presented are suitable for your needs"</i> (Price, et al., 2008)	5

Table 3 - Information quality dimensions

This complexity and variety of IQ dimensions has led to research efforts aiming at categorizing dimensions in suitable perspectives or frameworks. Like the dimensions, research has not yet reached consensus on perspectives of IQ. The diversity of the perspectives is presented in table 4.

Perspective / Construct	Times cited
Intrinsic / Accessibility / Contextual / Representational	5
Syntactic / Semantic / Pragmatic	3
Internal / External view	2
Extended ISO model	2
Subject / Object / Process	1
Content / Technical / Intellectual / Instantiation related	1
Product / service quality	1
Intrinsic / Relational / Reputational	1
Source / QCA / User query-specific	1
Syntactic / Semantic / Pragmatic / Social	1
Content / Presentation and delivery-aspect	1
View / Values / Presentation / General dimensions	1

Table 4 - Information quality perspectives

The most cited perspective of IQ-dimensions in past literature was first presented by Wang & Strong in their conceptual framework of IQ (Wang & Strong, 1996). In this study, four distinct patterns of IQ were identified (Katetattanakul & Siau, 1999; Wang & Strong, 1996):

By *intrinsic IQ*, literature suggests that information has quality in its own. Typical dimensions in this pattern are accuracy, objectivity, believability and reputation.

Contextual IQ highlights IQ to be considered within the context of use, supporting the tasks of the information consumers. Typical dimensions in this pattern are relevancy and completeness in order to add value to the tasks or purposes of the information, timeliness and appropriateness of the amount, and the degree of value added to the consumer.

Representational IQ relates to the format and meaning of information. Dimensions included in this pattern, are the interpretability, ease of understanding, consistency and conciseness of the information.

Accessibility IQ relates to how information is accessed in the information systems. Dimensions included are accessibility and security.

2.2.3 Information quality in context

To succeed and identify net benefits, defined in the D&M model, context or frame of relevance must first be defined. (DeLone & McLean, 2003).

To specify a scope or a boundary of a study area or a discourse, context is commonly used. Demographic or geographical contexts are examples, where IS research treats context as a boundary to focus the area of study (Lee, 2003). Lee's study viewed context as a differentiator by specifying the relationship between contents and environments (ibid.).

According to Shanks and Corbitt, it is not sufficient to identify the common elements of IQ frameworks as individual entities in their own right. IQ needs to be assessed within the context of its generation (Shanks & Corbitt, 1999). Katerattankul and Siau's study expanded this viewpoint of IQ and context by adding 'intended use' as a part of the assessment (Katetattanakul & Siau, 1999). The reason for including contextual factors when assessing IQ, was further strengthened by Knight and Burn's study stating that the attributes of IQ varies, depending on the context in which the information is to be used (Knight & Burn, 2005). Stvilia et al. further elaborates the classical problems within the IQ research – IQ is problematic to define, is context-specific and cannot be described nor measured in a single model (Stvilia, et al., 2008).

2.2.4 IQ and impact

What may be considered good information for some stakeholders may not be sufficient for other stakeholders (Wang & Wang, 1996). In order of sharing information successfully, an agreement on the quality of information is needed. The stakeholders' views of what is 'good' and 'useful' are contingent on their roles, agendas, wants and needs (Klischewski & Scholl, 2006).

In order to improve IQ and predict impact, researchers need to understand what IQ means to stakeholders and capture and reconcile their perceptions of what constitutes important IQ dimensions (Wang, 1998; Wang & Strong, 1996).

The relationship between IQ and individual impact has been tested and found to be associated significantly (DeLone & McLean, 2003). In this particular research, IQ was operationalized

into the dimensions of accuracy, relevancy, timeliness, completeness and consistency. Individual impact was defined in three categories; 1) decision making performance, 2) job effectiveness and 3) quality of work (ibid.).

Lee and Strong (2003) stated that information is context-dependent due to the assumption that knowledge is socially constructed. In order to be able to raise inquiries about problems of IQ, the members of the organization must be in possession of knowledge of work processes and the context in general (Lee & Strong, 2003). Further, having knowledge of IQ at hand would be beneficial and helpful, but is often unavailable to users (Chengalur-Smith, Ballou, & Pazer, 1999).

2.3 Gap in Literature

Figure 7 shows an increasing number of studies targeting IQ. This trend is acknowledged by Madnick et al. stating that IQ research will continue to grow and evolve and have made significant progress the past two decades (Madnick, et al., 2009).

Earlier studies, like Lee's study from 2003, have called for research aimed at providing a broader body of knowledge, including different facets of theoretical underpinnings of IQ in complex and actual organizational environments. Lee states the importance of this expansion of theories in order of understanding how technical and managerial initiatives are applied to solve IQ problems (Lee, 2003).

Later studies, like Stvilla et al., stated the need for empirical case studies of IQ. Their study called for more research in order to generate systematic knowledge for guiding towards construction of context-specific models of IQ (Stvilia, et al., 2008).

The most recent studies, like Madnick et al., states that IQ research faces new challenges due to business environments in constant motion, constant changes in regulatory demands, evolution of media types and forms of information, and emerging technology. According to Madnick et al., this fundamentally impacts generation, storage, manipulation and consumption of information (Madnick, et al., 2009).

The previous research provides contributions to general topics of IQ, including dimensions and perspectives or constructs of dimensions, claiming to leverage the insight of IQ and providing implications for practitioners. Further, studies are highlighting the need for more research in this area, empirical research in particular, since the majority of present research seems to be conceptual constructs. There are several studies targeting the system quality part of the D&M model. The focus of this thesis is IQ, thus, system quality is not within our scope.

Several of the previous research efforts are leading readers to assume universal generalization. However, own experiences in a particular context, are indicating these assumptions to be insufficient. Several authors have noticed this, and stated IQ to be context-sensitive, and called for research by investigating different theoretical underpinnings of IQ practices in specific contexts.

In the literature review, some efforts of context-specific research were found, but none of these were targeted at understanding the underlying mechanisms of IQ practices. Moreover, none of these were targeted at the context of professional bureaucracies.

In order of scoping this research in the context of professional bureaucracies, the next chapter will present this setting.

2.4 The Context of Professional Bureaucracies

“The professional bureaucracy relies for coordination on the standardization of skills and its associated design parameter, training and indoctrination. It hires duly trained and indoctrinated specialists – professionals – for the operating core, and then gives them considerable control over their own work” (Mintzberg, 1983, p. 190).

Hospitals and universities are explicit examples of such organizations, where their tasks are considered predictable, stable and complex (Mintzberg, 1983). The value configuration in professional bureaucracies is often configured as *value shops*. A value shop performs a fixed set of activities that enables it to produce standard products in large numbers by a problem-solving approach. The organizations configured as value shops are populated with specialists and experts, called professionals. By definition, a profession has *“a knowledge base, methodology and language that is unique and requires a long training to master”* (Stabell & Fjeldstad, 1998, p. 423).

The key part in the professional bureaucracy is the operating core. To function, professional bureaucracies are relying on the skills and knowledge of the operating core professionals. Due to complexity of tasks, individuals in the operational core are, before employment, conducting formal education and practical experience. During work, professionals in the operating core work relatively independent of their colleagues and perform control and authority of their own tasks (Mintzberg, 1983).

By having a large operating core and main focus on the operational core-processes, professional bureaucracies have special needs for a large scale of supporting services. One of the reasons why the support services are prominent in professional bureaucracies is due to the high cost of the resources in the operating core, where these resources are few and hard to recruit. Since the support services personnel is cheaper and considered a more available work force, organizations are receiving benefits from facilitating the operating core so they concentrate on the core processes (ibid.).

In the operating core, the need for planning and formalizing of the work of the professionals is limited. Through individual competence, the employees within the operating core bring standardization of tasks and processes. Further, there is little need for direct supervision of the professionals or mutual adjustments between them, making the administrators of the professional bureaucracy less elaborated. Figure 9 shows the professional bureaucracy as a flat structure with a thin middle line, a tiny technostructure and a fully elaborated support staff (ibid.).

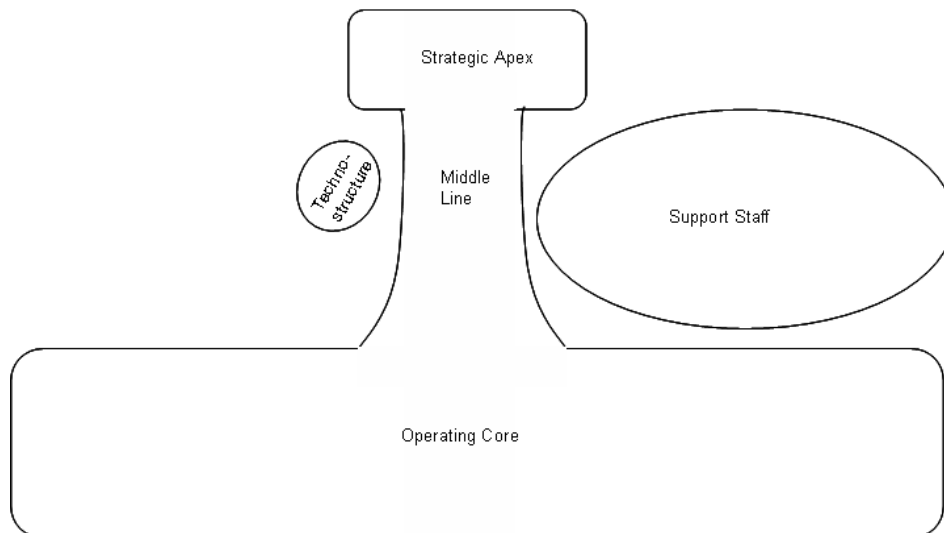


Figure 9 - Professional bureaucracy, adopted from (Mintzberg, 1983)

The value configuration relies on an intensive technology to solve a customer or client problem. Problem-solving is the change from an existing to a more desired state. An example in the medical service is to cure the patient of a sickness (Stabell & Fjeldstad, 1998).

The professional bureaucracy is considered a complex organization. The structure of organizations are characterized as inflexible and designed to produce standard outputs through 'programs'. Further, this inflexible structure leverages the complexity when implementing new programs (ibid.). In order to understand this complexity, we divided literature of professional bureaucracies into four distinct perspectives, illustrated in figure 10. The perspectives are named and grouped by adjacent characteristics existing in professional bureaucracies, derived from Mintzberg.

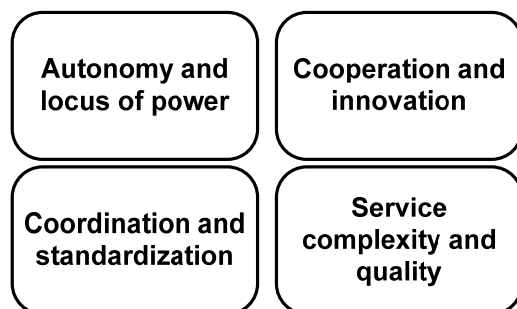


Figure 10 - Perspectives of professional bureaucracies, adapted from (Mintzberg, 1983)

Autonomy and power

Autonomy can be defined as: *“The concept of autonomy involves the idea of authoring one’s own world – without being subject to the will of others – through reflection and decision making and within a system of endorsed beliefs and principles”* (Ballou, 1998, p. 104).

Working in professional bureaucracies, the professionals appear to be acting autonomously due to their expertise and the close relationship with the clients. This autonomy allows the professionals to be working independently and perfecting their skills without interferences from the rest of the organization (Mintzberg, 1983).

In order to maintain control of the professional work and decisions affecting it, the professionals seek to make the job more professional to avoid the technostucture to rationalize their work. This ‘professionalism’ is done individually by improving the skills required, and collectively by establishing industry-wide standards to protect those skills (ibid.).

Professional bureaucracies are characterized by having both vertical and horizontal decentralized organizational structure. By this, the formal power in the organization exists on the ‘floor-level’ – the operating core – since complexity of core processes is not being surveyed directly by the middle line. Within the operating core, the power is divided; as the professionals gain experience and reputation, they move through the ranks within the operating core. An example is the academic becoming a lecturer, then assistant, associate and full professor, where senior professionals mentor and back up their less experienced colleagues (ibid.).

In addition to control and power of own work, the operating core seeks collective control of administrative decisions affecting their work. This is reflected in such organizations by the middle line recruiting from the operating core. Key personnel, recruited from the operating core, which are working in the middle line or the executive management, are referred to as *professional administrators*. The professional administrators have a key role in defining the borderline between different professions within the organization, demands from executive management and owners, and external actors, customers etc. Mintzberg concludes that an operator that chooses a carrier as a professional administrator, and performs this work in a good way, is in place of real power. Mintzberg emphasizes that this position is only real and exists as long as the operating core consider the professional administrator to serve the operating core in an efficient way (ibid.).

With the center of power placed in the operating core, members of the operating core perceive middle line and top management to be serving their purposes, and not the other way as in other types of organizations. The phenomenon is described as an inverted pyramid, where the operators are on top of the middle line. This results in having two parallel power structures; one formal with the management on top, and one informal and democratic hierarchy where the operating core is on top (ibid.).

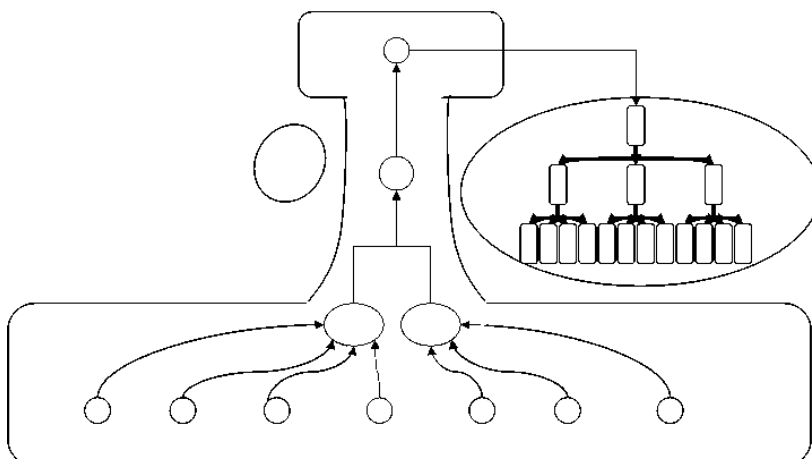


Figure 11 - Parallel hierarchies, adopted from (Mintzberg, 1983)

Organizational governance and standardization of skills

In professional bureaucracies, the coordination of standardized skills and knowledge is the primary mechanism for coordination. The environment is both complex and stable. Complex, by the requirement of extensive formal education and training to perform the procedures or programs, and stable over time enabling the procedures to be standardized (Mintzberg, 1983).

In the later years, the public sector has increased attention on measuring and evaluating organizational performances. This increase is in line with the changes in the public sector the later years, where private sector-principles have been the basis for reformations. Focus on performance assessment, is referred as the 'audit explosion' or the 'audit society' (Thiel & Leeuw, 2002). Both direct supervision by the administrators and mutual adjustments between colleagues are resisted in professional bureaucracies, since such mechanisms of control are perceived as trespassing the professionals' domain and violations of their autonomy (ibid.). One way to deal with the high demand for coordination across activities is to assign a problem to a single professional. He then follows the problem to resolution and facilitates information exchange while maintaining high professional commitment and responsibility (Stabell & Fjeldstad, 1998).

With the standardization of skills as the prime coordinating mechanism, this mechanism fails to address organizational needs in these organizations. Thus, facilitating coordination between the support staff and the operating core is essential. From the professionals' perspective, this is achieved by giving orders directly to the support staff members. Since the support staff is organized with a top-bottom-regime, this results in two parallel hierarchies where the support staff members are being pulled between two types of powers (Mintzberg, 1983). This is illustrated in figure 11.

In order to achieve standardization of skills, the professionals are trained in institutions, like universities, before joining an organization. A process of indoctrination begins; the institutions structure their courses as the to-be work programs. Becoming a skillful clinical surgeon requires five or more years where an important feature of the studies includes repetitive practice to develop automatic reflexes. An example is the anesthesiologist and a surgeon cooperating on removing an appendix, they need hardly to communicate, by virtue of their training and know exactly what to expect from each other (ibid.).

To increase their reputation and leverage their expertise, the professionals continue to improve their skills. This is done through efforts to keep up-to-date with the state-of-the-science and the state-of-art of their profession (Stabell & Fjeldstad, 1998).

Learning is an important part of the problem-solving cycle of the value-shop. As a sound basis for effective learning, professional bureaucracies are dealing with projects and clients with high expectations and demands. In order to improve the ability to deal more effectively with problems, evaluations and post-implementation controls are conducted. This facilitates for identifying more efficient ways to deal with a certain problem (ibid.).

A professional bureaucracy originates mainly outside its own structure. The operating core members join with their colleagues, through self-governing associations or linkages, in other professional bureaucracies. The association develops new standards, based on experience from the network of professional bureaucracies, which are imposed into the universities and later used by professional bureaucracies (Mintzberg, 1983). Hence, the process of standardization is a cycle, shown in figure 12, of continuous learning and enforcing new

standards into professional bureaucracies through formal education and indoctrination processes.

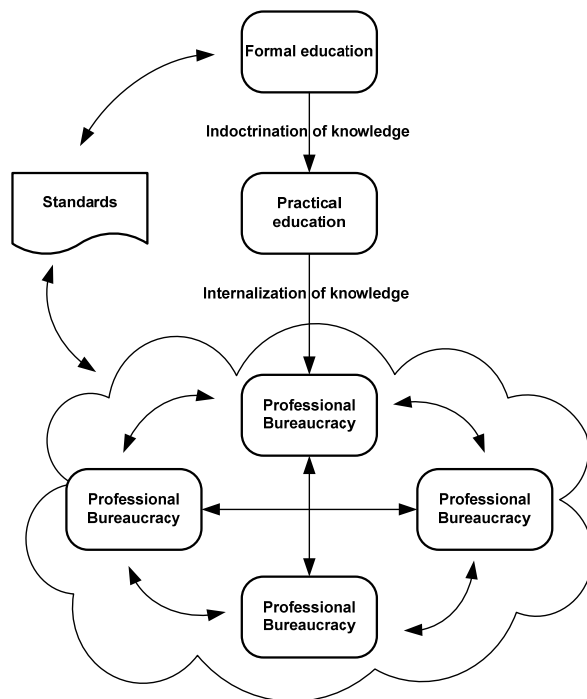


Figure 12 - Process of standardization of skills, based on (Mintzberg, 1983)

Service complexity and quality assessment

According to Stabell and Fjeldstad, the value crating processes in value shops are designed to deal with unique cases, even though most client problems are handled by more or less standardized procedures. Thus, less specialized professionals are often involved in solving the client problems. However, the specialists are always involved in order to recognize and deal with the limited cases which requires their involvement, when procedures are incorrectly applied, or when procedures are not performing as expected. Further, a strong asymmetry of knowledge between the professional and the client exists, and is the single most important reason of consulting the professionals. This asymmetry of knowledge leads the client to trust professionals and the services provided (Stabell & Fjeldstad, 1998).

In professional bureaucracies clients' needs are categorized into terms of a contingency, which indicates which standard program to use. Thereafter the standard program is applied or executed (ibid.). This is known as *pigeonholing* (Mintzberg, 1983) and consists of five activities that can be further divided into distinct categories dependent upon the particular industry (Stabell & Fjeldstad, 1998). Figure 13 illustrates how the activities are related.

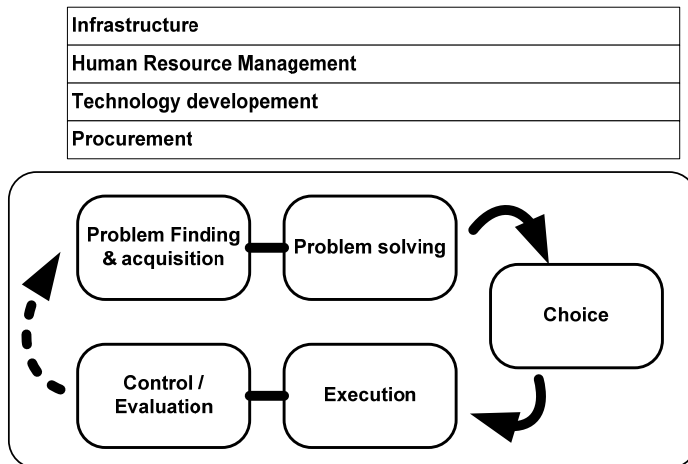


Figure 13 - Processes in value shops, adopted from (Stabell & Fjeldstad, 1998)

Through pigeonholing, clients are categorized since it takes enormous resources to treat every case as unique. The pigeonholing process makes it possible to decouple the tasks and further assign these tasks to individual professionals. Thus, the professionals are able to focus on performing his skills without spending time on coordination with peers. An example is a professor finding 100 students registered in his course and executes the lecture program on them (Mintzberg, 1983).

The clients of professional bureaucracies expect the professionals to be highly motivated and performing their skills in a professional way, not experimental, based on experience. The repetitive nature of the programs applied on clients, makes the professional perfecting their skills, and reducing uncertainties. This works, only as long as the pigeonholing process works fine. Over time, needs of clients change. New programs are created to prevent imposing programs failing to cover client needs. This has emerged as the source of great deals of conflicts within professional bureaucracies. Mintzberg states that much political blood has been spilled by continuous reassessments of these programs (ibid.).

One of the characteristics of professional bureaucracies is the difficulties in measuring the performance of the core services in the organization – the quality of the professionals’ services to the clients. Further, since the administrators are missing insights of the professionals’ work, incompetent professionals are hard to discover and deal with. Professionals may refuse to perfect the skills or take new knowledge into account, caring more for the salary than the clients. Or, the professional are only offering the programs he does the best, or enjoys the most. This works fine as long as the clients are directed his way (Mintzberg, 1983).

Still there are ways to ensure that quality on services is acceptable. E.g. the ratio of successful programs executed indicates quality, though the term ‘success’ is a diffuse concept, since this is a matter of perspective; convenience to the patient is important in quality assessment. Thus, the length of treatment in a hospital, or the number of tests before concluding the proper patient diagnosis, are examples of possible quantifications of quality (Stabell & Fjeldstad, 1998).

In value configurations like the value-shop, the main success driver is reputation; both organizational reputation and the reputation of individual professionals. This reputation signals a real value for the organization, and is apparent through e.g. a high demand of the services and difficulties of accessing the programs, or by publications in prestigious journals (ibid.).

Organizational cooperation and change management

The reasoning of professionals in the operating core is often characterized as *convergent thinking*, meaning they are approaching specific situations in a generalized manner. This often leads the professionals to be conservative, and resistant to change their well-established ways within the professional bureaucracy and its professional associations that control their procedures. With autonomy and bottom-up decision making, everybody must agree to the change, especially the operating core. Resistance to change has led to management attempts to control the professional bureaucracy by control mechanisms like direct supervision, standardization of work processes or standardization of outputs. Such attempts force the professional bureaucracy into a more machine-bureaucratic organization and are likely to fail in the long run since the professionals gets discouraged (Mintzberg, 1983).

The professionals' loyalty is to their profession, not to the organization where they practice it. In general, the professionals consider themselves individualists rather than a part of a team. This reluctance of cooperation is perceived to be one of the principal challenges of innovation. Further, cooperation is essential for the administrative structure to be functioning, but is often resisted by the professionals. Mintzberg exemplifies this by university professors resisting to show up for curriculum meetings, since they are reluctant to be dependent upon others (ibid.).

The professionals, as well as the professional associations on the outside, define the strategies for the professional bureaucracy. An example is starting a new degree program in a university. Managers seek to change the organization in ways that makes it more effective, and make strategies to attain this. In order to implement the strategies that the professionals would oppose, the administrator must rely on his informal power, performing changes carefully and in incremental steps over time (ibid.).

Welch and Pandey (2005) define Redtape as burdensome administrative rules and procedures preventing changes in organizations in the public sector. A professional bureaucracy is often found in the public sector. Redtape is reducing innovation and the productive potential in organizations by creating an organizational environment than influence the motivation and productivity negatively or by disrupting the decision-making processes. Factors that are affecting Redtape include, hierarchies, agreeing upon goals, culture and organizational change management (Welch & Pandey, 2005).

Mintzberg concludes that innovation in professional bureaucracies only comes from the slow process of changing the professionals themselves. By changing who can enter the profession, the knowledge attained in universities, the training of skills, and the attitude of upgrading skills, will eventually change the professional bureaucracy (Mintzberg, 1983).

2.5 Research Framework

According to our research agenda, this thesis seeks to investigate the underlying mechanisms of IQ in professional bureaucracies, and how IQ impacts these organizations. Since past literature provided us little help both regarding mechanisms in general and this specific context in particular, the research framework reflects this exploratory state by a simple construct illustrated in figure 14. The framework illustrates that the state of IQ will have an impact on various aspects of organizations, which will be dependent on the specific context. This study will analyze mechanisms related to IQ on the context of a professional bureaucracy, and the nature of the related impacts.

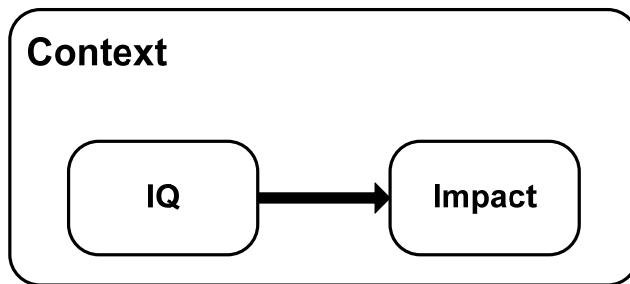


Figure 14 - Research framework

3. Research Design

This chapter aims at describing all the facets of the design of this research. Creswell (2009) defines a research design as: “*Research designs are plans and the procedures for research that span the decisions from broad assumptions to detailed methods of data collection and analysis*” (Creswell, 2009, p. 3).

A well-constructed design helps the researchers to reach the proposed goals, while a “*flawed design leads to poor operation or failure*” (Maxwell, 2005, p. 2). The components involved in a research design, depicted in figure 15, will be discussed in detail in the following subchapters. This includes our philosophical worldview, strategy of inquiry, selection of units and informants, data collection, data analysis, validation of research, issues regarding generalization of the research conclusions, and limitations.

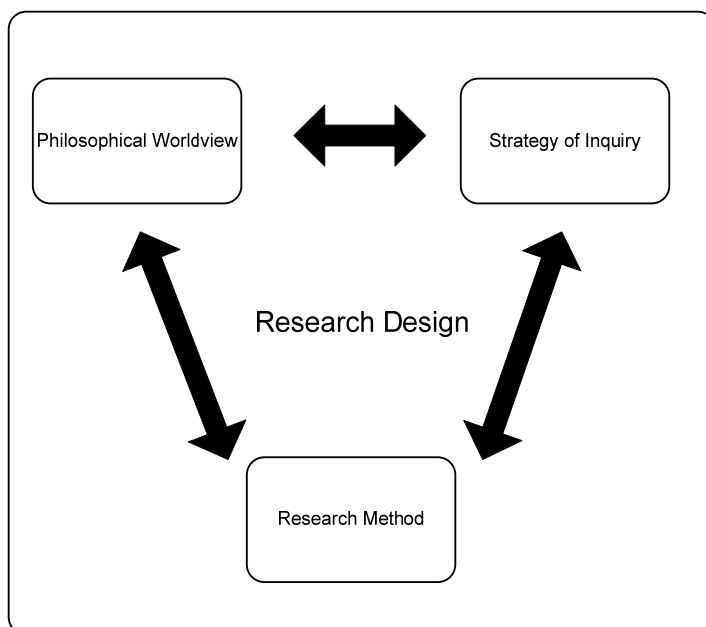


Figure 15 - Framework for research design, adopted from (Creswell, 2009)

3.1 Philosophical Worldview

Creswell (2009) defines the term *worldview* as: “*a basic set of beliefs that guide actions*” (Creswell, 2009, p. 6), meaning the general perspective the researcher holds of the world and nature of research. The researcher’s worldview is often shaped by factors such as; the discipline area, the advisors and faculty during education and past research experience. The term worldview has often been referred as ‘paradigms’, ‘epistemologies and ontologies’, or ‘broadly conceived research methodologies’ (ibid.).

Creswell (2009) states the importance of explicitly defining the researcher’s worldview, since the philosophical ideas often remain hidden, or pervasive, in the research (Creswell, 2009). The explicit statement of the worldview will contribute to explain and shape the chosen approaches (ibid). In literature, several different categorizations of philosophical orientations exist, where one of these distinguishes between three paradigms: (Post-) positivism, social constructionism and critical realism (Alvesson & Skjöldberg, 2009). Our philosophical reference point to science is based on the latter; *critical realism*.

At a general level, critical realism is characterized by the critical perspective of knowing reality with certainty, where the goal of research is perceived: “(...) *to hold steadfastly to the*

goal of getting it right about reality, even though we can never achieve that goal!” (Trochim, 2006). At a deeper level, critical realism separates reality into three domains: the empirical, the actual and the real (Alvesson & Skjöldberg, 2009; Bygstad & Munkvold, 2011; Fairclough, Jessop, & Sayer, 2001). The domain of *real* consists of objects or structures with causal powers (Fairclough, et al., 2001) or mechanisms (Alvesson & Skjöldberg, 2009), the domain of *actual* refers to the domain where these powers or mechanisms are active and how they impact, while the *empirical* domain refers to the actors’ observed subset of experiences how the real domain is affecting the actual. Thus, the task of science is to investigate how the domain of real relates to the two other domains: “*Scientific work is instead to investigate and identify relationships and non-relationships, respectively, between what we experience, what actually happens, and the underlying mechanisms that produce the events in the world*” (Alvesson & Skjöldberg, 2009, p. 40).

The reason for us to take the critical realists’ stance is due to our assumption of reality fitting this perspective. E.g. on a general basis, we believe that research will never be able to draw an exact picture of the real world, especially in information systems research, belonging to the social sciences. However, we are concerned with causalities and explanatory power of mechanisms causing phenomena, where our interest of research lies in finding the underlying causes, in opposite to having a predictive focus. Additionally, we are concerned with the possibility of generalizing findings of these underlying mechanisms.

3.2 Strategy of Inquiry

We believe the choice of research method is dependent on the rationale of the research, rather than pledging to one single method. E.g. in emerging areas, we believe qualitative methods to be best suited to discover underlying mechanisms and their causalities, while quantitative methods would be preferable to further verify the causalities and the explanatory powers. We concluded at an early stage, qualitative research approach to be best suited for this research. The main reason for this was the explorative nature of our research agenda, where we believed this agenda to be unexplored in previous research efforts. This qualitative approach at an early stage of an emerging research area is common and supported by e.g. (Creswell, 2009; Hellevik, 2006; Myers, 2009).

In order to verify our assumption about our agenda being unexplored, we decided to perform a literature review. This literature review serves further purposes in this study; first, it identifies research concepts in borderline of our research agenda, and second, these concepts are regarded as the basis for designing a research framework. The latter purpose was important for us, since we assumed, and concluded, that no such research framework existed in previous theory.

This two-staged strategy of inquiry is illustrated in figure 16. In the stage of theoretical data collection and analysis, the purpose was to develop a research framework based on literature review. Further, this research framework would be used in collecting and analyzing empirical collected data. The discussion would be based on both the result of the analysis of the empirically collected data and relevant literature found in the literature review. The literature review and results are described in chapter 2.

Lack of past research in our topic was essential in our choice of research questions, where the purpose of this study would be identification of the underlying mechanisms of IQ. This strategy is called inductive, and in opposite to deductive, there is a greater risk of not achieving clear and interesting conclusions (Hellevik, 2006).

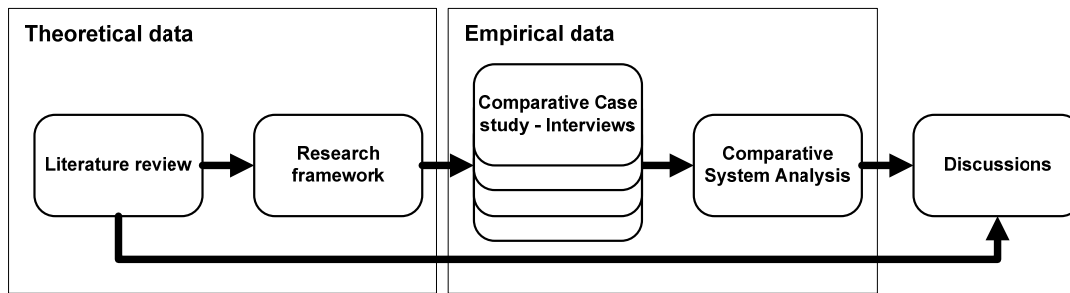


Figure 16 - Qualitative strategy of inquiry

Though there are several different qualitative research methods, e.g. ethnography, grounded theory and phenomenological research, we found case study to be the most appropriate in this research. The reason for this was curiosity based on experiences of IQ in one of the investigated organizations, since one of us is full-time employed in this organization. We believed a case study would be favorable in order to gain explorative insights in a complex environment and dealing with an agenda where we believed the boundaries between the phenomenon and the context was unclear. By this, and our motivation for investigating this in a real life context, the choice of case study research method was supported by e.g. Myers (Myers, 2009).

Furthermore, we wanted to increase the possibility of generalization of the research conclusions, and be able to present general findings characterizing a particular industry or type of organization. With this expansion of the scope, we anticipated to leverage the interest and impact of this thesis, and evolved into a comparative case study.

To find the specific type of comparative case study, we used the framework of Ringdal (Ringdal, 2007). Since we wanted this study to be intensive in order to gain depth in the investigation, we included two different cases. Furthermore, we wanted to investigate differences and commonalities between IQ practice in the two organizations at a macro-level. The framework concluded that research methods with units of analysis at macro-level between two distinct cases, and was referred as a *comparative system analysis* (Ringdal, 2007).

3.3 Selection of Units of Analysis and Informants

Since the curiosity of the research agenda originated from own experiences in one of the two organizations investigated, information practice in this organization was an obvious candidate to be one of the two units of analysis at the macro-level. One possible strategy was to choose a similar organization within the same sector, but we wanted to be able to present findings at a higher level in order to increase possibility of generalization beyond this specific sector. So, in order to find the second and comparative organization, we started to investigate the characteristics of the first organization, and found the organization to be a classical *professional bureaucracy*.

Professional bureaucracies are perceived to be an organizational construct of great complexity due to the nature of bureaucracy combined with highly specialized and autonomous employees. We found this complexity interesting and wanted to explore the mechanisms related to our research agenda in this environment. So, the criterion for the comparative organization was to fit the characteristics of a professional bureaucracy.

In order to increase the possibility for generalization of similarities, we decided to choose an organization with obvious differences regarding sector, practices, and customers. This choice

of contrasting organizations is characterized as a *critical test* (Jacobsen, 2005), where commonalities are more likely to be generalized to other professional bureaucracies.

In order to identify informants, we found it reasonable to base the selection on the five parts of professionals in professional bureaucracies within the clinic-level of the first organization and faculty-level of the second organization; Strategic apex, middle line, technostructure, support staff and operating core. This variation of professionals within comparable organizational levels between the two organizations was favorable by letting us explore our research agenda from different perspectives:

- Strategic apex – one informant representing both the top-level of the clinic/faculty, and the top-management of the organization.
- Middle line – informant representing the line management.
- Technostructure – informant representing the administrative staff.
- Support staff – informant representing support services to the clinic/faculty.
- Operating core – informants representing employees performing core services; clinicians in the first organization, faculty members / academics in the second. We perceived this part of the organization to be particularly interesting and characterizing for the organizations, two informants from the operating core from each organization were chosen.

This strategy of selecting representatives from different parts of the organizations, is referred as *breadth and variation* (Jacobsen, 2005). Further, the identification of informants in the two organizations was performed by a variant of the *snowball-method* (ibid.); we were given one name in both organizations which was expected to have opinions on our research agenda. Thus, we performed a pilot-interview with these informants, ending the interviews with a request of designation of informants having knowledge and opinions regarding our topic, within the five organizational levels. This gave us access to the 10 remaining informants. Further, like Barribal and While, we believe this strategy of pilot interviews gave us valuable experiences (Barribal & While, 1994).

3.4 Data Collection

“*The qualitative interview is the most common and one of the most important data gathering tools in qualitative research*” (Myers & Newman, 2007, p. 2). The qualitative interview is not exclusive for any particular research paradigms, and is used by positivists, constructivists, realists – in case studies, action research, grounded theory studies, ethnographies etc (ibid.). In this study, we found it natural to collect data by conducting interviews, primarily to the exploratory nature of our research agenda. In order to understand the underlying mechanisms of IQ practices, we believed the informants would be in possession of valuable knowledge, providing rich and in-depth information.

Further, there are several different types of qualitative interviews, where the most common distinction is group interviews, structured interviews and semi-structured interviews (ibid.). We chose the latter technique due to the exploratory nature of this research. This suited the assumptions of Barribal and While, that a semi-structured interview allows for exploring informant opinions, clarifying interesting and relevant issues, eliciting complete information and exploring sensitive topics within each interview (Barribal & While, 1994). Further, the semi-structured approach allowed us to take advantage of being two interviewers, since these interviews were based on an incomplete script. “*The researcher may have prepared some*

questions beforehand, but there is a need for improvisation. The interviewer is the researcher or is on a team” (Myers & Newman, 2007, p. 4).

In order to succeed with our data collection method we decided to review Myers and Newman’s list of pitfalls when conducting a qualitative interview (ibid.). In an attempt to solve these potential pitfalls, Myers and Newman suggest using a dramaturgical model for the qualitative interview (ibid.). The reason for using the dramaturgical model in this research was twofold; 1) the interviews were given a consistent structure and were well prepared, and 2) the interviews were based on previous successful ways of conducting qualitative interviews and would avoid pitfalls.

The dramaturgical model treats interviews as a drama with distinct concepts. A general description of concepts of the dramaturgical model is presented in table 5.

Concepts	Description
The drama	The interview is a drama with a stage, props, actors, an audience, a script, and a performance.
Stage	A variety of organizational settings and social situations. Various equipments might be used, such as notes and tape recorder.
Actor	Both the interviewers and the informant can be seen as actors. The researcher plays the part of an interested interviewer; the informant plays the part of a knowledgeable person in the organization.
Audience	Both the interviewer and the informant can be seen as the audience. The researcher should listen intently while interviewing; the informant should listen to the questions and answer them appropriately.
Script	The interviewer has a more or less partially developed script with the questions to guide the conversation.
Entry	Impression management is very important, particularly first impressions. Dressing (up and down) must depend on the situation.
Exit	Leaving the stage, preparing for the next performance.
Performance	All of the above together produce a good or a bad performance. The quality of the performance affects the quality of the disclosure which in turn affects the quality of data.

Table 5 - The qualitative interview as a drama, adapted from (Myers & Newman, 2007)

In order to set *the stage*, all informants received a request for the interview two weeks in advance. This request contained an interview planner, presented in appendix ‘E’, stating the purpose, content, type of interview and use of tape recorder. Further, we communicated the proposed date and time for the interview. In most cases our proposed date and time was accepted, but in some cases we needed more following up. Our project plan allowed for one month of conducting interviews. We received positive feedback on our requests and were able to conduct all interviews on schedule.

In order to make the informants feel comfortable and leverage the information collection, we decided to conduct face to face interviews in meeting offices in the informant’s location. We asked for simple meeting rooms consisting of a black board, table and chairs. Two interviews were held at the informant’s office and we recognized that having interviews in offices improved the data collection. These informants were able to provide further information from his/her pc, books, articles etc. Unfortunately, these two interviews were conducted at the later stage of the main data collection and, thus, we were not able to change settings for other interviews. On the other side, having interviews in meeting offices felt more comfortable,

making the informants more able to focus on the interview without being distracted by phones, people knocking on the door etc.

To help guide the conversation we developed an interview guide, presented in appendix 'C', consisting of an introduction, the questions and an exit. This *script* consisted of predefined questions, meant to be guiding the interview. In order to guide our informants into our research topic, we asked questions regarding information used in their daily work. The informant would then easier relate to types of information received, created and distributed. The informants were asked to describe problems relating to IQ and their perception on how IQ would be in a 'perfect world'. In order to help this process, and describe topics as rich as possible, the perspectives of IQ presented in table 4, was used to enhance the data collection. By doing such, we were able to identify perceptions, challenges and impacts of IQ.

The interviews had a time frame of one hour and the interview guide allowed for flexibility so the interviewer had opportunity to ask support and follow up questions elaborating details and enhancing data collection.

As part of *the drama*, both researchers attended each interview. By doing such, the risk of being embarrassed was reduced, and we increased the variety in communication and dialogue. Further, it helped steering the informants and helped overcoming different behavioral matters. By having two interviewers, there was an increased risk of the informant feeling intimidated, affecting the data collection. We decided to group the questions into four sections where the first two sections of questions were asked by the first researcher, and the remaining sections were asked by the second researcher. The researcher not asking questions had a reduced presence and took notes to create follow up questions.

We used a tape recorder to capture the data. The tape recorder helped focus on listening, interpreting answers and create and ask follow-up questions. It was important to discuss our intentions and use of the data collected, before the tape recorder was switched on. The confidentiality agreement, presented in appendix 'D', was purposed to create a joint understanding regarding publishing, storing, deletion of data, etc.

At the start of the interviews, we clarified the roles of *the actors*; In order to establish trust, we gave a brief explanation of our background related to both work and studies, and the reason for conducting this thesis.

To make a good first impression *the entry* was important; we always met on time, shook the informants' hands and had a short informal chat before starting the tape recorder. We showed respect for the informants' time and were thankful for letting us having the interview.

The exit of all the interviews was polite and respectful where the parties shook hands and agreed upon next step. Some interviews exceeded the time frame and with the acceptance of the informant, we kept the interview going until the interviewee felt no information was left behind.

We believe *the performance* of all the interviews had a good atmosphere, where the twelve interviews provided us with approximately 12 hours of audio, transcribed to 160 pages of data. The amount of data collected from each informant varied between 45 minutes and 1 hour and 20 minutes, depending on the informants' ability to clearly state his or hers opinions. We believe our data collection has been efficient, rich and feedback from informants concluded it to be performed in a professional way.

3.5 Data Analysis

The purpose of data analysis is to extract information from the collected data in order to shed light on the research question. This is done by simplification / data reduction due to the extensive amount of collected data (Hellevik, 2006).

In this research, we chose to base the analysis on Dubé and Robey’s (1999) framework for data analysis in qualitative research due to its structured approach. The model is depicted in figure 17 and its elements are discussed below.

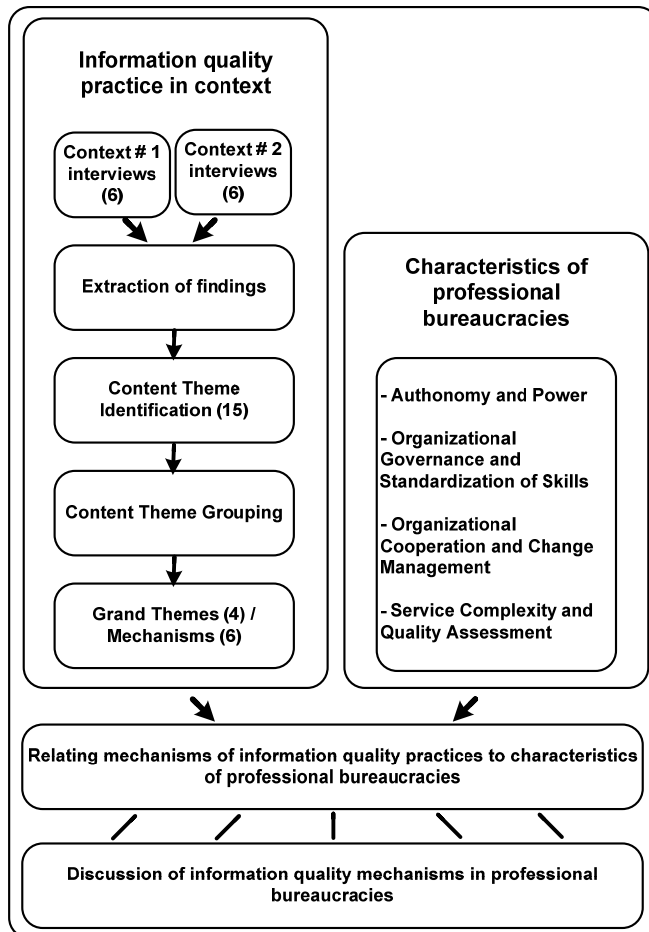


Figure 17 - Data analysis framework, adapted from (Dubé & Robey, 1999)

Prior to the coding process, we conducted two important steps adopted from Creswell (2009); organizing and preparing data for analysis, and carefully reading through data (Creswell, 2009). First, since the data in this research was collected by recorded interviews, this preparation consisted of transcribing all recordings. All the transcripts were exported from the dictation device to a computer. The computer application we used, DSS Player Olympus Dictation, made the transcription process easier by making it possible for us to use footswitch to start/stop the recordings while transcribing.

In the second step, all the transcripts were carefully read through multiple times. In order to have a fresh point of view, transcripts were put away for a couple of days between the reviews. This hermeneutic approach hopefully increased the understanding of the data at hand, both the data as a whole and its parts (Creswell, 2009; Myers, 2004).

Kvale (1996) discusses five main approaches to interview analysis: *categorization of meaning, condensation of meaning, structuring through narratives, interpretation of meaning,* and *ad-hoc* methods for generating meaning (Kvale, 1996, p. 187).

Ad hoc generation of meaning is viewed as the most common technique. This technique allows the researcher to use any combinations of the mentioned approaches in order to increase understanding of the subject of investigation (ibid). An ad hoc approach suited this particular research since it implied both 1) validating / revising previous research efforts and 2) exploring a gap in existing research. More specifically, the main approach was categorization of meanings by various coding techniques. Additionally, we interpreted meanings and quoted informants in order to support our findings.

To help finding the suited techniques for coding in the different stages of analysis, we used Boeije’s framework for coding of comparative studies (Boeije, 2002). Essential to the choice of coding technique was the explicit definition of subjects of investigation, analysis activities and the aim for the coding (ibid). Table 6 illustrates the steps of coding procedures used in this research.

Step	Subjects of investigation	Analysis activities	Aim
1a	Comparison within a single interview	Selective coding based on IQ perspectives	Basis for generating content themes
1b	Comparison within a single interview	Open coding	Basis for generating content themes
2	Comparison of all interviews from both organizations	Open coding	Generation of related content themes
3	Comparison of all interviews from both organizations	Open coding	Generation of related IQ mechanisms and grand themes of impact
4	Comparison of all interviews from both organizations	Selective coding based on professional bureaucracy perspectives	Basis for discussing mechanisms and impact of IQ in professional bureaucracies

Table 6 - Steps of comparative analysis procedure, based on (Boeije, 2002)

Besides the first and the last coding steps, all steps were coded by recursive abstraction / open coding. Open coding is defined as breaking down the transcripts analytically, in order to gain new insights. This is a common technique in explorative research where the state of the research area is still in lack of consensus / agreement (Corbin & Strauss, 1990).

In step 1a, categories from the literature review formed the basis of a selective coding process, aiming at generating content themes of IQ perception. This coding was done directly in the transcripts without need for further grouping, since we introduced these top-cited perspectives, illustrated in table 4, to the informants in the interviews.

In step 1b, we investigated all the transcribed interviews separately, looking for statements shedding light on our research agenda. This process was done by open coding, and was conducted twice; one time by each. All these temporary concepts were then compiled in one single spreadsheet for further analysis.

In step 2, we investigated all the temporary concepts across the two cases, looking for common denominators, similarities, and patterns. This process was done in cooperation between the two of us, where the temporary concepts were coded by open coding. This resulted in identification of 15 content themes of IQ across the two organizations.

In step 3, we arrived at our mechanisms. This was done by grouping the related content themes into categories. This resulted in the mechanisms affecting IQ and the grand themes of impact within the two organizations.

Furthermore, we found Dubé & Robey’s research to be reasonable and structured in their presentation of findings, by explaining and shedding light on their grand themes by extensive use of informant quoting (Dubé & Robey, 1999). Thus, we once more investigated the coded mechanisms and grand themes in the transcripts marking the quotes which best represented the findings.

The last step of coding, step 4, aimed at generating the basis for discussing these mechanisms of IQ in professional bureaucracies. This was done by selective coding of mechanism and grand theme findings to the perspectives of professional bureaucracies, as illustrated in figure 10.

3.6 Validity of data

According to Hellevik, validity of data is the suitability of the data to enlighten the research question (Hellevik, 2006). This suitability is decided by two conditions: the *definitional validity* of the data, and the *reliability* of the data, depicted in figure 18.

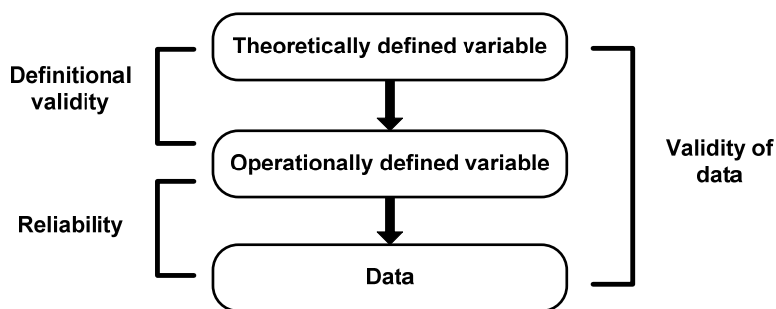


Figure 18 - Relation between reliability and validity, adopted from (Hellevik, 2006)

Definitional validity is describing the *accuracy* of how close the operationally defined variables are to the theoretically defined variables (Creswell, 2009; Hellevik, 2006). In qualitative studies, and this study in particular, definitional validity can be described as all the activities and methods targeted at collecting relevant data for answering the research questions, ensuring that our models and methods are accurate.

Reliability is the factor describing the *consistency* of the data across different researchers and projects, and the accuracy of handling the data collected (Hellevik, 2006).

It is important that both factors are managed in order to achieve high validity of data: It is not sufficient to perform excellence in data collection if the data is not representative to the investigative questions. Correspondingly, it is not sufficient with excellent theoretical and operational definitions if the collection and handling of data is poor (ibid).

Table 7 summarizes all procedures and techniques we used in this research in order to address issues regarding definitional validity and reliability.

Definitional validity strategy	Strategy description
Academic supervision	By regular academic guidance and discussions throughout the research process, the validity of the research design increased. This included the <i>strategy of peer debriefing</i> (Creswell, 2009), by using our supervisor to verify the consistency and understandability of the questions used in the interviews.
Clarification of biases	Commenting our interpretations of findings, defining limitations and possible biases, was an important factor increasing the validity of our research (Creswell, 2009). Our role as researchers and derived limitations are stated in subchapter 3.9.
Interview guide	Developing an interview guide raised the awareness of the data collected, and decreased the biases of the data collected by assuring that the same questions and topics were addressed in all interviews. Thus, the biases in the data were reduced and the possibilities of comparison increased.
Literature review	The completion of a literature review in advance of the data collection was an important prerequisite providing us a theoretical foundation and increased possibility to operationalize theory.
Member checking	In order to validate the qualitative findings, our findings were sent back to informants with the request of commenting erroneous use of statements, misinterpretations, and encouragement of further comments. This strategy is recommended by Creswell (Creswell, 2009).
Pilot interviewing	Pilot interviewing provided an opportunity to modify the research design, and the interview guide in particular. This was the first test of validity of the operationalization of the theoretical body of knowledge.
Presentation of negative and discrepant information	By presenting negative, discrepant and contradictory evidence, greater realism and transparency was achieved (Creswell, 2009). This strategy contributes to increased validity.
Rich, thick descriptions	Using rich, thick descriptions of themes contributes to greater realism in the perspectives (Creswell, 2009). This was achieved by applying techniques to the questions in the interview guide, i.e. by using questions like “why” and “what” rather than “how” (Kvale, 1999).
Triangulation	In the process of generating themes, it was important to converge several sources and perspectives in order to build coherent justifications for themes (Creswell, 2009). This validation strategy was taken into account during the process of selecting objects to investigate: we selected both breadth and variation (Jacobsen, 2005) to shed light on the same subjects by choosing corresponding professionals in two professional bureaucracies. This triangulation of data sources was essential in this research in particular, and in critical realism in general (Trochim, 2006).
Reliability strategy	Strategy description
Contracting	By offering a contract of discretion, regulating our commitments and procedures of handling the information collected, we forced ourselves to raise the consciousness of reliability issues.
Pair coding and definitions drifting	Pair coding gave us the opportunity to discuss coding options and generation of themes. This increased the likelihood of understanding the respondent (Kincaid & Bright, 1957), and thus increased the reliability. Furthermore, pair coding reduced the likelihood of experiencing drifting in code definitions, and made the analysis more consistent.
Pair interviewing	Pair interviewing, or tandem interviewing, gave opportunities to e.g. take notes, while one interviewer is constantly giving the respondent complete attention (Kincaid & Bright, 1957). By one of us taking notes during the interview and

	using these notes actively when asking questions, we experienced, like Kincaid & Bright predicted, that this increased the precision of the questions. Furthermore, we believe that pair interviewing increased the awareness of questions asked, and avoided us from leading the interviewee.
Transcripts check	One important reliability procedure was to make sure the transcripts did not contain obvious mistakes (Creswell, 2009). Transcribing the recorded interviews was alternated between the two of us, and the transcripts check was taken care of by reviewing the other person's transcripts.

Table 7 - Validity and reliability strategies

3.7 Generalization

Case studies have been criticized by lack of generalizability. However, from the critical realists' point of view, Yin (1989) suggested: *“The short answer is that case studies, like experiments, are generalizable to theoretical propositions and not to populations or universes. In this sense, the case study, like the experiment, does not represent a ‘sample’, and the investigator’s goal is to expand and generalize theories (analytical generalization) and not to enumerate frequencies (statistical generalization)”* (Yin, 1989, p. 21). By this, we consider this research to be analytically generalizable; the intention of this study was to identify the underlying mechanisms of IQ in professional bureaucracies. By selecting two professional bureaucracies and investigating these mechanisms in both organizations, we believe that the discussion of our findings, and how these are related to the previous research and theories, may be directional for other professional bureaucracies, particularly the related findings between the two organizations (Easton, 2010). However, these findings must be tested quantitatively in order of verification. Further, quantitative research would verify the causal relations and the strength of explanatory variables.

3.8 Limitations

Creswell (2009) highlights the importance of stating the limitations of the research, including our own roles as researchers, which influences and shapes this thesis (Creswell, 2009). First of all, it is important to explicitly state that one of us is employed in one of the two investigated organizations. By research in own organization, often called ‘backyard research’ (Creswell, 2009), issues like disclosure compromises and biases in interpretation of data are common. We believe the awareness of these issues and by additionally having a second researcher who critically questioned potentially biased reasoning, this problem was reduced.

Further, there are always limitations related to the representativeness of the informants in qualitative research, including this thesis. We cannot claim the informants in this research to be representative for all employees in the organizations investigated, but we believe we have chosen research strategies to be able to cover both the breadth and depth in an emerging research area.

The perspectives of professional bureaucracies, illustrated in figure 10, contain topics we believed to be closely related. Other perspectives within professional bureaucracies exist, e.g. a customer related perspective, where our defined perspectives may be grouped differently by other researchers or even broken down into more distinct parts. However, we believe these perspectives to be representing the theory logically, and were a necessity in order to relate mechanisms of IQ to professional bureaucracies.

4. Case Analysis

The analysis of the collected data will be presented in this chapter as followed:

First, the two organizations investigated will be briefly presented. Second, our findings are presented for each of the organizations, including table summaries. Third, the related findings across the two cases are summarized. Figure 19 illustrates the structure of this chapter.

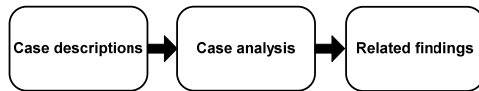


Figure 19 - Structure chapter 4

4.1 Case Description

In this chapter, the organizations investigated are presented. Since the research agenda does not imply a problem-based approach, only general descriptions of the two organizations are presented.

4.1.1 Organization 1 – Health enterprise

Organization 1 is one of eleven health enterprises owned by the largest regional health enterprise in Norway. The Ministry of Health and Care Services is the superior authority of the regional health enterprise. The 14 health enterprises is present in 10 counties, providing health services at specialist level to approximately 2,7 million inhabitants in the southern part of Norway. The regional enterprise is managing an annual budget of approximately 58 billion NOK, and 70.000 employees. The financial structure is partly based on direct funding by the central government budget, and partly based on activity-based refunds.

Organization 1 is an independent health enterprise offering all health services at specialist level in both somatic and psychiatric disciplines. By three general hospitals, district psychiatry, and pre-hospital services, the enterprise is present in almost all of the municipalities in two counties, covering health services for more than 280.000 inhabitants.

Approximately 7000 people are employed in the health enterprise, and the annual budget is more than 4 billion NOK. The enterprise is headed by a managing director who is reporting to the enterprise board. The enterprise is organized in 3 medical clinics (Medicine, Surgery, and Psychiatry), a medical-service clinic (Radiology, Laboratory etc), Division of Maintenance and the Administration. The top management includes the directors of the clinics, director of maintenance, directors of administration and the managing director.

Approximately 1500 people are employed in the Psychiatric Clinic, consisting of departments presented in table 8.

Department
Head of Psychiatric Clinic, including the staff
Department of Hospitalized Psychiatry
Four departments of District Psychiatry
Department of Psychiatry for Children and Adolescences
Department of Addiction Treatment
Department of Psycho-somatic Treatment

Table 8 - Departments of Psychiatric Clinic

Employees in Organization 1 deal with several different types of information at all organizational levels. Among the types of information in the organization, our findings are presented in table 9.

Information type	Description
Administrative information	Administration, Organization, Personnel and Structure.
Client information	Patients and Patient treatment.
Financial information	Accounting and Economical information.
Service information	Guidelines, Internal procedures, Production data and Scientific knowledge of patient treatment.

Table 9 - Information types in Organization 1

In the following, the part of the organization we investigated, Psychiatric clinic, is referred as 'Organization 1'.

4.1.2 Organization 2 - University

Organization 2 is one of the eight universities in Norway. The Ministry of Education and Research is the superior authority of the universities.

Organization 2 is an independent university offering educational services and research. Approximately 8.500 students and 1.000 employees are associated to the university, distributed on two different campuses. The annual budget is approximately 1 billion NOK.

The university has a divided leadership where the rector is the chair of the university board and responsible for academic affairs, while the managing director is the head of the university administration. The university is organized in 5 faculties; Faculty of Health and Sport Sciences, Faculty of Humanities and Education, Faculty of Fine Arts, Faculty of Engineering and Science and Faculty of Economics and Social Sciences. The faculties have a divided leadership where the dean is responsible for academic affairs, while the faculty director is responsible for the administration of the faculty.

More than 150 people are employed in the Faculty of Economics and Social Sciences which consisting of the departments presented in table 10.

Department
Department of Working Life and Innovation
Department of Information Systems
Department of Sociology and Social Work
Department of Political Science and Management
Department of Economics and Business Administration
Centre for Development Studies

Table 10 - Departments of Faculty of Economics and Social Sciences

Employees in Organization 2 deal with several different types of information at all organizational levels. Among the types of information in the organization, our findings are presented in table 11.

Information type	Description
Administrative information	Administration, Implementation plans, Organization, Personnel and Structure.
Client information	Student information.
Financial information	Accounting and Economical information.
Service information	Case processing, Course content, Course evaluations, Course offerings, Education plans, Internal procedures and guidelines, Production data, Student evaluations and Scientific knowledge applied for education and research purposes.

Table 11 - Information types in Organization 2

In the following, the part of the organization we investigated, Faculty of Economics and Social Sciences, is referred as ‘Organization 2’.

4.2 Case analysis

In the coding process, described in chapter 3.5, we identified six distinct mechanisms affecting IQ and four grand themes of impact. Brief descriptions of these mechanisms and grand themes are provided in table 12, including the content themes.

Mechanisms	Brief description
Awareness of IQ	Related to the state of awareness of IQ in the organization, through <i>organizational awareness</i> in general, and <i>organizational initiatives</i> aiming at increasing IQ
Bureaucratization	Related to how bureaucratic contingencies are affecting IQ through the level of <i>bureaucratic degree</i> , and through <i>bureaucratic impact</i> .
Individual contingencies	Related to how <i>individual experience and premises</i> , and <i>individual perceptions of information</i> are affecting IQ
Locus of power	Related to how hierarchies and structures of <i>formal power</i> , <i>informal power</i> , and <i>shift of power</i> are affecting IQ
Complexity	Related to how the organizational complexity is affecting IQ through the perceived <i>pace of change</i> and <i>service complexity</i>
Perceptions of IQ	Related to how IQ is perceived in the organization in the quality perspectives of <i>accessibility</i> , <i>contextual</i> , <i>intrinsic</i> , and <i>representational</i>
Grand themes	
Client impact	Related to how IQ impacts clients of the organization
Organizational impact	Related to how IQ impacts the organization in general
Personal impact	Related to how IQ impacts employees in the organization
Service impact	Related to how IQ impacts services the organization provides

Table 12 - Mechanisms of IQ and grand themes of impacts in professional bureaucracies

4.3 Case Analysis – Organization 1

In the following sub-chapters, the findings in Organization 1 are presented by the mechanisms and the corresponding content themes. Our definitions of the mechanisms and content themes are presented in table 12 in subchapter 4.2.

4.3.1 Awareness of IQ

Awareness of IQ derived from the following two content themes; *Organizational awareness* and *organizational initiatives*. The findings of these themes in Organization 1 are presented in the following sub-chapters.

Organizational Awareness

One factor perceived by the informants to be influencing IQ, was the organizational autonomy – the fact that the clinic was operating independently from the rest of the organization. This independency was mostly perceived positive in terms of IQ, with the possibility of taking own initiatives and weighting quality higher than the rest of the organization. However, this independency resulted in negative consequences for IQ: *“There is little cooperation between our clinic and the rest of the organization related to documentation. (...) We choose to exclude ourselves and we are being excluded. At the same time we are not good at including ourselves when we should. That’s a real problem”* (Technostructure informant). In practice, the support staff experienced this in organization-wide seminars aiming at increasing the overall IQ in Organization 1: *“When we are attending seminars for all off the support staffs, the main focus is on the somatic disciplines. (...) The small part of the agenda concerning psychiatry is met by yawning from the rest of the audience, because we are so few”* (Support staff informant).

Further, the operating core experienced lack of interdisciplinary cooperation and discussions of information related to patient treatment: *“When a team, preferably an interdisciplinary team, has a professional discussion regarding a patient or a disease progression, this provides high quality information to me. Unfortunately, we don’t do this very much”* (Operating core informant #1).

The informants provided examples of how to raise the awareness of the information itself, by adding information of intention, and responsibilities to increase the possibility of targeting information to the person in need of information in the specific situation. The following quotation illustrated the development of work procedures: *“I really believe in developing recipes starting with a brief description of the purpose, scope and actions, which I believe are the three chapters that should be mandatory in all procedures. In the description of scope, I think it is significant to quite quickly see who this procedure is meant for”* (Technostructure informant).

The organization of the support staff in the clinic was perceived as an asset, increasing the IQ of the operating core: *“We have a good and dedicated staff, supporting and executing the practical and administrative tasks, releasing time for clinical work and management”* (Strategic apex informant). This was further elaborated by the support staff informant who stated that leveraging IQ was one of the most important tasks for the support staff.

Organizational initiatives

The clinics in the organization were operating autonomously, leading to differences in awareness of IQ. Several informants believed the awareness in the clinic investigated to be at a higher level than the rest of the organization. E.g. the clinic had implemented, and was accredited on an international quality model, DDKM¹, as an initiative of increasing quality in all aspects of the service: *“The clinic has piloted the implementation of DDKM, the Danish model of quality. The model has led to a quite regulated way of handling the different tasks we meet, through different levels and in relation to the employees”* (Line manager informant).

Furthermore, as an initiative to increase the awareness of quality, the clinic employed a dedicated resource, a quality consultant, reporting to the head of the clinic. The role of this resource was to coordinate and standardize quality initiatives throughout the clinic.

The clinic used balanced scorecards extensively on department-level, for governing the performance and the quality of production. Further, these scorecards were used both at department and clinic-level in order to increase the awareness of quality by giving a managerial focus: *“We use balanced scorecards actively. (...) Each month we review the scorecards, showing the whole organization how the status is according to the demands and expectations we are committed to. Both on line-management level, the lowest management level in our organization, and additionally sending information directly to the line managers regarding the activity status of each employee”*(Strategic apex informant).

All of the informants reported initiatives aiming at increasing the awareness of IQ at different levels; The middle line informant gave once a week different employees the responsibility to find selected work procedures, reviewing it and reporting the procedure back to their colleagues. This specific initiative made operating core aware of how to retrieve and use information.

The support staff reported meetings for information awareness as an important activity: *“We have our own group discussing how to register information - and how to do it the same way. Discussions of how to do things easier and how to do things more correct. (...) We meet every day and discuss things at a daily basis”* (Support staff informant). Further, the support staff was organized with super-users. These super-users had regular meetings across the departments discussing the same issues at a higher level. The results of these discussions were brought back to the departments for implementation.

As an initiative to increase the learning process when errors have been made and to prevent the reoccurrence of errors, a system for registering undesired incidents was implemented in the organization. This initiative favored the awareness of IQ: *“We strive to register all undesired incidents. For an incident to be undesired, we need to know the reference of what the desired action is. That is what our procedures are describing”* (Technostructure informant).

For the operating core, the use of context-specific templates was helpful in documentation: *“We have a system where we (...) through templates, are guided on what information is expected from us to produce and what’s not”* (Operating core informant #1).

¹ DDKM (Den Danske Kvalitetsmodel) is an international ISQua-approved quality model for accreditation in health care sector

The strategic apex informant explained how governmental revisions of work practice affected the awareness in the organization positively: *“We worked hard in advance to inform the organization of the announced revision of our practice. We had meetings with all employees to inform, made new work procedures (...) informed the whole organization how things were related. By this job and focus, the revision found no violations of our practice”* (Strategic apex informant).

4.3.2 Bureaucratization

Bureaucratization derived from the following two content themes; *Bureaucratic degree* and *Bureaucratic impact*. The findings of these themes in Organization 1 are presented in the following sub-chapters.

Bureaucratic degree

Bureaucratization of the health care sector was increasing the later years. The operating core informant perceived an increase the past 10 years, while the middle line informant more specifically described changes in bureaucratization the past two years as followed: *“Let’s say in the past 1-2 years, procedures regulating things we’re supposed to do, whether it’s related to patients, next of kin, following-up on patients, or economy, are increasing enormously, and becoming as detailed as it possibly gets”* (Middle line informant).

Also the strategic apex informant perceived increased bureaucracy through rules, but felt that experience with the organization over time helped finding freedom within the limits of the bureaucracy – where the borderline of acceptance was drawn. However, not everybody felt this freedom, like the support staff informant’s quote regarding procedures: *“We don’t have any slack at all. That’s the way it is, end of discussion”* (Support staff informant).

Bureaucratic impact

The increase in bureaucratization led to more standardized documentation of information, even though the outcome was perceived positively: *“My perception so far is that the focus on regulations has been positive in general, even if it has resulted in less personalization of documentation (...) I think we will gain overall profits by aiming at a certain level of quality. (...) In total, I think the quality of our services will increase”* (Middle line informant).

On the other hand, several informants perceived bureaucratization to have negative impact related to IQ. One example was the technostructure informant’s view of the process of developing new work procedures, including procedures to increase IQ: *“Often I feel bound by the bureaucracy – especially when developing new procedures. First, national guidelines must be taken into consideration because they set the standards for the content. Second, the Council of professionals, the Council of quality, and the Council of work environment are required to be consulted. There are many councils.. And the end-users want to have an opinion on details. So I experience that it sometimes can be extremely bureaucratic to gain acceptance”* (Technostructure informant).

The bureaucratization impacted the IQ negatively by the dilemma of balancing the bureaucratic demands of documentation and providing services to the patients: *“At the same time, I am among the skeptics of reducing too much of the time, attention and resources on what is the basis of our profession – the relation with our patients and their next of kin, creating relationships and be available – from watching television or having a walk with our patients – it’s in these situations relationships with our patients are created. It is not created*

by reading procedures and by increasing the demands of documentation” (Middle line informant).

4.3.3 Individual contingencies

Individual contingencies derived from the following two content themes; *Individual experience and premises* and *Individual perceptions of information*. The findings of these themes in Organization 1 are presented in the following sub-chapters.

Individual experience and premises

Two of the factors the informants perceived to influence IQ, included age and education of the operating core members. The middle line informant deliberately reduced the expectations and demands to some of the employees, since certain employees perceived information system use as an impossible barrier to overcome. The informant thought that this was related to both age and education: “(...) *the less formal education, the higher the threshold of being curious and try different ways of information retrieval. Some might easier give up and have a longer way to go. (...) They have barriers that really aren’t necessary, and give up before they even try*” (Middle line informant).

Moreover, linguistic challenges were perceived in an organization in need of highly specialized employees with recruitment of personnel in the operating core from different nations: “... *we have doctors from many different countries, and if they decide to do their own documentation, the information they produce is not always understandable. The information can often turn out erroneous. We don’t understand it, and we’re supposed to correct the information...*” (Support staff informant).

Also individual experience affected the relevancy of information. As one of the operating core informant stated: “*It can be tremendous differences in the quality of information received from a experienced psychiatrist of psychologist, and the information received from an new and inexperienced doctor*” (Operating core informant #2).

Individual perceptions of information

All the informants perceived individuals to have a strong influence on IQ. The middle line informant described the complexity and individuality of information perception: “... *if you have 40 different people, you have 40 different personalities to deal with. You can’t take for granted that the information provided is perceived likewise. It’s got something to do with both the sender and receivers of information being in constant motion. (...) I have been surprised several times by distorted information – in particular when it has been retold to me - information that was distributed in my presence and my experience of the information was completely different*” (Middle line informant).

4.3.4 Locus of Power

Locus of power derived from the following three content themes; *Formal power*, *Informal power* and *Shift of power*. The findings of these themes in Organization 1 are presented in the following sub-chapters.

Formal power

One of the operating core informants illustrated the contradictions between the desired autonomy and managerial expectations and demands regarding quality of documentation: *“When I meet leaders who insist on submission (...) and if they additionally play on our morale, it causes frustration. It gets terribly unexciting – and what I feel is exciting, is to be a professional, not a bureaucrat nor an administrator”* (Operating core informant #1).

The involvement of the operating core specialist was perceived crucial in the process of approval of procedures: *“So, when the Council of professionals approves the procedure, this alone will add credibility and reputation to the content. The reason for this is because a fixed number of psychiatrists and psychologists in the council have put their stamp of approval on the information”* (Technostructure informant).

Informal power

From both the strategic apex and the line manager’s perspectives, adjustments were made as a consequence of the informal power of some professionals: *“I know examples of employees that are allowed to avoid having to use electronic systems – people who definitely ought to. But they possess a certain type of knowledge and they are needed, so we do not put up the same demands for them, as we do for the rest. So, it’s a kind of inconsistency...”* (Middle line informant).

New initiatives for leveraging IQ, like demands for documenting psychiatric patients’ physical lifestyle in the first meeting with the psychologist, not perceived to be within the psychologists’ professional domain, created joint opposition against the initiative: *“I think there is some sabotaging in the name of the profession. No rules or regulations are broken, but... (...) It has been discussed ways of influencing, and recently I saw one method – a protest statement signed by two psychologists”* (Operating core informant #1).

In the decision-making in general and in development and implementation of work procedures for leveraging IQ in specific, the technostructure informant perceived the specialists to have a key role possessing both informal and formal power: *“It is often the operating core specialists who is most oppositional, not necessarily the middle line. (...) We have many individuals with strong opinions. I think of it as an organizational problem (...). Many of these specialists are also part of formal decision-making councils (...)”* (Technostructure informant).

The interviews revealed both formal hierarchies through the line of management, and informal hierarchies between the professionals in the organization and internally between professions in the operating core. The position of the support staff in the informal hierarchy was illustrated in the following quote concerning the role of support staff in change processes: *“They are always involved at a late stage, often when things already are implemented and seemingly in place. Then you get reactions from them. I experience them to be excluded, perhaps in almost all decisions concerning them”* (Technostructure informant).

The use of support staff revealed informal hierarchies between professionals in the operating core. The psychiatrists and psychologist seemed to be using support staff extensively, while other professions in the operating core, like nurses, had to document on their own. According to the support staff informant, this is the way it has always been, without reflecting on this difference. For the operating core members, privileged to use the services of support staff, the cooperation was affecting IQ positively: *“Most colleagues hand most materials over to the support staff who is executing the formal registration in our electronic system (...) The communication between the support staff and me, provides all the information or data to be registered correctly and assuring the information to attain high quality”* (Operating core informant #1).

Additionally, between specialists, psychiatrists and psychologists, an informal hierarchy existed. The following quote considered the psychologists’ opinions regarding patient treatment in discussions with doctors: *“I have never experienced unpleasantness in discussions with doctors. I discuss and promote my opinions. But the other way – you are not supposed to question considerations done by the doctor”* (Operating core informant #1).

Shift of power

The interviews indicated that the degree of autonomy in the operating core might be changing. As one operating core informant reflected on the differences between established psychologists and younger ones: *“My main impression is that younger psychologists are more concerned about doing things right – the way the system expects it of them. They are actually surprisingly concerned with it. Of course – there are differences (...) but my main impression is that they are doing their best. Psychologists have become so good at school, because it’s quite hard to get the professional degree – so, many of them have become conformists”* (Operating core informant #1).

4.3.5 Complexity

Complexity derived from the following two content themes; *Pace of change* and *Service complexity*. The findings of these themes in Organization 1 are presented in the following sub-chapters.

Pace of change

The health care sector experienced constant changes in regulations and demands, organizational composition and structure of ownership, and professional assumptions. The middle line informant illustrated this challenge in the following quote: *“I can understand that changes are necessary in order to improve services, but the pace of changes is creating lags and things aren’t able to stick in peoples’ minds, before new demands replace the previous one”* (Middle line informant). Difficulties in implementing changes in the organization were further elaborated by one operating core informant: *“We have recently been instructed to do some of our documentation in a different way (...) I don’t know if it will sink in at some point... It might take some time. (...). I guess it is the resistance to change-concept. Changes aren’t always so much fun”* (Operating core informant #2).

Service complexity

At a general level, the context of healthcare had distinctive characteristics. The strategic apex informant stated that complexity of the services provided to the patients led to problems related to quantification of quality: *“One thing is obvious: quality is a diffuse concept, but it is an absolute demand for us to provide acceptable services”* (Strategic apex informant). This complexity of health services in general was highlighted by all informants, and one of the operating core informants further illustrated the complexity of psychiatric health care, stating that psychiatry is not an exact science: *“In opposite to the somatic medicine, the psychiatric discipline is operating with consensus categories”* (Operating core informant #1).

Both the line manager informant and the technostructure informant further illustrated the complexity of working in an environment of health care where information had to take soft values and ethics into consideration: *“The whole job is pervaded by doing considerations where there in many situations does not exist one single answer. You have to collect information from both patients and their next of kin, observe, mapping the information needed – and it takes time”* (Middle line informant).

4.3.6 Perceptions of IQ

Perceptions of IQ derived from the four perspectives of IQ; *Accessibility*, *Contextual*, *Intrinsic*, and *Representational*. The findings of these themes in Organization 1 are presented in the following sub-chapters.

Accessibility

The accessibility perspective for IQ was highlighted by the technostructure informant stating that all employees producing information must be followed up on making information accessible to others. Employees must be trained to improve their information seeking skills to access available information. The support staff informant stated further: *“... it should be simple for all employees to access what information that is produced throughout the Clinic”* (Support staff informant).

However, the most obvious perceived challenge with information accessibility was related to providing information to the receivers in need for it – information distribution. Most of the relevant information needed for tasks was available in the organization; the problem was how to target it to the people in need for the specific information: *“In the distribution of information from that level (Middle line) we experience deficiencies. We notice that the people in the operating core are never informed of the decisions taken – decisions that the management has decided to be distributed to the operating core. I feel that we increasingly are trying to inform in more information channels, attempting to reach out, but...”* (Technostructure informant).

On the other hand, the middle line informant perceived the process of filtering relevant information to the subordinates as challenging, because; *“In my experience, people always cry out for more information than they actually want”* (Middle line informant). One of the reasons for the complexity of distribution was the physical decentralization of the employees and shift work, making it difficult to reach out to all employees at the same time. In addition the employees were reluctant to search for information: *“Many wants to receive information directly in their hands, rather than actively seek for the information that already exists. (...) The information that people deal with is the one that they’ve been told about. So, actively seeking information on their own – people got some kind of barriers or limitations”* (Middle line informant).

Contextual

Parts of the contextual perspective of IQ, the amount of information and relevancy, were clearly the most dominant factors perceived in Organization 1. Both the middle line and the operating core informants stated the need for reducing the amount of documentation and rather focus on documenting the relevant information. *“It is not necessarily that we need to document more, but better. In our documentation, there are many things we could have reduced, and more relevant information could have been included (...) Too much information makes you wonder if it’s worth the effort to read and find what’s relevant, or if you’ll just give it up”* (Middle line informant). Also the strategic apex perceived the balancing of information access as a challenge. Even though the filtering process of information in the line of management, matching relevant information to specific receivers, may be a goal on the one hand, the wide distribution of information throughout the organization was beneficial: *“It is obviously a challenge to know who the information is relevant for. At the same time, I think the organization in general, (...) people need to be informed to a certain degree, in order to feel included in the organization”* (Strategic apex informant).

In the patient documentation, the dimensions of amount of information, value-adding and relevancy were clearly contextually contingent: *“When working in the emergency room, we do not need the whole life history of the patient. Sometimes, too much information can be counterproductive. (...) It’s a matter of whether information is value adding, or if it is just blank information (...) Blank information is just journal garnishment”* (Operating core informant #2).

The dilemma between amount of information and relevancy was pointed out by the operating core informant, related to the psychiatrists’ / psychologists’ documentation of a solution to patient treatment: *“You need to have a certain degree of depth. Especially when there is a suggestion for solutions, you would like to know the reasoning of the solution, because things don’t always add up at once... When they (the psychiatrists / psychologists) have managed to document more than just “headlines”, then it’s good. You must have some degree of depth.”* (Operating core informant #2)

By distribution of organizational information, the dilemma between the amount of information and relevancy was obvious in Organization 1. On the one hand, the information is valued, but on the other hand too much information leads to overload: *“I believe in a systematic flow of information in an organization. It provides people with more organizational knowledge and provides understanding of how things are related and why we are here.(...) Periodically we experience overflow of e-mails by receiving copy of almost all (...) It’s all about finding the right balance”* (Strategic apex informant).

Intrinsic

In Organization 1, the most frequently mentioned quality characteristic concerning information itself, intrinsic, was *conciseness* – the information should be compact and to the point. This characteristic was considered important regardless of the type of information in question. In the documentation of patient treatment, one informant of the operating core explained the difficulty in reporting concisely and objectively: *“All the information the patient provides in the interaction with us is relevant. It may be complex and must necessarily be interpreted by me. It requires my professional skills to activate, clarify, extract and filter the information for me to add meaning to it and be able to share this meaning”* (Operating core informant #1).

Furthermore, both the members of technostructure and strategic apex stated the credibility of the information as an important perspective primarily related to information concerning changes in the organization, illustrated in the following citation concerning development of work procedures in the clinic: *“It must be credible. Information I send is built on the credibility of the sources I use. Further, the authority of procedures approval will add credibility to the content. By using evidence-based sources in the process of decision making, I feel more comfortable of arguing proposed changes.”* (Technostructure informant). Credibility related to patient information was sometimes perceived as a problem to the operating core, where the quality of information from externals, like referrals and the patients, where questioned: *“We always deal with the information from the patient, and sometimes we are certain that it is incorrect. Sometimes we are uncertain, but sometimes the patient is clearly not telling the truth”* (Operating core informant #2).

Support staff perceived correctness in their documentation as the single most important perspective. Incorrect information was perceived as a problem from both members of the strategic apex and operating core: *“... but there are lots of bad data. I look at what is being registered and observe that much of it is wrong”* (Operating core informant #1).

Representational

In Organization 1, the technostructure informant perceived representation as an important perspective of IQ, regarding development of work procedures: *“... and the way the procedures are presented. Today, procedures are Word-documents and must be printed separately. This is not exactly high-tech, and not appealing to the end-users. In my experience as former end-user, this system was poor. Maybe that is what I’ve brought with me in this position, because I think that the way it’s presented and the availability means a lot for the end-user”* (Technostructure informant).

The strategic apex informant reflected on the individual perceptions of representation of information: *“I think it is important that information is represented in an OK manner. But (...) you have those who are more visual than others, and some more verbal or theoretical than others. So... the representation of information is somehow dependent on the individual receiver”* (Strategic apex informant).

Operating core perceived challenges to the format of information. The following quote reflects issues to the format of the psychiatrists’ documentation of patient treatment: *“They (the psychiatrists) only use these standard generic terms, so you have to figure it out by yourself (...) Sometimes these terms are recurring, and these words don’t help us anything. Especially not the patient, because we then have to further clarify the information with the patient (...) There is a vast amount of professional terminology and internal jargon”* (Operating core informant #2).

Both members of the strategic apex and middle line emphasized the importance for information to be unambiguous, meaning that one should not be able to interpret information in different ways.

4.3.7 IQ impact

IQ impact was organized in the following four grand themes; *Client Impact*, *Organizational Impact*, *Personal Impact*, and *Service Impact*. The findings of these grand themes in Organization 1 are presented in the following sub-chapters.

Client Impact

The most severe impact we observed for the patient was related to violations of the work procedures. In terms of IQ, the violations were caused by issues like accessibility to procedures, the amount of procedures, describing complex tasks in procedures etc.: *“The consequences of not distributing procedures (...) could be incorrect treatment and obligations not fulfilled. This may be obligations to the patient in which the patient is unaware of, and provision of legal rights the employee is unaware of. (...) Ultimately, lack of available procedures, like considerations of suicidality, could have fatal consequences for the patient”* (Technostructure informant).

The quality of the previous documented patient treatment resulted in severe impact for the patient: *“... it may be related to the considerations of the treatment regarding life and death if sufficient information is unavailable when needed. If you then must have subjective considerations of actions to take, it could lead to dramatic consequences”* (Middle line informant).

The quality of information received from external sources resulted in impact for the patients: *“Sometimes, the premises for the admissions could be erroneous, because the referral information is erroneous or with low quality. (...) Sometimes, especially with patients admitted to compulsory treatment (...) and it appears not to correspond to reality. (...) It is, of course, bad for the patient to be admitted to compulsory treatment, when it should be done voluntarily.”* (Operating core informant #2).

We observed that it was not only the operating core who influenced the patient impact through the quality of information: *“... it could result in administration of incorrect medicine.. If I have documented something I thought I’ve heard and it would turn out to be wrong.. Incorrect medicine or tests the patient was supposed to take within a period of time...”* (Support staff informant, talking about the process of transcribing the psychiatrists’ consultation notes).

Organizational Impact

IQ impacted decision making process in Organization 1, as illustrated by the strategic apex informant: *“We can take the wrong decision on erroneous information. We have to use a lot of extra time to get knowledge if the amount of information is insufficient”* (Strategic apex informant). On the other hand the middle line informant stated fact based information to be invaluable in discussions with employees: *“(...) fact based information gives us a good foundation for discussing an issue in a professional manner (...)”* (Middle line informant).

The strategic apex informant suggested that the organization, on the one hand, suffered direct economical impacts due to poor quality in activity information. On the other hand, the informant pointed out economical impact due to time consumption for the operating core to find relevant information: *“People use time to find information, when they really should use the time to treat patients. Everything is connected; bad information - time-consuming information retrieval - low access to clinical capacities - bad quality of the service provided.*

This is a vicious circle, and the reduced efficiency leads to economical impacts” (Strategic apex informant).

Other important findings on the organizational impact of IQ were:

- If middle line was unable to pass on a type of information that employees expected to receive and they should be able to have opinions on, it created uncertainty and unease resulting in deterioration of the working environment.
- Our technostructure informant emphasized that if employees violated routines, due to lack of access or lack of knowledge of how to access the routines, the clinic risked failure in quality accreditation.

Personal Impact

In order to avoid employees feeling excluded and not seeing their part in the organization, the strategic apex informant stated: *“By having information overflow, people can have trouble to separate relevant information from non-relevant information. But also, if you have information underflow, people can be silenced and not feel a part of a larger organization. (...)in order to be able to balance the information sent from strategic and middle line, it is important to have a continuous dialogue with the organization”* (Strategic apex informant). Thus, information overflow impacted the employees in a personal manner: *“If all information is sent out, and not being filtered by strategic apex or middle line, there is a chance information will make people confused on what information is priority and not”* (Strategic apex informant).

Documentation of patient treatment was mandatory to be able to evaluate treatment retrospectively. Low quality of documentation, or even lack of documentation, resulted in personal impact for the responsible operating core member. The following quote was the line manager view of personal impact of low quality documentation: *“(...) where you also experience that a procedure, demands and expectations to documentation, contact, considerations, especially by considerations of suicidality, compulsory treatment, where you may have to take difficult decisions that may have severe consequences. If it’s not documented in shed of the light at the certain situation, the considerations the actions were based on, the employee could be held responsible in ways that may feel quite rough”* (Middle line informant).

From the perspective of the technostructure informant, the impact on the corporate climate, as well as on the personal level, was affected in the process of putting work procedures into production, and then postponed by the middle line: *“... you can see it in the corporate climate, and it’s sometimes personally demotivating. It is hard to keep the momentum when others are reluctant to engage in implementing it. It may seem as when things are bottling up, you get further discouraged (...) Periodically, I experience heated discussions, also in the middle line, who wants to have an opinion on details”* (Technostructure informant).

A part of the support staff tasks was to provide the psychiatrists and psychologists with correct patient information through transcribed documents. The documents were used to plan further treatment and it was of utmost importance that the documents were describing the correct patients. Our support staff informant stated that the electronic system allowed for erroneous transcriptions and distribution of wrong documents, which resulted in embarrassment for the support staff employees.

Service Impact

At Organization 1 there were issues regarding accessibility to the information system at a specific time. The middle line informant said: “(...) *I was thinking of the electronic systems that sometimes, the employee-portal for instance, I need some information in order to reach a deadline and then the system is down. It becomes a tremendous time-consumer*” (Middle line informant). Also the support staff had problems accessing information when needed: “(...) *I need different types of information, and if you do not get it (through email) you need to call them, show up in their office or put the case on hold until the information comes*” (Support staff informant). Efficiency in services was influenced by the way the information system supported the task at hand. Our representative from the technostructure stated: “*When I develop new routines I build upon existing information from other places, if it is present. That’s where I would like to have databases containing guidelines. In the information systems today, I need to re-invent the powder each time I develop new rules and procedures*” (Technostructure informant).

Inefficiency in information systems in Organization 1 was further highlighted by the Strategic Apex informant, stating: “*DIPS² has an overflow of reports leading to use of unnecessary time when searching for the correct report*” (Strategic apex informant). All informants mentioned the use of unnecessary time for retrieving information – time that should rather be spent on clinical treatment.

The other main category regarding how IQ impact services, were issues of how the services were performed. When performing core services, our operating core informant stated: “*If the information on procedures and national guidelines for medical treatments are poor, the operating core can conduct treatment that is not considered to be the best practice*” (Operating core informant #1).

A part of the clinical treatment was to spend time with the patient during the admission in the clinic. Detailed information regarding the clients’ past behavior affected the precautions the operating core needed to address: “*If I received a patient being transferred to our clinic for depression having record of violence and other police matters, (...) we need to take other precautions than normal. In such cases historic patient information is vital on how we perform our services*” (Operation core informant #2).

² DIPS is the electronic patient record system used in Organization 1

4.3.8 Analysis summary Organization 1

Table 13 summarizes the findings in Organization 1. The findings are structured by the content themes within the derived mechanism affecting IQ.

Awareness of IQ	Findings
A.1 - Organizational awareness	<ul style="list-style-type: none"> - A.1.1 - Organizational autonomy was positively associated with implementation of IQ initiatives - A.1.2 - Interdisciplinary patient treatment cooperation provided increase in IQ - A.1.3 - Targeting information to professionals - A.1.4 - Use of support staff for increasing IQ
A.2 - Organizational initiatives	<ul style="list-style-type: none"> - A.2.1 - Implementation of quality model (DDKM) - A.2.2 - Dedicated quality consultant in management - A.2.3 - Implementing balanced scorecards - A.2.4 - Giving employees responsibility to review and present work procedures - A.2.5 - Regular meetings with IQ discussions - A.2.6 - Super-users as IQ agents - A.2.7 - Registering undesired incidents - A.2.8 - Context-specific templates to increase IQ in patient documentation - A.2.9 - Governmental revisions forced new initiatives
Bureaucratization	Findings
B.1 - Bureaucratic degree	<ul style="list-style-type: none"> - B.1.1 - Increase in bureaucracy the past 10 years - B.1.2 - Organizational experience helped finding freedom within the bureaucracy
B.2 - Bureaucratic impact	<ul style="list-style-type: none"> - B.2.1 - More standardized documentation reduced personalization and leveraged IQ - B.2.2 - Bureaucracy delayed implementing new routines targeted at increasing IQ - B.2.3 - Created dilemma of spending time to increase IQ or providing services to patients
Individual contingencies	Findings
I.1 - Individual experience and premises	<ul style="list-style-type: none"> - I.1.1 - Information retrieval was affected by age and education - I.1.2 - Cultural background affected understandability of information - I.1.3 - Professional experience affected relevancy of information
I.2 - Individual perceptions of information	<ul style="list-style-type: none"> - I.2.1 - Information was perceived individually
Locus of power	Findings
L.1 - Formal power	<ul style="list-style-type: none"> - L.1.1 - Contradictions between desired autonomy and managerial expectations affect IQ - L.1.2 - Professional councils added credibility and legitimacy to information
L.2 - Informal power	<ul style="list-style-type: none"> - L.2.1 - Informal power caused inconsistent demands to IQ - L.2.2 - Informal power created joint opposition to IQ initiatives - L.2.3 - Operating core possessed both formal and informal power affecting IQ - L.2.4 - Informal hierarchies between professionals affected IQ - L.2.5 - Informal hierarchies between professions in operating core affected IQ - L.2.6 - Informal hierarchies between specialists in operating core affected IQ

Identifying Information Quality Mechanisms

L.3 - Shift of power	- L.3.1 - Young psychologists tended to be conformists and by that reducing own autonomy
Complexity	Findings
C.1 - Pace of change	- C.1.1 - Constant changes in regulations, demands, organizational composition, and structure of ownership
C.2 - Service complexity	- C.2.1 - Services are complex, leading to difficulties in quantification of quality - C.2.2 - Documenting information regarding patients included soft values and ethics, increased complexity
Perceptions of IQ	Findings
P.1 - Accessibility	- P.1.1 - Need for training to improve information seeking skills - P.1.2 - Focus on providing access to produced information - P.1.3 - Lack of information distribution and targeting information to specific context - P.1.4 - Employees had barriers towards active information-seeking
P.2 - Contextual	- P.2.1 - Hard to balance the amount of information and relevance when distributing information to the organization - P.2.2 - Hard to balance the amount of information and relevance when documenting patient information - P.2.3 - Hard to balance the amount of information and relevance when documenting patient treatment - P.2.4 - Supplementary information was valued, but led to overload
P.3 - Intrinsic	- P.3.1 - In order to achieve intrinsic information, it needed professional skills in patient documentation - P.3.2 - Credible information was needed to achieve organizational changes - P.3.3 - Credibility in information sources varied in patient treatment - P.3.4 - Data needed to be correct
P.4 - Representational	- P.4.1 - The end-user perceived well-presented information to be increasing the availability - P.4.2 - The quality of the presentation was individually perceived - P.4.3 - Information presented with professional terminology or internal jargon, led to reduced understandability - P.4.4 - Information should be unambiguous to employees

Table 13 - Findings of mechanisms in Organization 1

Table 14 summarizes the findings of IQ impact in Organization 1. The findings are structured within the four grand themes of impact.

IQ Impact	Findings
Client impact	- IC.1 - Violations of patient-related work procedures due to accessibility, amount and complexity, may affect patient health - IC.2 - Amount of documentation of previous patient treatment may affect patient health - IC.3 - The quality of information from external sources may lead to erroneous admissions - IC.4 - Misinterpretation of information may lead to incorrect medicine administrations
Organizational impact	- IO.1 - Amount of information affected decision-making - IO.2 - IQ of activity data had economical impact - IO.3 - Absence of information led to deterioration of the working environment - IO.4 - Fail to achieve quality accreditation
Personal impact	- IP.1 - Absence of information led to employee exclusion

	<ul style="list-style-type: none"> - IP.2 - Information overflow led to employee confusion - IP.3 - Operating core employees held personally responsible for IQ in patient documentation - IP.4 - Demotivated employees when IQ initiatives are obstructed - IP.5 - Support staff experience embarrassment when being responsible for low IQ
Service impact	<ul style="list-style-type: none"> - IS.1 - Access to information affected the service efficiency - IS.2 - Information overload affected service efficiency negatively - IS.3 - Up-to-date information affected the way services were performed - IS.4 - The amount of information affected the way services were performed

Table 14 - Findings of impacts in Organization 1

4.4 Case Analysis – Organization 2

In the following sub-chapters, the findings in Organization 2 are presented by the mechanisms and the corresponding content themes. Our definitions of the mechanisms and content themes are presented in table 12 in chapter 4.2.

4.4.1 Awareness of IQ

Awareness of IQ derived from the following two content themes; *Organizational awareness* and *Organizational initiatives*. The findings of these themes in Organization 2 are presented in the following sub-chapters.

Organizational awareness

In general, the informants had few explicit opinions regarding awareness of IQ in Organization 2. Though, we observed differences between the types of tasks: *“The awareness in the organization regarding information quality... To some degree, I would say. In my experience, people on department-level are concerned with having the access to the information needed to perform tasks, both administrative tasks and in teaching – the professional part. But – the research part of the job is more decoupled from the other parts”* (Operating core informant #2).

The strategic apex informant was aware of challenges of IQ related to accessibility and information distribution, particularly on the overall organizational level: *“The management is aware of this and we have received feedback from both the Council of work-environment and a revision-report from the Labor inspection authority. They are all pointing at the information-flow to be the greatest challenge”* (Strategic apex informant). One informant perceived the lack of IQ awareness to be apparent in the organization: *“Professional handling of information would be good, but we experience a really understaffed information department. If you take a look at the front web-page of the university, the headlines are constantly 14 days old”* (Operating core informant #1).

However, on the institute-level, all informants reported satisfaction to the level of information provided from the middle line. Though, the format of information distribution was discussed: *“I think we have a good team bringing the information to the operating core. At the same time I think there is a lack of shared forums, information meetings for all the employees. It’s got something to do with being informed in a group, and the shared interpretation of the information”* (Operating core informant #1).

From the middle line perspective, the organization did not have a systematic approach, emphasizing the lack of IQ awareness: *“We do things the classic way – ad-hoc. When you experience mistakes or discrepancies related to IQ, then these specific incidents are being investigated and actions are made. But obviously, the exact same incident doesn’t reappear the next 10 years, but other incidences do... We approach these incidences case-oriented”* (Middle line informant).

The awareness of the quality of information itself was considered in decision-making processes: *“When informal information comes to my attention, let’s call it gossip, I get information not meant for my ears - certainly not meant for public forums. The information could be extremely relevant but typically incomplete (...). The amount of information is probably insufficient, so I need to know more. I don’t take decisions purely based on the information, but it’s not completely irrelevant.”* (Strategic apex informant).

Organizational initiatives

Initiatives to increase the awareness of IQ in Organization 2 were implemented or planned implemented – both explicitly and implicitly. An example of an explicit initiative was illustrated by the strategic apex informant: *“I want to have an intranet-solution. By this, you have a sensible channel of informing many people without using e-mail-crap, to put it that way. A well-structured intranet would be suitable for us”* (Strategic apex informant).

Another targeted initiative for increasing the awareness of the type of information distributed in the organization was implemented in order to reduce the overflow of information: *“There have been stated examples of the kind of information people are allowed to distribute. This has been successful”* (Operating core informant #2).

Implicitly, the risk of information overload to students has led to awareness of the amount of information distributed: *“When we meet the students on their first day, we inform them of things important at the moment. The details will have to wait. (...) The students who have attended for a period of time need a different type of information. (...) We try to provide information that is relevant for the current phase in the course”* (Technostructure informant).

4.4.2 Bureaucratization

Bureaucratization derived from the following two content themes; *Bureaucratic degree* and *Bureaucratic impact*. The findings of these themes in Organization 2 are presented in the following sub-chapters.

Bureaucratic degree

The informants all perceived an increase in bureaucratization in the organization. The following quote is one operating core informant’s reflections of bureaucratization: *“And the past 10 years that is what’s been invested in – administrative resources. It’s been hired more administrative personnel than academic resources – that’s the part of the organization that’s growing the most the later years”* (Operating core informant #2). Both the operating core informants elaborated that this growth was not unique for this organization, but an international trend of universities, most likely related to the entire public sector. The operating core informant further reflected on the reason of bureaucratic growth in the following manner: *“But, of course, you can do this in public sector, because you’re not managed by market incomes. You’re managed by public departmental funding”* (Operating core informant #2).

Furthermore, the middle line informant elaborated differences in the perception of bureaucratization between different parts of the job: *“We must deal with several frameworks, but there are great differences between research and teaching. Considering the teaching part, it’s definitely bound by rules and relatively standardized (...). Considering the research part, it’s not standardized at all. It has been somehow slightly more standardized, not necessarily by rules but with stronger demands on the output – we’re assessed by what we publish and the counting of publications has become significantly more important the later years, so by that, we’re more bureaucratic”* (Middle line informant).

The strategic apex informant also perceived increased bureaucratization, but elaborated the importance of exploiting the freedom within the borders of the bureaucracy: *“We must deal with it, and it’s all about cutting the Redtape – to find agile solutions. In strategic decisions, you are free to make decisions, but when it’s made, all the formalities of implementation must be dealt with. Formally, almost all are bound by regulations. In reality, we have more freedom”* (Strategic apex informant).

The technostructure informant was concerned with balancing the bureaucratic burdens, using regulative when necessary, but reducing formalities when it was possible. The informant was especially concerned with reducing bureaucracy for the operating core: *“Scientific employees are experiencing more pressure and are increasingly spending more time on administrative matters. But – we are concerned by, at least some of us, helping them so they can be doing exactly these things: teaching and research”* (Technostructure informant).

The other operating core informant perceived the bureaucratization to have both positive and negative impact on the processes of decision-making: *“Actually, it has been a positive development on the lower levels, the institute-level. Much easier, more transparent decision-making processes, shorter and faster decision-making processes. All on institute-level”* (Operating core informant #2). But the same informant perceived negative impacts on the bureaucratization on higher organizational levels: *“Above the institute (...) it has become significantly harder. We have got ourselves a bureaucracy where things we used to decide ourselves now must be clarified many places (...)”* (Operating core informant #2).

Bureaucratic impact

Positive impacts of the increase in bureaucracy were reported. One operating core informant reported that the internal visibility and accessibility of research was unconditionally positive. This led to increased recognition of research and external promotion of the research originated from the organization.

The middle line informant illustrated how bureaucratization has led to reduction in IQ concerning student feedback information: *“First of all, we experience the will of the students to provide feedback to be low, so we have no information to evaluate. The challenge is to get students to give responses. I believe that the standardization, in order to fulfill external demands, was a set-back compared to how student evaluation was performed 10 years ago, when the individual teacher was responsible of evaluation”* (Middle line informant).

The organization was perceived to be a classical professional bureaucracy by the middle line informant. This informant illustrated differences in IQ according to the level of standardization of the processes involved: *“I think there are few challenges, because it’s a well standardized process derived from a machine bureaucracy. It’s the exact way to treat the information, standardized regarding what to include, the terms, and it’s almost automated. And you’ll see that this work is not performed by academic professionals, but by the student*

counselors or secretaries. This is delegated to the administrative support staff. (...) When we talk of the individual courses, then it's mostly the individual course teachers' responsibility. It's the classic professional bureaucracy" (Middle line informant). The informant further found it peculiar that the most standardized processes, the processes with the least involvement of the operating core, were the processes with least student complaints.

4.4.3 Individual contingencies

Individual contingencies derived from the following two content themes; *Individual experience and premises* and *Individual perceptions of information*. The findings of these themes in Organization 2 are presented in the following sub-chapters.

Individual experience and premises

Both the middle line informant and one of the operating core informants elaborated on the value of experience impacting IQ. The retrieval and distribution of relevant information in the organization was particularly perceived to be easier for people with more knowledge of the organization. The middle line informant reflected on the challenges of balancing the amount of relevant information to the employees: *"These mistakes always happen. After a while, you'll learn these things. After more than 20 years in the system, I believe I have a certain overview of what's perceived as relevant and what's less relevant, but I also make mistakes. That is perhaps the most important role of the middle line – to filter information, both up and down the line"* (Middle line informant).

Individual perceptions of information

The perceived value of leveraging IQ was dependent on the rationale of initiatives, and the individuals proposing initiatives, as illustrated from the strategic apex informant: *"It is obviously an enormous ability to change in our organization. And there is an incredible will of change when people suggest the change themselves. Change forced upon us is not instantly something people want. So, to believe we will solve all challenges and increase the quality of information – making all smile – I don't think that's possible"* (Strategic apex informant).

Individual perceptions of information value were found to be affecting IQ. The middle line informant illustrated this by reflecting on the quality of reported scientific statistics: *"So, once again, the individual perceptions of added value and usage of the information are contributing to information insufficiency and is the reason why we are having problems of getting people to use the systems. It's a common problem"* (Middle line informant). This perception of absence of individual value-adding and biases in perspectives was confirmed by one of the operating core informants: *"When my paper is published, then it's published – then it's "go to next", you know. And then it's expected for me to start registering a whole bunch of bureaucratic work when I've finished my paper – that is not motivating. So people avoid it"* (Operating core informant #2).

4.4.4 Locus of power

Locus of power derived from the following two content themes; *Informal power* and *Shift of power*. The findings of these themes in Organization 2 are presented in the following sub-chapters.

Informal power

The autonomy of professionals in the operating core was from several informants perceived to influence the IQ. One operating core informant self-examined own actions taken when mandatory registrations were perceived as irrelevant and not value adding. This person deliberately omitted imposed registration of information without fearing consequences. The person considered this decision to be a privilege.

Shift of power

The operating core informants, in particular, reflected on the reduction of user-involvement, and suggested one reason to be changes in the management structure, where decisions in past days were taken in the collegiums of professionals at the institute-level. Many of these decisions are now made on faculty management-level. Some of the attitudes against new initiatives, including initiatives affecting IQ, were based on the level of involvement of the professionals in the operating core: “... *user-involvement is something the academic professionals are excluded from. We’re not informed or have been given the opportunity to have any opinions in advance. It’s just imposed on us*” (Operating core informant #1). The other operating core informant stated that reduction of autonomy in the operating core impacted IQ: “*It’s not just the user-involvement – in the past these were things we used to take care of ourselves, which at one point was taken out of our control. And the quality has become significantly reduced, because decisions are being made by non-competent people*” (Operating core informant #2). These changes have led to reduction in the individual autonomy, where certain professionals choose to adapt to the changes, while others, in some situations, choose not deal with new demands of e.g. registrations. One informant believed this lack of involvement from professionals to be related to the shift of the formal power from academic professionals to professional administrators, especially for experienced academics who knew the system in past days.

Hierarchical changes were observed, where the balance of informal power shifted in the organization. As one of the operating core informants perceived the shifts in hierarchies: “*Feedback on the things you do, e.g. when registering forms with specific deadlines – 10 years ago, an administrative professional would never order me to send this within the next Wednesday (...) They would have presented this in a different way. (...) It has been a shift in concepts in terms of academic professionals, including professors, having become front-desk personnel - people regarded as the bottom of the hierarchy in institutions like this*” (Operating core informant #1).

4.4.5 Complexity

Complexity derived from the following two content themes; *Pace of change* and *Service complexity*. The findings of these themes in Organization 2 are presented in the following sub-chapters.

Pace of change

The organization was perceived to be dynamic and in constant motion: *“Related to activities, very few things here are slow. We are ready for changes. We have almost 3000 students to take care of, almost 160 employees, 12-15 different student programs in constant, dynamic development, so the organization should perhaps have been more rigid. Or, on the contrary, you could consider this to be the factor of success, because we are able to take fast decisions, taking full advantage of theory of options, postponing all decisions as long as possible. But when decisions have to be made, we make them fast, and react fast”* (Strategic apex informant).

Service complexity

At a general level, the context of the university sector had distinctive characteristics. One of the operating core informants illustrated the complexity of services, leading to challenges in quality assessment: *“This quantification doesn’t need to be an expression of quality in these institutions. (...) It depends on how you assess it”* (Operating core informant #1).

4.4.6 Perceptions of IQ

Perceptions of IQ derived from the four perspectives of IQ; *Accessibility*, *Contextual*, *Intrinsic*, and *Representational*. The findings of these themes in Organization 2 are presented in the following sub-chapters.

Accessibility

The information streams within the organization needed to be accessible, according to our technostructure informant: *“The information regarding laws and regulations is important. (...) it needs to be accessible through clear lines. (...) in order to regard such information as good, it must be easy to retrieve through tools and information lines that I know about”* (Technostructure informant). The most frequently used distribution channel of information in Organization 2 was e-mail. *“Yes, if you are thinking about distribution channels, e-mail is the one that is being most frequently used. It is flexible and I can access information when I want to from where I want”* (Operating core information #2). Even though there were opposing views on how effective the e-mail system worked, the system provided accessibility to different types of information, e.g. organizational information.

When retrieving information from the web pages of the organization, or other information systems, our support staff informant highlighted the need for good metadata in order to enable easy access to information: *“It is important to categorize information - information describing the underlying information in any report or information system. This makes the information easier to access”* (Support staff informant).

Another perspective of accessibility related to how students access information. Most student information were distributed through ClassFronter³ or the web pages of the organizations, but

³ ClassFronter is the electronic system used in Organization 2 for distributing course material and 2-way communication with students

one of our operating core informant stated the need for investigating emerging systems to provide student information: *"I am thinking that one of our challenges is that we distribute information on ClassFronter when the students are using social media. The student thinks it is much "cooler". What we should be talking about is getting our information out in social media"* (Operating core informant #1).

Contextual

All informants perceived relevancy as important. The technostructure informant stated: *"(...) quality of relevancy - it is critical, because we experience that some information are less relevant"* (Technostructure informant). Another view on relevancy was related to the presentation of text for different audiences: *"It is a subjective matter. I separate between the text and the experience of the text. In the meeting of your text during lectures and the experience the reader gets from the text, the challenge is to write to an audience and find out how to define your audience. Who are they?"* (Operating core informant #1). One of our operating core informants further strengthened the need for relevant information: *"The information I'm retrieving is just data, just numbers. The point is that I'm getting what I need. And that's it. There are no quality issues with it."* (Operating core informant #2). Further, when weighing the intrinsic quality of information against the relevancy of information, our representative from the middle line stated: *"There are two different things here, one is the information itself, which in most cases we have no reasons for doubting the quality of. The problem is rather what information I need, and what information I don't need (...)"* (Middle line informant).

In the context of employee information, the strategic apex informant stated: *"On information regarding employees, then the amount of information is important. (...) you need to maneuver between different types of personalities and therefore know what type of person each employee is"* (Strategic apex informant). One of the operating core informants stated: *"I'm making my workday more effective by not looking for information that is not being pushed at me from the management, because I do not need it in my work"* (Operating core informant #2).

Another frequently mentioned aspect was *timeliness*. Getting information at the right time at the right place was of importance to both the support staff and the strategic apex. When dealing with different situations in a constant changing environment, our strategic apex informant stated: *"(...) regarding information of employees and course development, where you are dependent on having information early to be able to handle the situation quickly. To always enter a situation too late is not acceptable"* (Strategic apex informant).

Intrinsic

Credibility was perceived as important by the support staff and the operating core. The technostructure informant stated: *"Regarding information from the students, it is very important that it is credible, especially regarding counterfeit diplomas"* (Technostructure informant). Diplomas from former studies were verified by the support staff, before acceptance of enrollment for studies was issued to the student.

When working with economical data our operating core informant stated: *"(...) it is very credible. I can have some problems getting the data I need but the credibility on the data I receive and are working on, the economical data (...)"* (Operating core informant). This statement was supported by the strategic apex informant who stated the following concerning accounting information: *"(...) accounting information should be relevant, accurate, credible"*

and contemporary” (Strategic apex informant). Part of this citation included the second most referenced intrinsic IQ characteristic – *accuracy*. The operating core received information from both strategic apex and middle line: “*When it comes to short written messages, then I think they should be to-the-point - accuracy is important*” (Operating core informant).

Representational

During lectures, the course information was presented by the operating core. Our informant stated: “ (...) *The challenge is to present something that can be complex, in a way that is understandable*” (Operating core informant #1). Further, our second operating core informant stated: “*When the information is to be presented, I am very focused on presenting it in a good way, and understandable way - I am very focused that things must be understood.*” (Operating core informant #2). The support staff developed guidelines for faculty users of e.g. information systems, and stated the following concerning how the guidelines were presented: “*I am making the guidelines as easy as possible to understand. If I have presented them in a way that does not create any questions back, then I have presented them well*” (Support staff informant).

Unambiguous information was found to be an important characteristic of representational IQ. The Strategic Apex Informant said: “ (...) *information must provide credible representation. (...) it must be timely, verifiable and of a character that it tells me what I think the information tells me. That is the most important*” (Strategic apex informant).

The way information was presented over time, was an important characteristic. Information presented consistent over time, was interpreted quicker by the user. By changing the consistency, users were forced to change the way of interpreting the information.

4.4.7 IQ Impact

IQ impact was organized in the following four grand themes; *Client Impact, Organizational Impact, Personal Impact, and Service Impact*. The findings of these grand themes in Organization 2 are presented in the following sub-chapters.

Client Impact

Organization 2 offered a wide range of courses each semester for bachelor, master and PhD students. The student selected his or her choice of courses from a list of offerings prior to commencing studies. However, the course offerings were affected by the completeness of information in the decision-making process, as our strategic apex informant stated: “*We have a decision in the faculty that if there are less than 10 people registered for a course, the course will not be conducted. (...) If I get information that there is only six students registered, the course will be cancelled, end of story. But, if only 50% have registered on time, then I might have done a mistake. If this is a course that is based for English speaking students, then we might have late arriving international students. So, if we cancel this course before having such information, this will impact such students in a negative way*” (Strategic apex informant).

In the communication between lecturers and students, it was important to make sure the information was distributed so students were not excluded: “ (...) *the place you are distributing information about meetings in different associations, then it is sometimes only the master students that perceives that this information is for them, the bachelor students are thinking this is not for us. Then you need to add another dimension to the information stating who the information is aimed at*” (Operating core informant #1).

Organizational Impact

The funding of the organization was partly based on publication of research papers. Several informants stated the lack of willingness to register published papers as an economical impact. The technostructure informant stated: *"To make the operating core registering their research into ForskDok⁴, is important. This is important because we need to promote our research and also that is what we make money on"* (Technostructure informant). This statement was followed up by the middle line informant: *"It can provide economical and reputational consequences and is connected to the people that do not register research work"* (Middle line informant). The strategic apex informant was able to put figures to the economical impact: *"(...) if a researcher writes a paper alone it funds the university with 35 000 NOK and 70 000 to the faculty. If we do not report such research we do not get the funding. (...) it reduces our economical freedom"* (Strategic apex informant). One of the operating core informants confirmed the impact: *"When our research paper is delivered for printing and distribution, the work is done. We are very happy. Afterwards there is a lot of imposed reporting. I can understand the need for reporting but (...). I believe people up there (referring to the strategic apex) are frustrated, that I can understand."* (Operating core informant #2).

Another finding regarding economical impacts included financial planning. Our strategic apex informant stated the need for correct financial data to be able to make future plans: *"If there is wrong information in the accounting regarding ongoing projects, the economy of the faculty seems to be better than it really is, then I might think we have more economical freedom than we really have. Then I might use that money and have problems in the coming months. This happens, both ways"* (Strategic apex informant).

The operating core informant was particularly focused on the topic of organizational reputation and how information on research was distributed and presented to outsiders through the website of the organizations: *"Some researchers coming from other universities think our website is too little informative. It contains too little information about the research and researchers. (...) If the university would like to profile itself on a national level, then it is obvious that the easiest thing people do, is to enter the university web pages. I think it is a stupid lack of investment not using it or not taking full advantage of it"* (Operating core informant #1).

In order to facilitate continuous development, feedback from students was needed. Our middle line informant stated issues regarding incomplete feedback from students: *"The course evaluation is meant to give feedback from the students. Especially in classes where there is a large number of students and it is impossible to talk to all students. So missing feedback from students prevents intercepting mistakes and leads to reduced learning possibilities"* (Middle line informant).

⁴ ForskDok is an electronic system for registering research in Organization 2

Personal Impact

Personal impact of trying to improve the information through various initiatives was illustrated by one of the informants: *“Yes. It is obvious – it results in tiredness in the long run, and you become resigned”* (Technostructure informant).

Service Impact

The most mentioned impact regarding services was the use of unnecessary time and resources. Our support staff informant stated :*“(...) and the flow of information is not good. We use a lot of time finding the relevant information (...)”* (Support staff informant). E-mail was the preferred electronic communication channel, and thus time-consuming: *“There is an endless flow of emails each week. If I were to respond to every email I need to use one working day pr week. I do not think my employer wants me to use 20% of my work time responding to email”* (Operating core informant #1).

When information was inaccessible in information systems, other employees needed to be consulted: *“(...) and the involvement of other employees that should not be necessary, it would be nicer to be able to find the information by myself”* (Support staff informant).

4.4.8 Analysis summary Organization 2

Table 15 summarizes the findings in Organization 2. The findings are structured by the content themes within the derived mechanism affecting IQ.

Awareness of IQ	Findings
A.1 - Organizational awareness	<ul style="list-style-type: none"> - A.1.5 - Degree of IQ awareness differed between tasks - A.1.6 - Management aware of IQ problems through labor inspection-report - A.1.7 - Understaffed information department - A.1.8 - Information distribution to operating core perceived satisfactory at institute-level - A.1.9 - Lack of shared forums for sharing and interpreting information - A.1.10 - Lack of systematic approach to IQ - A.1.11 - Awareness of IQ in decision-making
A.2 - Organizational initiatives	<ul style="list-style-type: none"> - A.2.10 - Implementing intranet - A.2.11 - Reduced overflow of information by guidelines of distribution - A.2.12 - Targeting information to students
Bureaucratization	Findings
B.1 - Bureaucratic degree	<ul style="list-style-type: none"> - B.1.3 - Increase in bureaucracy in the past 10 years - B.1.4 - Focus on cutting the Redtape in order to create freedom within the borders of bureaucracy - B.1.5 - Technostructure focused on balancing the bureaucratic burdens to reduce time spent on administrative tasks by the operating core - B.1.6 - Decreased bureaucracy at institute-level, increased on faculty-level
B.2 - Bureaucratic impact	<ul style="list-style-type: none"> - B.2.4 - Increased visibility and accessibility of research - B.2.5 - Reduced IQ in student feedback - B.2.6 - IQ was affected by the level of standardization of the processes
Individual contingencies	Findings

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I.1 - Individual experience and premises	-	I.1.4 - Retrieval and distribution of relevant information was affected by professional experience
I.2 - Individual perceptions of information	-	I.2.2 - The perceived value of leveraging IQ was dependent on the rationale of the initiative
Locus of power		Findings
L.1 - Formal power		No findings
L.2 - Informal power	-	L.2.7 - The perception of value affected operating cores' attitude to imposed registration of information
L.3 - Shift of power	-	L.3.2 - Reduced autonomy in the operating core due to power-shift to the professional administrators - L.3.3 - Change in hierarchies between professionals changed the locus of power
Complexity		Findings
C.1 - Pace of change	-	C.1.2 - A dynamic organization in constant motion affectd IQ
C.2 - Service complexity	-	C.2.3 - Services are complex, leading to difficulties in quantification of quality
Perceptions of IQ		Findings
P.1 - Accessibility	-	P.1.5 - The organizational information streams must be accessible - P.1.6 - Use of metadata made information easier to find and access - P.1.7 - Social media increased accessibility to information for students
P.2 - Contextual	-	P.2.5 - Quality of relevancy perceived to be most important - P.2.6 - Important to know your audience to define relevancy - P.2.7 - Management perceived the amount of employee information as important - P.2.8 - Information preferred handed directly, rather than seeking actively - P.2.9 - Timeliness of information was important to be able to deal with situations quickly
P.3 - Intrinsic	-	P.3.5 - Credibility was important for student information - P.3.6 - Economical information should be accurate and credible - P.3.7 - Operating core preferred organizational information to be accurate and to-the-point
P.4 - Representational	-	P.4.5 - Understandability was perceived important in both verbal and textual presented information - P.4.6 - Managerial information must be unambiguous - P.4.7 - Consistency and same format over time, made information easier to interpret

Table 15 - Findings of mechanisms in Organization 2

Table 16 summarizes the findings of IQ impact in Organization 2. The findings are structured within the four grand themes of impact.

IQ Impact	Findings
Client impact	<ul style="list-style-type: none"> - IC.5 - Reduced course offerings due to decisions made on incomplete information - IC.6 - Lack of metadata in information led to students feeling excluded
Organizational impact	<ul style="list-style-type: none"> - IO.5 - Economic impact due to incomplete information in funding decisions - IO.6 - Economic impact due to incomplete information in financial data - IO.7 - Incomplete information regarding research and researchers on website led to poor reputation - IO.8 - Incomplete feedback from students led to reduced learning possibilities
Personal impact	<ul style="list-style-type: none"> - IP.6 - Tiredness from trying to improve IQ
Service impact	<ul style="list-style-type: none"> - IS.5 - Information overflow increased time used to find relevant information - IS.6 - Inaccessible information led to unnecessary involvement of other employees and reduced efficiency

Table 16 - Findings of impacts in Organization 2

4.5 Related findings

The final step of the analysis was to relate the findings in both organizations to the perspectives of professional bureaucracies, depicted in figure 10. This process reduced the findings to only include findings directly related to the perspectives of professional bureaucracies, activated by one of the identified mechanisms affecting IQ and impacts directly related to these perspectives.

4.5.1 Mechanisms

The findings activated by one of the mechanisms, are summarized below in four separate tables – one table for each perspective of professional bureaucracies. The coded findings in table 17, 18, 19 and 20, are obtained from table 13 and 15.

In the perspective of ‘autonomy and power’, three distinct mechanisms were active and affecting IQ; *bureaucratization*, *individual contingencies*, and *locus of power*. Our findings show that *locus of power* was the most present impact of IQ, with findings in both organizations. Further, the two mechanisms, *bureaucratization* and *individual contingencies*, were active in this perspective, but not present in both organizations. The former mechanism was found active in Organization 1, while the latter was found in Organization 2. The findings are summarized in table 17. The findings in the table are coded by “A”, indicating relation to autonomy, or “P”, indicating relation to power. Almost all of the findings were related to the power-part of this perspective.

Perspective: Autonomy (A) and power (P)			
Mechanism	Influence on perspective	Org 1	Org 2
Bureaucratization	In Organization 1, the mechanism of bureaucratization reduced the personalization of documentation, hence reducing the degree of autonomy. This mechanism was not found active in Organization 2.	B.2.1 (A)	
Individual contingencies	Organizational experience, and individual contingency, among the professional administrators, affected relevancy of information distributed to the operating core. Organizational experience increased the power of the professional administrator. This was only found in Organization 2.		I.1.4 (P)
Locus of Power	In Organization 1 the mechanism of locus of power affected IQ by having formal power within professional councils and informal hierarchies between professionals. Further, informal power of professionals in the operating core caused inconsistent demands to IQ. In Organization, 2 shift of power from operating core to administrators and changes in hierarchies between professionals changed the locus of power.	L.1.2 (P) L.2.1 (P) L.2.4 (P)	L.3.2 (P) L.3.3 (P)

Table 17 - Related findings of ‘Autonomy and power’

In the perspective ‘organizational governance and standardization of skills’, five mechanisms were active and affecting IQ; *awareness of IQ*, *bureaucratization*, *complexity*, *individual contingencies*, and *perceptions of IQ*. Our findings show that *awareness of IQ* was the most present impact of IQ, with findings in both organizations, though the majority was observed in Organization 1. The mechanisms of *individual contingencies* and *bureaucratization* were not observed active in both organizations; the former in Organization 1, and the latter in Organization 2. The mechanisms of *complexity* and *perceptions of IQ* were observed active in both organizations. Table 18 summarizes the findings, where the code “O” indicates relation to organizational governance, and “S” indicates relation to standardization of skills. The majority of the findings were related to the standardization of skills-part of this perspective. The mechanisms of *bureaucratization* and *complexity* were active in the organizational governance-part of this perspective.

Perspective: Organizational governance (O) and standardization of skills (S)			
Mechanism	Influence on perspective	Org 1	Org 2
Awareness of IQ	In Organization 1, the mechanism of awareness of IQ affected IQ through implementation of quality models, facilitating learning environments and discussions and by registering undesired incidents. All findings were targeting the standardization of skills. There were no findings regarding this perspective and this mechanism in Organization 2.	A.2.1 (S), A.2.4 (S), A.2.5 (S), A.2.7 (S)	
Bureaucratization	In Organization 2, the mechanism of bureaucratization affected IQ through focus on cutting the Redtape, reducing time spent by operating core on administrative tasks and the level of standardization of processes. There were no findings regarding this perspective and this mechanism in Organization 1.		B.1.4 (O), B.1.5 (O), B.2.6 (S)
Complexity	In Organization 1, the mechanism of complexity affected IQ through having a dynamic organization in constant motion. Organization 2 experienced constant	C.1.1 (O)	C.1.2 (O)

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	changes in regulations, demands and organizational composition and structure of ownership to affect IQ.		
Individual contingencies	In Organization 1, the mechanism of individual contingencies affected IQ by concluding that information retrieval is affected by age and education. Further the professional experience affected the relevancy of information. Both findings are targeting the standardization of skills and this mechanism was only reported active in Organization 1.	I.1.1(S), I.1.3 (S)	
Perceptions of IQ	In Organization 1, the mechanism of perceptions of IQ affected IQ through poor information seeking skills targeting the standardization of skills. In Organization 2 there was an indication that information was preferred handed directly to the operating core rather than seeking it actively.	P.1.1(S), P.1.4 (S),	P.2.8 (S)

Table 18 - Related findings of ‘Organizational governance and standardization of skills’

In the perspective of ‘service complexity and quality assessment’, four mechanisms were active and affecting IQ; *awareness of IQ*, *bureaucratization*, *complexity*, and *perceptions of IQ*. Our findings show that *perceptions of IQ* was the most present mechanism and active in both organizations, though the majority was found in Organization 1. Further, the mechanism of *complexity* was found in both organizations. The mechanism *awareness of IQ* was only found active in Organization 1, while *bureaucratization* was only found in Organization 2. Table 19 summarizes the findings, where “S” indicates the relation to service complexity, and “Q” relates to quality assessment. The majority of findings were related to the service complexity-part of this perspective.

Perspective: Service complexity (S) and quality assessment (Q)			
Mechanism	Influence on perspective	Org 1	Org 2
Awareness of IQ	In Organization 1, the mechanism of awareness of IQ affected IQ through targeting information to professionals. To improve the quality assessment, balanced scorecards were implemented. There were no findings regarding this perspective and this mechanism in Organization 2.	A.1.3 (S), A.2.3 (Q)	
Bureaucratization	In Organization 2, the mechanism of bureaucratization affected IQ by increasing the visibility and accessibility of research and reported reduced IQ in student feedback. There were no findings regarding this perspective and this mechanism in Organization 1.		B.2.4 (Q), B.2.5 (Q)
Complexity	In Organization 1, the mechanism of complexity affected IQ by having complex services that lead to difficulties in quantification of quality. Further, the documentation of soft values and ethics increase the complexity. Organization 2 experienced complex services leading to difficulties in quantification of quality.	C.2.1 (Q), C.2.2 (S)	C.2.3 (Q)
Perceptions of IQ	In Organization 1, the mechanism of perceptions of IQ affected IQ by providing access to produced information and balancing relevancy and amount of information. Further, intrinsic information needs professional skills and professional terminology may lead to reduced understandability of information. In Organization 2, use of metadata for making	P.1.2 (S), P.2.3 (S), P.3.1 (S), P.4.3 (S)	P.1.6 (S)

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	information easier to find and access was perceived valuable.		
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Table 19 - Related findings of ‘Service complexity and quality assessment’

In the perspective of ‘organizational cooperation and change management’, five mechanisms were active and affecting IQ; *awareness of IQ*, *bureaucratization*, *individual contingencies*, *locus of power*, and *perceptions of IQ*. Our findings show that *perceptions of IQ* was the most present mechanism and active in both organizations, though the majority was found in Organization 1. Further, the mechanism of *awareness of IQ* was found in both organizations, while the remaining three mechanisms was only found in one of the organizations. *Locus of power* was only found in Organization 1, though with several findings. Table 20 summarizes the findings, where “O” indicates the relation to organizational cooperation, and “C” relates to change management. The majority of findings were related to the change management-part of this perspective.

Perspective: Organizational cooperation (O) and change management (C)			
Mechanism	Influence on perspective	Org 1	Org 2
Awareness of IQ	In Organization 1, the mechanism of awareness of IQ affected IQ through interdisciplinary cooperation and governmental revisions. In Organization 2, labor inspection-reports made the management aware of IQ problems. Further, the information distribution to the operating core was perceived satisfactory at the institute-level, but shared forums for discussing information was absent.	A.1.2 (O), A.2.9 (C)	A.1.6 (C), A.1.8 (O), A.1.9 (O)
Bureaucratization	In Organization 1, the mechanism of bureaucratization affected IQ through delay implementations of new routines targeted at increasing IQ. There were no findings regarding this perspective and this mechanism in Organization 2.	B.2.2 (C)	
Individual contingencies	In Organization 2, the mechanism of individual contingencies affected IQ; operating core perceived value of leveraging IQ being dependent on the rationale of the initiative. There were no findings regarding this perspective and this mechanism in Organization 1.		I.2.2 (C)
Locus of power	In Organization 1, the mechanism of locus of power affected IQ; by having contradictions between desired autonomy and managerial expectations. Further, informal power created joint opposition to IQ initiatives and prevented change. Further, young psychologists tends to be conformists and by that reducing own autonomy and making change easier for the professional administrators. There were no findings regarding this perspective and this mechanism in Organization 2.	L.1.1 (O), L.2.2 (C), L.2.3 (C), L.3.1 (C)	
Perceptions of IQ	In Organization 1, the mechanism of perception of IQ affected IQ by balancing amount of information and relevancy, and providing credible and unambiguous information to the organization to enable change. Providing unambiguous information to the organization was also reported in Organization 2.	P.2.1 (C), P.2.4 (C), P.3.2 (C), P.4.4 (C)	P.4.6 (C)

Table 20 - Related findings of ‘Organizational cooperation and change management’

Overall, the majority of findings in the two organizations were related to three of the perspectives of bureaucratization; ‘organizational governance and standardization of skills’, ‘organizational cooperation and change management’, and ‘service complexity and quality assessment’. The mechanism we found to be the most active was *perceptions of IQ*, followed by *awareness* and *locus of power*.

4.5.2 Impacts

The findings of impacts related to the perspectives of professional bureaucracies are summarized in table 21. The coded findings in this table are obtained from table 14 and 16.

Our findings show that the majority of IQ impacts were related to the perspective ‘service complexity and quality assessment’. Within this perspective, most impacts were found in the grand themes *service impact* and *client impact*, with findings in both organizations. Impacts related to the perspective ‘organizational governance and standardization of skills’ were only observed in Organization 2, while the majority of findings in ‘organizational cooperation and change management’ and ‘autonomy and power’ were observed in Organization 1.

Impact in perspective: Autonomy (A) and power (P)		Org 1	Org 2
Personal impact	In Organization 1, professionals in the operating core were personally held responsible for insufficient IQ documentation of patient treatment. This was only found in the most autonomous part of the professional core.	IP.3 (A)	
Impact in perspective: Organizational governance (O) and standardization of skills (S)			
Organizational impact	In Organization 2, incomplete feedback from students reduced possibilities for organizational learning and course improvement.		IO.8 (O)
Impact in perspective: Service complexity (S) and quality assessment (Q)			
Client impact	In Organization 1, inaccessibility, amount and misinterpretation of information, impacted the patient treatment and patient health directly. In Organization 2, incomplete information and lack of metadata led to reduced course offerings and exclusion for students.	IC.1 (S) IC.2 (S) IC.4 (S)	IC.5 (S) IC.6 (S)
Organizational impact	In Organization 1, poor IQ resulted in increased risk of failure in achieving quality accreditation. In Organization 2, poor reputation of the organization would be the impact of incomplete information on website regarding research and researchers.	IO.4 (Q)	IO.7 (Q)
Personal impact	In Organization 1, information overflow led to confusion for the individual employees. Further, support staff experienced embarrassment when being responsible for low IQ.	IP.2 (S) IP.5 (S)	
Service impact	Both organizations reported IQ affected the services performed; low efficiency due to overload or inaccessibility of relevant information or the currency of the information. Further, Organization 2 experienced inaccessibility to information to involve other employees, reducing service efficiency at a larger scale than on an individual basis.	IS.1 (S) IS.2 (S) IS.3 (S) IS.4 (S)	IS.5 (S) IS.6 (S)
Impact in perspective: Organizational cooperation (O) and change management (C)			
Organizational impact	In Organization 1, the amount of information affected the decision-making. Further the absence of information led to deterioration of the work	IO.1 (O) IO.3 (C)	

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	environment. These impacts were not observed in Organization 2.		
Personal impact	Impacts on the personal level regarding the organizational climate were observed in both organizations; In organization 1, obstructions of IQ initiatives led to demotivation, while Organization 2 reported tiredness from trying to improve IQ.	IP.4 (O)	IP.6 (O)

Table 21 - Related findings of impact and perspectives of professional bureaucracies

Overall, the majority of findings in both organizations were related to the grand theme *service impact*. However, the most obvious finding was the difference in severity in *client impact* between the two organizations; in Organization 2 the most severe impact was related to exclusion and missed courses for the students, while the most severe impact in Organization 2 affected the health of patients.

5. Discussion

In this chapter, the mechanisms affecting IQ and the grand themes of impacts are discussed within the perspectives of professional bureaucracies. This discussion focuses on professional bureaucracies in general, based on the related findings in the two organizations investigated. Thus, the discussion is not aimed at Organization 1 and Organization 2 in particular.

5.1 Autonomy and Power

The increased bureaucratization the past 10 years have resulted in efforts of leveraging IQ, i.e. by standardizing the documentation of patient treatment and reduced the possibilities of personalization of documents. This reduction of possibilities was perceived to reduce the autonomy of professionals in the operating core.

According to Mintzberg, working in professional bureaucracies, professionals act autonomously and free of interference (Mintzberg, 1983). The standardization of documentation interfered with the work of the professionals, providing the organization increased insights in the professionals' work with the clients. Further, interferences and increased insights of the professionals work are often obstructed by the operating core in order to maintain control of the work and decisions affecting it, unless the rationale of the initiative are perceived to be value adding by the professionals.

The initiative of standardization of documentation was perceived to increase IQ, and there was no indication of obstructions, even though this resulted in reduced autonomy and was the effect of the *bureaucratization* mechanism. One reason for accepting this reduction in autonomy was related to the *personal impact* of insufficient documentation; the operating core professionals were held personally responsible. Thus, these initiatives of standardization were guidelines of expected quality of documentation, and added value to the professionals by reducing the possibility of this negative and personal impact. This finding on *personal impact* strengthens DeLone and McLean's statement of relations between IQ and individual impact to be significantly associated (DeLone & McLean, 2003).

Related to the mechanism of *locus of power*, the support staff was perceived to be an asset, and one of their single most important tasks was to facilitate operating core in order to increase IQ. Still, the support staff was often excluded in decisions-processes concerning IQ. This indicated an informal hierarchy between professionals within the organization, where this mechanism affected IQ negatively. According to Mintzberg, the locus of power is placed in the operating core, resulting in a bottom-up decision-making process, known as an inverted pyramid (ibid.). Further, this leads to parallel hierarchies, where the support staff is pulled between the formal power-structure, and the informal power of operating core professionals.

Our findings showed changes in the hierarchies between the professionals the later years, affecting the mechanism of *locus of power*. The increase in bureaucratization made the administrative structure fully elaborated, and thus more powerful. This further resulted in a shift of power from the professionals to the administrative structure, making professionals front-desk personnel, considered to be a low-rank position in professional bureaucracies. According to Mintzberg, the operating core seeks collective control on the administrative decisions affecting their work, through recruiting professional administrators from the operating core (ibid.). Our findings indicated a trend where professional administrators acted on demands from executive managers and owners, rather than the operating core. This trend needs further research, but our findings related to the mechanism of *locus of power*, showed that the operating core felt decisions taken previously in the collegiums of the professionals, were now taken on the management-level. From the operating core perspective, this reduction

of power and autonomy resulted in decreased IQ, due to decisions affecting IQ was taken by incompetent employees rather than the professionals.

The mechanism of *individual contingencies* was perceived to be affecting the relevancy of information distributed to operating core e.g. by the organizational experience among the professional administrators. According to Mintzberg, the professionals move through the ranks within the operating core as they gain experience and reputation (ibid.). Moving through the ranks, professionals were possible candidates for professional councils. This finding of organizational experience among the professionals is closely related to the assumptions of Klischewski and Scholl, stating the stakeholder's views of what is 'good' and 'useful' are contingent on their roles, agendas, wants and needs (Klischewski & Scholl, 2006). Our findings showed that the mechanism of *locus of power* affected IQ by having formal power within professional councils, and informal hierarchies between professionals. Shift of power from operating core to administrators and changes in hierarchies between professionals, changed the locus of power.

5.2 Organizational Governance and Standardization of Skills

Related to the increase in the bureaucratization the past 10 years, the mechanism of *complexity* was increasingly affecting IQ by constant changes in regulations, demands, organizational composition and structure of ownership, making the professional bureaucracy a dynamic organization in constant motion. Some of these changes must be considered as results of reformations in public sector, based on principles from private sector (Thiel & Leeuw, 2002). The constant changes forced upon the professional bureaucracy affected IQ negatively by not giving employees time to adapt to previous changes before commencing new ones. Implementing changes was considered a time consuming task, and will be elaborated later in this discussion.

Further, the attention on measuring and evaluating organizational performances, leveraged the degree of bureaucratization. This increasing focus on performance assessment is characteristic for the public sector, and referred as the "audit explosion" (ibid.). To avoid reduction in efficiency of services performed by the professional bureaucracy, our findings indicated attempts to reduce the effect of the *bureaucratization* mechanism, by focusing on cutting the Redtape in order to create freedom within the borders of bureaucracy. By only using formalities when it was absolutely necessary, this helped reducing the degree of bureaucratization and maintained service efficiency among the professionals.

According to Mintzberg, coordination of standardized skills and knowledge is the primary mechanism for coordination in professional bureaucracies (Mintzberg, 1983). Findings suggest the mechanism of *awareness of IQ* to be affecting IQ by initiatives aiming at standardization of processes. Implementation of quality models was targeted at increasing quality in all parts of the service, including the services performed in the operating core. It was found that the level of standardization of the process affected the IQ positively, driven by the *bureaucratization* mechanism. Thus, there was an indication showing processes performed by others than the professionals, were easier to standardize and expected to sustain at a higher level of IQ.

In order to achieve standardization of skills, according to Stabell and Fjeldstad, the professionals are trained at institutions before joining an organization. In order to increase their reputation and leverage their expertise, the professionals continue to improve their skills during work. This is done through efforts to keep up-to-date with the state-of-the-science and the state-of-art of their profession (Stabell & Fjeldstad, 1998). In order to keep up-to-date

with information, the professionals must possess information seeking skills, in order to access information. Our findings related to the mechanism of *perception of IQ*, showed that professionals needed more training in order to improve their information seeking skills. Further, certain professionals had barriers towards active information-seeking and preferred to be handed information directly. As a part of the perspectives of IQ, the accessibility to information, are in such cases affected negatively and further affecting the ability for the professionals to keep up-to-date with information. Findings suggested that the information retrieval throughout the professional bureaucracy was affected by the age and education, an entity of the *individual contingencies* mechanism. There was an indication showing the less formal education an employee possessed, the higher the threshold for being curious by increased barriers towards active information seeking. This showed differences in abilities to seek and retrieve information throughout the organization.

Stabell and Fjeldstad state learning to be an important part of the problem-solving cycle of the professional bureaucracy. In order to improve the ability to deal more effectively with problems, evaluations and post-implementation controls are conducted. This facilitates for identifying more efficient ways to deal with a certain problems (Stabell & Fjeldstad, 1998). Registering undesired incidents, giving the employees responsibility to review and present work procedures, and having regular meetings discussing IQ, were all associated with the mechanism of *awareness of IQ*. Such processes regarding leveraging the IQ in the learning part of the problem-solving cycle, facilitated for continual learning within the professional bureaucracy. By facilitating for continual learning, experience was documented and distributed to other employees. According to Mintzberg, the professional associations develop new standards based on experience from the network of professional bureaucracies which are imposed into learning institutions (Mintzberg, 1983).

5.3 Service Complexity and Quality Assessment

In professional bureaucracies, the pigeonholing process categorizes the clients' needs into terms of contingency indicating which standard program to be used. The pigeonholing process makes it possible to decouple the tasks and further assign these tasks to individual professionals. Even though the clients' problems often involve standardized solutions, the value creating process is configured to deal with unique cases. The professionals repeat the same complex programs time after time, reducing the uncertainty until they get them just about perfect (ibid.). Independently of cases being unique or standard, the professionals must document progress during and on completion of a program. While performing services to the clients, our findings revealed issues regarding documentation of these services. During services to individual clients, the information included soft values and ethics increasing the service complexity, thus affecting the *complexity* mechanism. Further, findings suggested professionals to be struggling on balancing the amount information and relevance during documentation of services, associated to the mechanism of *perception of IQ*. When documenting, the professionals were uncertain how information would be used in later stages, thus, prediction of relevancy was hard to achieve. What may be relevant for some professionals may be less relevant for others – which was also supported by Klischewski and Scholl (Klischewski & Scholl, 2006). This related to the grand theme of *client impact*, where the amount of information would affect clients in later stages of services if important information was left out. On the other side, documenting too much information would impact the overall service efficiency by professionals negatively, related to the grand theme of *service impact*.

Our findings showed when documentation was performed by the professionals, the content included professional terminology or internal jargon, leading to reduced understandability for others. The finding was related to our mechanism of *perception of IQ*. By using professional terminology or jargon, it leverages the IQ for certain professionals who are able to interpret such information quicker, but other professionals had difficulties interpreting such information – especially internal jargons related to an organization – reducing the service efficiency, related to the grand theme of *service impact*. Further, misinterpretation of information may lead to incorrect client services, a *client impact*.

Mintzberg states the clients of a professional bureaucracy to be expecting professionals to be highly motivated and performing their skills in a professional way, not experimental, based on experience (Mintzberg, 1983). In order to perform a satisfactory service, the professionals needed access to information. Our revealed impacts showed, among others, that too much information, information overflow, increased the time to find the relevant information, and reducing service efficiency, related to the grand theme of *service impact*. Within the mechanism of *perception of IQ*, findings showed relevant information existed within the professional bureaucracy, but the problem was finding it in an efficient way. Metadata provides a way to categorize information and provide easier access to information, perceived as important. By use of metadata, the *service impact* related to unnecessary involvement of other employees would be reduced. Further, by adding information regarding intention and information about purposed receiver, this targeted information to professionals made retrieval easier. This finding affected the mechanism of *awareness of IQ* positively.

Findings related to the complexity of the services being performed, was affecting the mechanism of *complexity*. Complexity, in terms of quantification of service quality, was found present in the organizations, due to the uniqueness of cases and particularly by professionals dealing with consensus-based sciences. These difficulties of quantification and assessment of service quality, are characteristic for professional bureaucracies (Mintzberg, 1983).

However, according to Stabell and Fjeldstad, there are ways to ensure that quality on services is acceptable. E.g. the ratio, amount of attempts and length of successful programs executed would indicate quality (Stabell & Fjeldstad, 1998). In order to achieve quality accreditation, where failure was revealed as an *organizational impact*, the administrators had to perform quality assessment, even though this was perceived complex. An initiative found to be positively associated with the mechanism of *awareness of IQ*, was implementation of balanced scorecards. Balanced scorecards helped visualizing and reporting information of status of demands and expectations throughout the organization. By assessing the pigeonholing process from different perspectives (e.g. success ration, attempts or length), administrators were, to some extent, able to supervise professionals. This gives administrators the possibility to reveal professionals not providing sufficient quality of services, even though Mintzberg perceived this to be a common problem in professional bureaucracies (Mintzberg, 1983).

Further, feedback from clients was perceived to be an important contribution to service quality assessment, and our findings indicated the mechanism of *bureaucratization* to be negatively associated with the quality of feedback; increase in bureaucracy resulted in standardized feedback routines providing less value than past routines. In order to assess services, a certain amount of feedback was needed. Satisfied clients were not likely to report their satisfaction, unless discrepancies occurred. According to Wang and Strong, consumers are the most capable of defining and evaluating quality (Wang & Strong, 1996), and thus,

they encourage IQ research to take a client perspective. Still, in professional bureaucracies, an information asymmetry exists between the clients and the professionals. Thus, clients are struggling to define the acceptable level of quality, since the majority of clients are not in possession of the knowledge needed to evaluate the services performed by the professionals.

In value configurations of value shops, often found in professional bureaucracies, the main driver is organizational- and individual reputation, since reputation signals real value (Stabell & Fjeldstad, 1998). One positive *organizational impact*, caused by the mechanism of *bureaucratization*, was increased internal visibility and accessibility of produced documents, e.g. research articles. This further increased the recognition of research and through external promotion, the reputation was leveraged. The absence of such information, particularly on websites, would lead to reduced reputation.

5.4 Organizational Cooperation and Change Management

In professional bureaucracies, the cooperation, both between professionals and professionals and administrators, is crucial to the functioning of the administrative structure. Generally the professionals do not see themselves as a part of a team which deteriorates the cooperation environment (Mintzberg, 1983). In contrast to Mintzberg's opinions, our findings indicated the operating core to be aware of cooperation in interdisciplinary teams leveraged IQ, affected by the mechanism of *awareness of IQ*. So why do they not cooperate?

One answer lies in a finding regarding the second mechanism affecting cooperation, *locus of power*; the contradictions between desired autonomy and managerial expectations. The administrators seek to make the organization more effective. When administrators tried to facilitate increased cooperation by forcing initiatives onto professionals and insisting on submission or playing on the professionals' morale, it caused frustration and resistance.

According to Mintzberg, the loyalty of the professionals lies within their profession and not to the organization where they practice it (ibid.). The administrators are aware of this problem, thus, bringing the professionals together, informing about organizational strategies and other matters, leveraged the professionals' feeling of being part of a whole - a team. From our findings, an absence of information led to deterioration of the working environment, elaborating the importance that middle line knows exactly who to distribute relevant information to. This was considered a complex task. One initiative to overcome such complexity was by conducting information meetings. Even though Mintzberg states that professionals resist information meetings (ibid.), our finding suggests that operating core was missing such meeting points, and highlighting the need of bringing professionals together in shared forums. In contrast to individual interpretations, this would allow shared interpretations of information, leveraging IQ. So, even though the information from the administrators to the professionals was perceived satisfactory, facilitating for discussions and cooperation would leverage the IQ.

Findings indicated that administrators were aware of issues regarding poor IQ through government revisions and labor inspection reports. Such external organs force the administrators to implement initiatives to leverage the IQ, and thus affected by the mechanism of *awareness of IQ*. According to Mintzberg, the core processes in professional bureaucracies are hard to standardize, and the administrators do not possess knowledge of all these processes (Mintzberg, 1983). In order to rise inquires about problems of IQ in an organization, the members, e.g. administrators, must be in possession of knowledge of the work processes and the context in general (Lee & Strong, 2003). The lack of knowledge of work processes in professional bureaucracies makes it difficult for administrators to identify

areas within the organization of poor IQ and start appropriate countermeasures or initiatives for leveraging the IQ.

According to Mintzberg, convergent thinking within professional bureaucracies makes the professionals resistant to change their well-established ways. Further, due to autonomy and bottom-up decision making, everybody must agree to the change, especially the operating core. In order to implement strategies, e.g. initiatives from external organs, the administrator must rely on his informal power and move in incremental steps to achieve changes. Forcing on other coordination mechanisms than standardization of skill and knowledge, will not enable change within the professional bureaucracy (ibid.). The mechanism of *perception of IQ* led administrators to distribute credible and unambiguous information to the professionals in order to gain acceptance for changes. By further using evidence-based sources in the process of decision making, the administrators felt more comfortable in the process of arguing for the proposed changes. Related to this mechanism, findings included challenges of balancing the amount of information distributed and the relevancy of information. Communicating changes through email, challenged the administrator to decide whether to elaborate in detail on the proposed changes, causing information overload, or to be consistent and only present the relevant information. This choice affected the number of employees reading through the information and affected their interpretations of it. In order to move in incremental steps to achieve change, the administrator must consider the amount of receivers, the relations to the receivers, and his informal power.

The perceived value of leveraging IQ was dependent on the rationale of the initiative and was found in the mechanism of *individual contingencies*. Employees were more willing to change when the initiatives are according to their agenda, rather than forced upon them. As Mintzberg states, making everybody agreeing on change, seem harder for initiatives not coming from the professionals (ibid.) and seems to have a higher probability of creating joint oppositions towards change among the professionals, including IQ initiatives. Joint oppositions to change and use of informal power were found to be entities of the mechanism of *locus of power*.

Welch states that bureaucratization is reducing the innovation by creating an organizational environment influencing the motivation and productivity negatively or by disturbing the decision-making process (Welch & Pandey, 2005). In our findings, several informants perceived bureaucratization to have negative impacts related to IQ, affected by the *bureaucratization* mechanism. Councils of professionals, councils of quality and councils of work environment were all examples of counsels needed to be consulted when trying to implement initiatives targeting at improving IQ. Our findings indicated occurrences of *personal impacts* when employees tried to improve the IQ through initiatives; tiredness and demotivation was reported outcomes of obstructed initiatives.

So is there any way professional bureaucracies can implement changes targeting on improving IQ? Mintzberg concludes that innovation in professional bureaucracies can only come from the slow process of changing the professionals themselves and moving the locus of power to the administrators (ibid.). This assumption is in line with our findings of the mechanism of *locus of power*; younger professionals seemed more concerned with performing the services according to the guidelines provided by the administrators. This conformist-attitude of younger professionals was perceived to be a trend, where the locus of power slowly shifts from the professionals to the administrators. In parallel to this generation-shift of professionals, the IQ increases.

5.5 Revised Research Framework

Remembering the research framework shown in figure 14, this thesis has discussed how the mechanisms affecting IQ are related to the perspectives of the professional bureaucracy and grand themes of IQ impact. In order to get an understanding how all the mechanisms affect IQ and how this relates to all the impacts, we have expanded the research framework as shown in figure 20.

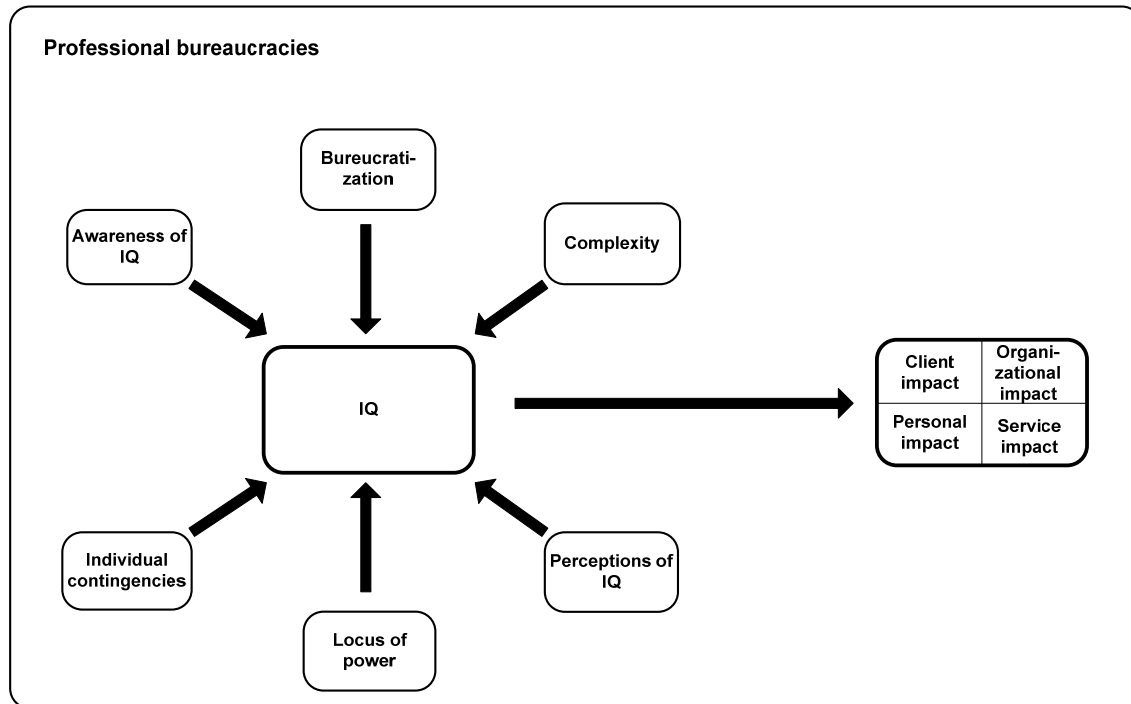


Figure 20 - Revised research framework

The revised research framework includes the context of professional bureaucracies as defined within four perspectives. The arrows are meant to show the relations between 1) IQ and the mechanisms, and 2) between IQ and impacts.

The arrows between the mechanisms and IQ are suggesting that the state of IQ in professional bureaucracies is being shaped and affected by the six underlying mechanisms. However, this thesis does not include sufficient empirical data to be able to suggest the explanatory powers, nor the order of these mechanisms. Still, the findings, presented in tables 17 and 20, suggests different mechanisms to be affecting different perspectives within the professional bureaucracy, e.g. the mechanism of Locus of power affecting both the perspective of *Autonomy and Power* and the perspective of *Cooperation and Change Management*.

The relation between IQ and impact suggests that IQ practice in professional bureaucracies leads to impacts within the four grand themes; *personal impact*, *organizational impact*, *service impact*, and *client impact*. The data collected was insufficient to be able to connect the mechanisms directly to the impacts. However, the differences in severity of impacts observed, leads to the assumption of a direct relation between impacts and the mechanisms. Perhaps, impact of IQ in professional bureaucracies is a differentiator, regulating the effects of the mechanisms – e.g. the more severe personal and client impacts of IQ practice, the more active the mechanism of awareness in the organization – leading to increased IQ.

6. Conclusion and Implications

The purpose of this master's thesis was to identify underlying mechanisms in professional bureaucracies, and identifying the impacts of IQ. By analyzing empirical data, collected by semi-structured interviews from two professional bureaucracies, we found 13 content themes, grouped into 6 distinct mechanisms. As our discussion shows, the mechanisms were all related to, and must be considered as an integral part of professional bureaucracies. This thesis suggests the following mechanisms to be addressing the first research question – the mechanisms affecting IQ in professional bureaucracies:

- *Awareness of IQ* – Mechanism affecting IQ by the state of awareness of IQ in the organization, by organizational awareness of IQ in general, and by organizational initiatives aimed at increasing IQ.
- *Bureaucratization* – Mechanism affecting IQ by bureaucratic contingencies, by the level of bureaucracy and the impact of bureaucratization.
- *Individual contingencies* – Mechanism affecting IQ by individual experiences and premises, and by individual perception of information.
- *Locus of power* – Mechanism affecting IQ by hierarchies and structures of formal and informal power, including shift of power in organizations.
- *Complexity* – Mechanism affecting IQ by organizational complexity including pace of change and service complexity.
- *Perceptions of IQ* – Mechanism affecting IQ by individual perceptions of quality in organizations.

The impacts of IQ in professional bureaucracies, derived from the analysis, were grouped into four distinct grand themes. Addressing the second research question, these grand themes were; 1) *Client impact*, 2) *Organizational impact*, 3) *Personal impact*, and 4) *Service impact*. All these grand themes were identified in the two professional bureaucracies studied, but the severity of the impacts was found to be remarkably different between the two organizations.

The literature review in this thesis is an up-to-date compilation of IQ research, consisting of articles from top journals and conferences. This compilation, including the presentation of IQ dimensions and IQ perspectives, contributes to research by providing an updated starting point for further IQ research.

Direct relations between the mechanisms and the impacts were not established due to the limitations of the empirical data. However, we believe these to be closely related; e.g. the mechanism of awareness may be affecting IQ more positively in organizations facing severe personal and client impacts, than organizations facing less. Thus, we suggest impact of IQ to be a differentiator of mechanisms between professional bureaucracies. We call for more research on the relations between the mechanisms and impact.

Further, we believe our revised research framework to be contributing to the IQ research by its context-approach, and thus addressing Stvilia et al.'s call for contributions towards context-specific IQ models (Stvilia, et al., 2008). We encourage researchers to use this framework in context-based IQ research in order to verify the model, both by qualitative and quantitative research. Future research is needed to establish causality in the research framework, to determine the strength of the mechanisms, and to determine if some mechanisms are missing in the model. Even though this research model is targeted at professional bureaucracies, we believe the mind-set of this thesis to be transferrable to other

contexts. By this, we believe some of these mechanisms are found in other industries, but the explanatory effect of the mechanisms would be different.

We argue for the need to address a corrective to the direction IQ research is suggested to take; according to Wang and Strong, consumers are the most capable of defining and evaluating quality (Wang & Strong, 1996), and thus, they encourage IQ research to take a client perspective. We, on the other hand, believe this stance to be too narrow, leading the IQ research in certain contexts, like professional bureaucracies, in a wrong direction. This is due to the assumptions of professional bureaucracies to be performing services which quality is hard to evaluate, and where the information asymmetry between the specialist and the clients makes it impossible for the clients to evaluate the quality. This stance introduced by Wang and Strong has been contributive to the difficulties of adapting existing IQ research to the context of professional bureaucracies. Thus, we suggest future IQ research to include a broader perspective of quality assessment.

In this thesis, our scope was broad, including all types of information in the organizations investigated. We believe this approach to be appropriate in this explorative phase of a context-specific IQ research. Thus, future research efforts must narrow the scope in order to get a better understanding of the mechanisms. We suggest future research initiatives must be 1) more specific regarding the types of processes included in the research, e.g. by only including value-adding processes, and 2) we suggest to target only certain types of information, e.g. by investigating information of client services isolated.

In the interview setting, we experienced that informants had difficulties relating to the concept of IQ and to the dimensions of IQ in particular. However, we experienced the perspectives of IQ, or the constructs, to be easier for the informants to relate to. By this, we suggest future research initiatives will benefit by communicating the concept of IQ in terms of perspectives, perhaps by designing context-dependent perspectives of IQ.

We believe this thesis contributes to IQ practice in professional bureaucracies. First, awareness of IQ and possible impacts is useful for organizations. Actually, raising the awareness, found to be one of the mechanisms affecting IQ, is perhaps the easiest initiative professional bureaucracies can take to improve IQ.

Further, we experienced deficiencies regarding information distribution and information retrieval. First, it seems to be a paradox in professional bureaucracies related to the process of indoctrination; when joining a professional bureaucracy, professionals are fully trained to perform the services to the clients, but training in information retrieval from information systems, identified as an important part of the core processes (Stabell & Fjeldstad, 1998), seemed to be neglected. Such training was identified to be missing, and thus, the operating core preferred information to be handed directly from administrators, rather than actively seeking it. We believe training in information retrieval for operating core professionals would reduce the barriers towards information retrieval, reducing the alienation of information systems, and increasing IQ.

Second, we found the line management to play a key role in information distribution in the organizations. For practice, this implicates the need for raising consciousness of the role of the line managers; their crucial part in filtering information in the line, and the importance of using several channels of information, including meeting points for verbal information distribution.

Finally, we found the administrative structure in the organizations to be increasing the later years in parallel to the increase in bureaucratization. This has led to a shift of power from the professionals to the administrative structure, and thus increased the administrative burdens for the operating core. This must be considered a paradox, since this thesis suggests that IQ is dependent on the level of standardization of processes, where organizations are increasingly paying attention to IQ in core processes, which in nature are hard to standardize. By this, we believe professional bureaucracies must deal with increased administrative burdens for the operating core from a different perspective; the increased demands for IQ in organizations must be isolated and assigned to the support staff, in the situations where this is possible. This would obviously lead to an increase in support staff members, but would give professionals in the operating core more time to spend on core processes.

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Appendices

A – IQ dimensions with citations

25 most cited dimensions, including authors.

Dimension	Cited by
Accuracy	(Ballou & Pazer, 1995; Calero, et al., 2008; Cappiello, Francalanci, & Pernici, 2003; DeLone & McLean, 1992; Eppler & Wittig, 2000; Gonzalez & Bharosa, 2009; Hadaya & Éthier, 2008; Katetattanakul & Siau, 1999; Khatri & Brown, 2010; Kim, Kishore, & Sanders, 2005; Klein & Lehner, 2009; Klischewski & Scholl, 2006; Knight & Burn, 2005; Naumann, Leser, & Freytag, 1999; Naumann & Rolker, 1999, 2000; Nelson, et al., 2005; Nicolaou & McKnight, 2006; Olsina, Sassano, & Mich, 2008; Parssian, Sarkar, & Jacob, 2004; Rieh, 2002; Shanks & Corbitt, 1999; Strong, et al., 1997; Stvilia, et al., 2008; Wand & Wang, 1996; Wang & Strong, 1996; Wixom & Todd, 2005; Zeist & Hendriks, 1996)
Completeness	(Bharosa & Janssen, 2010; Calero, et al., 2008; Cappiello, et al., 2003; DeLone & McLean, 1992, 2003; Eppler & Wittig, 2000; Gonzalez & Bharosa, 2009; Helfert & Foley, 2009; Kahn, et al., 2002; Khatri & Brown, 2010; Kim, et al., 2005; Klein & Lehner, 2009; Knight & Burn, 2005; Naumann, et al., 1999; Naumann & Rolker, 1999, 2000; Nelson, et al., 2005; Nicolaou & McKnight, 2006; Parssian, et al., 2004; Price & Shanks, 2004, 2005; Price, et al., 2008; Shanks & Corbitt, 1999; Strong, et al., 1997; Stvilia, et al., 2008; Wand & Wang, 1996; Wang & Strong, 1996; Wixom & Todd, 2005)
Relevancy	(Bharosa & Janssen, 2010; Calero, et al., 2008; Cappiello, et al., 2003; DeLone & McLean, 1992, 2003; Eppler & Wittig, 2000; Gonzalez & Bharosa, 2009; Kahn, et al., 2002; Kim, et al., 2005; Klischewski & Scholl, 2006; Knight & Burn, 2005; Lee, Shin, & Lee, 2008; McKinney, et al., 2002; Naumann, et al., 1999; Naumann & Rolker, 1999, 2000; Nicolaou & McKnight, 2006; Price & Shanks, 2004; Price, et al., 2008; Strong, et al., 1997; Stvilia, et al., 2008; Wand & Wang, 1996; Wang & Strong, 1996; Zahedi & Song, 2008)
Timeliness	(Ballou & Pazer, 1995; Bharosa & Janssen, 2010; Calero, et al., 2008; DeLone & McLean, 1992; Eppler & Wittig, 2000; Gonzalez & Bharosa, 2009; Helfert & Foley, 2009; Kahn, et al., 2002; Khatri & Brown, 2010; Klein & Lehner, 2009; Klischewski & Scholl, 2006; Knight & Burn, 2005; Lee, Shin, & Lee, 2008; McKinney, et al., 2002; Naumann, et al., 1999; Naumann & Rolker, 1999, 2000; Price & Shanks, 2005; Price, et al., 2008; Shanks & Corbitt, 1999; Strong, et al., 1997; Wand & Wang, 1996; Wang & Strong, 1996; Wixom & Todd, 2005)
Accessibility	(Bharosa & Janssen, 2010; Calero, et al., 2008; Chang & King, 2005; Eppler & Wittig, 2000; Helfert & Foley, 2009; Kahn, et al., 2002; Knight & Burn, 2005; Lee, et al., 2008; McKinney, et al., 2002; Naumann & Rolker, 1999; Nelson, et al., 2005; Olsina, et al., 2008; Prestipino, Aschoff, & Schwabe, 2007; Price & Shanks, 2004, 2005; Price, et al., 2008; Shanks & Corbitt, 1999; Strong, et al., 1997; Stvilia, et al., 2008; Wang & Strong, 1996; Wixom & Todd, 2005)
Consistency	(Bharosa & Janssen, 2010; Calero, et al., 2008; Cappiello, et al., 2003; Chengalur-Smith, et al., 1999; Eppler & Wittig, 2000; Gonzalez & Bharosa, 2009; Helfert & Foley, 2009; Kahn, et al., 2002; Katetattanakul & Siau, 1999; Knight & Burn, 2005; Naumann, et al., 1999; Naumann & Rolker,

	1999, 2000; Price & Shanks, 2005; Price, et al., 2008; Shanks & Corbitt, 1999; Strong, et al., 1997; Stvilia, et al., 2008; Wand & Wang, 1996; Wang & Strong, 1996)
Reliability	(Bharosa & Janssen, 2010; Chang & King, 2005; DeLone & McLean, 1992, 2003; Hadaya & Éthier, 2008; Klischewski & Scholl, 2006; Knight & Burn, 2005; Lee, et al., 2008; McKinney, et al., 2002; Naumann, et al., 1999; Naumann & Rolker, 1999, 2000; Nelson, et al., 2005; Nicolaou & McKnight, 2006; Price & Shanks, 2004; Price, et al., 2008; Wand & Wang, 1996; Wixom & Todd, 2005; Zeist & Hendriks, 1996)
Understandability	(Calero, et al., 2008; DeLone & McLean, 1992, 2003; Hadaya & Éthier, 2008; Kahn, et al., 2002; Knight & Burn, 2005; Naumann, et al., 1999; Naumann & Rolker, 1999, 2000; Price & Shanks, 2004, 2005; Price, et al., 2008; Shanks & Corbitt, 1999; Strong, et al., 1997; Wand & Wang, 1996; Wang & Strong, 1996; Zahedi & Song, 2008; Zeist & Hendriks, 1996)
Security	(Calero, et al., 2008; Cappiello, et al., 2003; DeLone & McLean, 2003; Gonzalez & Bharosa, 2009; Kahn, et al., 2002; Knight & Burn, 2005; Naumann & Rolker, 1999, 2000; Price & Shanks, 2004, 2005; Price, et al., 2008; Strong, et al., 1997; Stvilia, et al., 2008; Wang & Strong, 1996; Zeist & Hendriks, 1996)
Currency	(Cappiello, et al., 2003; DeLone & McLean, 1992; Heinrich, Klier, & Kaiser, 2009; Kim, et al., 2005; Klischewski & Scholl, 2006; Nelson, et al., 2005; Nicolaou & McKnight, 2006; Rieh, 2002; Stvilia, et al., 2008; Wand & Wang, 1996; Wixom & Todd, 2005; Zhu & Gauch, 2000)
Reputation	(Calero, et al., 2008; Kahn, et al., 2002; Klischewski & Scholl, 2006; Knight & Burn, 2005; Naumann, et al., 1999; Naumann & Rolker, 1999, 2000; Shanks & Corbitt, 1999; Strong, et al., 1997; Stvilia, et al., 2008; Wang & Strong, 1996; Zhu & Gauch, 2000)
Conciseness	(Calero, et al., 2008; DeLone & McLean, 1992; Kahn, et al., 2002; Knight & Burn, 2005; Naumann & Rolker, 1999, 2000; Shanks & Corbitt, 1999; Strong, et al., 1997; Wand & Wang, 1996; Wang & Strong, 1996)
Usefulness	(Chang & King, 2005; DeLone & McLean, 1992; Hadaya & Éthier, 2008; Knight & Burn, 2005; McKinney, et al., 2002; Rieh, 2002; Shanks & Corbitt, 1999; Wand & Wang, 1996; Zahedi & Song, 2008)
Value-added	(Calero, et al., 2008; Kahn, et al., 2002; Klischewski & Scholl, 2006; Knight & Burn, 2005; Naumann & Rolker, 1999, 2000; Price & Shanks, 2004; Strong, et al., 1997; Wang & Strong, 1996)
Amount of data / information	(Calero, et al., 2008; Kahn, et al., 2002; Knight & Burn, 2005; Naumann, et al., 1999; Naumann & Rolker, 1999, 2000; Strong, et al., 1997; Wang & Strong, 1996)
Believability	(Calero, et al., 2008; Kahn, et al., 2002; Knight & Burn, 2005; Naumann & Rolker, 1999, 2000; Prat & Madnick, 2008; Strong, et al., 1997; Wang & Strong, 1996)
Flexibility	(Chang & King, 2005; Kahn, et al., 2002; Nelson, et al., 2005; Price & Shanks, 2004, 2005; Price, et al., 2008; Wand & Wang, 1996; Wixom & Todd, 2005)
Interpretability	(Calero, et al., 2008; Cappiello, et al., 2003; Kahn, et al., 2002; Naumann & Rolker, 1999, 2000; Strong, et al., 1997; Wand & Wang, 1996; Wang & Strong, 1996)
Objectivity	(Calero, et al., 2008; Eppler & Wittig, 2000; Kahn, et al., 2002; Knight & Burn, 2005; Naumann & Rolker, 1999, 2000; Strong, et al., 1997; Wang & Strong, 1996)
Usability	(DeLone & McLean, 1992, 2003; Knight & Burn, 2005; Lee, et al., 2008; McKinney, et al., 2002; Shanks & Corbitt, 1999; Wand & Wang, 1996;

	Zeist & Hendriks, 1996)
Availability	(DeLone & McLean, 2003; Knight & Burn, 2005; Naumann, et al., 1999; Naumann & Rolker, 2000; Zeist & Hendriks, 1996; Zhu & Gauch, 2000)
Format	(Cappiello, et al., 2003; DeLone & McLean, 1992; Gonzalez & Bharosa, 2009; Nelson, et al., 2005; Wand & Wang, 1996; Wixom & Todd, 2005)
Correctness	(Bharosa & Janssen, 2010; Price & Shanks, 2004, 2005; Price, et al., 2008; Shanks & Corbitt, 1999)
Response time	(DeLone & McLean, 2003; Naumann, et al., 1999; Naumann & Rolker, 1999, 2000; Nelson, et al., 2005)
Suitability	(Olsina, et al., 2008; Price & Shanks, 2004, 2005; Price, et al., 2008; Zeist & Hendriks, 1996)

B – Full list of IQ dimensions cited in previous research

The table below consists of all IQ dimensions identified in the literature review. The number of appearances in previous literature is given in the parenthesis.

Accuracy (28)	Informativeness (3)	Goodness (1)
Completeness (28)	Price (3)	Granularity (1)
Relevancy (24)	Quantity (3)	Helpfulness (1)
Timeliness (24)	Scope (3)	History maintenance (1)
Accessibility (21)	Sufficiency (3)	Information delivery (1)
Consistency (20)	Verifiability (3)	Information packaging (1)
Reliability (19)	Adaptability (2)	Information structure (1)
Understandability (18)	Attractiveness (2)	Information-to-noise ratio (1)
Security (15)	Cohesiveness (2)	Interactivity (1)
Currency (12)	Comparability (2)	Interoperability (1)
Reputation (12)	Compliance (2)	Language (1)
Conciseness (10)	Comprehensiveness (2)	Learnability (1)
Usefulness (9)	Content (2)	Maturity (1)
Value-added (9)	Customer support (2)	Naturalness (1)
Amount of data/information (8)	Documentation (2)	Non-redundancy (1)
Believability (8)	Freedom from bias (2)	Operability (1)
Flexibility (8)	Integration (2)	Ownership (1)
Interpretability (8)	Latency (2)	Performability (1)
Objectivity (8)	Level of detail (2)	Personalization (1)
Usability (8)	Adequacy (1)	Popularity (1)
Availability (6)	Appearance (1)	Portability (1)
Format (6)	Awareness of bias (1)	Privacy (1)
Correctness (5)	Complacency (1)	Readability (1)
Response time (5)	Complexity (1)	Recoverability (1)
Suitability (5)	Confidence (1)	Speed (1)
Efficiency (4)	Consensus (1)	Time-to-publish (1)
Meaningful (4)	Credibility (1)	Traceability (1)
Navigation (4)	Customizability (1)	Uniqueness (1)
Precision (4)	Data volume (1)	Up-to-dateness (1)
Unambiguously (4)	Degradability (1)	User-friendliness (1)
Clarity (3)	Easy-to-read (1)	Vividness (1)
Conforming to metadata (3)	Explicitness (1)	Volatility (1)
Free-of-error (3)	Fault tolerance (1)	Volume (1)
Importance (3)	Functionality (1)	Well-defined (1)

C - Interview Guide

Introduction

- Presentation of ourselves
- Presentation of our master's thesis
 - Topics
 - Research questions
 - Placing the informant in the model (Strategic apex, Middle line, Support staff, Operating core, Technostructure)
- Request of taping the interview
 - In order to secure best possible representation of the interview
 - The interview will be transcribed based on the audio recording and notes taken. The tape will be deleted after the transcription
- The form of the interview
 - The interview will be semi-structured and will be characterized as a up to one hour conversation
- Agreement of confidentiality
 - Presentation of an agreement of confidentiality securing anonymity and the use of collected data

Background questions

1. Which services does this organization provide?
2. (How many employees are working in this organization?)
3. (How are the employees distributed according to the model of bureaucracy?)
4. What is your title?
5. What is your organizational position?
6. What is your responsibilities and tasks?
7. To what extent do you perceive your tasks to be subject to administrative “burdens” like regulations, procedures etc (*finding the level of bureaucracy - Redtape*)?
8. To what extent do you find your tasks to increasing or decreasing administrative burdens for others?

Defining information quality

9. What kind of information from an information system do you need (or create) in performing your tasks (*clues: administrative, production, statistics*)?
10. Who do you distribute information to (*internal and external*)?
11. With the type of information you use or need in your work – in a perfect world – what do you perceive to be the criteria for this information to be good (*this is immediate reflections*)?
 - a. *Possibilities for follow-up questions*
12. *Present the perspectives of IQ* – Based on this, are there other criteria for good information quality, in your opinion (*a more reflective and widener perspective*)?
 - a. *Intrinsic – Meaning that information, itself, has quality (like accuracy, objectivity, credibility, reputation)*

- b. *Representational* – Relates to quality based on how information is presented (like interpretability, understandability, consistency over time, format, conciseness of presentation)
- c. *Contextual* – Relates to quality based on the value of information for a certain task (like relevancy, completeness, value-adding, timeliness, amount)
- d. *Accessibility* – Relates to quality based on how information is accessed (like availability and security)

Perceived information quality

- 13. Based on the current situation in your organization, what do you perceive to be the challenges to information quality (*emphasizing that we want challenges, not impacts*)?
 - a. Follow-ups based on answers from questions 9, 10, 11, and 12
 - b. What part of the organization do you perceive to be involved in these challenges?
- 14. To what extent do you perceive awareness in the organization regarding information quality?
 - c. Initiatives targeting at increasing awareness of information quality?

Perceived impact

- 15. What impacts do you believe these challenges give?
 - a. Internal impact (*based on question 13*)?
 - b. External impact (*based on question 13*)?

Wrapping up

- 16. Are there other issues you believe will be shedding light on this topic?

We thank you for your accommodation and cooperation. As mentioned initially, we will transcribe the interview based on the audio tape. The results will be anonymous and we will send you a copy of the thesis as thanks for spending time on us.

D - Confidentiality Agreement

This contract applies to data collection to a master thesis (course code IS-501 – Master thesis in information systems) performed by students at the Faculty of Economics and Social Sciences at the University of Agder, spring 2011. The contract is signed by the students and given to the informant.

The data collection is based on the following preconceptions:

- The informant is allowed by his/her leader to conduct the interview
- The interview will be tape recorded
- The master thesis will be available for publicity

Name of informant _____

Interview date _____

Place for interview / Org. _____

The students are committed to:

- Treat and report the information revealed during interviews with respect, humbleness and caution
- Store the tape recorded files secure
- Delete the tape recorded files (not later than 2 months after conducting the interview)
- Present the informants anonymously in the report

Knut Marcus Henriksen

Geir Inge Hausvik

E – Interview planning

Purpose

The interview is part of the data collection in a master thesis at the University of Agder (UiA), spring 2011. A total of 12 interviews will be conducted. The data collected will be analyzed and presented in a research report.

Research topic

The goal of this master thesis is to study information quality in professional bureaucracies. The information societies we live in have led to an increase in focus on the quality of the information being generated and distributed within and between organizations. The researchers want to study and identify mechanisms affecting information quality in professional bureaucracies.

Interview structure

The interview will be performed as a semi-structured interview. By this, the researchers ask questions defined prior to the interview, but also ask follow up questions based on the answers received from the interviewee.

In order to make it easier to analyze the data collected and make sure all elements will be included, the interview will be tape-recorded. Prior to the interview a contract will be signed by the researchers and the interviewee that secures and defines the storing and distribution of data.

Time / Place / Date / Duration

<Add info here>

Attendants

<Interviewee>

Geir Inge Hausvik, Marcus Henriksen – Masterstudents