Information Technology Governance: The Role of Organizational Culture and Structure

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Abstract

Information Technology Governance (ITG) is among the most important challenges for the managers today. IT is not anymore just a supportive tool but also a strategic driver for the businesses. In the dynamic and competitive world of today, it is crucial for organizations to know how to govern IT rather than just to use it. IT governance deals with specifying responsibilities and decision rights to encourage the desirable behaviour from IT and generate value from IT investments. IT governance can impact the overall performance of organizations, however there are still difficulties in understanding IT governance and the factors that may influence it.

Organizational culture and structure are among the factors that have significant influence on many issues in an organization. According to previous research, organizational culture and structure need to be considered when implementing IT governance. However, there is a lack of research focusing on how organizational culture and structure can influence IT governance performance and implementation. Thus, the main research question addressed in this thesis is: *How are organizational culture and structure related to IT governance?* To address this question, this research has performed literature reviews and conducted case studies to investigate the role of organizational culture and structure on IT governance. As the first step, the previous literature was reviewed to find the gaps in the research on culture and IT governance. As the next step, four case studies were conducted to explore the influence of organizational culture and structure on IT governance. Two case studies have investigated the relation between organizational structure and IT governance implementation and performance in large organizations; and two other case studies investigated on how different types of organizational culture influence IT governance performance outcomes.

The results of this research respond to the research question by specifying the role of culture in IT governance through a categorization of prior research both from research and practice perspectives; specifying the influence of different organizational culture types on IT governance performance outcomes in different organizations; and by specifying IT organizational structure relationship with IT governance performance outcomes and IT governance implementation.

The research presented in this thesis provides both theoretical and empirical contributions to the IT governance research and practice.

Keywords: *IT governance, organizational culture, organizational structure, IT governance performance, IT governance implementation.*

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ZATIONAL CULTURE AND STRUCTURE

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Information Technology Governance: The Role of Organizational Culture and Structure

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Dedicated to the lights of my life, my beloved parents,

Professor Mostafa Assi and Hamideh Mahrouyan....

To my friend forever and sister, Pardis...

And to my love, Navid...

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Sammanfattning

IT-styrning är en av de viktigaste utmaningarna för chefer idag. IT är inte längre bara ett stödjande verktyg utan också en strategisk drivkraft för organisationer. I dagens dynamiska och konkurrenskraftiga värld är det viktigt för organisationer att veta hur de ska styra IT, och inte bara förstå hur de ska använda den. IT-styrning handlar om att specificera ansvar och beslutanderätt för att uppmuntra ett önskvärt beteendet kring IT samt skapa värde från IT-investeringar. IT-styrning kan påverka organisationens övergripande resultat, men det finns fortfarande svårigheter att förstå IT-styrning och de faktorer som kan påverka denna.

Organisationskultur och organisationsstruktur är bland de faktorer som har ett betydande inflytande på en organisations olika aspekter. Enligt tidigare forskning måste organisationskultur och organisationsstruktur därför beaktas vid IT-styrning. Det finns emellertid brist på forskning kring hur dessa faktorer kan påverka IT-styrningens implementering och resultat. Den övergripande forskningsfrågan i denna avhandling är: *Hur är organisationskultur och organisationsstruktur relaterad till IT-styrning?* För att angripa denna fråga har litteratur- och fallstudier genomförts. Först granskades tidigare litteratur för att hitta luckor i forskning om kultur och IT-styrning. Sedan genomfördes fyra fallstudier för att undersöka påverkan av organisationskultur och organisationsstruktur på IT-styrning. Två fallstudier har undersökt förhållandet mellan organisationsstruktur och resultat samt implementering av IT-styrning i stora organisationer, och två andra fallstudier har undersökt hur olika typer av organisationskultur påverkar resultat av IT-styrning.

Resultaten av denna forskning svarar på forskningsfrågan genom att specificera kulturens roll i IT-styrning genom en kategorisering av tidigare forskning, både från ett forsknings- och praktikperspektiv; specificera påverkan av olika organisatoriska kulturtyper på IT-styrningens resultat i olika organisationer; och genom att specificera relationen mellan organisationsstruktur och IT-styrningens resultat och implementering.

Forskningen som presenteras i denna avhandling ger både teoretiska och empiriska bidrag till forskning och praktik om IT-styrning.

Acknowledgment

This thesis represents the results of my five years journey of PhD studies. However, this could not be possible without the help of many people.

First and foremost, I would like to offer my deepest gratitude to my main supervisor, Professor Lazar Rusu. He advised me effortlessly with his knowledge throughout my PhD studies and also allowed me the room to find my own way of work. He encouraged me to work on new ideas and collaborate with various researchers around the world. Lazar Rusu was a friendly supervisor supporting me in research and also different life situations in these years.

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Parisa Aasi
Stockholm, June 2018

List of Papers

This thesis is a compilation of research papers. The publications listed below are included in this thesis. These research papers are referred to in the text as RP 1 to RP 7. Reprints of these papers are used with the permission of the publishers.

Papers Included in the Thesis

PAPER I: Aasi, P., Rusu, L., Leidner, D., Perjons, E., and Corrales Estrada, M. (2018). What is the Role of Organizational Culture in IT Governance Performance of Collaborative Virtual Networks? *International Journal of IT/Business Alignment and Governance,* 9(1).

PAPER II: Aasi, P., Rusu, L., and Vieru, D. (2017). The Role of Culture in IT Governance Five Focus Areas: A Literature Review. *International Journal of IT/Business Alignment and Governance*, 8(2), 42-61.

PAPER III: Aasi, P., Rusu, L., and Han, S. (2014). Culture influence on IT governance: What we have learned? *International Journal of IT/Business Alignment and Governance*, 5(1), 34-49.

PAPER IV: Aasi, P., Rusu, L., and Leidner, D. (2017). IT Organizational Structure Relationship with IT Governance Performance: Case of a Public Organization. In *Information Technology Governance in Public Organizations,* (pp. 229-252), Springer International Publications.

PAPER V: Aasi, P. and Rusu, L. (2017). Facing The Digitalization Challenge: Why Organizational Culture Matters and How It Influences IT Governance Performance. In Paspallis, N., Raspopoulos, M. Barry, M. Lang, H., and Linger, C. Schneider (Eds.), *Information Systems Development: Advances in Methods, Tools and Management (ISD2017* Proceedings), (pp. 1-12), Association for Information Systems.

PAPER VI: Aasi, P., Rusu, L., and Han, S. (2016). The Influence of Organizational Culture on IT Governance Performance: Case of The IT Department in a Large Swedish Company. In *Proceedings of the 49th Hawaiian International Conference on System Sciences (HICSS 49)*, (pp. 5157-5166), IEEE Computer Society.

PAPER VII: Larsson, F., Rusu L, and Aasi, P. (2015). Organizational Structure in IT Governance: A Case Study of an IT Governance Implementation Project. In *Proceedings of the 21st Americas Conference on Information Systems (AMCIS 2015),* (pp. 1-11), Association for Information Systems.

Papers Not Included in the Thesis

PAPER VIII: Aasi, P., Rusu, L., Leidner, D., Perjons, E., and Corrales Estrada, M. (2018). How Does the Organizational Culture of Collaborative Networks Influence IT Governance Performance in a Large Organization? In *Proceedings of the 51st Hawaiian International Conference on System Sciences (HICSS -51)*, (pp. 4941-4951), IEEE Computer Society.

PAPER IX: Aasi, P., Nunes, I., Rusu, L., and Hodosi, G. (2015). Does Organizational Culture Matter in IT Outsourcing Relationships? In *Proceedings of the 48th Hawaii International Conference on System Sciences (HICSS-48),* (pp. 4691-4699), IEEE Computer Society.

PAPER X: Aasi, P., Rusu, L., and Han, S. (2014). The Role of Culture in IT Governance (Research in Progress). In *Proceedings of 20th Americas Conference on Information Systems (AMCIS 2014)*, (pp. 1-8), Association for Information Systems.

PAPER XI: Aasi, P., Rusu, L., and Han, S. (2014). The Influence of Culture on IT Governance: A Literature Review. In *Proceedings of 47th Hawaii International Conference on System Sciences (HICSS 47),* (pp. 4436-4445), IEEE Computer Society.

PAPER XII: Han, S., Juell-Skielse, G., Smedberg, Å., Aasi, P., and Nilsson, A. G. (2014). Benefits of mobile reporting systems in

social home care: the case of seven Swedish municipalities. *International Journal of Technology Assessment in Health Care*, 30(4), 409-415.

PAPER XIII: Aasi, P., Nunes, I., Rusu, L., and Hodosi, G. (2013). The Impact of Different Organizational Cultures on IT Outsourcing Relationship Management. *International Journal of Innovation in the Digital Economy*, 4(2), 50-66.

PAPER XIV: Aasi, P. Rusu, L. and Han, S. (2017). Culture Influence on IT Governance: What We Have Learned? In *Organizational Culture and Behavior: Concepts, Methodologies, Tools, and Applications,* (pp. 1329-1347), IGI Global.

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Abbreviations

ABW	Activity-Based Workplace
BSC	Balanced Score Card
BU	Business Unit
BUGM	Business Unit General Manager
CIO	Chief Information Officer
DSV	Department of Computer and Systems Sciences of Stockholm University
IEC	International Electrotechnical Commission
IHS	Case Study 3 Anonymous organization label
IS	Information Systems
ISACA	Information Systems Audit and Control Association
ISO	International Organization for Standardization
IT	Information Technology
ITG	Information Technology Governance
ITGI	Information Technology Governance Institute
ITP	Case Study 3 -Anonymous project label
ITS	Case Study 1 - Anonymous IT department label
MIT	Swedish Research School of Management and Information Technology (*Forskarskolan Management och IT*)
OC	Organizational Culture
OCAI	Organizational Culture Assessment Instrument
PM	Performance Measurement
RK	Risk Management
RM	Resource Management
RP	Research Paper
RQ	Research Question
SA	Strategic Alignment
SLA	Service Level `Agreement
SRQ	Sub Research Question
VD	Value Delivery

1 Introduction

1.1 The Importance of IT Governance

Firms today make large investments in Information Technology (IT), but face many challenges in terms of directing their IT appropriately in order to create business value (Mithas and Rust, 2016). Moreover, IT is a crucial factor in the modern world that enhances an enterprise's capacity for survival in a highly competitive environment (Couto et al., 2015; De Haes and Van Grembergen, 2015; Hardy, 2006; ITGI, 2011; Sesay and Ramirez, 2016).

Managing IT and using it as a strategic driver for the business is therefore a high priority for firms (Bowen et al., 2007; Duffy, 2002; Kappelman et al., 2014; Peterson, 2004; Van Der Zee and DeJong, 1999).

Given the importance of IT as a strategic driver, a major challenge that managers are faced with is "*how to govern the IT?"* (Bergeron et al., 2017; ISACA, 2011; Nfuka and Rusu, 2013). Every year, firms invest large sums in IT projects, but a large number of these projects fail to deliver the desired value to the business. Research has shown that one reason for this is poor IT governance; there is a direct link between poor IT governance performance and IT project failures (Asgarkhani et al., 2017).

This challenge can be addressed through the governance and management of IT using specific processes. This helps managers to tackle the important role of IT in business and identify the achievements of IT projects (Huygh, et al., 2018). According to Sirisomboonsuk et al. (2018), IT governance has a positive impact on the performance of projects in firms, and it is therefore very important to define IT governance for each firm in such a way that it promotes the goals of the business and improves the overall performance.

Research has shown that IT governance can influence the organizational performance in general (Kearns and Sabherwal, 2006; Turel and Bart, 2014). According to Weill and Ross (2004), the highest performing organizations gain 40% more from their IT investment than their competitors. Furthermore, IT governance has a critical impact on innovation and on enhancing these organizations' performance (Vejseli and Rossmann, 2017).

However it is difficult to find a specific IT governance framework that can work for every organization (Batyashe and Lyamu, 2018). Thus an understanding of the different aspects of IT governance is a significant chal-

lenge for managers today and can lead the firm into either a prosperous or critically dangerous position (Wu et al., 2015).

IT Governance and its Performance

IT governance is defined as *"specifying the decision rights and accountability framework to encourage desirable behavior in the use of IT"* (Weill and Ross, 2004, p. 8).

IT governance and corporate governance are interrelated; IT governance is an integral part of corporate governance. For this reason, many issues and concepts discussed in corporate governance are also involved in IT governance (De Haes and Van Grembergen, 2017). According to Weill and Ross *"effective IT governance is the single most important predictor of the value an organization generates from IT" (*Weill and Ross, 2004, p. 3-4*)*. Hence, the degree to which IT governance is effective in an organization affects the overall performance.

Consequently, it is crucial for firms to be able to measure the extent to which their IT governance is effective; this can be achieved through *"IT governance performance"* (Weill and Ross, 2004). *"IT governance performance is one of the IT governance domains that measures the IT outcomes for business value and competitive advantage delivered by IT"* (ITGI, 2003, p. 18). Today, as the IT within organizations is undergoing a transition from a provider of IT services to a strategic partner in the business, the performance of IT governance has become crucial (Kurt and Bowles, 2009). However, not all organizations are capable of completely perceiving and evaluating their IT governance performance and making appropriate decisions based on this (Simonsson and Ekstedt, 2006).

Ineffective IT governance is the origin of many problems and destructive consequences in IT investment. Some of these negative experiences include financial losses, a lack of innovative IT solutions, low enterprise performance, and core process problems and missed deadlines for the delivery of various projects (ITGI, 2003).

IT governance may be implemented inversely in each organization and implementing IT governance can be defined through different processes, frameworks and standards (Van Grembergen and De Haes, 2017).

In order to achieve and implement effective IT governance, enterprises need to identify and measure the status of the current performance, and to compare this with the desired objectives. These performance measurements need to be applied to the whole process of IT governance and also to other processes associated with IT (ITGI, 2003).

IT governance performance can be assessed using a formula introduced by Weill and Ross (2004, p. 239) that is based on four main outcomes of IT governance: the cost - effective use of IT; the effective use of IT for growth;

the effective use of IT for asset utilization and; the effective use of IT for business flexibility. Firms that are more advanced in IT governance performance may also have a higher general performance. In many organizations, IT has a particularly important strategic role. In these organizations IT governance performance is a major issue for managers (Joshi et al., 2017).

Organizational Culture and Structure

There are many factors that should be considered when investigating IT governance. Organizational culture and structure are among the most important factors influencing IT governance performance (Rowlands et al., 2015). According to Dittes and Smolnik (2016) organizational culture and structure have a potential influence on organizations, and this influence may be constructive or destructive. Managers should be aware of this influence, and it should be reflected in IT governance.

Organizational culture can be defined as "the shared patterns, beliefs and values in an organization that are considered valid by the members and are considered as the accepted way of behaving, thinking and facing the problems" (Schein, 2010, p. 12). "Organizational culture varies a great deal from one organization, company, institution, or group to another and represents those expectations, norms, and goals held in common by members of that group" (Deresky, 2011, p. 107).

Organizational structure can be defined as "positioning the formal roles, powers and authorities in an organization, identifying the involved people and defining the relationships" (Galbraith et al., 2001, p.3). It can also be seen as "the way of designing an organization so that decision rights are correctly allocated" (Pearlson and Saunders, 2013, p. 79). A suitable structure for an organization is the one that makes the organization capable of effectively responding to problems and changes in the environment, technology, market or human resources (Webb et al., 2006; Jones, 2007).

In addition, "organizational culture and structure need to be compatible and this compatibility can have a positive impact on an organization's performance" (Janićijević, 2013, p. 39). Pearlson and Saunders (2013, p.79) state that, "ideally, an organization structure is designed to facilitate the communication and work processes necessary for accomplishing the organization's goals". Hence, when studying the influence of organizational culture on IT governance, it is also important to study the influence of organizational structure on IT governance.

1.2 Research Problem

This section describes the problem field of this research, the knowledge gaps and the research questions to be addressed in this thesis.

1.2.1 Problem Field

The large number of IT projects that fail every year, causing massive costs to firms, demonstrate that IT without effective governance does not bring value to organizations. Governing IT is the key to developing the most value from IT (Alvesson, 2012). This highlights the crucial role of IT governance in organizations (Alvesson, 2012), and is also the reason for IT governance becoming an important issue for both practitioners and academic researchers (Van Grembergen and De Haes, 2017).

IT within organizations is shifting from an operational role to a more strategic one, and this fact highlights the need to insure that IT is properly governed (Awais and Gill, 2016; Lunardi et al., 2014). Moreover, organizations need to match their technology to their organizational environment to achieve the optimal value from IT (Hester, 2013). Recent technological advancements and the evolutionary role of IT require new and adaptive changes in organizations and the ways of working (Hoogervorst, 2009). Information systems and IT governance should be reflected in the design of the organizations' and their IT departments' structure.

Information Systems (IS) research has recognized the necessity of a focus on IT governance and the business value creation of IT (Mitra et al., 2011). Also some examples of large companies' IT project failures (Pearlson and Saunders, 2013), have elevated the importance of the topic of IT governance, from both research (Weill and Ross, 2004) and practical perspectives (ISACA, 2012).

There are a number of factors that may influence IT governance performance, such as environmental factors, internal resources, leadership styles, organizational culture and structure (Brown and Grant, 2005; Huygh et al., 2017; Leidner and Keyworth, 2006; Van Grembergen and De Haes, 2017).

According to Wilsson and Pollard (2009), IT governance distributes the responsibilities and decision rights in an organization, in relation to many different organizational issues such as structure, culture, goals, strategies and control systems. The role of organizational issues in IT governance has been addressed to some extent in previous research. However the knowledge is still very scarce regarding the exact importance of the organizational issues in terms of implementing and effective IT governance (Debreceny, 2013).

The focus in this thesis is on organizational culture and structure. The research literature shows that organizational culture can influence both IT

governance and the performance of an organization (see for example Aasi et al., 2014; Janssen et al., 2013). Ke and Wei (2007) state in their research that IT governance performance is influenced by organizational culture, which can be used positively in the implementation of IT governance. Moreover, according to the research literature, IT organizational structure also needs to fit with IT governance in a way that supports the mechanisms of IT governance (Heckler and Powell, 2016; Kappelman et al., 2014). Today, organizational structures are changing and becoming more complex in response to dynamic business and IT needs (Chan, 2002). Therefore the role of organizational culture and structure in IT governance performance is prominent. Despite this, the research literature shows that there is a lack of research into the influence of organizational culture and organizational structure on IT governance performance (Alvesson, 2012; Brown and Grant, 2005; Chong et al., 2012; Kanungo et al., 2001; Kingsford et al., 2003; Leidner and Kayworth, 2006; Orlikowski and Barley, 2001; Palvia and Pinjani, 2007; Debreceny, 2013; Jairak et al., 2015; Dittes and Smolnik, 2016).

Previous researchers have also called for more empirical research on IT governance and factors influencing it (Huygh et al., 2017). The research presented in this thesis also answers this call.

1.2.2 Research Problem and Research Gaps

The main research problem addressed in this thesis is the limited amount of studies and knowledge of the role of organizational culture and structure in IT governance. This problem has been divided into two knowledge gaps, as described below.

Knowledge Gap 1

There is a lack of research regarding the role of organizational culture in IT governance. Organizational culture plays an important role in the implementation and use of IT in organizations (Huygh et al., 2017; Walsham, 1995). Organizational culture and IT governance is a new field of study, and researchers and practitioners require an extensive analysis of how organizational culture should be considered when implementing IT governance. However, there is limited research into how different organizational cultures can influence IT governance performance (Aasi et al., 2014; Huygh et al., 2017; Leidner and Kayworth, 2006; Rowlands et al., 2015). The research on this topic so far has highlighted the importance of organizational culture in IT governance, but a deep investigation of the role of organizational culture on IT governance performance is still missing.

Thus the first knowledge gap to be addressed can be specified as follows:

There is a lack of research regarding the influence of organizational culture on IT governance performance that needs to be addressed.

Knowledge Gap 2

There is a lack of research into the role of IT organizational structure on IT governance. As organizations grow globally, more complex patterns and structures are used to organize their IT (Bell and Kozlowski, 2002). In large organizations with complex structures, it is more challenging to implement IT governance and to recognize IT-related decisions and responsibilities. Information systems and IT governance should be reflected in the design of the organizations and their IT department structure (Hester, 2013). However there is a lack of research addressing this issue (Heckler and Powell, 2016; Kappelman et al., 2014).

Thus the second knowledge gap to be addressed can be specified as follows:

There is a lack of research regarding the relationship of IT organizational structure with IT governance performance and implementation.

1.3 Research Question and Sub-Questions

To address the research problem and the knowledge gaps introduced above, a main research question (RQ) and two sub-questions (SRQ1 and SRQ 2) were formulated as follows:

RQ: *How are organizational culture and structure related to IT governance?*

SRQ 1: *How do different types of organizational culture influence IT governance performance?*

SRQ 2: *How is organizational structure related to IT governance performance and IT governance implementation?*

Through SRQ 1 and SRQ 2, this research will investigate how the organizational culture and structure are related to IT governance. IT governance has many different aspects; however the two research questions in this thesis focus on the effective IT governance implementation and IT governance

performance. Several different activities are performed in this research in response to SRQ 1 and SRQ 2.

1.4 Delimitations

In this section, some of the delimitations of this research are described. Firstly, the research focus is on how organizational culture and structure can influence the IT governance performance, and not vice versa, (i.e. the influence of IT governance performance on organizational culture and structure). IT governance performance is among the primary challenges faced by managers in many organizations, and it is therefore important for them to identify how this can be improved. The results of this research can be used to determine how to improve IT governance performance, in view of the role of organizational culture and structure. Of course there may also be some influence from IT governance on the existing organizational culture and structure of a firm; however, this is beyond the scope of the current research and may be examined in future work.

Secondly, the research focus is on organizational culture rather than on the national culture of the country in which these organizations operate. The national culture of the country in which firms are located may have an effect on their organizational culture, despite these firms having defined their own organizational culture values (Hofstede, 2006). However, the focus in this research is on organizational culture, since it is more important for the organizations to become aware of its influence on IT governance, and since this has received attention from recent researchers in the field of IT governance field (Aasi et al, 2014). Within the global companies used as case studies in this research, the organizational culture was examined disregarding the national culture.

1.5 Publications

This section presents publications produced during the course of the author's PhD studies. These are divided into two parts: section 1.5.1 presents the publications included in this PhD thesis (reprints of these papers are included Appendix 4), while Section 1.5.2 presents the related publications that are not included in this thesis. The contribution of the author to these publications is also discussed at the end of this section.

1.5.1 Publications Included in the Thesis

1- Research paper 1 (RP 1)
   Aasi, P., Rusu, L., Leidner, D., Perjons, E., and Corrales Estrada, M. (2018). What is the Role of Organizational Culture in IT Governance Performance of Collaborative Virtual Networks? *International Journal of IT/Business Alignment and Governance,* 9 (1).

2- Research paper 2 (RP 2)
   Aasi, P., Rusu, L., and Vieru, D. (2017). The Role of Culture in IT Governance Five Focus Areas: A Literature Review. *International Journal of IT/Business Alignment and Governance*, 8(2), 42-61.

3- Research paper 3 (RP 3)
   Aasi, P., Rusu, L., and Han, S. (2014). Culture influence on IT governance: What we have learned? *International Journal of IT/Business Alignment and Governance*, 5(1), 34-49.

4- Research paper 4 (RP 4)
   Aasi, P., Rusu, L., and Leidner, D. (2017). IT Organizational Structure Relationship with IT Governance Performance: Case of a Public Organization. In *Information Technology Governance in Public Organizations,* (pp. 229-252), Springer International Publications.

5- Research paper 5 (RP 5)
   Aasi, P. and Rusu, L. (2017). Facing The Digitalization Challenge: Why Organizational Culture Matters and How It Influences IT Governance Performance. In Paspallis, N., Raspopoulos, M. Barry, M. Lang, H. Linger, and C. Schneider (Eds.), *Information Systems Development: Advances in Methods, Tools and Management (ISD2017* Proceedings), (pp. 1-12), Association for Information Systems.

6- Research paper 6 (RP 6)
   Aasi, P., Rusu, L., and Han, S. (2016). The Influence of Organizational Culture on IT Governance Performance: Case of The IT Department in a Large Swedish Company. In *Proceedings of the 49th Hawaiian International Conference in System Sciences (HICSS 49)*, (pp. 5157-5166), IEEE Computer Society.

7- Research paper 7 (RP 7)
   Larsson, F., Rusu L, and Aasi, P. (2015). Organizational Structure in IT Governance: A Case Study of an IT Governance Implementation Project.

In *Proceedings of the 21st Americas Conference on Information Systems (AMCIS 2015),* (pp. 1-11), Association for Information Systems.

This PhD thesis includes seven research papers, which were published between 2014 and 2018 in journals, scientific conferences and a book. The contributions of Parisa Aasi in these papers are described below.

Parisa Aasi is the main author of six out of these seven research papers (RP 1, RP 2, RP 3, RP 4, RP 5, and RP 6). In these publications, Parisa Aasi developed the general research strategy and conceptual framework, collected and analyzed the data and wrote the main body of these papers. In the case study papers (RP 1, RP 4, RP 5 and RP 6), Parisa Aasi developed the theoretical section, made contact with the managers of the case organizations in different countries, conducted the interviews, collected secondary data and performed the analysis. For RP 7, Parisa Aasi was involved in research supervision and in authoring the paper. Table 1 presents the included research papers outcomes in relation with the two research questions of this research.

Research Question	Research Paper	Outcome
SRQ 1: How do different types of organizational culture influence IT governance performance?	RP 2 (IJITBAG 2017) ⇢ RP 3 (IJITBAG 2014) ⇢	Literature review on IT governance and culture with both research and practice perspectives. The literature review identified research gap: lack of research on the influence of culture on IT governance performance.
SRQ 1: How do different types of organizational culture influence IT governance performance?	RP 1 (IJITBAG 2018) ⇢ RP 5 (ISD 2017) ⇢ RP 6 (HICSS 2016) ⇢	Case studies indicating that organizational culture is influencing IT governance performance outcomes, and that different organizational culture types are desired for different IT governance performance outcomes in organizations with complex structures.
SRQ 2: How is organizational structure related to IT governance performance and IT governance implementation?	RP 4 (Springer 2017) ⇢ RP 7 (AMCIS 2015) ⇢	Case studies indicating that organizational structure of IT department needs to fit and support the IT governance implementation, and that organizational structure of the IT department may differ according to the desired IT governance performance outcomes.

1.5.2 Publications Not Included in the Thesis

The publications mentioned below are not included in the thesis but are in the field of computer and systems sciences.

8- Research paper 8 (RP 8)
Aasi, P., Rusu, L., Leidner, D., Perjons, E., and Corrales Estrada, M. (2018). How Does the Organizational Culture of Collaborative Networks Influence IT Governance Performance in a Large Organization? In *Proceedings of 51th Hawaiian International Conference in Systems Sciences (HICSS -51)*, (pp. 4941-4951), IEEE Computer Society.

9- Research paper 9 (RP 9)
Aasi, P., Nunes, I., Rusu, L., and Hodosi, G. (2015). Does Organizational Culture Matter in IT Outsourcing Relationships? In *Proceedings of 48th Hawaii International Conference on Systems Sciences (HICSS-48),* (pp. 4691-4699), IEEE Computer Society.

10- Research paper 10 (RP 10)
Aasi, P., Rusu, L., and Han, S. (2014). The Role of Culture in IT Governance (Research in Progress). In *Proceedings of 20th Americas Conference on Information Systems (AMCIS 2014)*, (pp. 1-8), Association for Information Systems.

11- Research paper 11 (RP 11)
Aasi, P., Rusu, L., and Han, S. (2014). The Influence of Culture on IT Governance: A Literature Review. In *Proceedings of 47th Hawaii International Conference on System Sciences (HICSS-47),* (pp. 4436-4445), IEEE Computer Society.

12- Research paper 12 (RP 12)
Han, S., Juell-Skielse, G., Smedberg, Å., Aasi, P., and Nilsson, A. G. (2014). Benefits of mobile reporting systems in social home care: the case of seven Swedish municipalities. *International Journal of Technology Assessment in Health Care*, *30*(4), 409-415.

13- Research paper 13 (RP 13)
Aasi, P., Nunes, I., Rusu, L., and Hodosi, G. (2013). The Impact of Different Organizational Cultures on IT Outsourcing Relationship Management. *International Journal of Innovation in the Digital Economy*, *4*(2), 50-66.

14- Research paper 14 (RP 14)

Aasi, P. Rusu, L. and Han, S. (2017). Culture Influence on IT Governance: What We Have Learned?. *In Organizational Culture and Behavior: Concepts, Methodologies, Tools, and Applications,* (pp. 1329-1347), IGI Global.

The contribution of Parisa Aasi to these papers not included in this thesis is described below.

In six papers, Parisa Aasi was the main author (RP 8, RP 9, RP 10, RP 11, RP 13 and RP 14). As the main author, Parisa Aasi developed the research strategy, data collection and analysis. In one of the papers, RP 12, Parisa Aasi was partly involved in the authoring of the paper.

In February 2016 Parisa Aasi defended and published her licentiate thesis (Aasi, 2016). This licentiate thesis includes the papers: RP 3, RP 6 and RP 7.

1.6 The Research Focus in Relation to Research in DSV and Swedish Research School of Management and Information Technology (MIT)

IT governance is among the important topics in IT management and both researchers and practitioners are emphasizing its significant and challenging role in organizations (ISACA, 2012). Today, IT governance needs to be addressed properly since it affects the general performance of the organizations (Debreceny, 2013). As mentioned earlier, this research is focusing on the role of organizational culture and structure on IT governance. The Swedish Research School of Management and Information Technology (MIT) is focusing on the research on IT management. The MIT research school has gathered different Swedish university researchers together to research on IT management field.

The topic of this thesis is aligned with the focus area of the MIT research school and is supported by the school. The author has been communicating with different researchers in the MIT research school during the course of her PhD studies. This research has been presented to the MIT research school researchers in different stages of the work. During the course of this PhD and in different MIT research school conferences and courses, the author of this thesis shared ideas with other MIT researchers and also received constructive feedback from them. Thus, the results of this research contributes to the research performed at the MIT research school and can be used by the future researchers at this school.

1.7 Thesis Structure

This thesis consists of five chapters described below:

Chapter 1:
In chapter 1 the topic and background of this thesis is introduced. The problem field is introduced; the research problem and knowledge gaps are identified. Delimitations and scope of this research are explained and the research questions and the publications are presented and their relation is also explained.

Chapter 2:
In chapter 2 the theoretical foundation for this research is presented. The concepts from previous literature used in this research are introduced and described briefly. These concepts include the IT governance definition, IT governance frameworks, IT governance performance, organizational culture and structure and virtual networks, organizational culture assessment instrument and digitalization.

Chapter 3:
In chapter 3 the research process and methodological approach is described. The qualitative research approach is introduced and case study research method is described as the selected method for this research. It is also explained how the literature were reviewed to find the gaps in the research. The justification for selecting the research method and data collection technique is presented. The application of the method, case selection and research reliability and validity are discussed and finally the ethical considerations in this research are presented.

Chapter 4:
In chapter 4 the research results are presented and it is explained how these results address the research questions.

Chapter 5:
In chapter 5 the conclusions are presented. In this chapter it is described how this research fulfills the knowledge gaps introduced. It is also expressed in this chapter how this research theoretically and empirically contributes to the field of IT governance. In the end the limitations of the research are discussed and the potential future paths based on this research are proposed.

2 Research Background

This chapter includes a summary of the key concepts and definitions used in this research. The relationship of these concepts and how they form the theoretical background to this research are also explained. The chapter first provides a background to the topic of IT governance. Several definitions, models and standards for IT governance are introduced and briefly explained. IT governance focus areas and IT governance performance outcomes are also described. The concepts of organizational culture and structure are then introduced by presenting various definitions, models and aspects identified in previous works in the literature. The organizational culture assessment instrument used in several phases of this research is introduced, and explanation is given of the suitability of this instrument for this research. Following this, the concept of digitalization in today's organizations is explained, and the concept of virtual networks is defined. The virtual networks concept is explained as a new and complex aspect of modern global organizations. This concept is relevant to this research since this research focuses on the influence of organizational culture on IT governance in different organizations, and since virtual networks are becoming widely used in large organizations.

The chapter ends by explaining the importance of the concepts of organizational culture and structure in IT governance and digitalization. The importance of these concepts and their connections has been mentioned by several previous researchers, however a thorough investigation of how the organizational culture and structure can influence the IT governance performance in an organization is absent in research of today.

The contents of this chapter are drawn primarily from the Licentiate thesis submitted by the author (Aasi, 2016).

2.1 IT Governance Background

2.1.1 Defining IT Governance

Researchers have used several typologies to define IT governance. According to Wilkin and Chenhall (2010) and Zarvić et al. (2012), the term "IT

governance" appeared for the first time in research during the 1990s. Loh and Venkatraman's (1992) work is one of the first studies to use the concept of IT governance, pointing out that IT governance is starting to be acknowledged as a significant part of IT strategy.

IT governance is an issue that has received increasing attention in research and practice since the mid-nineties (Simonsson & Johnson, 2006). The IT Governance Institute (ITGI) defines IT governance as "the responsibility of the board of directors and executive management. IT governance as an integral part of enterprise governance (De Haes and Wan Grembergen, 2015) consists of the leadership and organizational structures and processes that ensure that the organization's IT sustains and extends the organization's strategies and objectives" (ITGI, 2006, p.10). In this paper, we have used the definition given by Weill and Ross (2004, p.2) gave: *"IT governance is defined as specifying the frameworks for decision rights and accountabilities to encourage desirable behavior in the use of IT"*.

Van Grembergen (2007, p.1) defines IT governance as "the organizational capacity exercised by the board, executive management and IT management to control the formulation and implementation of IT strategy and in this way ensure the fusion of business and IT".

This study adopts the above definition of IT governance given by Weill and Ross (2004), which represents the collective of decision rights and responsibilities of organization members implementing and using IT to gain value from IT.
IT governance is the responsibility of the executives and the board of directors.

IT Governance versus Corporate Governance

IT governance is strongly linked with the corporate governance (Licht et al., 2005). Van Grembergen and De Haes (2009, p.4) also state "enterprise governance of IT governance is an integral part of corporate governance". Corporate governance is defined as the division of power and wealth in the corporation and the system through which the organization is controlled and directed (Van Grembergen and De Haes, 2009).

The link between the corporate governance and IT governance was found to be such important that the International Organization for Standardization (ISO) has created a specific standard (ISO/IEC 38500:2008) for corporate governance of IT. It defines the guidelines for preferred behavior in corporations to guide the IT decision making.

In recent years, when the role of IT changed from just a supporter to a strategic partner of business, IT governance also became as a subset to the corporate governance (Gill, 2008; Kingsford et al., 2003; Van Grembergen and De Haes, 2008).

2.1.2 IT Governance Framework of Structures, Processes and Relational Mechanisms

"According to Peterson (2004) IT governance is the integration of strategies and tactics. IT governance can be developed through a combination of specific structures, processes and mechanisms. Van Grembergen and De Haes (2008) have introduced a framework based on three necessary components of IT governance: structures, processes and relational mechanisms (Figure 1). The authors define enterprise IT governance as "an integral part of enterprise governance and addresses the definition and implementation of processes, structures, and relational mechanisms in the organization that enable both business and IT people to execute their responsibilities in support of business/IT alignment and the creation of business value" (p.3). The elements of this framework are interrelated and cannot form the IT governance separately.
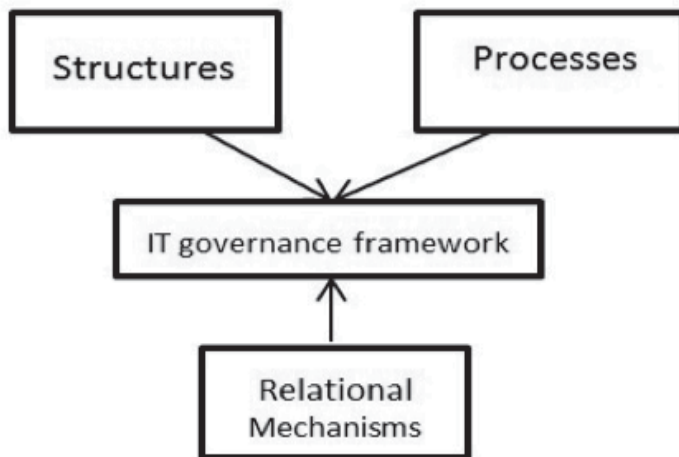
Figure 1. IT governance framework elements (adapted from Van Grembergen and De Haes, 2008. p.25)

Structures

In the IT Governance framework of Van Grembergen and De Haes (2008), the structures consist of roles and responsibilities, IT organization structure, Chief Information Officer (CIO), IT strategy committee and IT steering committee. The authors state that it is very important that all the roles and tasks are defined and expressed unambiguously concerning the involved people in IT. The structures include a clear presentation of the responsibilities of the executive managers. In addition the CIO needs to be aligned with Chief Executive Officer (CEO) and be accepted in the execu-

tive board at the top level management by the senior executives in this board. The authors define the IT organization structure through the three main modes of centralized, decentralized and federal IT governance.

Processes

The processes in the IT Governance framework (Figure 1) are more engaged with business/IT alignment as one of the focusing area in IT governance. There are also some tools and frameworks used for processes such as balanced score card (BSC), Val IT, service level agreement (SLA) and CO-BIT.

Relational Mechanisms

The mechanisms in the IT Governance framework (Figure 1) are engaging with the understanding of the relational mechanisms between business and IT. The relational mechanisms consider the shared knowledge, a two-way communication, participation and also collaboration between business and IT departments. According to Reich and Benbasat (2000) "shared domain knowledge" is gained through the experience of IT executives in business and vice versa. This is an important issue in the understanding of business and IT from each side. Moreover "social capital" which covers the relationships between the employees on different levels as well as organizational relationships and communications are important concepts embedded in the relational mechanisms in IT governance (Reich and Benbasat, 2000)" (Aasi, 2016, p 20-22).

2.1.3 IT Governance Five Focus Areas

"There are five focus areas for IT governance identified by the IT Governance Institute (ITGI, 2003): Strategic Alignment (SA), Resource Management (RM), Performance Measurement (PM), Value Delivery (VD) and Risk Management (RK). The five focus areas of IT governance are based on the stakeholders' values. The first three (strategic alignment, resource management and performance measurement) are considered as drivers and the other two (value delivery and risk management) as outcomes. Most of the IT governance models, frameworks, standards and structures consider these five focus areas during IT implementation (ITGI, 2003) and this is the reason for this research to choose this practical approach of IT governance in reviewing and categorizing the literature.

The ITGI (2003) defines each criterion as follows:

1) IT strategic alignment: Ensures a linkage between business and IT plans, defines, maintains and validates IT value propositions and

aligns IT and enterprise operations. The main concern relates to the linkage of enterprise business and IT plans with operations.

2) IT value delivery: Deals with the execution of the value propositions through the delivery cycle, makes certain that IT delivers the promised benefits vs. the strategy. The main concern is optimizing costs and proving the intrinsic value of IT throughout the delivery cycle.

3) Risk management: Ensures risk awareness by senior officers in the organization, a clear transparency and understanding of the organization's desire for significant risk and compliance requirements as well as embedding risk management responsibilities in the organization. The main concern is embedding accountability to mitigate significant risks.

4) IT resource management: Ensures optimal investment and proper management of critical IT resources: applications, information, infrastructure and people. The main concern is regarding optimizing knowledge and infrastructure. The IT resource management area overlays all the other four areas.

5) Performance measurement: Tracks and monitors implementation of strategies and projects. This also applies to the use of resources, performance of processes and delivery of services. An example is the use of a Balanced Score Card (BSC), which translates strategies into action for achieving goals that are measurable beyond conventional accounting. Key issues relate to setting and monitoring strategies and services (Figure 2).
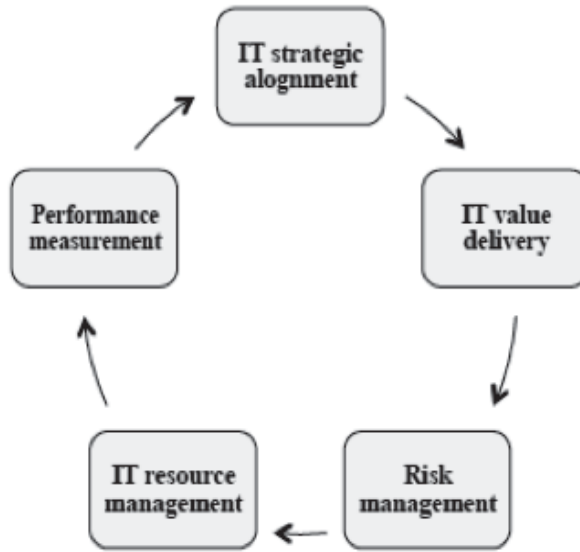
Figure 2. IT governance five focus areas (adapted from ITGI, 2003

IT governance is a continuous life cycle that can be entered at any point. Usually the organizations start with the strategic alignment and after that they start the implementation and then delivering value from IT. The risks should be identified and addressed, the performance needs to be measured, and the strategy should be monitored regularly.

ITGI (2003) states that IT governance does not occur in an isolated place and it is influenced by the environment that it is taking place in. This environment is at the same time influenced by some factors such as: "stakeholder values; the mission, vision and values of the enterprise; the community and company ethics and culture; applicable laws, regulations and policies and industry practices" (p. 21). This highlights the significant role of environmental factors such as culture in the focus areas of IT governance" (Aasi, 2016, p. 22-23).

2.1.4 IT Governance Performance

"Weill and Ross (2004) mentioned that "Governance performance assesses the effectiveness of IT in delivering four objectives weighted by their importance to the enterprise" that are: 1) Cost-effective use of IT, 2) Effective use of IT for asset utilization, 3) Effective use of IT for growth and 4) Effective use of IT for business flexibility" (Weill and Ross 2004, P.121).

1) *Cost–effective use of IT* is mostly engaged with how much IT has been beneficial for the business; *2) Effective use of IT for growth* concern is how

IT has been effective in learning, being innovative, gain competitive advantage and making improving changes; *3) Effective use of IT for asset utilization* is focusing on how successful IT has been to use the knowledge based assets in an organization; *4) Effective use of IT for business flexibility* investigates on how IT has been successful for the business to respond to the internal and external changes.

In this research the four outcomes of IT governance introduced by Weill and Ross (2004) are used in order to identify the IT governance performance. They introduce a formula to calculate the IT governance performance total score using the above four objectives.

According to this formula first the importance of each ITG performance outcome is rated (scale of 1-5), this rating may be different in different firms. Then the degree to which the firm is successful in reaching each of those outcomes is scored (scale of 1-5) and in the end the overall ITG performance is calculated.

Finally a weighted average formula is used to calculate the overall ITG performance score with a maximum score of 100.

Overall IT Governance Performance Score is:

$$\frac{\sum_{n=1 \text{ to } 4} (\text{importance of outcome}) * \text{influence of IT governance} * 100}{\sum_{n=1 \text{ to } 4} (5 * (\text{importance of outcome}))}$$

Weill and Ross (2004) used this formula for measuring the ITG performance in 256 companies in 23 countries. The average score was 69 out of 100, with minimum score of 20. One third of the companies scored over 74 and only seven percent scored over 90" (Aasi, 2016, p. 26).

2.1.5 IT Governance Standard: ISO/IEC 38500:2008

"ISO/IEC 38500:2008 standard of IT governance is developed by the International Standardization Organization (ISO) and the International Electrotechnical Commission (IEC) (ISO/IEC 2008) as a specialized system for worldwide standardization.

There are different mechanisms, frameworks and standards for IT governance. For example, COBIT 5 which is a mechanism, separating IT governance from the general management. COBIT 5 defines management as the function of supporting strategies and strategic plans and "runs" and "monitors" business processes aligned with them. The strategic plans are set up by the top level decision makers (governance) (ISACA, 2012, p.31) and management is done by lower level managers. Wilkin and Chenhall (2010) also

explain this difference by stating that "management has the task of managing the company, while the governance has the responsibility of overseeing the organization and setting future strategic plans for the enterprise" (Wilkin and Chenhall, 2010, p. 111). Organizational structures around management, governance and IT will be arranged in various ways depending on the specific organization and the settings it has internally and externally.

Previous research using the standard of ISO/IEC 38500:2008 is very rare according to Wilkin & Campbell (2010). So this research will be helpful in authentication of the ISO/IEC 38500:2008 standard. The ISO/IEC 38500:2008 is an instrument for top level management when it comes to IT governance in an organizations. According to Chaudhuri (2011) this standard is particularly used through the processes of "evaluating, directing and monitoring IT" (Chaudhuri, 2011, p.5). Its goal is to be applicable for different sorts of organizations, including governmental (public) and private organizations. This standard is proposed to foster the effective use of IT by directing top-level management (Chaudhuri, 2011). Wilkin and Campbell (2010) state that the ISO/IEC 38500:2008 has three important intentions: 1) Assure the employees, investors and other stakeholders that the organization is working according to the standard aiming to achieve a desired level of effectiveness in IT governance; 2) The standard specifies directions for top level managers regarding IT solutions and projects in the whole organization; and 3) The possibility of IT governance evaluation by the organization managers by using the standard.

There are six principles introduced by ISO/IEC 38500: 2008 for governance of information technology including: responsibility, strategy, acquisition, performance, conformance and human behavior. ISO/IEC 38500: 2008 states that thee principles should be evaluated, directed and monitored. The principles are defined below (ISO/IEC 38500: 2008, p.6):

"*Responsibility*

The understandings and acceptance from groups and individuals in an organization about their responsibilities. These responsibilities are both regarding supply and request for IT. The people with responsibility for actions also have the power to make those actions.

Strategy

The business strategy of the organization is regarding the current and future abilities of IT; IT strategic plans fulfill the current requirements of the organization's business strategy.

Acquisition

IT acquisitions are made based on different motives based on suitable and on-going analysis, with well-defined and clear decision-making. For both current (short term) and future (long term) there should be a balance between benefits, opportunities, costs, and risks.

Performance

IT is required for supporting organization, service delivery with levels of service quality essential to meet current and future business requirements.
Conformance
IT fulfills all mandatory legislation and regulations. Policies and practices are clearly outlined, implemented and enforced.
Human Behavior
IT policies, practices and decisions establish respect for Human Behavior, including the current and upcoming needs of the people involved in process. Table 2 summarizes the description of evaluation, direction and monitoring for each of the ISO/IEC 38500: 2008 principles.

Table 2. ISO/IEC 38500:2800 standard of IT governance principles and processes (Adapted from ISO/IEC 38500: 2008, pp.9–15)

	Evaluate	Direct	Monitor
Responsibility	Evaluation of each principle mean to evaluate the current and future use of IT	Direction of each principle deals with preparation and implementation of policies to ensure the correct way of IT use aligned with organization objectives.	Monitoring each principle deals with the degree to which IT is conforming with policies and how aligned IT is with the plans.
Strategy			
Acquisition			
Performance			
Conformance			
Human behavior			

As shown in Table 2, the processes need to be done for each principle. Six principles of ISO/IEC 38500:2008 are in the left column. These principles can be applied through three steps of evaluating, directing and monitoring, which are positioned at top row of Table 2" (Aasi, 2016, p. 24-25).

2.1.6 IT Governance Archetypes

"Weill and Ross (2004) have defined six archetypes for IT governance in organizations. These archetypes explain how each of the five key IT deci-

sions are made. The five key IT decision include: 1) IT principles, 2) IT architecture, 3) IT infrastructure strategies, 4) Business application needs, and 5) IT investment. The six archetypes are then defined as: 1) Business monarchy, 2) IT monarchy, 3) Feudal, 4) Federal, 5) IT duopoly, and 6) Anarchy. A short description of each of the IT governance archetypes of Weill and Ross (2004) are summarized as is following:

1) Business monarchy: In business monarchy archetype the input or decision rights come from a group of business executives or individual business managers (the CIO may be or may not be involved) but the IT executives are not involved in decisions.

2) IT monarchy: In IT monarchy archetype the input or decision rights are made by IT individuals or group executives.

3) Feudal: In feudal archetype the input or decision rights originate from the business unit leaders or the key process owners.

4) Federal: In federal archetype the managers involved in making input or decision rights are the business groups and IT executives for different units and processes.

5) IT duopoly: In IT duopoly archetype the input or decisions rights originate from the IT executives and one other group that can be business or process units.

6) Anarchy: In anarchy archetype the input or decision rights come from each individual user.

After studying 256 both private and public enterprises, Weill and Ross (2004) claim that the IT governance in public enterprises is more a federal archetype for inputs to all key IT decisions. When deciding on different IT governance aspects, an organization needs to know which governance archetypes would work. The IT governance archetypes are not completely under the control of the IT side; the business side also affects the chosen archetype. According to Weill and Ross (2004) the top performing enterprises govern their IT in various ways and they have different IT governance archetypes for each of the five key IT decisions. In summary, the IT governance archetypes play an important role in how the key decisions regarding IT governance are made and who provides an input to these decisions" (Aasi et al., 2017, p. 233-234).

2.2 Organizational Culture and Structure Background

2.2.1 Organizational Culture

"Culture can be viewed from different perspectives and in different levels. There are also variant definitions of it among the researchers and practi-

tioners in various fields. The culture gets formed where there are some elements shared among a group. These elements can be shared experience, shared history, common activities, common colleagues or managers and shared places. Schein (2010) defines culture as *"a pattern of shared basic assumptions that was learned by a group as it solved its problems of external adaptation and internal integration, that has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think, and feel in relation to those problems"* (Schein, 2010, p.17).

Definition of Culture

Culture can be defined based on the level of the people groups in which culture exists and also based on the level in which the culture can be visible in each group. The people groups can be in national, organizational and sub-units levels. Researchers have defined various concepts and models for explaining culture at different levels. Hofstede (2001) introduces five dimensions for characterizing and measuring the national culture including power distance, individualism/collectivism, muscularity/ femininity, uncertainty avoidance and long term orientation. A large research program called GLOBE (Global Leadership and Organizational Behavior Effectiveness) also introduces nine dimensions for national culture as performance orientation, future orientation, assertiveness, power distance, humane orientation, institutional collectivism, in-group collectivism, uncertainty avoidance, and gender egalitarianism (House et al., 2002). According to Robbins & Judge (2011) organizational culture is related with the value system shared by members of an organization. This value system contains the main characteristics in which a group of people understands each other and behave. This presents the features that differentiate one organization from other organization. Jones (2007) also defines organizational culture by four fundamentals as follows: characteristics of people within the organizations, organizational ethics, property right system; and organization structure. Jones argues that the four mentioned fundamentals interact with each other and all together shape the organizational culture of a firm.

Cameron and Quinn (2011) have developed a strategy for measuring the organizational culture adapting both quantitative and qualitative approaches. They assume the quantitative approach for examining the underlying beliefs and values (culture) and qualitative approach for exploring the surface of the organization (climate). They propose the Organizational Culture Assessment Instrument (OCAI) a dimensional model of the organizational culture based on the Competing Values Framework previously introduced by Quinn and Rohrbaugh (1983). This framework is established on two dimensions of structure and focus of organization, specifying the degree of internal or ex-

ternal focus of the organization and the degree of the flexibility or stability of the organization structure.

As one of the most recent models regarding organizational culture we can remark the model called "X Model of Organization Culture" developed by Smit et al. (2008). This model categorizes the organizational culture elements in five clusters named: leadership, strategy, adaptability, coordination and, relationship.

In many large organizations we can find also subcultures. While the main culture represents the more important and well known values that most of the staff in the company are aware of them and have them in their minds, the subcultures represent the common understanding found in specific departments or local offices. Culture at the national level is on the other hand affecting the other two levels of culture and sometimes they are not so accurately defined. Hofstede et al. (1990) has concluded that organizational culture is to a certain point determined only by national culture. Therefore the culture exists in all levels of people groups and it can be even mixed in different groups. There are also different models introduced for culture in different levels.

National Culture

According to Hofstede (1984), the culture of a society called the "national culture" is defined as the shared values, understandings, assumptions and goals that exist in the current society and have been learnt from earlier generations. This culture gives directions to the way of living, communication, life and work standards and expectations of the person (Dressler, 1976).

Rauch et al. (2013) indicates that different national cultural contexts are related to various issues, even to the degree of innovation and growth in firms. According to Deresky (2011), it is a critical skill for managers of organizations to have an understanding of the national culture of the environment in which they are running their business, especially when organizations operate globally. Different researchers have developed various frameworks for studying and understanding national culture and it has been assessed by both values and practices (i.e. Hofstede, 2001; Javidan and House, 2001; Gupta et al., 2002).

Organizational Culture

Organizational culture is the object of many studies in relation to its definition, its effects on organizations' success or failure, and its formation and influential factors (Schein, 2009; Alvesson, 2012). Organizational culture is expressed from two aspects: 1) practices and values and 2) behavior and beliefs. Organizational culture can be defined as the specific ways that an organization behaves over a period of time (Kostava, 1999). The organization's work practices define the organization's knowledge and competence, while organizational values and norms weave a belief system (organizational

culture) by which organizational members make sense of their actions (Vieru and Rivard, 2014).

Choo (2013) proposes a typology called "information culture" and counts it as analogous with organizational culture. Information culture is similar to organizational culture but with a distinctive focus on the cultural norms, values and behaviors regarding the way information is perceived, used and managed in an organization. Additionally, according to Kappos and Rivard (2008) there may even be subcultures within an organization related to the norms and values shared among its subunits. Guzman and Stanton (2009) also note the important role of cultural fit to subunits in the organizations. They suggest that the cultural fit of the employees working with IT occupations influences the IT performance" (Aasi, 2016, p. 28-30).

2.2.2 Organizational Culture Assessment Instrument (OCAI)

"Various models and frameworks introduced for identifying or measuring the OC dimensions (Cameron and Quinn 2011; Schein 2009; Hofstede 2001; Janssens et al. 1995).

An instrument for diagnosing OC is developed by Cameron and Quinn (2011) called Organizational Culture Assessment Instrument (OCAI). Through OCAI, six key dimensions of organizational culture are considered to be evaluated:

1) "The dominant characteristics of the organization
2) The leadership style and approach that permeate the organization
3) The management of employees or the style that characterizes how employees are treated
4) The organizational glue or bonding mechanisms that hold the organization together
5) The strategic emphases that define what areas of emphasis drive the organization's strategy
6) The criteria of success that determine how victory is defined and what gets rewarded and celebrated" (Cameron and Quinn 2011, p. 151)

OCAI is based on the Competing Values Framework previously introduced by Quinn and Rohrbaugh (1983) in which four groups of organizations are diagnosed. These four groups are specifying the core values through which the organization is recognized and judged. These core values are different through two main aspects: 1) Internal focus and integration versus External focus and differentiation and 2) Stability and control versus Flexibility and discretion. Figure 3 summarizes the dimensions of organizational culture and four cultural types introduced in OCAI model.

Internal Focus and Integration

External Focus and Differentiation

Culture Type: CLAN	Culture Type: ADHOCRACY
Orientation: COLLABORATIVE	Orientation: CREATIVE
Leader Type: Facilitator Mentor Team builder	Leader Type: Innovator Entrepreneur Visionary
Value Drivers: Commitment Communication Development	Value Drivers: Innovative outputs Transformation Agility
Theory of Effectiveness: Human development and participation produce effectiveness.	Theory of Effectiveness: Innovativeness, vision, and new resources produce effectiveness.
Culture Type: HIERARCHY	Culture Type: MARKET
Orientation: CONTROLLING	Orientation: COMPETING
Leader Type: Coordinator Monitor Organizer	Leader Type: Hard driver Competitor Producer
Value Drivers: Efficiency Timeliness Consistency and uniformity	Value Drivers: Market share Goal achievement Profitability
Theory of Effectiveness: Control and efficiency with capable processes produce effectiveness.	Theory of Effectiveness: Aggressively competing and customer focus produce effectiveness.

Stability and Control

Figure 3. OCAI model, four types of organizational culture (Cameron and Quinn, 2011, p. 46)

Four clusters of OC are named after their most notable characteristic, which are clan, adhocracy, market and hierarchy.

The Clan Culture

If an organization is profiled as a clan culture firm it means that they have a friendly environment and people share many things with each other. In such a cultural profile the organizations can be considered as a large family with the managers as the mentors or even parents. Loyalty is an important factor, which leads to a high commitment. The human resources are long term beneficial. The main concern is on customers and the success of the organization is defined through how sensitive the organization is regarding its customers. Team work, participation have a high priority in a clan culture organization.

The Adhocracy Culture

In an adhocracy culture the emphasis is on being creative, entrepreneurial and dynamic. The organization is risk taking, leaders try innovative solu-

tions and they want to be the premiums on their own business. Their aim is growth and leading in product or service they provide. The individuals have freedom for creativity as an important commitment.

The Hierarchy Culture

Hierarchy culture in an organization equals with having a high formalized and structured work environment in which there is a procedure for everything and everybody with specific tasks. Leaders are not risk taking or innovative and they are more efficiency minded instead. Stability is the long term aim and the performance just needs to be efficient with usual operations. Such organizations consider themselves efficient when they have the needed delivery of products or services, follow the formal rules on time and have a low cost and not on how creative people are.

The Market Culture

A market culture organization is a result- oriented one. The most important concern is getting the job done on time and competition is crucial in such organization. The leaders are drivers and compete a lot. Organizations are considered successful if they have a notable share in the market and there is a lot of need for their products or services. An important issue in a market culture organization is managing to have a competitive pricing as well as reputation.

Motivations to Use OCAI for this Research

According to Cameron and Quinn (2011), OCAI instrument uses the integration of many dimensions of OC. OCAI includes aspects both regarding the current state of the OC and the way the members believe it should be developed based on the business demands. Moreover, OCAI is a validated tool used by over 10000 companies worldwide (OCAI online, 2015); it examines OC and the desire for change in an organization through an integration of many dimensions. It can be used by consultants to help an organization make the constructive changes with new teams and leaders with new working methods (Suderman, 2012). The above argued reasons make OCAI an appropriate OC model to be used for the purpose of this research which is to find the influence of OC on ITG performance. Additionally in this research the focus is on ITG performance and the departments working on IT have a great potential of changing their team work methods. These changes need to be followed by changes in peoples' behavior and culture as well and OCAI can be very useful in identifying and applying desired cultural changes" (Aasi, 2016, p. 30-32).

2.2.3 Organizational Structure

"Organizations can choose different types of organizational structures based on their business objectives. Jones (2007) states that for an organization, the suitable structure is the one that makes the organization capable of effectively respond to the problems and changes of the environment, technology, market or human resources. The IT department can have their own specific organizational structure or the same structure as the general organization. Pearlson and Saunders (2013) state that the information systems at the organization need to support it in achieving the goals and must reflect the business strategy. They note that the information systems need to be coordinated with the business strategy and organizational strategy. The organizational structure they choose for their IT department should be in a way that supports those other two strategies. Different organizational structures reflect different organizational strategies they follow aligned with the business strategies to accomplish goals. Therefore it is very important for the IT department to design an organizational structure in a way that all the IS resources such as human resources, hardware, software and data are used perfectly. The following sections briefly introduce different organizational structures based on Perlsons and Saunders (2013).

Hierarchical Organizational Structure

The hierarchical organizational structure is based on the division of control, labor, expertise and unity of demand. Decisions are usually made top down and centralized. The process of work starts by ordering from the top level and the middle managers have the role primary information processing. The middle managers are the ones who communicate the tasks to their subordinates.

Jobs are usually divided according to the specifications and particular functions. The hierarchical organizational structures are most suited for those organizations that are relatively stable and are working in a certain environment in which the top managers are able to make decisions about every issue in the organization very quickly.

Flat Organizational Structure

The flat organizational structure is in contrast with the hierarchical organizational structure. In this type of structure there is less top down decision-making and command chain. Usually there is no specific organization chart; the relationships, job definitions and reporting systems are fluid. In the flat organizational structure everyone does whatever needed to complete a business task and is also eligible to make needed decisions about it. In flat structures it is possible to respond quicker to the changes in the market and dynamic unstable environment. In flat organizations there is more potential for

innovation and flexibility but this is only possible with a strong teamwork. Teamwork is very important in flat organizations. Decision-making is usually decentralized in flat organizations but when they grow and more individuals are added to the groups there will be some hierarchy also created.

Matrix Organizational Structure

Matrix organizational structure is the third popular organizational structure (Pearlson and Saunders, 2013). In matrix organizational structures, the workers are assigned to two or more supervisors. Each supervisor is specialized in one issue and directs a different aspect of the business. This way the organization makes sure they use their human resources in different projects. In this type of organization, the team members should report to both of their supervisors and both supervisors are responsible for the work development and performance of their team members. It is the team managers who make needed decisions. The matrix allows the organizations to focus on both function and purpose and the human resources are shared in a flexible way between different groups. The matrix organizational structure is appropriate for these organizations with complicated decision making process and unstable environments. There are also some drawbacks for matrix organizations such as confusions for employees regarding their task definitions and reporting to two managers and some of the problems may stay hidden in such system.

Networked Organizational Structure

This type of organizational structure is possible through advanced IT systems today. The decision rights are highly decentralized in these organizations. The controls are based on information systems sharing and communication systems. The networked structures are aiming for high creativity and flexibility using information systems and keep control on operational processes at the same time.

In networked organizational structure there is the possibility for all the employees to share knowledge and experience. Decision-making can be performed very fast since the needed data for decision-making is shared, stored and analyzed instantly"(Aasi, 2016, p. 34-35).

Virtual Networks in Organization Structure

The nature of work in today's organizations is changing. In recent years, corporate activity has become increasingly more global, competition from both foreign and domestic sources has grown dramatically, and there has been a continued shift from production to service/knowledge-based work environments (Townsend et al., 1998). In addition, advances in information and communication technology have enabled a faster pace of change than in the past and have created jobs that are increasingly more complex and dynamic. In response to these changes, organizational systems, structures, and

processes have evolved to become more flexible and adaptive (Bell and Kazlowski, 2002).

Wilkin and Chenhall (2010) note that organizational structures formed around IT project management and IT governance, will vary dependent on the certain organization and its internal and external circumstances.

According to Bailey and Kurland (2002) we can generally differentiate virtual forms of working groups subject to the number of persons in those groups and also the level of interaction among them. For instance telework or telecommuting is a form of virtual working in which the members are fully or partially outside of the main organization location and they work with the help of IT and telecommunication amentias. If a group of teleworkers is joint and report to the same leader, then a virtual group is created. At the next level, a virtual team is created when different members of virtual group cooperate with each other to reach one goal. The next level of virtual working is the virtual community. Virtual communities are larger in size and they are separated in different locations. Member of virtual communities work and participate in the community through the Internet. It is worth wealthy to point that the virtual communities are not a form of organizational structure and they are not either implemented inside the organizational structure. The virtual communities are inducted by some of the members of the organization that have different expertise and work in different locations but aim for some common goals, norms and roles and report to common managers (Wellman, 1997; Bell and Kozlowski, 2003).

2.2.4 Importance of Organizational Culture and Structure in IT Governance

"The phenomenon of digitalization involves a reconsideration of the role of IT strategy, from simply a functional role adapted to the business strategy to a strategic role which can bring value to the business (Bharadwaj et al., 2013).

In requesting for digitalization, organizational culture is among the factors that can play an important role. An organizational culture aligning with the business objectives can boost the performance in aspects such as digitalization and IT governance (Chatman et al., 2014).

Currently most of the organizations are dealing with different challenges regarding digitalization and IT governance performance is one of the top issues considered by managers in digitalization (Hansen and Sia, 2015).

Over the past years, a fast evolution of technology use has occurred in organizations. Specifically the organizations are increasingly getting interested in using collaborative technologies in order to improve their performance. The organizations are collaborating globally and through complex struc-

tures. Therefore the concept of IT governance in such organizations will be also complicated to be identified.

Dahlberg and Helin (2017) indicate that the IT governance practices today are operated with limited resources specifically the resources that can motivate cooperation. According to Dahlberg and Helin (2017), IT governance research should consider the inter-organizational contexts.

According to Janićijević (2013), the two concepts of organizational culture and structure are used as variables in the research for explaining various phenomena in organizations. However, there is a lack of research on understanding the influence of organizational culture and structure on IT governance" (Aasi, 2016, p. 37).

Organizational culture and structure are among the inter-organizational contexts that can affect the IT governance in an organization. Thus this research focuses on deep understanding of the influence of organizational culture and structure on IT governance performance and implementation.

3 Research Methodology

This chapter describes the methodological approach used in this research. There are of course, many different available research methods, and a researcher should choose the method that is most suited to the topic and the research questions. This chapter begins by briefly introducing various existing methods, and continues by explaining the method found to be most suitable for this research. An introduction is given to the topics of qualitative research in information systems, case study research, semi-structured interviews for data collection, thematic analysis and the concepts of triangulation, and an explanation of how these are used at the different stages of this research. Four different case studies are used in this research. These cases and the sites at which, data were collected are introduced, and a description is given of when and how the case studies were performed. The conceptual framework used in each part of the research is also described. Later in this chapter, the process used to analyze the data is explained and some examples of thematic analysis for each case are provided; more details about this analysis are provided in Chapter 4, and also in the published papers in Appendix 4. At the end of this chapter, the validity and reliability of this research and the ethical considerations are discussed.

This chapter is partly based on the Licentiate thesis published by the author (Aasi, 2016).

3.1 Research Design

The research presented in this thesis starts with a systematic literature review of IT governance and culture, carried out using two different literature reviews. The previous literature with main focus on IT governance and culture was reviewed from the two perspectives of research and practice.

In the next step, four different case studies were performed to answer the main research question. In these case studies, semi-structured interviews and internal documents were used as different sources of data. The collected data was analyzed qualitatively using the thematic analysis. Through these case studies and the analysis of the collected data, both sub research questions

(SRQ 1 and SRQ 2) were answered. The details of the research process activities are explained in the following sections.

There are numerous ways to classify research methods. One way to classify research methods is distinguishing between quantitative and qualitative research methods.

The quantitative research method has its origins in natural sciences. Laboratory examinations, formal methods, numerical analysis and mathematical modelling are common quantitative methods that are used for studying natural phenomena (Myers, 2009).

Qualitative research methods on the other hand were developed to study cultural and social phenomena (Myers, 2009). Social science researchers are the primary users of this category of research methods. The most common qualitative research methods are case studies, action research, and ethnography.

This research has selected to use the qualitative method. This method is aligned with the main research question of this research. A qualitative approach is used in this research, since a qualitative study is more likely to obtain unexpected information than the quantitative approach, which is more structured and detailed from the beginning (Myers, 2009). Additionally, previous research studies within the similar field have commonly used the qualitative method and state that this method is the most suitable method when studying organizational issues in the field of IS.

By conducting a literature review on the previous research in culture and IT governance, it was found that qualitative research method is the most used method by them (for example look into: Cormack et al., 2001; Janssen et al., 2013; Satidularn et al., 2012; Wilkin & Campbell, 2010; Willson & Pollard, 2009; Zhong et al., 2012). This provides credibility for selecting this method in this research too.

3.1.1 Case Study Research

Case study research method is the most widely used qualitative method in the field of IS (Myers, 2009, Orlikowski and Baroudi, 1991, Alavi and Carlson, 1992). According to Yin (2013), a case study involves researchers examining a current phenomenon in its real-life context. The researchers are aware that the phenomenon is strongly dependent on its specific context, and that the same phenomenon in a different context may therefore produce different results for the study.

Case study research is an appropriate choice in an organizational context where the authors' creativity should be used to interpret the existing envi-

ronmental issues to understand complex processes and events (Benbasat et al., 1987; Myers, 2009).

The reasons making the case study method being selected as the most suitable method for the current work are explained in the next section.

Myers (2009) indicates that case study as a research method is used wide-ly in the fields of business, business management and information systems research.

According to Yin (2013), case study is a method suitable to be used in situations when the research has questions about "how" or "why" and when we have no control over the studied situation. In this research we have the following research questions:

SRQ 1: *How do different types of organizational culture influence IT governance performance?*

SRQ 2: *How is organizational structure related to IT governance perfor-mance and IT governance implementation?*

Through these research questions we are seeking to understand a phe-nomenon by deeply investigating several different aspects of it. According to Yin (2013) a case study is a good choice of method when a researcher is seeking a deep understanding of a phenomenon, which is dependent on dif-ferent factors and cannot be measured through pre-defined metrics. Through SRQ1 and SRQ 2, we want to understand the influence of organizational culture and structure on IT governance performance of the organizations.

We do not have control over the organizational culture and structure in different organizations and how it influences their IT governance perfor-mance. This phenomenon is also different in each organization and needs deep investigation and study of the situation in each specific organization. Additionally SRQ 1 and SRQ 2 are about the topic in the field of business management and information systems and as mentioned above, Myers (2009) finds the case study method a suitable method for studies in these fields.

Therefore the case study method sounded the most appropriate method to answer our research questions SRQ 1 and SRQ 2.

Case studies can implicate either single or multiple cases and use various levels of analysis (Yin, 2013). Denscombe (2014) also states that a case study research focuses on different illustrations of a specific phenomenon in its real context and uses different data sources to describe the phenomena.

There are a number of studies using case study and qualitative analysis of data exploring IT governance (for instance: Cormak et al., 2001; Janssen et al., 2013; Satidularn et al., 2011; Wilkin and Campbell, 2010; Willson and Pollard, 2009; Zhong et al., 2012). These studies provide credence for se-lecting this method for addressing this research question.

3.1.2 Data Collection

There are different data collection techniques that are used in each of the above mentioned qualitative research methods. The case studies can accommodate different methods of data collection for instance; a mixture of questions, interviews, archives, surveys and observations may be used in one single study. According to Myers (2009), interviews are typical techniques for data collection in the case study research.

The evidence may be qualitative (e.g., voice or records, words and figures), quantitative (e.g., numbers and diagrams) or a combination of both qualitative and quantitative data (Eisenhardt & Graebner, 2007; Myers, 2009). Data or empirical material in qualitative research can include sources such as company documents, reports, letters, e-mails, website, PowerPoint presentations, news articles and flyers (Myers, 2009). Researcher can collect the empirical data and that is not published elsewhere (primary data) or the data can be collected through secondary sources that are published previously (secondary data).

3.1.3 Data Analysis

There is not one specific data analysis approach suitable for every method. The researchers need to decide on the data analysis method according to the nature of topic, research question, research method and the data collection.

In this research the thematic analysis method is selected for analyzing the data collected for the case studies. "Thematic analysis is a method for identifying, analyzing and reporting patterns and themes within the data" (Braun and Clarke, 2006, p. 6).

In this research we use the "deductive thematic analysis". As Braun and Clarke (2006) discuss, the thematic analysis can be done in either ways of inductive or deductive. In an inductive way of thematic analysis, the researcher defines the themes with strong linkage to the collected data themselves. In an inductive way of data analysis therefore, during the data coding process, the researcher does not use any pre-defined coding frame and does not try to fit the collected data to such a framework.

In the deductive or some may call it theoretical thematic analysis in contrast, the researcher has an analytical interest in the area and seeking for the data in that area. The researcher pays attention to the previous research on the topic and even a pre-defined theoretical frame can be used for deriving the codes and categorization. In a deductive way of thematic analysis, the researcher is interested in chasing for the codes among the data that are focusing on a particular topic and not all parts of the data.

According to Braun and Clarke (2006), when the research is aiming to answer a specific research question that maps with a theoretical approach, then the deductive way of thematic analysis is more suitable. We selected the deductive way of thematic analysis in this research since the research questions SRQ 1 and SRQ 2 are focusing on a very specific topic derived from the knowledge gaps found in the previous research. Therefore the data should be collected and analyzed in a way that they addressed precisely to those research questions. We take even one step further in this research in regards to the deductive way of analysis and we defined a conceptual framework in each research activity before collecting and analyzing the data.

We made this conceptual framework based on the previous literature in IT governance and organizational culture and structure. This framework was used for coding the collected data, defining the themes and writing the data analysis.

Thematic analysis of the data can be done in six iterative steps. These six steps include: "1) Familiarizing yourself with your data, 2) Generating initial codes, 3) Searching for themes, 4) Reviewing themes, 5) Defining and naming the themes, 6) Producing the report" (Braun and Clarke, 2006, p. 16).

In this research all the interviews were recorded, transcribed and analyzed thematically. The categorization of the initial codes was mainly based on the concepts of virtual networks (Hertal et al., 2005), IT governance performance (Weill and Ross, 2004; Van Grembergen and De Haes, 2009) and organizational culture dimensions (Cameron and Quinn, 2011).

3.2 Research Processes

The research processes are described in this section. The research processes explains different activities in this research, the relevant research question, the applied research method and the supporting research papers published by the author. As said earlier in the introduction section, the research questions are as follows:

SRQ 1: *How do different types of organizational culture influence IT governance performance?*

SRQ 2: *How is organizational structure related to IT governance performance and IT governance implementation?*

Like any other research, this research is also based on some theoretical foundation. To find the theoretical foundation, we did two literature reviews. The literature reviews aimed to find and review the previous literature that investigate on culture and IT governance as their main concern and find the gaps in the field. The literature reviews considered both practical and re-

search perspective of IT governance. Through the literature reviews and gap finding the continuing path for this research was also identified. As the next step, four case studies were performed to respond to the research questions one to three. Table 3 represents the research processes and the relevant research questions.

Table 3. Research processes related to the research questions

Addressed research question	Applied research strategy	Supporting research papers
Research Process 1: Literature Review		
SRQ 1	Literature reviews 1 and 2	RP 2, RP 3, RP 10*, RP 11* and RP 14*
Research Process 2: Case Study		
SRQ 1	Case study 1	RP 5, RP 6
SRQ 2	Case study 2	RP 4
SRQ 2	Case study 3	RP 7
SRQ 1	Case study 4	RP 1, RP 8*

As shown in Table 3, for addressing the research questions the literature reviews were performed first to find out the gaps in the literature in the role of organizational culture in IT governance. Since this is a new topic there is scarce research performed in it. As the second research process, there are different case studies performed to respond to each research question. This is in order to provide a holistic view on the complicated concept of organizational culture and structure and its relationship with IT governance. Through different cases in different public and private organizations, this research provides an overall insight on how the organizational culture and structure in different organizations influence the IT governance performance. The sections below describe each research activity.

3.2.1 Research Process 1: Literature Review

Research process 1 includes two different literature reviews performed on the influence of culture on IT governance.

We also performed a literature review on organizational structure. The organizational structure concept is linked with the organizational culture (Janicijevic, 2013). Therefore in chapter 2 (research background) we have presented a number of papers that focused on organizational structure and IT governance that are important for the results of this thesis.

Different perspectives were used in each of the literature review. The first literature review was done taking a research perspective on IT governance and the second literature review was done taking a practical perspective on IT governance. Therefore through the literature reviews, the IT governance was approached from both research and practice perspectives. Through the research perspective, IT governance structures, processes and relational mechanisms introduced by Van Grembergen and De Haes (2009) were studied. Through the practice perspective, the five focus areas of IT governance introduced by ITGI (2003) were studied. The approach for performing the literature reviews is concept centric in that the lens for organizing the literature is based on the concepts introduced in the reviewed papers (Webster & Watson, 2002).

The literature review activity was performed through the following steps: 1) identifying keywords, 2) finding the literature examining the topic, 3) selecting and filtering the relevant studies, 4) organizing the findings, 5) summarizing the findings from literature and categorizing them (Creswell, 2011).

Also for searching the pertinent article, the six-step technique suggested by Punch (2014) was used: 1) Using Boolean logic for key terms, 2) Using phrase searching, 3) Using proximity operators, 4) Using truncates and wildcards, 5) Determining database fields, 6) Limiting searches

3.2.1.1 Literature Review 1: Culture and IT Governance Using the ITG Framework of Van Grembergen and De Haes (2009)

This research activity was the start point for this research. The purpose of this research activity was to find the previous literature studying the role of culture in IT governance. The literature review was performed through the systematic literature review steps explained in section 3.2.1. In this literature review the focus was on the IT governance framework of structures, processes and relational mechanisms introduced by Van Grembegen and De Haes (2009).

Table 4 represents the steps through which this literature review was conducted.

Table 4. Literature review 1, research activity steps.

Literature review 1	
Research activity steps	**Details**
Keywords selection	Combination of the keywords: IT governance, IT management, culture, processes, structure, and mechanisms.
Literature database search	Databases: Business source premier, Science direct, IEEE explore, AISeL and ACM digital library. Peer reviewed journals and conferences such as: MISQ, MISQE, IJITBAG, IJIS, ICIS, PACIS and HICSS.
Defining the literature review inclusion criteria	Papers with the significant focus on the culture and IT governance processes, structures or mechanisms.
Selecting papers to include in the review	Eight papers were selected for review. (RP 3 in Appendix 4)
Full text evaluation, categorization and gap finding	Findings from the papers were categorized through the lens of influence of culture on the elements of the IT governance framework of structures, processes and relational mechanisms introduced by Van Grembergen and De Haes (2009) and the gaps were identified.

As shown in Table 4, the first step to perform the research activity of literature review was defining the keywords. The keywords mentioned in Table 4 are only a sample of the keywords used in this study. These keywords were used together with some other keywords through different AND/ OR combinations. The keywords were selected according to the literature used for this study. Other keywords used are: IT standards, IT governance frameworks, clan culture, adhocracy, control, hierarchy, market, business flexibility and performance.

The search databases, journals and conferences for research articles were selected according to the databases mainly used in the IS research and suggested in different literature. In order to prevent having an unmanageable number of articles with limited value, we decided to bind the sample articles to those significantly investigating both culture and IT governance.

More details about the literature review in research activity 1 are presented in RP 3 in Appendix 4.

3.2.1.2 Literature review 2: Culture and IT Governance Using ITG Five Focus Areas from ITGI (2003)

In this research activity the literature on culture and IT governance was reviewed with a practice point of view and using the five focus areas of IT governance introduced by ITGI (2003).

Table 5 represents the steps through which this literature review was conducted.

Table 5. Literature review 2, research activity steps.

Literature review 2	
Research activity steps	**Details**
Keywords selection	Combination of the keywords: IT governance, performance, culture, organizational culture, IT value, IT resource management, business-IT alignment and IT risk management.
Literature database search	Databases: Business source premier, Science direct, IEEE explore, AISeL and ACM digital library. Peer reviewed journals and conferences such as: MISQ, MISQE, IJITBAG, IJIS, ICIS, PACIS and HICSS.
Defining the literature review inclusion criteria	Papers with the significant focus on the culture and IT governance five focus areas.
Selecting papers to include in the review	Fifteen papers were selected for review. (RP 2 in Appendix 4)
Full text evaluation, categorization and gap finding	Findings from the papers were categorized through the lens of influence of culture on each of the five focus areas of IT governance introduced by ITGI (2003).

As shown in Table 5, the first step to perform the research activity of literature review was defining the keywords. The keywords mentioned in Table 5 are only a sample of the keywords used in this study. These keywords were used together with some other keywords through different AND/ OR combinations. The keywords were selected according to the literature used for this study. Other keywords used in this literature review included: ITGI, leadership, strategic alignment, organizational factors, values, believes, IT department and IT governance implementation.

The search databases, journals and conferences for research articles were selected according to the databases mainly used in the IS research and sug-

gested in different literature. In order to prevent having an unmanageable number of articles with limited value, we decided to bind the sample articles to those significantly investigating both culture and IT governance.

More details about the literature review in research activity 1 are presented in RP 2 included in Appendix 4.

Research process 1 provided the results from two literature reviews on the influence of culture on IT governance from both research and practice points of view. Literature review 1 provided a review on eight papers in culture influence on IT governance using the IT governance framework of structures, processes and relational mechanisms. In this way literature review 1 used a research point of view and found the gaps in the area. Literature review 2 provided a review on fifteen papers on organizational culture influence on IT governance using the IT governance five focus areas including IT values delivery, IT resource management, IT risk management, Business-IT alignment and performance measurement. In this way literature review 2 used a practical point of view and found the gaps in the area.

After finding gaps from the literature review, the case studies were performed in four different cases to empirically investigate the influence of organizational culture and structure on IT governance performance.

3.2.2 Research Process 2: Case Study

In this research process, the case study research method steps introduced by Yin (2013) are used.

Case Studies 1 to 4

Four case studies in four different organizations were performed in this research during the years 2014 till 2017. The aim of these case studies were respond to the research questions and provide empirical knowledge to the field of IT governance. Table 6 summarizes the information about each case.

For the sake of confidentiality of the companies' data, the first three cases are respectively called with the anonyms names of *SwedCon, IHS and Company A*. We were allowed to announce the name of the last case, which was *Cemex*.

Table 6. Information of the four cases used in this research.

	Case study 1	Case study 2	Case study 3	Case study 4
Company	SwedCon	IHS	Company A	Cemex
Organization type	Private	Public	Private	Private
Core business	Construc-tion and architecture	Education and Re-search	Construc-tion	Ready-mix Concrete
Number of employees	42000	500	18000	44000
Year of studies	2014-2015	2016	2013	2016-2017
Published pa-pers	RP5 and RP6	RP4	RP7	RP1

As described in Table 6, three cases organizations were private and one organization was public. Each of the four organizations had different core businesses. All four cases were large organizations. Three out of four were globally working organizations and one was a local research and education organization (the public organization). All four cases had been operating for over 15 years and had between 500 and 44000 employees. Moreover all of these organizations had their own IT departments that were the main site for data collection in this study.

3.2.2.1 Case Study 1: The Influence of Organizational Culture on IT Governance Performance

In the first study, the focus was on the role of organizational culture in IT governance performance. We employed a case study of the IT department of a single construction company. The studied case is the IT department of a large construction company headquartered in Sweden, anonymously called ITS in this research. A conceptual framework was used in this study to conduct the interview questions and perform the data analysis. This conceptual framework is shown in Figure 4.
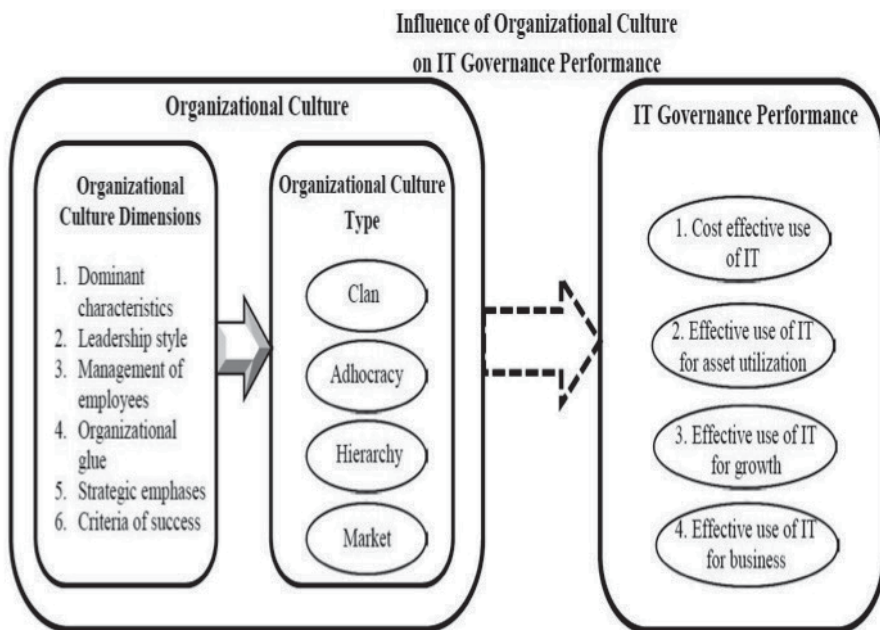
Figure 4. Research conceptual framework for influence of organizational culture on IT governance performance (Aasi et al., 2014)

As represented in Figure 4, the organizational culture types introduced by Cameron and Quinn (2011) and the IT governance performance outcomes introduced by Weill and Ross (2004) are used in this conceptual framework. These concepts are the base to investigate the role of organizational culture in IT governance performance in this study. This case study was conducted to address SRQ1 that seeks to find out "How do different types of organizational culture influence IT governance performance?" This case study resulted in publishing papers RP5 and RP6. The steps taken through this case study are described in Table 7.

Table 7. Case study 1, research activity steps.

Case study 1	
Research activity steps	**Details**
Preparing the theoretical background	Considering SRQ 1, the literature on IT governance performance and organizational culture were reviewed.
Selecting the literature to use	IT governance performance objectives from Weill and Ross (2004) and organizational culture assessment dimensions from Cameron and Quinn (2011) were selected to create the research conceptual framework.
Case selection	A large construction company headquartered in Sweden with an IT department of over 220 employees (SwedCon).
Data collection preparation	Interview questions guide were made (Appendix 2). Request for authorization and the interview information were sent to the interviewees.
Data collection	Ten semi-structured interviews with IT managers and business liaisons (Appendix 1, Table of interviews).
Data analysis	Thematic analysis of the interviews data (Appendix 3) and triangulation between data from interviews and other sources of data provided by the company (RP 5 and RP 6 in Appendix 4).

3.2.2.2 Case Study 2: IT Organizational Structure Relationship with IT Governance Performance

In the second case study the research investigated on finding how suitable is the IT organizational structure in relation with IT governance performance in a public organization. This case study had the IT governance performance concept on one side and on the other side pursued to find how the IT organizational structure needs to be designed to evolve the IT governance performance. This case study was performed in a public organization acting as an education and research institute (anonymously labeled IHS). This organization has over 500 employees and has it own IT department. In this case study a conceptual framework was used to direct the case study and analyzing the data. Figure 5 illustrates the conceptual framework used in this case study.
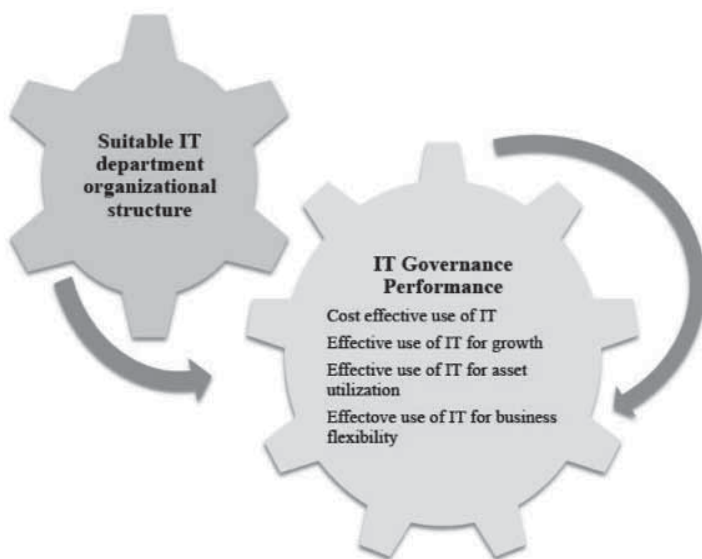
Figure 5. Research conceptual framework for IT organizational structure in relation to IT governance performance (Aasi et al., 2017).

As represented in Figure 5, the four IT governance performance objectives introduced by Weill and Ross (2004) are used to explore IT governance performance. This case findings are in line with addressing SRQ2 that seeks to find out "How is organizational structure related to IT governance performance and IT governance implementation?" This case study resulted in publishing RP 4. The steps taken through this case study are described in Table 8.

Table 8. Case study 2, research activity steps.

Case study 2	
Research activity steps	**Details**
Preparing the theoretical background	Considering SRQ 2, the literature on IT governance performance and organizational structure were reviewed.
Selecting the literature to use	IT governance performance objectives from Weill and Ross (2004) were used to assess the IT governance performance in relation with IT organizational structure.
Case selection	An education and research organization in a developing with over 500 employees were selected as the case site (IHS).
Data collection preparation	Interview questions guide were made (Appendix 2). Request for authorization and the interview information were sent to the interviewees.
Data collection	Four semi-structured interviews were performed in focus groups including the IT managers and research project leaders (Appendix1, Table of interviews).
Data analysis	Thematic analysis of the interviews data (Appendix 3) and triangulation were done between data from interviews and other sources of data provided by the company (RP 4 in Appendix 4).

3.2.2.3 Case Study 3: Organizational Structure Supporting IT Governance Implementation

The research in the third case study focused mainly on the organizational structure changes while implementing IT governance practices. The case study was conducted in a large construction company (anonymously called Company A) working globally and headquartered in Sweden. The IT governance practices applied in this specific project are studied through the lens of ISO/IEC 38500:2008 to discover how they are related to the principles of this standard and the organizational structure around it. The company was running an IT governance project (ITP) as part of a larger development project started in 2008, when Company A defined a new set of strategic objectives for 2012. The aim of the ITP project is to have an effective process line for production resulting in a reduced cost of production. To achieve this target, the customers end value has been increased by the company and this is done through enhanced use of the resources. At the same time, the com-

pany improved the products' qualities. Through the application of these changes, the organization reached a more competitive position in the market. This case was performed to respond to the SRQ 2. As explained earlier, SRQ2 seeks to find out "How is the IT organizational structure related to the IT governance performance?". In order to response to this research question, first it should be understood how the organizational structure needs to be adapted with IT governance implementing in an organization. The steps to perform this case study are described in Table 9. This case study resulted in publishing RP7.

Table 9. Case study 3, research activity steps.

Case study 3	
Research activity steps	**Details**
Preparing the theoretical background	Considering SRQ 2, the literature on IT governance and organizational structure were reviewed.
Selecting the literature to use	ISO 38500 framework of IT governance were used as the lens for IT governance implementation at the firms.
Case selection	A large construction company headquartered in Sweden was selected as the case site (Company A).
Data collection preparation	Interview questions guide were made (Appendix 2). Request for authorization and the interview information were sent to the interviewees.
Data collection	Six semi-structured interviews were performed with IT and business managers (Appendix1, Table of interviews).
Data analysis	Thematic analysis of the interviews data (Appendix 3) and triangulation were done between data from interviews and other sources of data provided by the company (RP 7 in Appendix 4).

3.2.2.4 Case Study 4: The Influence of Organizational Culture of Virtual Networks on IT Governance Performance

The research in case study four aimed to explore the influence of different organizational culture types on the IT governance performance in an organization with different virtual networks. This case, which was the last case study in this research, was performed in a very large company called Cemex with the core business of ready-mix concrete. Approximately 44000 employees work at Cemex all around the world. Cemex has a complex organi-

zation in which 11 different global virtual networks work together. Each of the Cemex global virtual networks has distinctive leadership and organizational culture. Through this case we aimed at finding out how each type of organizational cultures are promoted in each network based on the network IT governance performance precedence. A conceptual framework was used in this case study to direct the study and analysis of the data. Figure 6 represents the conceptual framework and the scope of the research.
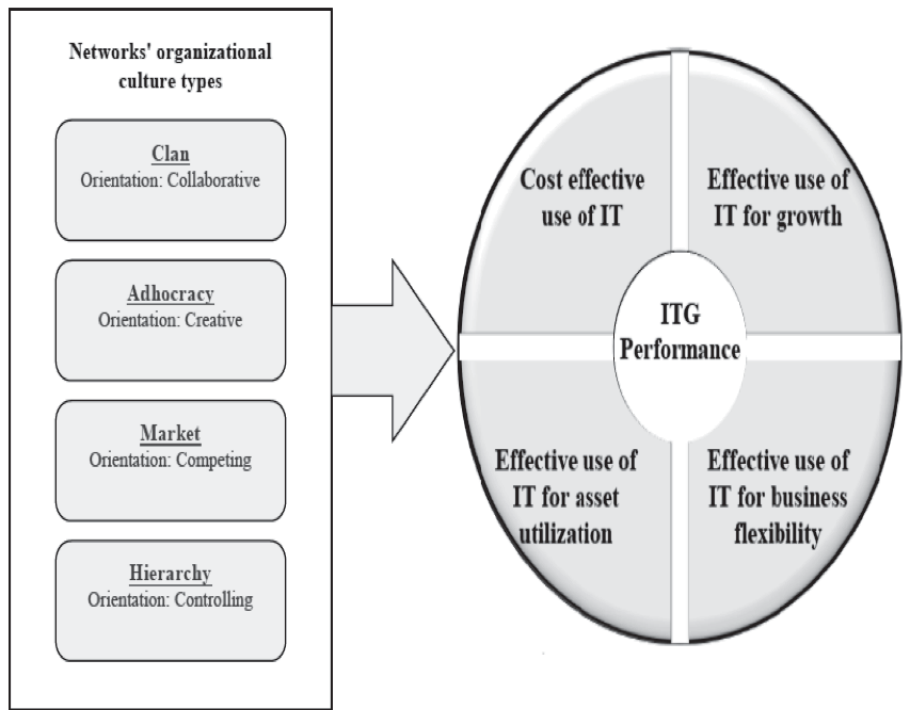
Figure 6. Research conceptual framework, networks organizational culture types influence on IT governance performance of the organization networks (Aasi et al., 2018).

As shown in Figure 6, the four objectives of IT governance performance introduced by Weill and Ross (2004) are used to explore IT governance performance. The four types of organizational culture in OCAI model introduced by Cameron and Quinn (2011) are also used to describe the organizational culture in this case. The case study at Cemex provided empirical data in addressing SRQ1 seeking to understand " How does the organizational culture influence the IT governance performance in different organizations?" This case study resulted in publishing papers RP1 and RP8. The steps taken through this case study are described in Table 10.

Table 10. Case study 4, research activity steps.

Case study 4	
Research activity steps	**Details**
Preparing the theoretical background	Considering SRQ 1, the literature on IT governance performance and organizational culture were reviewed.
Selecting the literature to use	IT governance performance objectives from Weill and Ross (2004) were used to assess the IT governance performance and the OCAI model from Cameron and Quinn (2011) were used to asses the organizational culture in collaborative networks.
Case selection	A large multinational company producing ready-mix concrete with global virtual collaborative networks were selected as the case site (Cemex).
Data collection preparation	Interview questions guide were made (Appendix 2). Request for authorization and the interview information were sent to the interviewees.
Data collection	Eleven semi-structured interviews were performed with the IT managers and heads of the global virtual collaborative networks (Appendix 1, Table of interviews).
Data analysis	Thematic analysis of the interviews data (Appendix 3) and triangulation were done between data from interviews and other sources of data provided by the company (RP 1 in Appendix 4).

3.2.3 Data Collection: Interviews and Documents

The main source of data collection in the case studies was the interviews with the managers in the studied organizations. In this research the data was collected through the semi-structured interviews. According to Yin (2013), semi-structured interviews are very well aligned with the case study research as it provides in depth data about a phenomenon. The semi-structured interviews questions allow the respondents to talk freely about their experiences (Runeson et al., 2012). In semi- structured interviews, there is a guide for asking questions. However based on the answers of the respondents, the interviewers are allowed to make questions other than the predefined ones in the interview guide (Johannesson and Perjons, 2014).

In this research, we performed a total number of 31 interviews for data collection in four case studies. The respondents of the interviews were mainly the top and middle managers in the studied organizations. The interviews ranged from 50 to 90 minutes in length and were recorded. The interviews were in English or translated to English by the author. Appendix 1 presents the information about the interviews done in this research. The interviews were semi-structured and an interview guide was used at every interview. The questions in the interview guides were made according to the research questions and the conceptual framework used in each case study. The interview guides are included in Appendix 2.

In addition to the data from the interviews, there were other sources of data used for the analysis in all four case studies. The additional sources of data have included the internal documents from the firms such as reports, presentations, brochures, website and public information. A triangulation was performed between interviews data and the documents provided by the companies. Different sources of data were compared and cross- checked. The internal documents were also used to interpret the interviews and also different diagrams and reports from the companies were used in creating some figures and tables in this research showing the organizational structures, organization plan, results and IT governance outcomes.

3.2.4 Data Analysis: Thematic Analysis

Using thematic analysis, all the data collected both from the interviews and the organizations' documents were analyzed. Following the six steps of thematic analysis introduced by Braun and Clarke (2006) we performed a thematic analysis for all the case studies. These six steps were described earlier in Section 3.1.4.

The first step defined by Braun and Clarke (2006) was familiarizing with the data. At this step we recorded, translated (if needed) and transcribed the interviews. The other sources of data such as organizations' documents, slides and reports were also categorized.

Through the second step we generated the initial codes. This step was done by finding codes from the conceptual framework defined in each case study and from the literature used in each case.

The third step was searching themes, through which we searched for the themes from the interviews and also other sources of data that were matching with the conceptual framework of the case studies. The themes searched for were the ones describing issues such as the IT governance in the organizations, IT governance performance, IT governance priorities, organizational structure, organizational culture, different cultural values, communication and expectations from IT department employees. In case study 1 (SwedCon)

after the author defined the codes and themes, a qualitative analysis software (Nvivo 10) was also used for finding those themes from the transcribed interviews. However the results from Nvivo 10 were not enough for the complete analysis of a complicated topic such as ours (organizational culture and structure influence on IT governance). Therefore the analysis of the data in this research is interpreted by the researcher.

In the fourth step, these themes were reviewed and changed where necessary by listening to the interviews again and rereading the internal documents. At this step extra connections with the interviewees were made and more discussions were made with the interviewees and a draft of the analysis was also sent to the interviewees.

Steps five and six involved the categorization, labeling and organization of the analyzed results, and the production of the report. As part of the analysis, several direct quotes from the interviewees were also used (see Appendix 3).

3.3 Research Validity and Reliability

Since the main research method used in this research is the case study, the validity and reliability of this research is mainly concerned with the case study validity and reliability. There are logical tests specially defined to assess the quality of any research. Regarding the case study research, Yin (2013) suggests four tests that are often used for the empirical social research quality evaluation. Case studies carried out can be grouped among the empirical social research mentioned by Yin (2013), therefore those four tests are considered for testing them. The four quality tests are named: *construct validity, internal validity, external validity and reliability*. The following sections explain how each of these tests was applied for each part of this research.

Construct validity deals with developing correct sets of measures for the concept that is being studied (Yin, 2013). This is about a credible way of conceptually interpret the data and applying the concepts in the study. He also suggests three different strategies to help the researchers in addressing the constructive validity in case studies. These three strategies are: *"using multiple sources of evidence", keeping a chain of evidence, key informants review the case study report"* (Yin, 2013, p. 38). The following sections explain how each of theses three strategies were applied in the case studies performed in this research.

Using multiple sources of evidence were applied through different channels of data collection in each case study. Multiple sources of evidence in this research included: data collected through semi-structured interviews

(recorded and transcribed), focus groups, data from pre-interview meetings with the interviewees, filled questionnaires and scoring tables by the interviewees for IT governance performance and organizational culture, brochures, internal reports and documents and presentations provided by the companies' managers. Triangulation was also conducted using the above-mentioned sources of data to provide more credibility to the results.

Keeping a chain of evidence was applied in this research through which all questions and data were linked with the conceptual frameworks in the case studies and this was followed when doing the thematic analysis of the data. Categorization and presentation of the analyzed results were also done following this path. In all four case studies, the research questions and concepts can be traced in the discussion and conclusions with evidence provided from the collected data.

Last but not least, the triangulation concept is a significant element in this research. Triangulation suggests studying a specific focus subject from numerous viewpoints (Runeson et al., 2012). To increase the reliability of this research and its data collection collected data, several managers were selected for interviews. These managers were in the companies in different IT and business positions related to the area of research. These data were used together with the internal documents provided by the companies to gain a more holistic and balanced view of the cases. The analysis of the data was also done through specified steps introduced by Braun and Clark (2006) and the results were double-checked with the interviewees. The results from the NVivo 10 software for qualitative data analysis were used in case study 1 as a complementary analysis tool. The software produces the same results with the same input data.

Key informants review the case study report was also applied in this research. The case studies 1 to 4 were performed by interviewing the IT and business managers of each company that were completely aware of the companies' situation. Additionally, after each case study report was written, it was sent to the interviewees from the companies involved in each case study and they confirmed it. Finally all four case studies done in this research resulted in published papers including: one journal paper (RP 1), one book chapter (RP 4) and two conference (RP 5 and RP 6). Therefore, informant research reviewers reviewed all case studies too.

Internal validity is the internal designing of research and causal relations. In all four case studies performed in this research, there was a conceptual framework defined by the researcher before making the case study. This conceptual framework was created based on the research question seeking to answer. In case studies 1 and 4 (research process 2: research activities 1 and 4), the research question was on the role of organizational culture in IT gov-

ernance performance (SRQ 1). The conceptual framework in these case studies was defined based on the concepts of IT governance and IT governance performance defined by Weill and Ross (2004) and concepts of organizational culture and OCAI model defined by Cameron and Quinn (2011). These conceptual frameworks were used as the research lens through which the data were collected, sorted and analyzed. The themes created based on these conceptual frameworks for all four case studies and the sample interview extracts related to them are presented in Appendix 3.

Also for the case studies 2 and 3 (research process 2: research activities 2 and 3) with the research question regarding the relation of organizational structure and IT governance (SRQ 2), conceptual frameworks were created in order to apply the concepts and direct the study according to those concepts. The conceptual framework in case study 2 was created based IT on the organizational structure definition of Pearlson and Saunders (2013) and IT governance performance assessment of Weill and Ross (2004). In case study 3, the conceptual framework was based on the IT governance principles and processes of ISO/IEC 38500 and organizational structure definition of Pearlson and Saunders (2013).

External validity is mostly concerned with the generalizability of a study. According to Yin (2013), the findings from a single case study can be generalized to some extent. This applies to the findings of this research too. However the findings are specific for that case and its specific conditions. If the conditions change in another case, the results may be different. In this research some of the findings were similar in different cases. For instance in both case studies 1 and 4, it was found that the adhocracy organizational culture is desired when the organization is seeking to improve the IT governance performance outcome of effective use of IT for growth.

Reliability of the research demonstrates whether the study can be repeated in terms of data collection and get the same results. Reliability concerns if a future researcher repeats the same procedure using the same concepts, can gain the same results and extract the same conclusions (Yin, 2013). Reliability in a research aims to reduce the errors and ambiguity as much as possible. The reliability in this research is considered by using conceptual frameworks with reference to the previous literature. A proper systematic literature review were performed in the starting phase of this research to make sure the knowledge gap is selected precisely. This literature review also guided us to choose the most appropriate IT governance, organizational culture and organizational structure concepts to use for formulating the conceptual frameworks for the case studies.

In this research all of the activities performed in each part of research process are documented. In case studies 1 to 4, there was an interview guide

created before the interviews were performed (Appendix 2). All interviews were recorded and transcribed and analyzed, using the thematic analysis. The thematic analysis sample tables are included in Appendix 3. In this way the future researchers are able to follow the same procedure to repeat each case study (Yin, 2013). Of course in the cases with the organizational culture focus, the results may change in the future since organizational culture has a dynamic nature (Schein, 2010). It is worthwhile to mention that case studies 1 to 4 resulted in published papers (RP1, RP 2, RP 4 and RP 7). These published papers were peer-reviewed and discussed with academic community through journal reviewing processes and discussions in academic conferences. The results presented in this thesis are reliable and in line with other researchers' work. The methods used in this thesis are also relevant to the research aim.

3.4 Ethical Consideration

In case study research, the main ethical consideration concerns the confidentiality of data and the anonymity of research participants (Stake, 2003).

This research is using case study research method; thus the ethical considerations in this research mainly relate to the confidentiality of the information provided by the organizations within which case studies 1 to 4 were performed. The confidentiality of the data and the anonymity of the participants are carefully protected in this research as explained below.

Firstly, the participants in the interviews for all case studies were voluntarily participating in this research. They were contacted in advance and interviews were only performed after they agreed to participate.

Secondly, the anonymity and confidentiality of the participants was protected in this research. An authorization agreement was made between the researcher and the interviewees before the interview were performed. In all case studies (SwedCon, Company A, IHS and Cemex), it was agreed that only the author (Parisa Aasi) would be able to use the data arising from the interviews and documents. The use of pseudonyms for the organizations was also agreed and the interviewees' names were not revealed. Interviewees' positions are included in the thesis, but without mentioning any names. Only in the fourth case study (Cemex), the company permitted the author to publish the name of the company but not the interviewees' names.

Thirdly, after conducting each of the four case studies, the results were sent to interviewees, who confirmed them.

Finally the thesis was reviewed several times. The use of previous research was done with full citations and the referencing.

4 Results

This chapter presents a summary of results of this research. These results in more detail are presented in RP 1 to RP 7, which are included in the Appendix 4 of this thesis. In this chapter, the results are sorted according to the relevant research activities for each research process described in the methodology chapter. These results provide answers to the research questions.

4.1 Results of Research Process 1: Literature Reviews

This research activity aimed to identify the previous literature on IT governance and culture from the perspective of both research and practice. The results of this research activity answer SRQ 1: *How do different types of organizational culture influence IT governance performance?*

4.1.1. Results from Research Process 1, Literature Review 1

➢ *Research question*
The first literature review focused on addressing SRQ 1: *How do different types of organizational culture influence IT governance performance?* This first literature review takes a research perspective.

➢ *Conceptual framework*
The IT governance framework of processes, structures and relational mechanisms by Weill and Ross (2004) was the base for the conceptual framework used in this literature review. The conceptual framework provided directions on selection criteria for papers to be reviewed. The conceptual framework was also used as the lens for categorization the findings from literature.

➢ *Literature search strategy*
The literature review aimed to identify papers that had their main focus on both topics of culture and IT governance. Relevant research databases

were searched using different searching strategies and keywords (details are presented in Table 4 in Section 3.2.1.1).

After searching for the papers in relevant databases, journals and articles, there were 220 papers found in the first hit. Then the duplications were removed. After reading the abstract and relevancy assessment, there were 23 papers left. After that the full text review of those 23 papers was done. After checking the candidate papers through the selection criteria, 8 papers were found that had the culture influence on at least one of the IT governance framework components as their research focus.

➤ *Papers*
Paper RP 3, RP 11 and RP 14 are grounded on this literature review and present the findings from it.

➤ *Results*
The 8 papers identified though the literature search strategy are presented in Figure 7 specifying the categorization of these 8 papers according to the IT governance framework of processes, structure and relational mechanisms.
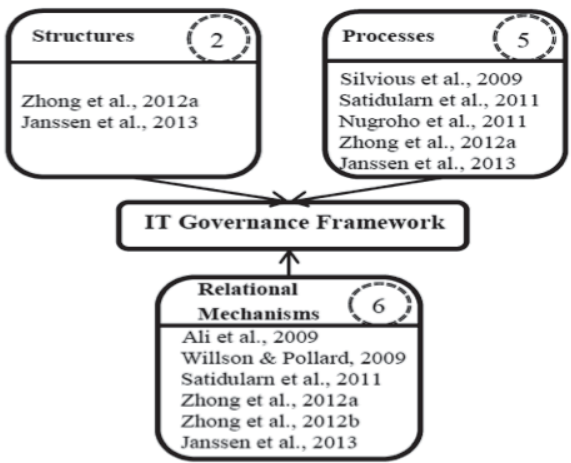
Figure 7. Categorization of the eight papers reviewed on culture and IT governance framework of processes, structures and relational mechanisms (Aasi, et al., 2014)

Among the 8 papers reviewed in this literature review, there were two of them focusing on the role of culture in IT governance structures. Five papers focused on the role of culture in IT governance processes and six papers focused on the role of culture in IT governance relational mechanisms. As shown in Figure 7, some of the papers focused on more than one element. Table 11 shows the information about the 8 papers reviewed in this literature review. Five out of eight papers had organizational culture point of view and three had a national culture point of view.

Table 11. Literature overview of culture influence on IT governance (Aasi et al., 2014)

Author	Culture level/focus, model or instrument used	Research focus on ITG	Culture influence on ITG framework components		
			Structures	Processes	Relational mechanisms
Ali et al. [34]	Organizational culture/ Ethic or culture of compliance	IT strategy committee, IT steering committee, corporate communication systems & top management involvement in IT	N/A	N/A	-**Culture of compliance or ethics** increases the loyalty, commitment and communication.
Willson & Pollard [6]	Organizational culture/ Key characteristics, attractive employer and store culture	Six facets of ITG; Also elements of ITG including structures, processes and control	N/A	N/A	-**Creating positive environment** influences the employees loyalty and their two-way communication -**Different geographical project teams** influence the collaboration between stakeholders
Nugroho et al [32]	Organizational culture/ OCAI	COBIT 4.1	N/A	-**Clan culture** influences the delivery and support on COBIT 4.1.	N/A

Satidularn et al.[17]	Organizational culture/ Hofstede model (1995)	IT governance effectiveness in terms of structures, processes and relational mechanisms	N/A	-Resistance to change influence the degree of attention to best practices and processes.	-Less power distance influences the communication between employees in different levels.
Zhong et al.[16]	National culture/ Hofstede model (2001)	ITG integration mechanism including structural, functional and social	N/A	N/A	-National culture capabilities influence different levels of social coordination in relational mechanisms.

Table 11. Literature overview of culture influence on IT governance (continued)

Author	Culture level/focus, model or instrument used	Research focus on ITG	Culture influence on ITG framework components		
			Structures	Processes	Relational mechanisms
Zhong et al [33]	National culture/ Hofstede model (2001)	IT governance capabilities including structural, process and relational capabilities	-**National culture phenomena of respecting individuals more than law and structures** influences the decisions and steering committee job. -**The culture of not being serious for accurate timing** influences the responsibilities. -**Individualism collectivism culture** influences the roles. -**Staff resistance to change and new technologies** makes them slow in using new monitoring and controlling systems.	-**Hierarchical culture** helps in applying IT processes -**The culture of not being serious in documentation** and following the roles influences how they follow the planned processes. -**Individualism -collectivism culture** influences the group work regarding IT processes. -**Staff resistance to change** and new technologies influences their acceptance for new standard processes.	-**The culture of not sharing information and considering it as personal benefit** influences the communication and relationships. -**Culture of communicating based on context and content** influences the relationship with stakeholders. -**Individualism collectivism** culture influences the inner relationships of the groups. -**Harmony maintenance culture** influences the level of negotiations between people.

Janssen et al.[16]	Organizational culture/ Hofstede model (2001)	IT governance structures, processes and relational mechanisms	-**Semi-state organizations having closed culture** influence the decision making structures.	-**Collectivism culture** influences the alignment of IT and business with each other and decision processes.	-**Individualistic culture** Influences the knowledge sharing and communication.

> *Contribution*

The results from this literature review indicated that both national and organizational culture have an influence on IT governance. Cultural issues such as timing accuracy, employees loyalty, resistance to change, individualism and the friendly relationships were found to have influence on IT governance processes, structures and relational mechanisms. It was also found through this literature review that the cultural factors are not considered in many cases when implementing IT governance. However, it was stated in some of those papers that there is a need for further research on the role of culture in implementing IT governance.

This literature review sheds light on the existing gaps in research on the influence of culture on IT governance and contributes in answering SRQ1.

4.1.2 Results of Research Process 1, Literature Review 2

> *Research question*

The second literature review focused on addressing SRQ 1: *How do different types of organizational culture influence IT governance performance?* This second literature review takes a practice perspective.

> *Conceptual framework*

The conceptual framework used in this literature review was based on the IT governance five focus areas introduced by ITGI (2003). These five focus areas include: strategic alignment, resource management, performance measurement, value delivery and risk management. The conceptual framework provided directions on selection criteria for papers to be reviewed. These five focus areas were also used in the literature review as the lens for categorizing the findings from literature.

> *Literature search strategy*

The literature review aimed to identify papers that had their main focus on both topics of culture and IT governance. The papers also needed to have an empirical nature. Relevant research databases were searched using different searching strategies and keywords (details are presented in Table 5 in Section 3.2.1.1).

After searching for the papers in relevant databases, journals and articles, the initial hit was 167 papers (duplications were removed). These papers included 15 papers in strategic alignment, 70 in resource management, 4 in performance measurement, 20 in value delivery and 58 in risk management. However not all of these papers fulfilled the requirements of the inclusion criteria in this literature review and many of them did not have culture and IT governance as their main focus. Some of them only mentioned this issue but did not investigate it.

After reading the abstract and relevancy assessment, and finally full text review, 15 papers were selected for the final review.

➢ *Papers*
Paper RP 2 and RP 10 are grounded on this literature review and present the findings from it.

➢ *Results*
The findings from the selected 15 papers for final review were categorized using the five focus areas of IT governance as the lens. The results from this literature review consist of main two parts. First, a taxonomy of culture concepts used in those papers were created. Second, the categorization of the findings of papers presenting the role of culture in each of the IT governance five focus areas.

The taxonomy (see Table 12) shows which cultural models, concepts and definitions have been used by previous researchers while studying IT governance. It also shows whether they focus on organizational culture or national culture.

Table 12. Taxonomy of the cultural concepts used in the reviewed papers (Aasi et al., 2017)

Taxonomy of cultural concepts and terms used in the reviewed papers

Cultural value-dimension	Reference	Level of analysis	Description of values	Reviewed Papers
Bases of truth and rationality	Detert et al., 2000	Organizational	Determines the degree to which the employees believe something is true or not and how they find it in an organization.	Rowlands et al., 2015
Nature of time	Detert et al., 2000	Organizational	The concept of time is dealing with the organization long- term planning, strategic planning and goal settings.	Rowlands et al., 2015
Motivation	Detert et al., 2000	Organizational	Motivation defines what motivates the employees in an organization.	Rowlands et al., 2015
Orientation to change	Detert et al., 2000	Organizational	The degree to which the individuals in an organization are open to change or take risks which is linked with innovation.	Rowlands et al., 2015
Orientation to work	Detert et al., 2000	Organizational	The certainty of work in human life and the balance between work as a production activity and as a social activity.	Rowlands et al., 2015
Isolation versus collaboration	Detert et al. 2000	Organizational	Deals with how employees work, alone or collaboratively.	Rowlands et al., 2015
Control, coordination, responsibility	Detert et al., 2000	Organizational	The degree to which control is concentrated or shared in an organization.	Rowlands et al., 2015
Orientation and focus	Detert et al., 2000	Organizational	The nature of the relationship between organization and its environment. The organization may have internal or external orientation in relation with its environment.	Rowlands et al., 2015

Term	Reference	Type	Definition	Citation
Institutional collectivism	House et al., 2004	Organizational	Institutional collectivism has been defined as the extent to which organizations are perceived to encourage and reward collective distribution of resources and collective action	Gu et al., 2014
Positive work environment	Howell and Shea, 2001	Organizational	Project champions in product development projects can add to the creation of a positive work environment	Gu et al., 2014
Leadership risk tolerance	Thamhain, 2004	Organizational	Leadership risk tolerance can be defined as the way management communicates the organization's tolerance to accept risk taking in projects	Gu et al., 2014
Results orientation	Greaver, 1998	Organizational	Focusing efforts on the results instead of the activities. In this way the customer and the supplier should have a common purpose	Gu et al., 2014
Innovation and risk taking	Robbins et al., 2009	Organizational	The degree to which employees are encouraged to be innovative and take risks	Erasmus et al., 2012
Attention to detail	Robbins et al., 2009	Organizational	The degree to which employees are expected to exhibit precision, analysis and attention to detail.	Erasmus et al., 2012
Outcome orientation	Robbins et al., 2009	Organizational	The degree to which management focuses on results or outcomes rather than the techniques and processes used to achieve these outcomes.	Erasmus et al., 2012
People orientation	Robbins et al., 2009	Organizational	The degree to which management decisions take into consideration the effect of outcomes on people within the organization	Erasmus et al., 2012
Team orientation	Robbins et al., 2009	Organizational	The degree to which work activities are organized around teams rather than individuals	Erasmus et al., 2012
Aggressiveness	Robbins et al., 2009	Organizational	The degree to which employees are aggressive and competitive rather than easy-going	Erasmus et al., 2012
Stability	Robbins et al., 2009	Organizational	The degree to which organizational activities emphasize maintaining the status quo rather than growth	Erasmus et al., 2012

Concept	Source	Level	Definition	Citation
Leadership	Smit et al., 2008	Organizational	The degree to which leaders are able to influence the culture of the organization in order to ensure optimal service delivery	Silvious et al., 2010; El-Mekawy et al., 2012
Strategy	Smit et al., 2008	Organizational	The degree to which the organization is clear about its strategic direction so as to ensure optimal service delivery	Silvious et al., 2010; El-Mekawy et al., 2012
Adaptability	Smit et al., 2008	Organizational	The degree to which the organization is in contact with and responds to change so as to improve service delivery	Silvious et al., 2010; El-Mekawy et al., 2012
Coordination	Smit et al., 2008	Organizational	The degree to which the internal system is horizontally and vertically aligned for optimal service delivery.	Silvious et al., 2010; El-Mekawy et al., 2012
Relationships	Smit et al., 2008	Organizational	The degree to which people in the organization work together to form strong working relationships that will ensure optimal service delivery	Silvious et al., 2010; El-Mekawy et al., 2012;
Power distance	House et al., 2001	Organizational	The degree to which members of a collective expect power to be distributed equally	El-Mekawy and Rusu, 2011
Uncertainty avoidance	House et al., 2001	Organizational	The extent to which a society, organization, or group relies on social norms, rules and procedures to alleviate unpredictability of future events	El-Mekawy and Rusu, 2011
Human orientation	House et al., 2001	Organizational	The degree to which a collective encourages and rewards individuals for their cooperation	El-Mekawy and Rusu, 2011
Institutional collectivism	House et al., 2001	Organizational	The degree to which individuals are integrated into groups within the society	El-Mekawy and Rusu, 2011
In-group collectivism	House et al., 2001	Organizational	The degree to which individuals have strong ties to their small immediate groups	El-Mekawy and Rusu, 2011
Assertiveness	House et al., 2001	Organizational	The degree to which individuals are assertive, dominant and demanding in their relationships	El-Mekawy and Rusu, 2011

Concept	Source	Level	Definition	References
Gender egalitarianism	House et al., 2001	Organizational	The degree to which a collective minimizes gender inequality	El-Mekawy and Rusu, 2011
Future orientation	House et al., 2001	Organizational	The extent to which a collective encourages and rewards future-oriented behaviors (delaying ratification, planning & investing in future, etc.)	El-Mekawy and Rusu, 2011
Performance orientations	House et al. 2001	Organizational	The degree to which a collective encourages and rewards group members for performance improvement and excellence	El-Mekawy and Rusu, 2011
Power Distance	Hofstede, 1980, 1983	National	The power distance index is an indication of the extent to which less powerful members of a society accept unequal distribution of power.	Janssen et al., 2013; Prinz, 2015; Satidularn et al., 2011; Silvious et al., 2009;; Zhong et al., 2012
Individualism vs. collectivism	Hofstede, 1984	National	In cultures that are considered highly individualistic, individuals are loosely tied to each other and are expected to look out for themselves and their family. In collectivist cultures, people are integrated into strongly cohesive in-groups, and group loyalty lasts a lifetime.	Janssen et al., 2013; Prinz, 2015; Satidularn et al., 2011; Silvious et al., 2009; Zhong et al., 2012
Masculinity vs. femininity	Hofstede, 1984	National	In the dichotomy masculine versus feminine, a masculine culture values assertiveness, performance and material success. In a femi-nine society values like quality of life, tenderness and modesty prevail	Janssen et al., 2013; Prinz, 2015; Satidularn et al., 2011; Silvious et al., 2009; Zhong et al., 2012
Uncertainty avoidance	Hofstede, 1984	National	The uncertainty avoidance index is defined as "the extent to which the members of a culture feel threatened by uncertain or unknown situations	Janssen et al., 2013; Prinz, 2015; Satidularn et al., 2011; Sil-vious et al., 2009; Zhong et al., 2012;

Concept	Reference	Type	Description	Source
Culture gap	Ward and Peppard, 1999	Organizational	The concept of gap used here, based on literature, refers to what is called 'culture gap' which is a variable that explains the challenges that can exist between the IT function and business activities	Almajali and Dahlin, 2010
Underlying assumptions	Schein, 2004	Organizational	Unconscious and taken-for-granted beliefs, perceptions, thoughts and feelings that members of the organization share	Xiao and Dasgupta, 2005
Espoused beliefs and values	Schein, 2004	Organizational	Espoused justifications including strategies, goals, and philosophies	Xiao and Dasgupta, 2005
Artifacts	Schein, 2004	Organizational	The visible organizational structures and processes	Xiao and Dasgupta, 2005
Stories	Johnson and Scholes, 1993;	Organizational	The *stories* told by members of an organization to each other, to outsiders, to new recruits and so on, embed the present in its organizational history and also flag up important events and personalities.	Cormack et al., 2001
Rituals and routines	Johnson and Scholes, 1993	Organizational	The *rituals* of organizational life are particular activities or special events through which the organization emphasizes what is particularly important and reinforces 'the way we do things around here'	Cormack et al., 2001
Symbols	Johnson and Scholes, 1993	Organizational	*Symbols57* such as logos, offices, cars and titles, or the type of language and terminology commonly used, become a shorthand representation of the nature of the organization	Cormack et al., 2001
Power structure	Johnson and Scholes,	Organizational	*Power structures* are also likely to influence the key assumptions. The most powerful groupings within the organization are likely to be closely associated with the core assumptions and beliefs.	Cormack et al., 2001

Organizational structure	Johnson and Scholes, 1993	Organizational	*Organizational structure* is likely to reflect power and show important roles and relationships.	Cormack et al., 2001
Control systems	Johnson and Scholes, 1993	Organizational	The *control systems*, measurements and reward systems emphasize what is important to monitor in the organization	Cormack et al. 2001
Clan	Cameron and Quinn, 2011	Organizational	The clan culture, as assessed in the OCAI, is typified by a friendly place to work where people share a lot of themselves. It is like an extended family	Nugroho and Surendro, 2011
Hierarchy	Cameron and Quinn, 2011	Organizational	Formalized and structured place to work. Procedures govern what people do	Nugroho and Surendro, 2011
Adhocracy	Cameron and Quinn, 2011	Organizational	Is characterized by a dynamic, entrepreneurial, and creative workplace. People stick their necks out and take risks. Effective leadership is visionary, innovative, and risk-oriented.	Nugroho and Surendro, 2011
Market	Cameron and Quinn, 2011	Organizational	Is a results-oriented workplace. Leaders are hard-driving producers and competitors. They are tough and demanding	Nugroho and Surendro, 2011

This taxonomy has a significant role in the literature review of the previous research in culture and IT governance. It shows which cultural models, concepts and definitions are used by previous researchers while studying IT governance. It also shows whether they focus on organizational culture or national culture. Therefore we can choose the most suitable cultural concepts to study the role of organizational culture in IT governance and respond to SRQ1. Then the literature was reviewed using the five focus areas of IT governance as the lens.

In the second part of the literature study, the role of culture in the papers was categorized according to the IT governance five focus areas. A concept matrix was created summarizing the information on each article, including its author(s), studied culture level and methods and findings, which are clustered through the five focus areas of IT governance (see Table 13).

Table 13. Literature overview of culture influence on IT governance five focus areas (Aasi et al., 2017).

Research literature overview of culture influence on the five focus areas of IT governance						
Reviewed paper (Author)	**Cultural focus**	**IT Governance focused area**				
		Value Delivery	**Resource Management**	**Risk Management**	**Strategic Alignment**	**Performance Measurement**
Prinz, 2015	National	X	X			
Rowlands etal., 2015	Organizational		X		X	
Gu et al., 2014	Organizational			X		X
Janssen et al., 2013	Organizational		X			
Zhong et al., 2012	National	X	X			X
El-Mekawy et al., 2012	Organizational				X	
Erasmus et al., 2012	Organizational				X	
El-Mekawy and Rusu, 2011	National				X	

Source	Level				
Nugroho and Surendro, 2011	Organizational	X			X
Satidularn et al., 2011	Organizational	X			X
Almajali and Dahlin, 2010	Organizational			X	
Silvious et al., 2010	Organizational			X	
Silvious et al., 2009	National			X	
Xiao and Dasgupta, 2005	Organizational				X
Cormack et al., 2001	Organizational			X	

It was found that among the papers reviewed there are two main levels of culture considered: national and organizational. Ten research papers selected the organizational culture and three selected the national culture perspective. This shows the importance of organizational culture role in IT governance in comparison to the national culture from the previous researchers' perspective (more details are include in RP2 in Appendix 4).

➢ *Contribution*

The important gap found through this literature review was the lack of research on cultural influence on the IT governance practical areas. The selected papers were very few and recent that shows that this topic is new and has not been investigated deeply. Additionally none of the reviewed papers cover all five-focus areas of IT governance.

There was no paper found with a focus on culture and IT governance risk management. Therefore the cultural influence is discussed for only four out of five IT governance focus areas.

The fifteen papers reviewed in this literature review are also analyzed through the research methodological aspect. For instance what strategy they use and how they collect data. The research methodological analysis of the reviewed papers is presented in Table 3 in RP 2. The most used research strategy in the papers on culture and IT governance was case study and most of the data collections were done through interviews or semi-structured interviews. This sheds light on the research methodology selection for the future research in this topic.

4.2 Results of Research Process 2: Case Studies

Through the four different case studies performed in this research, both research question SRQ 1 and SRQ 2 were addressed. The findings from the case studies indicated how the organizational culture influences the IT governance performance and also the relationship of the organizational structure and IT governance.

4.2.1 Results of Research Process 2, Case Study 1

➢ *Research question*

Case study 1 answered SRQ 1: *How do different types of organizational culture influence IT governance performance?*

> *Conceptual framework*

A conceptual framework was created using the organizational culture model introduced by Camron and Quinn (2011) and the four IT governance performance outcomes introduced by Weill and Ross (2004). According to Cameron and Quinn (2011), the organizational culture assessment model (OCAI) is based on six different dimensions which in the model are combined resulting in four possible organizational culture types: clan, adhocracy, hierarchy and market (Figure 1 in Section 2.2.2). The four IT governance outcomes are: cost effective use of IT, effective use of IT for growth, effective use of IT for asset utilization and effective use of IT for business flexibility (Weill and Ross, 2004).

This conceptual framework is presented in Figure 4 in Section 3.2.2.1. It was used as the lens through which the data were collected and analyzed.

> *Case selection*

The case site selected to perform this case study was a large global construction and architecture organization headquartered in Stockholm. This organization had its own IT department (anonymously named ITS) with over 220 staff.

> *Papers*

Papers RP 5 and RP 6 present the results of this case study.

> *Case description and Results*

This research activity aimed at finding the role of organizational culture in IT governance performance while facing the digitalization challenge.

This case study was performed in a large construction company (anonymously named SwedCon). This construction company has an IT department (anonymously named ITS) with 220 employees providing IT service for the whole company. In this case study, first the IT governance performance of ITS was evaluated through the use of four IT governance performance outcomes introduced by Weill and Ross (2004). Then the organizational culture of ITS was assessed using the organizational culture assessment instrument (OCAI) introduced by Cameron and Quinn (2011).

Each of the four outcomes of IT governance performance was assessed (using scale of 1-5) and then the overall score of the IT governance performance at ITS was calculated using the formula presented in Weill and Ross (2004) shown below:

Overall IT Governance Performance Score is:

$$\frac{\sum_{n=1 \text{ to } 4} (\text{importance of outcome})* \text{influence of IT governance} * 100}{\sum_{n=1 \text{ to } 4} (5 * (\text{importance of outcome}))}$$

ITS gained the total score of 62.74 out of 100 for IT governance performance. As we can notice, this score is close to the average score of the 256 companies studied by Weill and Ross (2004), which is 69. The scores for each of the IT governance performance outcomes are shown in Figure 12.
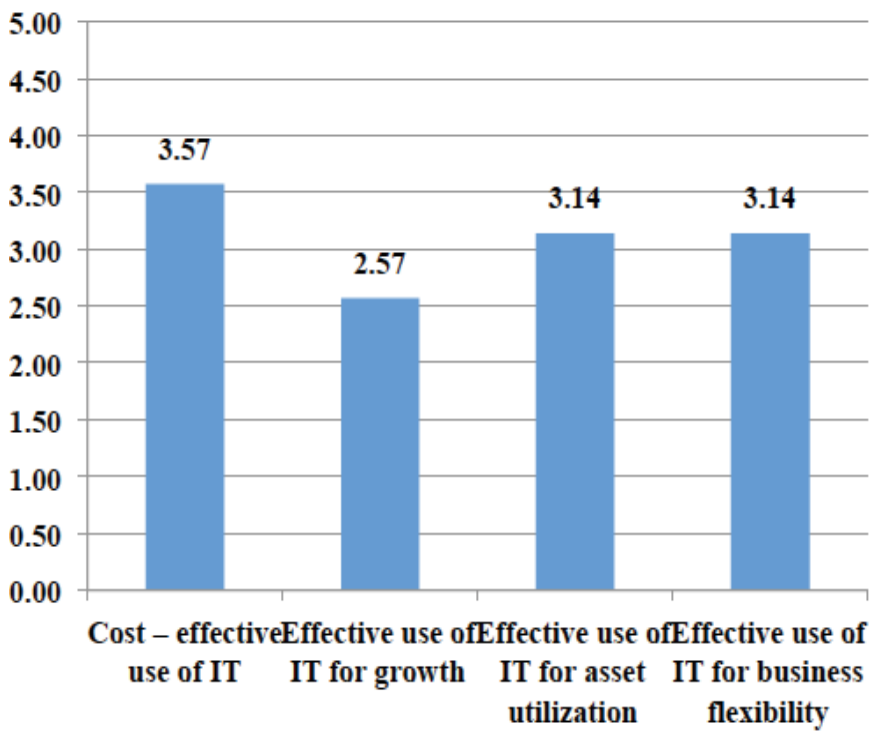

Figure 8. IT governance objectives scores at ITS (Aasi et al., 2016)

As illustrated in Figure 8, the cost-effective use of IT has received the highest score, and the effective use of IT for growth has received the lowest average score.

Having a high score in cost effective use of IT means that the IT department (ITS) has been successful in cutting the costs by using IT. The CIO of ITS also stated that during the past years, the business (SwedCon) was only asking ITS to provide the basic needs and stay with the budget.

On the other side, having a low score in effective use of IT for growth means that ITS has not been very successful in providing new and innovative IT solutions to the business. It also means that the IT has not played a strategic role for business and therefore has not provided a competitive advantage for the business. Recently, however, SwedCon has asked ITS to change the role of IT from being a supporter to business to being a strategic partner. Therefore SwedCon now requires the ITS to provide new IT solu-

tions and create a competitive advantage for them. As a consequence, ITS needs to improve the IT governance in order to support more effective use of IT for growth.

The case study at SwedCon aimed at finding the role of organizational culture in IT governance performance while SwedCon was facing the digitalization challenge. To address this challenge of digitalization, SwedCon had a plan to improve their IT governance performance. In Figure 9, it is illustrated how the company has faced the digitalization challenge by realizing the need for changing the organizational culture of ITS to improve the effective use of IT governance in growth. In order to accomplish this, ITS became a strategic partner to SwedCon. As a strategic partner, ITS main task was to investigate and understand the technological needs of SwedCon's customers (e.g., building tenants). In this way, ITS can raise its score in the effective use of IT for growth. In fact, ITS is now involved in planning new SwedCon projects.

According to the managers at ITS, through the digitalization of the products, there have been a three percentage added value.

In Figure 9 we have illustrated how this company has faced digitalization challenge by realizing the need for changing the organizational culture of ITS that improves the effective use of IT governance in growth.
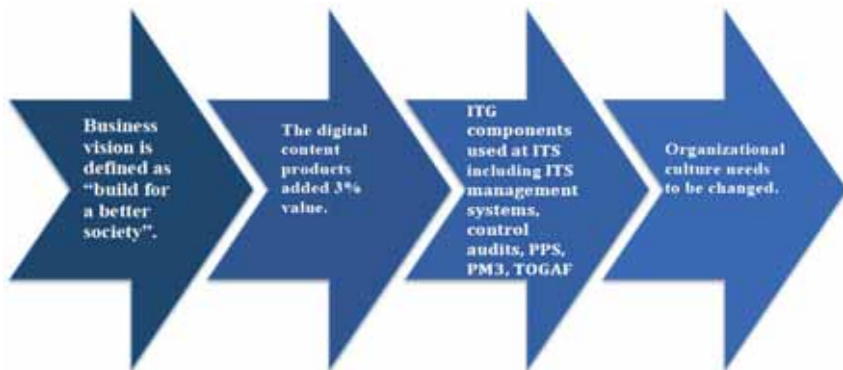
Figure 9. Facing digitalization at SwedCon by improving IT governance and changing organizational culture (Aasi and Rusu, 2017)

After realizing the important role of organizational culture in IT governance, ITS considered organizational culture in its planning for dealing with digitalization challenge (Figure 9). We used the OCAI model to assess the organizational culture in ITS. This instrument was also used by the ITS itself in 2011, and again in the end of 2015. Therefore, a comparison of the organizational culture in different periods of time was possible to carry out.

As is shown in Figure 9, ITS is planning to evaluate, compare and plan for future organizational culture based on how it works with their business strategies. A comparison between the OCAI assessment done at ITS between the years 2011 to 2015 and the new one for 2016 to 2020 (Figure 10) shows how ITS has changed its organizational cultural and how ITS intends to be ready to adopt further changes, according to their business objectives.
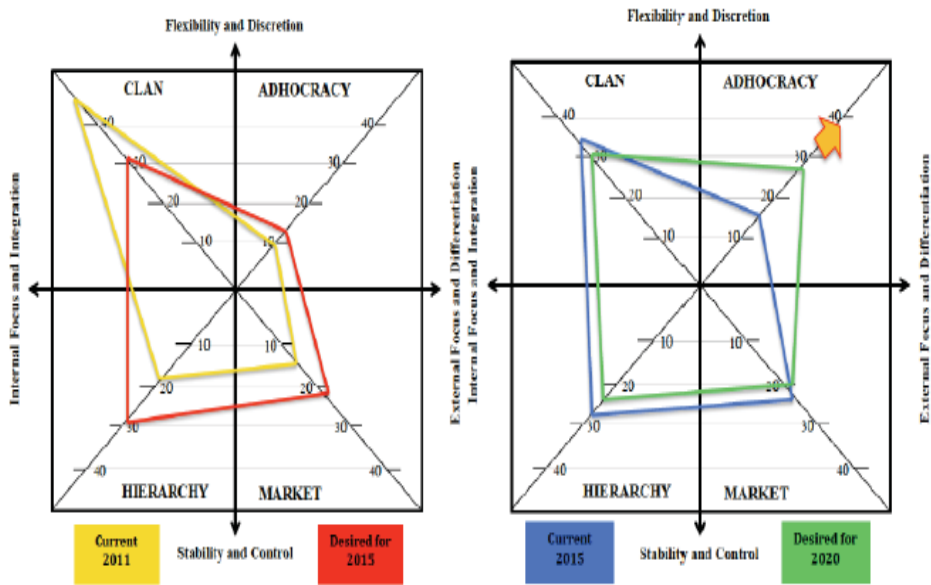

Figure 10. Organizational culture change at ITS: The results from OCAI assessment at ITS in 2011 and the end of 2015 and the desired organizational culture type for 2015 till 2020 (Aasi and Rusu, 2017)

The diagram on the left in Figure 10 shows the results of OCAI assessment of organizational culture type at ITS in 2011 and the desired organizational culture type for 2015. In the diagram on the right in Figure 10, it is indicated the OCAI assessment of the organizational culture type at ITS in 2015 and the desired organizational culture type for 2020. Most important, the diagram show a move from a clan organizational culture directed organization to a more adhocracy organizational culture.

ITS is also planning to move towards a more adhocracy directed organizational culture and emphasizing creativity and innovation. According to the findings of this case study the adhocracy organizational culture with more emphasize on creativity and innovation is desired to improve the IT governance effectiveness in the growth of the organization. The managers at ITS are investigating on organizational culture activities to promote such culture.

Table 14 represent these organization culture activities planned by six ITS managers including the CIO.

Table 14. Organizational culture activities planned for IT governance improvement in effective use of IT growth (Aasi and Rusu, 2017)

Action Number	ITS Organizational Culture Actions Planned for 2016-2020
1	Promote the proactive "development budget".
2	Make sure that the "development budget" is used.
3	Allocate free uptime for R & D.
4	Awards for innovativeness.
5	Be systematic in communication and collecting innovative ideas.
6	Create teams with IT and business people to solve customers problems.
7	Plan for story telling, news feeding and blogging for each task.

The planned organizational culture actions listed in Table 14 were found through the interviews with ITS managers. The internal documents provided by ITS managers were also used in finding these activities.

The planning of these actions shows how important the role of organizational culture is in SwedCon in improving the IT governance and facing the digitalization challenge.

Additionally the organizational culture actions are mainly planned with the intention of gaining innovative solutions from IT. These organizational culture actions are aligned with the adhocracy organizational culture type and aim at improving the effective use of IT for growth in this organization.

Finally the CIO of ITS has planned these actions together with the other ITS managers and they organize different training programs for the employees to encourage the applications of these actions. This shows that moving from a clan organizational culture directed organization to a more adhocracy organizational culture directed organization needs planning, training and monitoring.

• This case study provided results that answered SRQ1. In SRQ1 we were seeking to find out how the organizational culture can influence the IT governance performance.

The results from this case study showed that the organizational culture needs to be considered in improving IT governance performance in addressing the digitalization challenge. In particular, the characteristics of organizational culture types, such as communication styles and attitudes toward innovation and creativity, were found to influence the IT governance performance. In Table 14 the development budget is defined at ITS as "the budget that supports the notion of having a strategic role and being innovative". This budget has not been fully used by ITS, which is due to "their mindsets and culture". Therefore, ITS needs to change its organizational culture orientation in such a way to use their whole development budget and be more creative.

• Both concepts of IT governance performance and organizational culture were studied in this case. Figures 12 and 14 are showing these results. The organization studied in this case was looking forward to improve its IT governance performance to face the digitalization challenge. It was found that the organizational culture of this organization was influencing their IT governance in different ways. Figure 14 shows how the organizational culture is moving from previously clan oriented culture to adhocracy oriented culture which is desired for improving IT governance performance in effective use of IT for growth.

4.2.2 Results of Research Process 2, Case Study 2

➢ *Research question*

Case study 2 answered SRQ 2: *How is organizational structure related to IT governance performance and IT governance implementation?*

➢ *Conceptual framework*

A conceptual framework was created to perform this case study. This conceptual framework was created using the four IT governance performance outcomes introduced by Weill and Ross (2004) and the organizational structure definitions introduced by Pearlson and Saunders (2013). Moreover, IT Governance archetypes can also be seen as part of the conceptual framework. These archetypes explain who makes decisions concerning the information systems and where the inputs for those decisions come from.

(Weill & Ross, 2004). This conceptual framework was used as the lens to collect and analyse data.

➢ *Case selection*

The case site selected to perform this case study was an education and research organization (anonymously named IHS) and its IT department. IHS is a public organization in a developing country with over 500 employees. We performed the interviews with the CIO, the managers of the IT department and researchers that were involved in IT projects in this organization.

➢ *Papers*

Paper RP 4 present the results of this case study.

➢ Case description and Results

This research activity aimed at finding the IT organizational structure relationship with IT governance performance. The results from this research activity are answering SRQ 2.

The case study was performed at an education and research organization (anonymously named IHS) and its IT department. The IT department has a matrix structure, and each employee in this structure can be involved in different projects at the same time. According to the CIO, this is mainly attributable to the many new projects carried out as well as the "need to use the most from the resources". Most of the employees at the IT department are familiar with the needed skills in the projects and if not, they will be trained.

- **IT Governance Archetypes of the IT Department at IHS**

The IT governance archetypes by Weill and Ross (2004) explain who makes decisions concerning the information systems and where the inputs for those decisions come from. The IT governance archetypes relate IT governance performance and the IT organizational structure in an IT department and can therefore not be ignored in this study.

The IT governance archetypes in IHS were identified (see Table 15). In the IT department of IHS, the inputs for most of the decisions involve the business side, that is, the IHS general managers. This is reflected in the federal archetype for IT governance found in three main IT decisions, see Table 15. Weill and Ross (2004) also found in their study of 74 public organizations that there are more federal arrangements for all IT decisions in public than in private organizations.

Table 15. IT governance archetypes for IT decisions of the IT department at IHS (Aasi et al., 2017)

Decision Archetypes	IT Principles		IT Architecture		IT Infrastructure Strategy		Business Application Needs		IT Investments	
	Input	Decision	Input	Decision	Input	Decision	Input	Decision	Input	Decision
Business Monarchy									BU yearly IT budget	BUGM
IT Monarchy			IT Helpdesk	Head of IT network & security						
Feudal										
Federal	BU heads + CIO	IT board + BUGM			BU unit heads + CIO	Head of IT network & security + BUGM	IT board + BUGM			
Duopoly							CIO + BU unit heads			

BU heads- Business heads that is IHS heads in this case.

BUGM- Business General Managers that is IHS units' managers in this case.

As shown in Table 15, the business monarchy is used for inputs and decisions on IT investments. This is explained by the fact that IHS is a public organization and every investment decision should be finalized by the gen-

eral finance department of IHS. The IT monarchy archetype is used only for IT architecture decisions. However if these decisions need great investments, they need to be made together with the general finance office of IHS. Finally, the duopoly archetype is used for input into the business application needs since most of these needs are from the faculty and research staff that define new projects and consult the IT department regarding them.

• **IT Governance Performance of the IT Department at IHS**

The IT governance performance measurement formula suggested by Weill and Ross (2004) was used to score the IT governance performance of the IT department at IHS.

The CIO and mangers at IT department of IHS provided scores for four components of IT governance performance including: 1) cost effective use of IT, 2) effective use of IT for growth, 3) effective use of IT for asset utilization, and 4) effective use of IT for business flexibility.

Overall IT Governance Performance Score is calculated using the formula below from Weill and Ross (2004):

$$\frac{\sum_{n=1 \text{ to } 4} (\text{importance of outcome}) * \text{influence of IT governance} * 100}{\sum_{n=1 \text{ to } 4} (5 * (\text{importance of outcome}))}$$

The total score of IT governance performance for IHS is 55.91 out of 100. Weill and Ross (2004) found in their study of 74 public organizations that an average IT governance performance score of 70 out of 100. Considering this average score, the IT governance performance score of IHS (55.91) is lower. According to the CIO "In a developing country, using IT in different organizations has started later than the developed countries and that is why they are not very matured in their IT governance performance and still need to deal with many basic issues but they also need to move fast to be competitive". The internal documents of IHS are stating that "IHS is under major transition and IT has a significant role in this transition". These issues resulted in different scores for each of ITG performance components as shown in Figure 11.
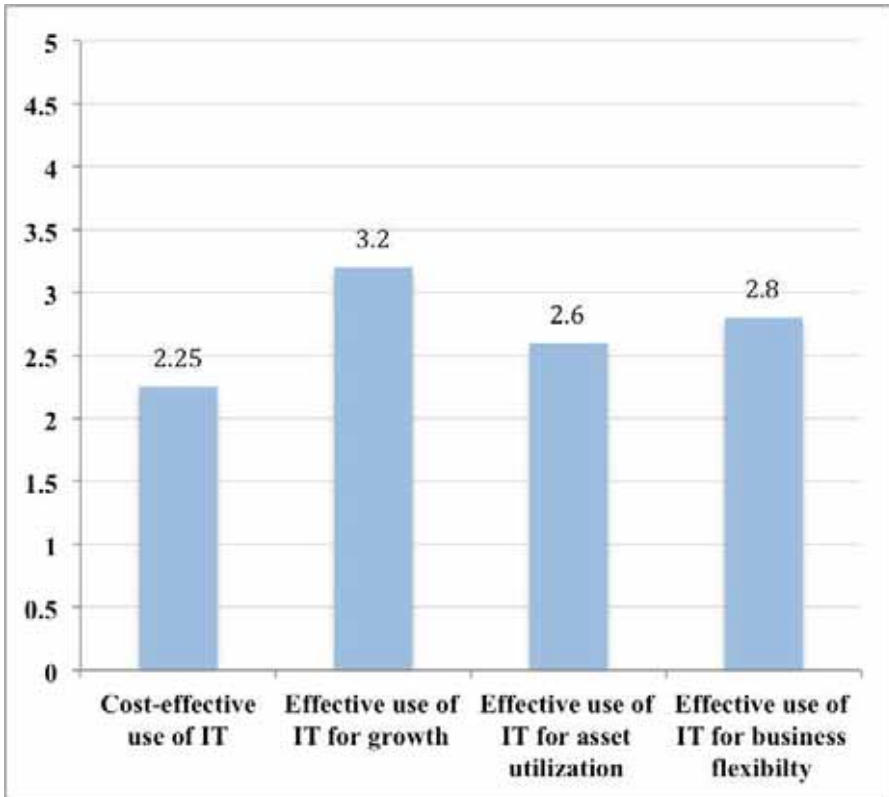
Figure 11. IT governance objectives scores at IHS (Aasi et al., 2017)

As shown in Figure 11, cost effective use of IT has the lowest score (2.25 out of 5) and effective use of IT for growth has the highest score (3.2 out of 5). The sections below explain how each of the scores in Figure 3 are received and what they demonstrate according to the interviews.

• Organizational Structure of IT Department at IHS Relationship with Cost Effective Use of IT

Being a public organization in a developing country that has a lot of income from the oil industry makes the budgeting issue different in IHS than other organizations in other countries. The budget for the IT department comes yearly as cash. Therefore, the cost effective use of IT does not have a significant importance and does not have a high score in ITG performance measurement. Moreover, the IT governance archetype for the IT department is a business monarchy archetype for IT investment decisions. This means that the general IHS managers decide about the IT investments and the IT department cannot make the decisions about IT investments by its own. The IT department HR and finance are the same as IHS general HR and finance

office. The IT department has a federal archetype for three other types of IT decisions, which means that business units (IHS general managers) have roles in making those IT decisions too. This limits the IT department recruitment of new expert staff as well as management of resources, leading to the use of pre-existing resources from other projects. According to the CIO, this is why he chose a matrix structure for the IT department.

• Organizational Structure of IT Department at IHS Relationship with Effective Use of IT for Growth

Effective use of IT for growth has the highest score and also is the most important component of IT governance for the IT department. In accordance with this, IHS is aiming for new competitive advantages that rely on IT. The head of IHS and heads of faculty suggest new projects such as an improved web page and a portal for humanities research. This results in the IT department running many projects at the same time and pushing the CIO to choose a matrix organizational structure. The CIO is planning for some improvements by having more formal and common meetings with IHS managers and involving them in IT projects. The CIO states: "the IHS managers should get informed more regularly and in details on how the IT projects can improve their research projects and this way they will support more". The faculty head also claims that "we are interested to get aligned with the IT and know more about how our IT department can help us in our projects but at the moment most of the times we only ask them to support us in a project which is already defined by some faculty group." The faculty heads then states: "it happens so often that when a complete pre-defined project by them is introduced to IT, there is a lot of issues brought by the IT managers that sometimes even makes the project impractical or make it delayed for a long time". The CIO believes that if the IT group is involved in the projects led by the faculty members from the beginning, then they can be a lot more helpful. The IT managers find the solution in "planning regular meetings with faculty members and more communication with different projects' leaders and IHS head" (quote from the CIO and networks manager). The relationship between different components of IT governance performance and IT governance archetypes and the IT department organizational structure at IHS are summarized in Figure 12.
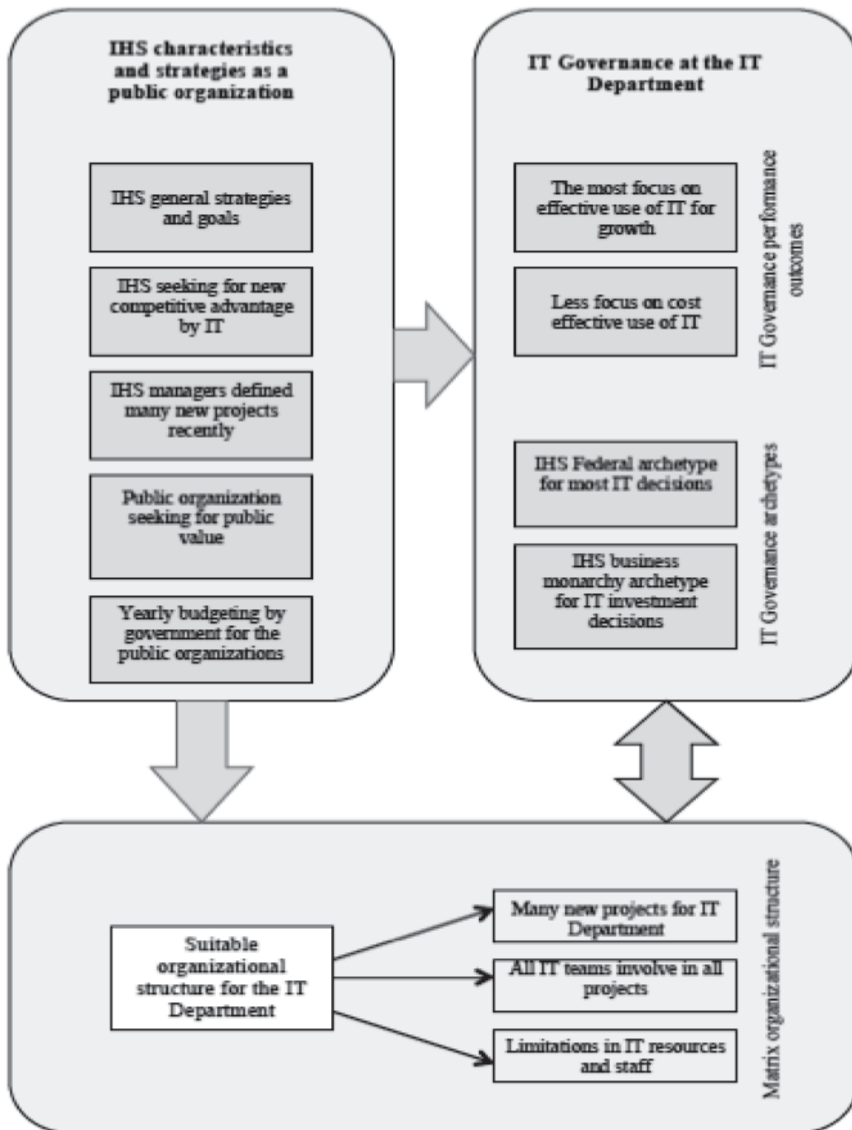
Figure 12. Organizational structure of IT department at IHS in relation with IT governance performance and IT governance archetypes (Aasi et al., 2017)

As shown in Figure 12, the matrix organizational structure is recognized as the suitable IT organizational structure for the IT department in relation with the IT governance performance and the IT governance archetypes. The left side of Figure 12 presents the IHS characteristics and the right side presents the IT governance performance outcomes and IT governance archetypes and their relationship with organizational structure of IT department at IHS.

• This case study provided results that answer SRQ 2. The findings from the interviews and internal documents and reports from IHS showed that the IT department needs to choose the best structure that is matched with their IT governance performance goals. In IHS, the most important outcome of IT governance was effective use of IT for growth. IHS is an educational and research organization and needs IT to act as a strategic driver to help IHS improve its ranking and compete. As it is shown in Figure 16, the matrix organizational structure in IT department is the one more related to their IT governance performance outcomes. IHS has a lot of parallel IT projects and limited number of IT employees that need to work in different projects.

• The IT governance archetypes that exist in IHS are also leading the IT department to choose a matrix organizational structure. With the business monarchy archetype for IT decisions and investments, the IT department is not making all decisions about the IT staff and resources. Therefore the CIO concluded that through the matrix organizational structure, IHS can use its resources best and improving their IT governance in effective use of IT for growth.

4.2.3 Results of Research Process 2, Case Study 3

➤ *Research question*

Case study 3 answered SRQ 2: *How is organizational structure related to IT governance performance and IT governance implementation?*

➤ *Conceptual framework*

The conceptual framework used in this case study was based on the IT governance principles introduced in ISO/IEC 38500:2008 standard. Through the six principles introduced in his standard the IT governance implementation was evaluated, directed and monitored. In this case study the organizational structure was studied to find out how it needs to be adapted in relation with the IT governance principles.

➤ *Case selection*

The case site selected for this case study was a large global construction organization (Company A) headquartered in Sweden with a large IT department. We performed interviews with the IT managers of this organization and also collected internal reports and documents from Company A. A new IT governance project was implemented in this organization and the IT organization structure was adapted to support the IT governance implementation.

➢ *Papers*
   Research paper RP 7 presents the results of this case study.

➢ *Case description and Results*
This research activity aimed at finding the relationship between organizational structure and IT governance implementation. The results from this research activity are answering SRQ 2.

   "Through a case study at a large construction company in Sweden (Company A), the organizational structure changes while applying IT governance practices in a large IT project (the ITP project) were studied. The ISO/IEC 38500:2008 IT governance standard was used as the lens for data analysis. The organizational structure was involved in implementation of each function of the IT governance standard. According to the findings from interviews and internal documents from Company A, all of the IT governance principles of the ISO/IEC 38500:2008 were recognized in the ITP project" (Aasi, 2016, p. 61). The six principles of ISO/IEC 38500:2008 considered in this study are listed as: principle 1) Responsibility: deals with the tasks and responsibilities divided among IT involved people; principle 2) Strategy: deals with IT supporting the future business objectives, fulfilling the stakeholders' needs and level of IT risk; principle 3) Acquisition: deals with different IT solutions and the value they bring in accordance with the IT investments; principle 4) Performance: deals with IT supporting the requirements and meets its target; principle 5) Conformance: deals with IT following the laws, regulations, policies and standards; principle 6) Human behavior: deals with the employees behavior inside the organization in relation to IT (ISO/IEC 38500: 2008).

   According to the ISO/IEC 38500:2008 standard of IT governance, all six principles mentioned above need to be: 1) evaluated, 2) directed and 3) monitored in different phases. According to the findings of case study 1, the initial organizational structure existing in Company A could not support the requirements for IT governance implementation and cover the all activities. Therefore some changes were made in order to have an organizational structure that supports the IT governance implementation.

   Figure 13 shows the organization structure covering ITG implementation for ITP project. P1-P6 represents 6 principles of ISO/IEC 38500, E, D and M represent Evaluate, Direct and Monitor for each principle. Figure 13 shows how the new organizational structure designed specifically for IT governance implementation is covering the IT governance principles. This structure is considered temporarily at this stage and may change later.
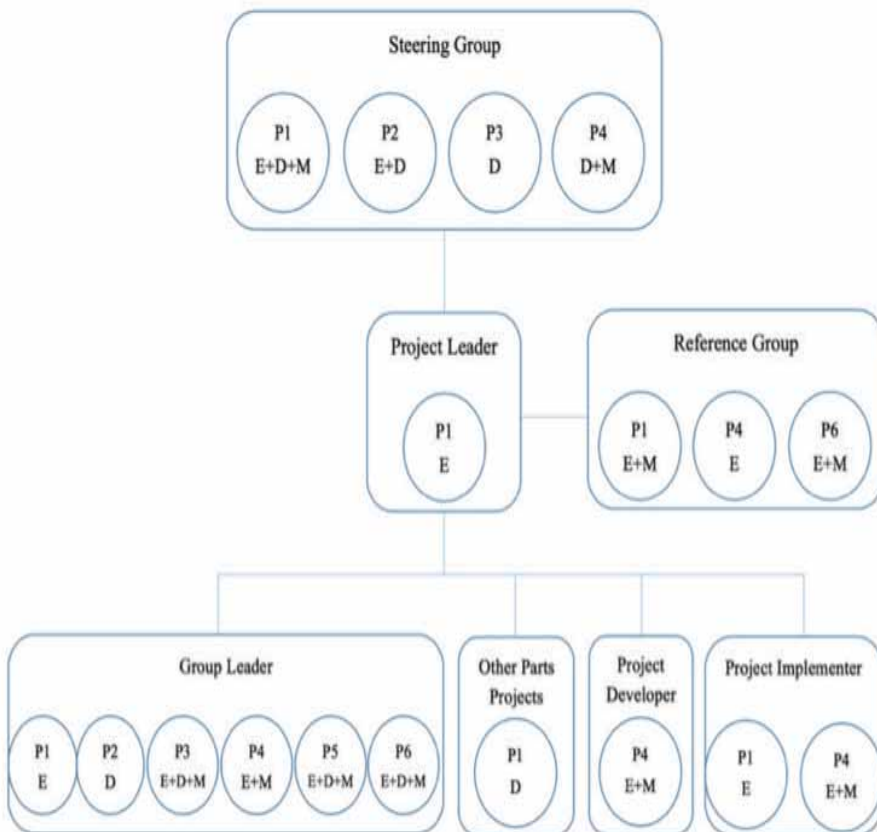
Figure 13.Organizational structure covering IT governance implementation through ISO/IEC 38500 (Larsson et al., 2015)

"As is shown in Figure 13, the steering group on the top of organization structure is leading the whole project development. The reference group is providing feedback on different phases of project progress and the reference group comprises different people involved in the project. The development head on a lower level manages all the part projects running under the general project. Each specific group has its own responsibility and needs to report the head of that specific group. Although the different parts of project are separate from each other, they cooperate with each other for the benefit of the general project. This study demonstrates an IT governance implementation case with a well-developed organization structure linked to ISO/IEC 38500:2008. It also shows that ISO/IEC 38500:2008 is a useful instrument for recognizing IT governance practices in IT governance implementation projects" (Aasi, 2016, p. 68).

• This case study provided results that answer SRQ 2. The findings from the interviews and internal documents and reports from Company A showed that the IT organizational structure sometimes does not match with the IT governance principles and it needs to be adapted to new IT governance principles. In this case the IT department had to adapt the IT organizational structure with the IT governance principles to be able to have an effective IT governance. Using ISO/IEC 38500:2008 principles as the lens helped in defining the new roles and positions identified in implementing the new IT governance project at Company A. Figure 13 shows this organizational structure and how it is covering the six principles of the ISO/IEC 38500:2008 standard. This is how the IT organizational structure is related to the IT governance implementation that is the identified in SRQ2.

4.2.4 Results of Research Process 2, Case Study 4

➢ *Research question*

Case study 4 answered SRQ 1: *How do different types of organizational culture influence IT governance performance?*

➢ *Conceptual framework*

A conceptual framework was used in this case study using organizational culture assessment instrument introduced by Cameron and Quinn (2011) and the four IT governance performance outcomes introduced by Weill and Ross (2004). This conceptual framework is shown in Figure 8. This conceptual framework was used to collect and analyze the data. In this case study we aimed at finding the influence of each type of organizational culture in each network in the organization on each one of the four outcomes of IT governance performance.

➢ *Case selection*

The case site for this case study was a global large concrete production organization called Cemex. At Cemex they have 11 global virtual networks collaborating with each other. These networks were established at 2014 with different purposes and focus areas. They are selected and monitored by the CEO and executive committee of Cemex. Each network has leader with different leading style and different organizational culture. Semi-structured interviews were performed with the leaders of the networks which were both IT and business managers. Cemex managers also provided a vast amount of internal documents including brochures, reports and presentations to be used for this research.

➢ *Papers*

Papers RP 1 and RP 8 present the results from this case study.

➢ *Case description and Results*

This research activity aimed at finding the organizational culture influence on IT governance performance in collaborative virtual networks. The results from this research activity are answering SRQ 1.

The findings from this case study reveal "that each of the functional global networks at Cemex can be considered as a small organization collaborating to achieve the general organization strategic objectives.

According to the leader of Cemex global networks, the networks have different priorities and each of them has its own organizational culture. The themes included below describe how different IT governance priorities in Cemex's networks align with different organizational cultures. These themes are in line with the conceptual framework of this research. Quotes from interviewees 1-11 (Int. 1-11) are used to illustrate relevant themes. The organizational culture types were distinguished from the thematic analysis of the interviews using the OCAI model. Moreover, the IT governance outcomes were distinguished through the four IT governance outcomes introduced by Weill and Ross (2004). The authors transcribed, coded and extracted themes according to the research conceptual framework" (Aasi et al., 2018, p. 4).

"Figure 14 illustrates the characteristic explained by interviewees matching the characteristics of clan culture in relation to integration through IT governance asset utilization and cost saving. The IT platform used by the networks for collaboration is also connected to clan culture by a dashed arrow since it is a tool supporting the clan culture" (Aasi et al., 2018, p. 5).
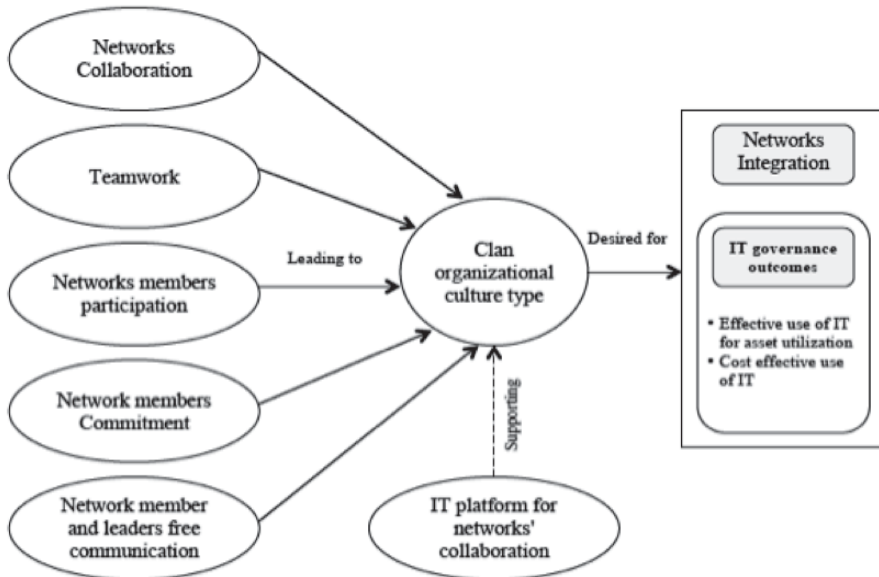
Figure 14.Organizational culture characteristics found to lead to clan culture desired for IT governance outcomes of effective use of IT for asset utilization and cost effective use of IT (Aasi et al., 2018)

"As shown in Figure 14, the clan culture with the focus on collaboration improves integration. According to one of the network leaders: "*The collaboration culture provides an environment for discussing new IT functions, finding the best practices and ways to cut costs. IT managers get informed about different processes and make better decision in process changes and evaluations*" (Int. 4).

Furthermore, network mobilizers follow the KPI assessment results of leaders of different global networks and ask for their ideas. For instance a Dubai manager's ideas turned out to be beneficial in another project in Switzerland. Figure 15 signifies characteristics of adhocracy organizational culture explained by network leaders supporting the effective use of IT for business growth" (Aasi et al., 2018, p. 5).

Figure 15. Organizational culture characteristics found to lead o adhocracy culture desired for IT governance outcome of effective use of IT for growth (Aasi et al., 2018)

"As shown in Figure 15, when there is a focus on the strategic role of IT, the desired characteristics explained by Cemex networks leaders match with the adhocracy culture. Cemex center of excellence and network mobilizers that is connected by dashed arrows to the adhocracy culture facilitate such an organizational culture" (Aasi et al., 2018, p. 7).

"Figure 16 shows the hierarchy and market organizational culture characteristics found to be related to IT governance outcomes of business flexibility and cost effectiveness of IT" (Aasi et al., 2018, p. 7).
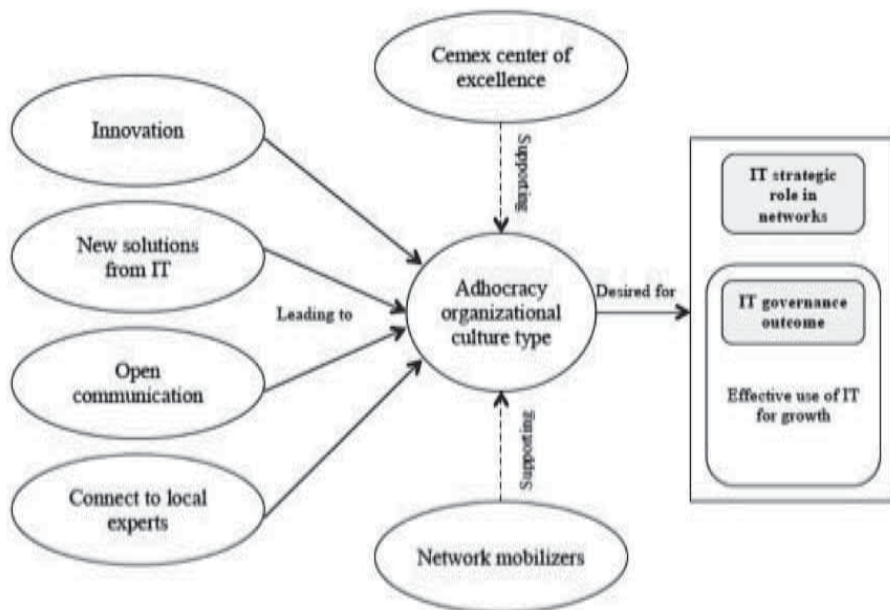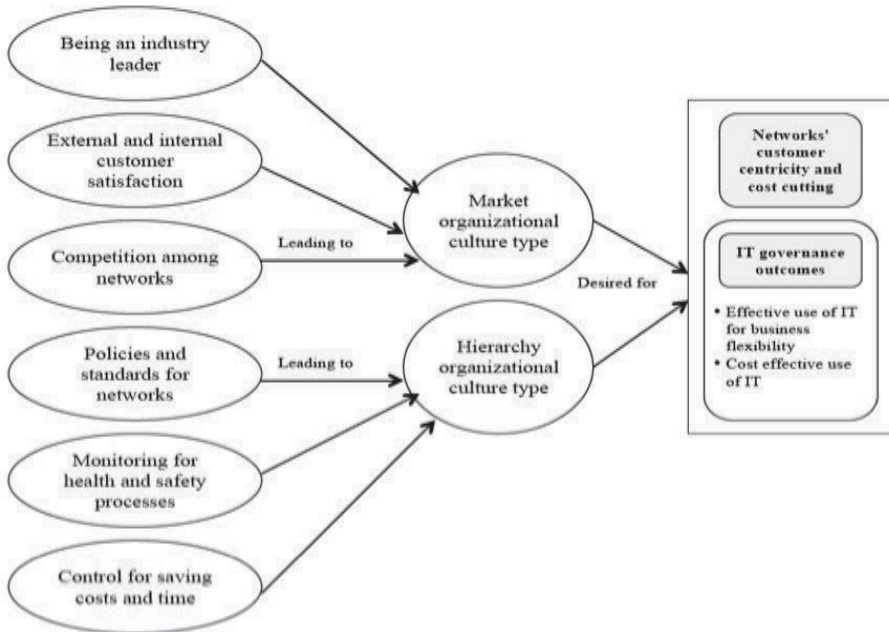
Figure 16. Organizational culture characteristics leading to market and hierarchy culture desired for IT governance outcomes of effective use of IT for business flexibility and cost effective use of IT (Aasi et al., 2018)

"As represented in Figure 16, when different networks at Cemex focus on customer satisfaction, competition with their competitors and cutting costs at the same time, they lean toward a hierarchy and market organizational culture. These organizational culture types are desirable in the networks for gaining effective use of IT for business flexibility and cost cuttings" (Aasi et al., 2018, p. 8).

• Different Organizational Culture Types Desired for Different IT Governance Performance Outcomes

"Figure 17 summarizes the most important findings of this case study. It is not surprising that in such a complex organization with different networks, diverse organizational culture types exist. Based on the priority that each IT governance performance outcome has, a different type of organizational culture proves most appropriate. Figure 17 also shows examples of IT governance outcomes from Cemex networks. Cemex leaders related these examples to the desired organizational culture types" (Aasi et al., 2018, p. 8).
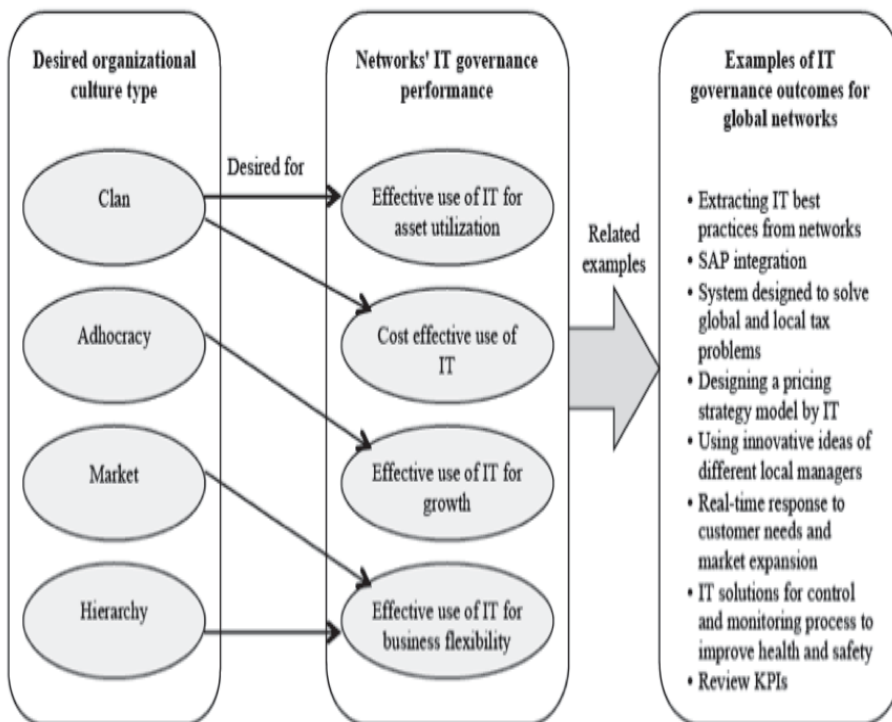
Figure 17. Different organizational culture types in different networks desired for IT governance performance objectives (Aasi et al., 2018).

"In Figure 17, each organizational culture type is linked to the relevant IT governance outcome mentioned by the networks leaders. According to Cameron and Quinn (2011), the organizational culture can be a combination of all four types of clan, adhocracy, market and hierarchy. However there will be one type as the dominant one in each organization. The results from this case study also show that a mixture of all four organizational types can exist in each network. However one or two organizational culture types are more dominant based on the network priorities and focus" (Aasi et al., 2018, p.8).

➢ *Contribution*

• This case study provided results that answer SRQ 1. The findings from the interviews and internal documents and reports from Cemex virtual global networks showed that based on the priority of each IT governance outcome in each network, the network may be directed to a certain type of organizational culture. Of course these networks may have a combination of all four types of organizational culture and they are all under the umbrella of Cemex organizational culture. But each network is more directed to one type of

organizational culture that is dominant in that network. The organizational culture of the networks in relation with four outcomes of IT governance was described in this case study. As shown in Figure 17, the findings from the virtual global networks at Cemex showed that clan organizational culture is more desired in those networks that focus on effective use of IT for asset utilization and cost effective use of IT. Adhocracy organizational culture is more desired in those networks that focus on effective use of IT for growth. The market organizational culture is more desired in those networks more focusing on effective use of IT for business flexibility; and finally the hierarchy organizational culture is more desired in those networks more focusing on effective use of IT for business flexibility and cost effective use of IT.

The findings of this case study describe the influence of each organizational culture type in networks on each one of the IT governance outcomes.

5 Contributions, Limitations and Further Research

This chapter presents the main contributions of this thesis, its limitations and suggestions for future research.

5.1 Research Contributions

This research contributes to the IT governance research field by investigating the influence of organizational culture and structure. IT governance is currently a significant challenge for the managers. In today's dynamic and competitive world, it is hard to imagine an organization operating without IT acting as a strategic partner to the business. However, the way IT is governed makes a substantial difference in achieving the firms' objectives. IT governance deals with the responsibilities, decision rights and behavior in the use of IT in order to gain value from IT in accordance with the business objectives. IT governance consequently deals with monitoring and measuring the IT value for different aspects of the business.

According to the findings of this research, firms are working on improving their IT governance performance. However, in many cases they fail in improving this task and the organizational culture and structure are among the main factors blamed for these failures. The results of this research contribute to the existing knowledge in the IT governance field by providing insight into how the type of organizational culture and the appropriate organizational structure can influence IT governance performance. This contribution was made by responding to the main research question and two sub research questions (SRQ 1 and SRQ 2), introduced at the beginning of this thesis. Literature reviews and case studies were conducted in response to the research questions. Table 16 presents the main contributions with respect to the research questions.

Table 16. Main contributions of the research in relation to the research questions.

Sub Research Questions	Main Contributions
SRQ1: How do different types of organizational culture influence IT governance performance?	-The role of culture in IT governance through a categorization of prior research and identification of the knowledge gaps in this field. -The influence of organizational culture types on IT governance performance outcomes in different organizations
SRQ 2: How is organizational structure related to IT governance performance and IT governance implementation?	-IT organizational structures relationship with IT governance performance and IT governance implementation.

By answering the above sub research questions, the main research question of this research, which was *"How organizational culture and structure are related to IT governance?"*, was answered as well.

A detailed description of the main contributions of this research and how they respond to the research questions is presented below.

➢ The role of culture in IT governance through a categorization of prior research and identification of the knowledge gaps in this field

1. The previous literature on the influence of culture on IT governance was reviewed from the perspectives of both research and practice through two systematic literature reviews. The IT governance framework of practices, structures and relational mechanisms (Van Grembergen and De Heas, 2009) was used to provide a research perspective on the literature. The five focus areas of IT governance including IT value delivery, strategic alignment, risk management, resource management, performance measurement (ITGI, 2003) were used to provide a practice perspective on the literature.
2. These literature reviews demonstrated the importance of the topic and showed that there is a gap in this field. The findings contribute to the knowledge by providing information on what research has been done earlier on the influence of culture on IT governance and its gaps.

3. Literature reviews of this type with a specific focus on prior literature studying culture and IT governance, as their main research question has not been done before. Therefore this research by providing the results from this literature review contributes to the existing knowledge of IT governance. This contribution is through explaining which aspects of IT governance have been studied by previous literature through the lens of cultural influence on them. The results revealed that the role of culture has not been considered in all of the IT governance aspects. The literature reviews also revealed that this topic is recent and there are few research initiatives investigating on it.

➢ The influence of organizational culture types on IT governance performance outcomes in different organizations

1. The influence of organizational culture types on IT governance four objectives was explored through two different case studies. The contribution of this research to the IT governance knowledge is to consider different influences of each organizational culture type on each IT governance objectives. The results from the case studies can help the IT governance researchers to distinguish which organizational culture type of clan, adhocracy, market or hierarchy is desired when aiming to improve the IT governance performance objectives. The results help the researchers to identify the influence of organizational culture on IT governance performance four objectives of: 1) cost effective use of IT, 2) effective use of IT for growth, 3) effective use of IT for asset utilization and 4) effective use of IT for business flexibility (Weill and Ross, 2004); and find the more suitable organizational culture type in improving each of them.
2. Additionally the results of this research can help the researchers in complex organizations with virtual global networks to find the influence of the culture type of each network on their IT governance performance. Different networks in an organization may have different organizational culture that influences their IT governance performance. For instance the adhocracy organizational culture type were desired in networks more seeking for creativity from IT. The clan organizational culture was found to be more desired were networks seek teamwork and cost efficiency from IT. Additionally an important outcome of this research was different sample activities found to be initiated in the organizations to direct their organizational culture in a desired direction matching with their IT governance performance needs.

➢ **IT organizational structures relationship with IT governance performance and IT governance implementation.**

1. This research contributes to the field of IT governance by conducting two case studies demonstrating that decision making positions that are directly or indirectly involved with IT within an organization needs to be changed if the organization is aiming for effective implementation of IT governance. Additionally the suitable organizational structure needs to be selected for the IT department in relation to the four IT governance performance outcomes.

2. This research identifies the organizational structure in relation with the IT governance implementation practices. Through a case study in a large organization, it was shown that when implementing the IT governance practices using ISO/IEC 38500:2008 standard, the organizational structure needs to be changed to be able to adapt with the IT governance needs. Both researchers and practitioners in the IT governance field can use these results to find the correct structure while implementing IT governance.

3. This research also identifies the organizational structure of the IT department while seeking to improve the IT governance performance. A case study conducted in a public organization provided results on the supporting IT organizational structure for IT governance performance. Considering the four objectives of IT governance performance, the researchers can use the results of this study to verify the structure of the IT department and decision makers' positions.

5.2 Limitations

As with all research, this study is not without limitations. The following limitations need to be considered while interpreting the results and analysis of this research. The literature reviews were seeking only on reviewing the papers focusing on culture and IT governance. This was done through systematic literature reviews. This topic is relatively new and there are few papers with deep investigation in this topic. The literature on organizational structure and IT governance was also reviewed, but this literature review was not done systematically like the literature reviews on culture and IT governance. Additionally, organizational structure and organizational culture are related (Janicijevic, 2013) and many papers focusing on the organizational culture on IT governance noted the organizational structure role as well. The organizational structure literature review is presented in the research background. Most of the literature on culture and IT governance included information about the organizational structure too.

There were four single case studies performed in this research and each study was conducted in a single site. Some may argue about the validity of the research in one site, nevertheless it is very common to conduct single case studies in qualitative research. According to a study by Sarker et al. (2013) who reviewed 98 papers in qualitative research, 52% used a single case study. In deep analysis of a topic such as the influence of organizational culture and structure with qualitative approach, single case study methodologies are adequate (Lee and Baskerville, 2003; Walsham, 1995).

Finally there were a sum of four case studies done in this research and the collected data included 31 interviews with the top and middle business and IT managers at these cases together with internal documents from the cases. However the interviewees were only the managers and the other employees were not interviewed during this research. All the limitations mentioned above did not have any impact on answering the research questions; nonetheless they are clarified in order to provide a clear insight on the research results presentation.

5.3 Further Research

This research provides insights from different case studies on how the organizational culture and structure influence IT governance performance. Moreover, this research also suggests the desired type of organizational culture while the organizations are seeking to improve specific objectives of their IT governance. Furthermore the supporting organizational structure of the IT department in relation to IT governance performance and implementation was also discussed in this research. In a future research, further steps can be taken to extend the results of this research concerning the influence of organizational culture and structure on IT governance.

The future research can for instance investigate the influence of organizational culture on IT governance with a quantitative approach. By using a quantitative approach, more data can be collected from different employees working in different levels of organization and not only the managers. By using a combination of qualitative and quantitative approaches in more cases, the role of organizational culture and structure on IT governance can be studied in more details. Furthermore, both national and organizational culture influence on IT governance performance can be considered in case studies within global organizations.

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Appendix 1: Interviews Information

Interview number	Interviewees' position	Organization	Interview length in minutes	Date of In-terview
Case 1				
1	CIO	SwedCon	60	Autumn 2014
2	Vice president of service manage-ment	SwedCon	60	Autumn 2014
3	Head of service & project manage-ment	SwedCon	90	Autumn 2014
4	Business liaison 1	SwedCon	60	Autumn 2014
5	IT architecture	SwedCon	60	Autumn 2014
6	IT supplier & risk management	SwedCon	60	Autumn 2014
7	IT maintenance manager	SwedCon	90	Winter 2015
8	Head of HR & communication	SwedCon	90	Winter 2016
9	Business liaison 2	SwedCon	90	Winter 2016
10	Head of local applications struc-ture	SwedCon	90	Winter 2016
Case 2				
1	CIO	IHC	60	Spring 2016
2	Head of network & society	IHC	60	Spring 2016
3	IT architect	IHC	60	Spring 2016
4	Research project leader	IHC	60	Spring 2016

Case 3				
1	IT manager	Company A	60	Spring 2013
2	CIO	Company A	60	Spring 2013
3	IT manager	Company A	60	Spring 201
4	IT architect	Company A	60	Spring 2013
5	Business manager	Company A	60	Spring 2013
6	Business manager	Company A	60	Spring 2013
Case 4				
1	Director of processes & IT	Cemex	70	Summer 2016
2	Cemex functional networks mobilizer	Cemex	60	Summer 2016
3	Research group innovation manager	Cemex	60	Summer 2016
4	Leader of Cemex functional networks	Cemex	60	Summer 2016
5	IT manager	Cemex	60	Summer 2016
6	Head of global processes in center of excellence	Cemex	50	Autumn 2016
7	Process center of excellence manager	Cemex	60	Autumn 2016
8	Head of business consulting	Cemex	60	Autumn 2016
9	Global processes manager	Cemex	60	Autumn 2016
10	Head of business process methodologies	Cemex	50	Autumn 2016
11	IT planning senior consultant	Cemex	60	Autumn 2016

Appendix 2: Interviews Questions

Case Study 1 Questions

Section 1- General Information

What is your position? For how long you had it?

What is your background?

Who do work with inside or outside your company regarding your job?

Section 2- IT Governance framework questions

How do you recognize IT governance in your company?

Who are the people involved in IT governance in your company?

Do you use any measurement framework, model, tool for IT governance performance?

What are the areas where IT governance works best? Why? (Weill and Ross, 2004)

What are the areas where IT governance is not effective? Why? (Weill and Ross, 2004)

How important are the following outcomes of your IT governance, on a scale from 1 (not important) to 5 (very important)?

You can consider the following clues for each of the 4 outcomes of IT governance, but please fill free to consider any other aspect you believe that should gain attention for each of them.

- Cost – effective use of IT: Mostly in financial terms, how much IT has been beneficial for the business?
- Effective use of IT for growth: How IT has been effective in learning in organization, being innovative, gain competitive advantage and making improving changes in your company?

- Effective use of IT for asset utilization: How successful IT has been to use the knowledge based assets?
- Effective use of IT for business flexibility: How IT has been successful for your business to respond to the internal and external changes?

Governance Outcome	Not Important 1	2	3	4	Im-portant Very 5
Cost – effective use of IT					
Effective use of IT for growth					
Effective use of IT for asset utilization					
Effective use of IT for business flexibility					

What is the influence of the IT governance in your business on the following measures of success, on a scale from 1 (Not successful) to 5 (very successful)?

Governance Outcome	Not successful 1	2	3	4	Very successful 5
Cost – effective use of IT					
Effective use of IT for growth					
Effective use of IT for asset utilization					
Effective use of IT for business flexibility					

What are the communication approaches of the top managers? What methods do they use?

What is your business strategy (Porter: differentiation, focus, cost effectiveness)?

How much the top managers are directly involved in IT governance?

How often do you have changes in IT governance? (Changes in involving who had decision rights for at least one of the key IT decisions)

Section 3- Organizational culture assessment instrument questions
   (Based on OCAI dimensions from Cameron and Quinn, 2011)
For each of the 6 section please divide 100 points among these four alternatives, depending on the extent to which each alternative is similar to your own organization. Give a higher number of points to the alternative that is most similar to your organization. Just be sure that your total equals 100 for each section.
Please fill the "Now" labelled column first which represents your rating how your organization is currently. When you finished please fill the "preferred" column which represents how you think your organization should be in five years to be spectacularly successful.

Organizational culture dimension	Scores	
• **Dominant characteristics**	**Now**	**Preferred**
A. The organization is a very personal place. It is like an extended family. People seem to share a lot of them.		
B. The organization is a very dynamic and entrepreneurial place. People are willing to stick their necks out and take risks.		
C. The organization is very results-oriented. A major concern is with getting the job done. People are very competitive and achievement-oriented.		
D. The organization is a very controlled and structured place. Formal procedures generally govern what people do.		
Total (must be 100)	**100**	**100**
• **Organizational leadership**	**Now**	**Preferred**
A. The leadership in the organization is generally considered to exemplify mentoring, facilitating, or nurturing.		

	Now	Preferred
B. The leadership in the organization is generally considered to exemplify entrepreneurship, innovation, or risk taking.		
C. The leadership in the organization is generally considered to exemplify a no-nonsense, aggressive, results-oriented focus.		
D. The leadership in the organization is generally considered to exemplify coordinating, organizing, or smooth-running efficiency.		
Total (must be 100)	**100**	**100**
• Management of employees	**Now**	**Preferred**
A. The management style in the organization is characterized by teamwork, consensus, and participation.		
B. The management style in the organization is characterized by individual risk taking, innovation, freedom, and uniqueness.		
C. The management style in the organization is characterized by hard-driving competitiveness, high demands, and achievement.		
D. The management style in the organization is characterized by security of employment, conformity, predictability, and stability in relationships.		
Total (must be 100)	**100**	**100**
• Organization glue	**Now**	**Preferred**
A. The glue that holds the organization together is loyalty and mutual trust. Commitment to this organization runs high.		
B. The glue that holds the organization together is commitment to innovation and development. There is an emphasis on being on the cutting edge.		
C. The glue that holds the organization together is the emphasis on achievement and goal accomplishment.		

	Now	Preferred
D. The glue that holds the organization together is formal rules and policies. Maintaining a smooth-running organization is important.		
Total (must be 100)	100	100
• Strategic emphases	**Now**	**Preferred**
A. The organization emphasizes human development. High trust, openness, and participation persist.		
B. The organization emphasizes acquiring new resources and creating new challenges. Trying new things and prospecting for opportunities are valued.		
C. The organization emphasizes competitive actions and achievement. Hitting stretch targets and winning in the marketplace are dominant		
D. The organization emphasizes permanence and stability. Efficiency, control, and smooth operations are important.		
Total (must be 100)	100	100
• Criteria of success	**Now**	**Preferred**
A. The organization defines success on the basis of the development of human resources, teamwork, employee commitment, and concern for people.		
B. The organization defines success on the basis of having the most unique or newest products. It is a product leader and innovator.		
C. The organization defines success on the basis of winning in the marketplace and outpacing the competition. Competitive market leadership is key.		
D. The organization defines success on the basis of efficiency. Dependable delivery, smooth scheduling, and low-cost production are critical.		
Total (must be 100)	100	100

Section 4- OC influence on ITG questions

Do you think the way the relationship between people is defined can affect the performance of your IT governance? (if it is friendly, creative, formal)

Do you think how the employees are managed can affect the IT governance performance?

Do you think how the organization defines its strategy and leadership affects the IT governance performance?

Do you think that the relationships in organization through formal rules or simple communication can affect the IT governance performance?

Do you think that the way the organization defines success is affecting the IT governance performance?

Case Study 2 Questions

Who are the people involved in IT governance in your company?

Do you use any measurement framework, model, tool for IT governance performance?

What are the areas where IT governance works best? Why? (Weill and Ross, 2004)

What are the areas where IT governance is not effective? Why? (Weill and Ross, 2004)

How important are the following outcomes of your IT governance, on a scale from 1 (not important) to 5 (very important)?

You can consider the following clues for each of the 4 outcomes of IT governance, but please fill free to consider any other aspect you believe that should gain attention for each of them.

1. Cost – effective use of IT: Mostly in financial terms, how much IT has been beneficial for the business?
2. Effective use of IT for growth: How IT has been effective in learning in organization, being innovative, gain competitive advantage and making improving changes in your company?
3. Effective use of IT for asset utilization: How successful IT has been to use the knowledge based assets?
4. Effective use of IT for business flexibility: How IT has been successful for your business to respond to the internal and external changes?

Governance Out-come	Not Important 1	2	3	4	Im-portant Very 5
Cost – effective use of IT					
Effective use of IT for growth					
Effective use of IT for					

asset utilization					
Effective use of IT for business flexibility					

What is the influence of the IT governance in your business on the following measures of success, on a scale from 1 (Not successful) to 5 (very successful)?

Governance Out-come	Not successful 1	2	3	4	Very success-ful 5
Cost – effective use of IT					
Effective use of IT for growth					
Effective use of IT for asset utilization					
Effective use of IT for business flexibility					

What are the communication approaches of the top managers? What methods do they use?

What is your business strategy (Porter: differentiation, focus, cost effectiveness)?

How much the top managers are directly involved in IT governance?

1. How is your organization structured? (vertical/horizontal/matrix).
2. How are the divisions in the company separated? Function, product?
4. Could you describe your IT structure?
5. What is the basis behind your choice of IT structure?

Case Study 3 Questions

	IT Governance practices in the Project ITP. Focus on the ISO/IEC 38500:2008.
1	**General background questions**
	Your position and your background
	When did you get involved in the project and in what phase was the project in at that time?
	What is your role in the project? Reason of Project & Portal
2	**Background and initiation of the portal**
	What role does the portal play in "Utvecklingsprojeket" (Development project)?
	Draw a project timeline? /What problem did/will it solve?
	How does it create value internally and externally? Against competitors? Anyone else with a similar function?
3	**Forming the project**
	(COBIT 5, Principle 1, Meeting stakeholder needs) & (The Seven Phases of the Implementation Life Cycle)
	What aspects were most important when creating the portal? Business objective?
	Key value drivers? How are people outside of Company A affected by the project? Were customers and suppliers consulted?
	What are their requirements? How does that turn into IT related goals for the project?
	What is the biggest difference before and after for customers and internally?
	Did you look at similar solutions?
	Did you look into any specific frameworks or models?
	Did you consult anyone?
4	**ISO/IEC 38500:2008 Principle 1 Responsibility**
	How is the organization formed around the Portal; Business units & responsibilities? (Draw organizational chart?)
	Who is responsible for the "IT side"? Talk more about that relationship
	Is the relationship ever evaluated or modified? When fully rolled out, what will the organization around the project look then?
5	**ISO/IEC 38500:2008 Principle 2 Strategy**
	How does business strategy drive IT development in this project? Is IT as support

	function or business driver?
	What effect does IT capabilities play in the forming of business strategy? How does business objectives turn into IT objectives? How are these objectives shared to the different people/units.
	Is there a function for governing that these IT goals are met within time frame etc.?
	Do you measure that IT will reach the intended benefits?
6	**ISO/IEC 38500:2008 Principle 3 Acquisition**
	Have there been any IT investments for this project? (Hardware/Software/Services) Who is responsible for procuring?
	How were these decisions made?
	Are procurements evaluated? (Hardware/Software/Services) ,How?
7	**ISO/IEC 38500:2008 Principle 4 Performance**
	Will the performance of the Portal be measured?
	How? (frequency, usability, down time, complaints?)
	Are there criteria that the portal is supposed to meet?
	Are other unit's measured?
	What kind of risk is there? (Business ex. Loosing clients and operational) Risk within organization. Acceptance? Many business units? Security? Intellectual property? Undisclosed documents? What if the system would crash? How will you work around that? Is that (risk) measured?
	Is there a budget set related to the IT solutions? Is there a budget follow up for the project? How often?
8	**ISO/IEC 38500:2008 Principle 5 Conformance**
	Are there any specific legislation, regulations or standards that you had to adapt to in this project? Any internal policies that you had to consider?
	Any ethical issues? Is there a control function within IT to make sure that these rules and regulations are followed?
9	**ISO/IEC 38500:2008 Principle 6 Human behavior**
	How are people educated to work with the portal? (Internally & externally); Feedback from users?
	Is there a lot of input coming from "down up" in this project? Work in groups? What were the main lessons learned when creating and implementing this portal?

Case Study 4 Questions

CEMEX Member Interview Guide
1. How long have you been a member/participant in the READY-MIX GLOBAL NETWORK and how long have you worked at CEMEX?

2. Can you briefly describe your role in CEMEX? (asking job title)

3. In what ways does the READY-MIX GLOBAL NETWORK facilitate your everyday work?

4. Are there any ways in which the READY-MIX GLOBAL NETWORK impedes your everyday work?

5. How would you describe your participation in the READY-MIX GLOBAL NETWORK?

1. How often do you interact with other members?

2. What type of content to you access?

3. What type of content do you contribute?

4. Can you provide an example of a way that the READY-MIX GLOBAL NETWORK has changed the way you work?

6. Would you say that the existence of the READY-MIX GLOBAL NETWORK and your participation in the READY-MIX NETWORK improves the quality of your work? Can you give any specific examples of how the use of the READY-MIX GLOBAL NETWORK improved a concrete business outcomes under your responsibility?

7. From your perspective as a member of a very large network, what mechanisms must be in place for the network to create value for members?

8. From your perspective, what is the role of the global network leadership?

9. What interaction do you have with the READY-MIX GLOBAL NETWORK leadership and how would you describe the leadership style?

10. Are there conflicts that emerge in such a large network – can you describe an example of a conflict and how it gets resolved?

11. How would you describe the culture of the READY-MIX GLOBAL NETWORK? Follow up questions such as: Do you feel pressure to participate, do you feel rewarded for participating? Are individuals open or closed, as far as the extent to which they contribute valuable information?

12. What specific features of the IT platform supporting the READY-MIX GLOBAL NETWORK do you find most useful? (Including the follow-up questions on how those features are used)

13. Are there specific features of the platform that are less helpful or that are constraining?

14. Any additional comments that may be of value regarding your network community?

1. Which specific character/s of your organizational culture do you find most important to your organization key achievements?

2. How important are these issues to your organization (IT department) on a scale of 1 (lowest) to 5 (highest) importance?

  - Being innovative

  - Team work and collaboration

  - Controlling and monitoring network performance

  - Aggressive completion and customer focus

3. Objective priorities
    - Which one of the above issues (a,b,c,d) do you find more important when seeking to cut costs ?
      i.
      ii.

- Which one of the above issues (a,b,c,d) do you find more important when seeking to obtain competitive advantage?
  - ➢
  - ➢
- Which one of the above issues (a,b,c,d) do you find more important when seeking to optimize asset utilization?
  - 14.
  - 15.
- Which one of the above issues (a,b,c,d) do you find more important when seeking quick response to business needs?
  - 1.
  - 2.

Appendix 3: Interviews Extracts

This appendix includes the sample key points extracted from the interviews performed in each of the four case studies. These samples shows how different quotes from the interviews were thematically analyzed and sorted based on the themes in each case study.

Case Study 1: SwedCon		
Themes	**Key findings from interviews for the influence of OC on ITG**	**Interviews extracts**
OC and Cost-effective use of IT	Clan culture and being team players led to work within the budget. Clan culture helped for fixing the basics (reducing costs by IT). Clan culture is not enough for bringing more value from IT.	"In ITS we have a very clan oriented … being team players is one of our cultural values which leads us to use the most of our teams within the limited budget" (CIO) "In the past 4-5 years it was only [asked from business] go and fix the basics but now the business asks us to come and help to understand what to do to add values … with this new request from business we cannot stay with clan culture and need to change the culture" (CIO)
OC and Effective use of IT for growth	Missing creativity and innovation is causing low use of IT for growth. Moving to adhocracy culture will led to improve ITG performance in terms of uniqueness and innovation	"We have a clan culture now but we need to have more adhocracy in balance with market and hierarchy" (CIO) "ITS four defined cultural values can help us to be more competitive and improve IT governance performance" (Service and project manager) "we are really missing creativity in our culture which is needed for IT governance performance" (Senior manager 1) "moving to adhocracy will help us to improve IT governance … risk taking, innovation, freedom and uniqueness in our culture are very low at the moment" (Service and project manager)

OC and Effective use of IT for asset utilization	Using expertise from separate units (asset utilization) is challenging because of OC. The informal communication through clan culture reduces the level of knowledge integration (asset utilization).	"The most difficult part of ITS governance is to deal with separate local units and the main reason is the organizational culture" (Senior manager 2) "We produce a lot of information in each project but we are not good in using them" "our expertise are mainly used outwards and within each single group and is not integrated through all ITS … we do not share knowledge assets within groups"(CIO) "most of our communication is informal and that is why sometimes in the beginning of projects we do not have information on what resources we have"(IT supplier manager)
OC and Effective use of IT for business flexibility	Clan Informal communication is helpful for business flexibility in some levels, but not in all of them. Cultural differences make it challenging to adapt with new business needs.	"communication is not very formalized, in some levels we have SLA or use some maintenance objectives, but we need to have the same structure"(Senior manager 2) "in some units we have more hierarchy culture and it is a challenge working with new partners or stakeholders when they decide to make changes"(middle manager 1) "the gap between executive management and senior executive teams is affecting their IT governance and responding to the changes"(business liaison)

Case Study 2: IHS	
Themes	**Interviews Extracts**
Organizational structure	• Structure the IT department according to the needs • Set up teams based on each new defined project • Teams set ups are with the current employees • Matrix structure including all IT department staff • Each project is leaded by both research faculty and IT managers • With matrix organizational structure, IT department uses and trains staff for different tasks
IT governance performance in cost effective use IT	• It is important to perform IT projects with lowest costs • It is not high priority for IT department to reduce IHS cost by using IT in different parts
IT governance performance in effective use of IT for growth	• The most important metric for assessing IHS performance is the research projects • Other IHS metrics are the number students and graduates, publications, professors and promotions • IHS has a specific focus on using IT for the research projects • IHS first priority is higher up the rank of their university • Large number of new projects have been defined in the recent years at IHS all involving IT
IT governance performance in effective use of IT for asset utilization	• There is not enough assets to perform IT projects with an acceptable standard • IT is not used to integrate knowledge assets in IHS
IT governance performance in effective use of IT for business flexibility	• IHS strategic plan focuses on using IT to respond to the IT evolution in this developing country

IT governance archetypes	• It is not easy to ask the IHS to employ new team members for IT department • The general budget discussions are between the CIO and IHS financial heads • The projects are defined by the research faculty heads • The budget for each project is allocated by the IHS finance department • There is no IT-business board regular meetings yet • Small IT project decisions are made inside IT department • Medium and large IT project decisions are made by IHS heads

Case Study 3: Company A	
Themes	**Interviews Extracts**
Responsibility (Evaluate, Direct, Monitor)	➤ "Steering group monitors the whole IT governance project". ➤ "A new reference group was formed specifically for this project to give feedback on the project performance". ➤ "The new IT people were employed and evaluated for the specific IT governance project". ➤ "The steering group is seen as the company board". ➤ "The human resources are examined through the project and changes are made". ➤ "New responsibilities are defined based on different project parts". ➤ "These responsibilities create new structure which will be changed after this IT governance project is finished." ➤ "New organization is formed around the portal, after this project, this new organization becomes part of the general organization and the general organization monitors them". ➤ "New organization structure has a new group for monitoring".
Strategy (Evaluate, Direct, Monitor)	• "The new IT governance project is part of a larger project". • "The IT governance projects should support the general business functions of the company". • "Pilot projects were evaluated before the real project were run to evaluate if it meets the business criteria". • "If something in the portal is

	changed, should there be changes applied in the mobile solutions too?"
	• "The strategic goals of the project come from the general organization business goals".
	• "Monitoring happens in different phases, some of the effects from IT governance portal project reveal after one year that project has been running and the new organization needs to continue monitoring it".
Acquisition (Evaluate, Direct, Monitor)	➢ "The new system was built internally in the beginning but later new IT experts were evaluated and employed".
	➢ "IT developers were added to the company previous staff".
	➢ "External sources are also used through outsourcing some tasks such as IT backup".
	➢ "The steering group evaluates the budget".
	➢ "Budget use, new staff, servers and backups are monitored by the steering group".
Performance (Evaluate, Direct, Monitor)	➢ "Risks are evaluated".
	➢ "The tests are pilots are continuously evaluated".
	➢ "There is also education and training regarding the new IT governance project and the new organization structure".
	➢ "How we work and collect feedback".
	➢ "Some performance evaluation phases of the portal are not clear yet for instance the of site data storage evaluation".
	➢ "The parameters to monitor and measure the portal performance is not precisely decided yet".

Conformance (Evaluate, Direct, Monitor)	• "Issues exist such as the degree of openness with customers, the proxies in different locations". • "It should be evaluated if the portal is supported by different systems". • "IT group should work in a way that the industry standards should be considered while implementing the portal".
Human Behavior (Evaluate, Direct, Monitor)	➢ "All involved people and tasks should be considered while implementing the IT governance project". ➢ "There is an IT survey every other year to evaluate the human behavior and receive feedback from more than 2000 people". ➢ "Employees receive training regarding the new structure in connection with the new project". ➢ "The training is one or one and a half day long and all the involved people are guided in all functions". ➢ "It is monitored how the people work within the new structure with the portal the way it is designed to and of they get the expected results".

Case Study 4: Cemex	
Themes	**Interview quotes**
Culture of collaboration desired for integration	☐ "All networks are leaded to the direction of having one single company and not different branches worldwide" ☐ "We use IT in our business process operations and in the recognition and evolution of different practices ☐ "IT value before the volume; 2) Asset management; 3) Aiming for efficiency; 4) Talent management" ☐ "Systems, Applications and Products in data processing (SAP) is used as our main transactional system; but it is not the only one system, we have five different systems worldwide and we are trying to reduce them to three". ☐ "Some local tax issues were solved by using the best practices revealed through collaboration with Cemex networks in another part of the world". ☐ "The collaboration culture provides an environment for discussing new IT functions, finding the best practices and ways to cut costs". ☐ "IT managers get informed about different processes and make better decision in process changes and evaluations".
Culture of innovation desired for business growth: center of excellence and network mobilizers are the keys	➢ "IT is not a provider to Cemex anymore, but is a part of Cemex business. The network used to be a client for IT but now IT (Processes and IT) belongs to the network". ➢ "People can expose themselves easily, managers have dialogue with everyone and have a bidirectional approach". ➢ "The scope of the networks

	range from very simple to very complex subjects". ➤ "The networks members have four hours of meetings every month discussing how different global networks work, they try to find commonalities, innovative ideas and new solution". ➤ "Mobilizers are the hubs". ➤ "They were capable to do this job since they were part of it".
Culture of competition and control desired for business flexibility and customer satisfaction	➤"1) Finding all Cemex processes that directly or indirectly involve health and safety issues and 2) make standardized policies to insure the quality of health and safety in those processes around the world". ➤ "IT governance has a significant role here by creating solutions to gain a lot of visibility in all processes and also provide tracking procedures". ➤"This also prevents extra costs that can occur because of unclear processes and an unstandardized monitoring system". ➤ "IT needs to be very agile to customer needs". ➤ "we are a leader in the ready-mix industry and we want to remain a leader". ➤" Real-time response to customer needs is possible only through the IT governance".

Appendix 4: Included Papers

RP1 to RP7 are reprinted in the following pages.