

Harri Hyvönen

Alignment and Leadership  
in ICT Strategies of Private  
and Public Organizations



JYVÄSKYLÄ STUDIES IN COMPUTING 216

Harri Hyvönen

# Alignment and Leadership in ICT Strategies of Private and Public Organizations

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UNIVERSITY OF JYVÄSKYLÄ

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## ABSTRACT

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Finnish summary

Diss.

This research contains case studies of information and communications technology (ICT) in the strategic reference framework of the investigated organizations operates in both private and public sector organizations. The dissertation includes five publications, each associated with information management processes, leadership, strategic frame of reference, or the methods used.

Finnish small and middle-sized municipalities have limitations concerning the utilization of information technology because their limited resources are dedicated on running the existing systems. Smaller municipalities, especially, have worked in relative isolation, and there has not been any wider networked model between their organizations. The dissertation suggests a concrete model about how a small municipality could plan and implement information management and its related architecture. Small municipalities also have the option of joining into larger units or a network, where development projects can be jointly carried out, financed and achieved results with lower investments.

Strategic positioning of ICT has begun to change gradually from the 1990's to the present. Information and communications technology strategies today are well integrated into the overall strategy framework and its implementation, especially in the private sector. Large Finnish companies operate well in a globalized environment and form part of large networks in which information technology is not only enabler for global businesses but also an important competitive factor. Companies in product businesses and related maintenance services have entered the outsourcing business by offering their customers ICT-based services. Traditional support functions such as IT and Human Resources have suddenly become an important part of companies' business enablers.

The role of outsourcing in increasing the efficiency of ICT remains still significant. Whilst outsourcing has been carried out and widely studied during decades, a large number of outsourcing projects fail. In our studies, we found that when outsourcing projects in challenging markets are launched little attention is paid to how work is to be organized and what kind of talent is needed.

**Keywords:** Information Management, outsourcing, strategy alignment, leadership, municipalities, services.

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## LIST OF THE ORIGINAL ARTICLES

- I. Hyvönen H. and Hokkanen P. (2011). Why to Outsource? Case municipality's IS in one region of Finland. Proceedings of 34<sup>th</sup> Information systems research seminar in Scandinavia (IRIS). Turku, Finland, August 16-19.8.2011.
- II. Nieminen J. and Hyvönen H. (2012). Information System Implementation Model and Observations. Proceedings of 4<sup>th</sup> Well-being in the Information Society (WIS) Conference. Turku, Finland, August 22-24.8.2012.
- III. Hyvönen H. (2014) Operations & Maintenance Business Model Transformation - Multiple Case Studies. Modern Economy (ME) Journal, December 2014.
- IV. Hyvönen H., Helminen M., Watanabe C. (2015) Significance of Supplier Selection Criteria Evolvement in IT Outsourcing to Emerging Economies - Lessons from a Global IT Outsourcing Project. Paper accepted to Journal of Technology Management for Growing Economies (JTMGE), April 2015.
- V. Dahlberg T., Hokkanen P., Hyvönen H., Newman M. (2015). The Tasks and Roles of CIOs: An Evolutionary Model and Its Use. Paper submitted to Human Technology Journal. May 2015.

# 1 INTRODUCTION

Information management plays a very important role in organizations today. Without well-planned and -managed ICT systems and processes, organizations' work could come to a standstill. During the recent decades, the change in ICT has been remarkable. New professions, among them those of information architect, Chief Information Officer (CIO) and IT security manager have been established in larger organizations. Technology progress has enabled companies to move from loosely connected cooperation models to tightly networked ecosystems.

Whilst traditionally ICT is seen as a support function in company's strategy execution (Venkatraman & Henderson, 2000), information management and ICT can enable, when correctly applied, creation of more value, shorter timeframes for processes and cost reductions due to reengineered processes. There are other benefits such as real-time availability of information, ease of creating new relationships and maintaining existing ones and cheaper global reach (Jutla et al., 2001). The role of information management was found to be strategic in the 1980's and emerged in the 1990's as a global enabler for companies' transformation (Lacity & Hirschheim, 1993). The literature widely discusses the role of information management in organizations from simple administrative support to complex strategic position (Farrell, 2003; Jeanne & David 1999). Around the turn of the millennium, its strategic role as a change agent was thought to be increasing (Gottschalk & Taylor, 2000).

A positive correlation between ICT investments and productivity is perceived whenever the implementation of new technologies has been correctly done (Brynjolfsson, 2003). The increased strategic role and importance of IM with the emergence of digital business models makes alignment of strategies even more critical (Sambamurthy et al., 2003). Both company business and ICT executives have key roles in that. These tasks fall within the realm of companies' governance striving to provide maximum benefits for ICT investments and performance and to create value and competitive advantage in the markets (Sääksjärvi, 2004; Bricknall et al., 2007). In information intensive industries where some vision of the future of ICT exists, ICT can create strategic opportu-

nities and competitive advantage by bringing in technology with a good fit for long-term objectives (Reich & Benbasat, 1996; Sambamurthy et al., 2003).

Some authors entertain different views. According to them, a competitive advantage cannot be created by investing on technology, ICT projects often failing without generating the expected value for organizations (Alter, 2013). It is difficult to judge whether ICT is truly as transformative as its ubiquity is obvious (Carr, 2003). ICT investments need other complementary investments to gain benefit from ICT, and it may take several years before business processes and controls are changed (Brynjolfsson, 2003). Therefore, information management as a function has clearly a broader role in company change, not only in ICT (Byrnes, 2005). Lack of alignment between business and ICT strategies is one of the main reasons why enterprises fail to exploit the full potential of their ICT investments (Henderson & Venkatraman, 1993).

However, many organizations, both in the private and public sector, are still in the middle of a large transformation with their IM. Leading ICT means leading complex networks. Organizations' objectives are to further automate processes and increase productivity through the utilization of ICT. They invest a lot in that. Still today, ICT's added value is hard to demonstrate. The value added by and the benefits of the investments on new ICT systems and technologies generate discussion in both the private and the public sector.

The research carried out in this study deals both with the public sector and private sector ICT. In Finland, the total size of ICT markets, including hardware, software and ICT services, is approximately € 10 billion (Market Visio, 2014), of which the public sector's share is approximately € 2 billion. Public sector ICT responsibilities are delegated to municipalities, various ministries and offices of ICT organizations. There are a great number of small municipalities in Finland. Whilst Finland has been ranked number one in overall global ICT utilization (World Economic Forum, 2013), its public sector organizations do not have the same flexibility to adopt ICT as private companies do. Small public organizations, in particular, do not have enough resources and common methods for developing and maintaining ICT on their own. There are challenges requiring continuous compliance with the Public Procurement Act and other rules and requirements set by the government. Resulting from the lack of development resources, there is a need to continue creation of networks for higher consolidation and centralized offering of public ICT services. However, there is a large number of EU and national level strategic programs, and joining them offers a good strategy for satisfying that need. Public sector ICT has not been centrally managed, and collaboration networks have traditionally been small and local. Recently, there have been efforts to improve the situation by legislative means, country-wide development programs and also by the support of independent organizations such as SITRA. Realization of those plans is mandatory for improved public sector efficiency in the coming years in Finland.

## 1.1 Research questions

The purpose of the case studies is to understand how organizations execute their strategies through ICT and outsourcing and to examine how the role of IM has changed in complex networked organizations. We also need to understand the key aspects influencing how well strategies can be aligned with ICT in small public organizations vs. large multi-business companies.

Private companies aim to make profit and increase shareholder value. Public organizations are owned by the state or municipalities, and their objective is to establish services for citizens within given budget frames mainly funded by taxation. The principal way to enable companies' strategies is to create and deliver ICT services required by them. Private ICT clearly has a role in making processes efficient; in public organizations, on the other hand, the need to carry out work according to regulations and agreed controls seems more compelling.

In the literature, there are many studies on the strategic alignment model based on theoretical research and on how that has been applied by practitioners in large private companies. However, there seems to be little research on how well small organizations, especially small public ones, can follow and execute their strategy (Hussin et al., 2002). Also the role of information management and CIO's leadership role are linked with strategy execution. A number of alignment models have been published in the literature, primary among them being the strategic alignment model (SAM). However, there is little published research that would attempt to validate SAM or describe its use in practice (Avison et al., 2004). Gutierrez et al. (2008) emphasize the need to measure the contribution of the theoretical alignment model and alignment and their benefits in practice. By completing a systematic analysis, the management will get needed information to allow a graphical interpretation of the organization's position from a strategic, structural and operational perspective. This would act as an indicator for the type and degree of alignment (Avison et al., 2004). The importance of the need for a strategic alignment concept is thus highlighted (Jouirou & Kalika, 2004).

The following themes around strategy alignment and ICT's role were chosen as the key research objectives for this dissertation:

- Differences between small public and larger private organizations in strategy alignment and execution in business and IM
- Emerging role of leadership in information management organizations and complex networks
- Outsourcing as a tool for transforming ICT in organizations

For the issues described above, the key questions in this dissertation are:

- *“How are ICT and business units strategies aligned in the strategies of public or private organizations of various sizes?”*
- *“How does ICT as a support function execute public or private organizations' strategies where ICT services are outsourced?”*
- *“How is the role of CIO seen in organizational networks from strategy and outsourcing point of view?”*

## 1.2 Relationships of the included articles

This dissertation includes five articles. In all of them, we have used case studies but in different forms. There were three different interview rounds.

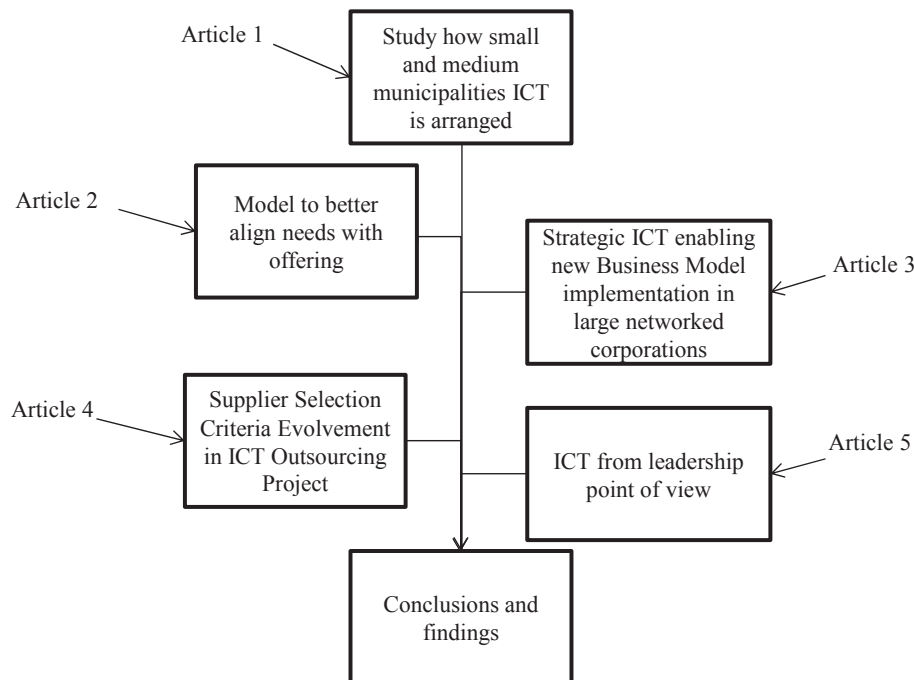


FIGURE 1 Relationships between articles

In this dissertation, we have examined how issues in figure 1 are interrelated. With the help of case studies in the articles, we also create a view on how these issues are seen in practice. Information Technology (IT) and Information, Communication and Technology (ICT) are very close as terminology and interchangeable with each other (Carr, 2003); when we mention IT, we also mean ICT, which, thus, is used as a wider term in this study.



## 2 THEORETICAL BACKGROUND

This chapter suggests background and theoretical review for research topics. The first chapter is background information for public sector ICT in Finland and the other chapters are theories for studied issues in articles.

### 2.1 Public sector ICT

Municipalities are independent, but their services to people are regulated by the government. When the total taxation revenue decreases as the proportion of older people increases, municipalities are forced to offer wider and more efficient services. Whilst the basic tasks remain much the same as before, applications and systems today are very fragmented and not compatible with each other. On the other hand, there are good examples of ICT systems development in the public sector receiving a lot of positive feedback. One good example is Finland's taxation system, which enables Finnish citizens to do their tax returns easily by using a web-based ICT system.

Municipalities' annual total spending on ICT amounts to € 830 million (Kunnat.net 2014). Of this, the share of the five metropolitan municipalities (Helsinki, Espoo, Vantaa, Kauniainen, Sipoo) is about 22% (Kuntajakoselvitys, 2014). Municipalities' decision making differs from that in private companies. In municipalities, the officials prepare decisions but final decisions are made by politicians representing different political parties. Recently, there has been a lot of discussion on and reorganizing of social and health care as that is clearly the biggest operational expense factor in the municipalities' budget covering 48% of the total public spending (Kunnat.net, 2013). Accordingly, ICT for social and health care represents the biggest single area of expenditure in ICT budgets. The second largest area is education and learning, amounting to 28%. Other focus areas in ICT execution and development needs are related to the municipalities' governance, digitalization and remote services.

ICT innovations have proven to be effective platforms to facilitate knowledge sharing, skills development, transfer of innovative e-government solutions and capacity-building for sustainable development among countries. E-government can generate important benefits in the form of new employment, better health and education (United Nations, 2014). In the rankings for e-government, Finland has gone down one position compared to 2012 but still holds the 10<sup>th</sup> position (United Nations 2014). France and Netherlands are placed higher than Finland. Although Finland's ranking is quite high, we conclude that the present level of ICT utilization and investment for common ICT infrastructure and systems in smaller public sector organizations is low. In e-Participation rankings, Finland is not among the top ten countries. Finland has scored well in the UN index for telecommunications infrastructure (0.8594 out of 1.0000) and in the Human Capital index (0.9037), but it is not included in the top index of the OnLine Service Component (0.7717). Finland gets a low ranking for engagement in decision-making processes ("e-decision making"), where its score is 22.22. For example, France's score is 77.78.

Finnish municipalities have existed since the early years of the country's independence. Their role and tasks are defined in laws and regulations. Unification of processes and ICT solutions have to be aligned with laws and regulations before aiming for competitive benefit or maximal efficiency. Every municipality has its own decision making and governance, and they can independently decide on how those defined tasks are carried out. There are several public sector strategies, with which also smaller municipalities need to get aligned. This has a strong bearing on ICT as is shown in table 1.

TABLE 1 Strategies for Finnish public organizations

	<b>Strategic program</b>	<b>Content and target</b>
<b>1</b>	Broadband for everyone	Until 2020 everyone need to have 30 Mbit/s broadband connections and until 2015 half of households cover 100 Mbit/s connections
<b>2</b>	National service channel	To create concept for user digital identification and authorization and open interfaces between digital services
<b>3</b>	TORI-program	To establish national ICT organization, which provides ICT application, computing and user care services for public organizations
<b>4</b>	SADe-program	To create platform for digital services (e.g. health and social-, learning- and infrastructure services) to ensure their inter-operations and virtual use
<b>5</b>	SOTE-services	Nationwide strategy for enhancing health and social services new organization including e.g health services remote use
<b>6</b>	EU digital strategies 2010, 2012	EU wide strategy to develop, deploy and use ICT and digital services

7	Europe 2020 strategy	EU wide strategy to increase use of digital innovation and use and improve EU competitiveness
8	Horizont 2020 program	Program which supports EU targets in creating industrial leadership and competitive frameworks, create excellence in social base and tackling social challenges. ICT has a wide role in realizing targets.
9	Government agenda 2011	Finland's government agenda target is to raise Finnish nation as a most knowledgeable citizen in the world until 2020. ICT is has a vital role in this agenda realization.
10	Information community program 2012	Whilst education is on high level in Finland, this program target is to raise remarkably ICT utilization in teaching and learning in schools and universities
11	KIDE intelligence strategy	The ministry of learning and culture has set a target to enhance ICT and digital environments teaching and learning to ensure better utilization of ICT in the future
12	ICT strategy for public governance 2012	Strategy, which aims to improve service innovations, open access and capabilities to utilize ICT efficiently in public organizations.
13	Middle Finland strategy and ICT strategy	Strategies, which includes list of activities to develop middle Finland's learning, social- and healthcare, ICT business, ICT security and digital services
14	Security and cyber strategies (INKA, EU, TUVE) 2013	Several EU and nationwide programs and strategies for information security development and management

Instead of just getting aligned with their own strategy, municipalities need to get aligned with the established strategies of the area, nation or even EU-wide programs. To facilitate this, an independent development organization "SITRA" has appointed middle layer administrators between the government and the municipalities. These middle layers, "Kuntien Tiera" and "Kuntien Taitoa", are service consortiums or providers for several municipalities and public sector organizations with similar types of needs. They are able to provide models, templates, processes and platforms for large but especially smaller municipalities which otherwise cannot deliver IT services with their own resources. At the end of 2014, a total of 194 municipalities out of 320 were owners of "Kuntien Tiera". However, it is remarkable that only four of the ten largest municipalities had joined to it. Joining forces with a leading country-wide networked-model organization would offer a good opportunity to speed up development and implementation of common ICT solutions. That kind of co-operation and consolidation appeared in large privately-owned companies already in the 1990's. This inertia is exemplified by the recent plan for future ICT management for five large municipalities (Helsinki, Espoo, Vantaa, Kauniainen and Sipoo) (Metropoli Selvitys, 2014). The planning is focusing on having ICT services just

for those five public organizations from 1<sup>st</sup> January 2017. The plan includes no references to any other municipalities' network or to the country-wide ICT provider "Kuntien Tiera".

## 2.2 Strategy and ICT alignment

Through the past decades, ICT has turned out to be of critical and strategic importance for many businesses (Henderson & Venkatraman, 1993). During the last decade, ICT has focused on increasing efficiency and effectiveness (Vaidya, 2012). ICT spending varies depending on the industry, but the average percentage of IT spending in operating expenses was 4.7 % (Gartner, 2013). That is notable, as it is on the same level as e.g. R&D spending, which is 4-5% on the average (Booz & co., 2013). By outsourcing, ICT companies are trying to improve cost-efficiency and performance as well as focusing on core competences (Feeny & Willcocks, 1998). Strategic actions are led by organizations' executives and strategic level make-or-buy decisions are made on companies' top levels (Graf & Mudambi, 2005). During the last four decades, outsourcing has been commonly used as a model for organizations to acquire ICT services, and the model is continuously actively discussed and researched (Lacity & Hirschheim, 1993). Outsourcing agreements are strategic and normally last for several years (DiRomauldo & Gurbaxani, 1998). These agreements can, in the best case, offer scalability and new capabilities with cost-efficiency, but, in the worst case, they are a big risk for companies' development and can affect their future needs (Lacity & Hirschheim, 1993).

Due to ICT's crucial strategic importance, there have been many studies on the alignment theory. However, more studies are needed to deepen our understanding about how the alignment of strategies and IM role are seen as a part of the practice (Avison et al., 2004). More research is needed especially on how outsourcing as a strategic level vehicle in smaller organizations is implemented and why there are differences between public and private organizations' ICT. As a member of the top team, the CIO is typically responsible for recommending ICT platform strategy to the top management team (Reynolds, 2009). However, this role is defined and implemented in diverse ways, and in many smaller organizations this leadership role may even be missing.

In order to describe how large the transformation has been, table2 lists the leading themes for information management and the contents of the CIO role for the past decades (Hirschheim & Klein, 2012).

TABLE 2 Key focus areas for Information Management 1981-2020

	1981-1990	1991-2000	2001-2010	2011-2020
<b>Hardware and Software</b>	Expansion of internet mainframe computing, appearance of PCs, in-house coded systems	Expansion of the Internet and e-mail Client-Server architectures, focus on ERP systems	Expansion of mobile technologies, virtualized servers, Web applications, expansion	Social media, Big Data, cloud computing
<b>Skills</b>	Program languages and coding	Large change programs	Processes & Systems configuration management	Outsourced application development
<b>Management</b>	Focus on in-house user-led systems development and management	Outsourcing expansion, CIO role enhancing	Business IT emergency. Networked way of working	IM as a recognized part in organizations governance. More complex networks

In private sector, ICT has been well entrenched in companies' strategy planning and seen as an enabler for creating competitive advantages. The new business model has been enabled with the help of the latest ICT innovations, which have created rapidly growing businesses around the internet. These include game businesses, e-commerce and related IT security products and services. ICT, where the strategic IT systems are centralized but used globally, is highly critical for organizations' processes. These complexities make CIOs to buy ICT services from external ICT suppliers and to outsource earlier in-house functions. Large international companies have global collaboration networks with leading ICT suppliers, and outsourcing of ICT continues to grow. Outsourcing projects demand right types of competences and know-how but also suitable organizational cultures between customers and suppliers, already at the beginning of their outsourcing projects.

A strategy is a pattern or plan that integrates an organization's major goals, policies and action sequences into a cohesive whole (Mintzberg, 1999). A well-formulated strategy helps to structure and allocate the organization's resources into a unique and viable posture, based on its relative internal competences and shortcomings, anticipated changes in the environment and contingent moves by intelligent opponents. IT strategy, especially, is a complex management process

that generates the organization's plans and activities in several major areas (Glaser & Holton, 2004). A company has to make strategic choices. Without choices, competitive advantages, such as the use of ICT, will be quickly copied and duplicated. If those choices are unique for the company, imitation will be much harder (Weill et al., 2002)

Strategies have to be aligned and executed with a discipline integrated to strategy and led by business and ICT management (Bossidy & Charan, 2011). Alignment between business and ICT has a positive impact on organizations' performance (Gerow et al., 2014). Organizations which want to gain competitive advantage by using ICT should integrate their ICT strategy with their overall business strategy (Rapp, 2002). Managing strategy is about managing change. A strategy can describe how an organization intends to create value for its stakeholders. Two types of behavioral change objectives can be proposed in this respect: those needed to create customer and shareholder value and those required to execute the strategy (Kaplan & Norton, 2004).

Inability to realize value from ICT investments is in part due to lack of alignment between business and ICT strategies. Both business and ICT executives have to take the lead in designing a business platform (Venkatraman & Henderson, 2000). Strategic alignment continues to be a major concern for business executives (Avison et al., 2004). Strategic alignment between business strategies and ICT improves both organizational and business performance (Jouirou & Kalika, 2004; Sabherwal & Chan, 2001). Business and ICT need to have a common strategy, vision and measures but also values (Reich & Benbasat, 2000). Also, there is a need to create a strategic level harmony between business and company infrastructures by using a systematic approach (Coleman & Papp, 2006).

Different parts of the organization want to prioritize their needs and often do not take into account corporate needs. They may want to move costs related to their own needs to higher corporate levels, which leads to sub-optimization (Hamel & Prahalad, 1989). A company may manage a short term improvement by just enabling business processes with ICT, but, to reach a real longer-term organizational performance improvement, alignment between business strategies and ICT has to be carried out. For the strategic impact to take hold, a longer time, usually more than one year, might be required (Schwarz et al., 2010).

Strategy alignment is a widely discussed topic among researchers and practitioners of information systems (IS). ICT strategic alignment is defined as "the degree to which a company's mission, goals, and business plans are shared and supported by ICT strategy" (Chan & Reich, 2007). Alignment between business strategy and ICT has been of interest for ICT executives for the past few decades. Business executives and ICT executives should together discuss how to map corporate strategies (Luftman & Kempaiah, 2008; Benbasat & Zmud, 2003). Strategic management of ICT has continued to receive attention from researchers and managers because of the increasing role of ICT in business and enhanced the need for integration of new and existing systems (Kearns & Lederer, 2003). Luftman & Brier (1999), in their study, pointed out how align-



ment was seen by executives in 500 companies: only half of them agreed that ICT and business strategies were aligned, 42% disagreed and the rest did not have clear view. There is a lot of discussion on the topic but a little evidence about which organizations should align their ICT and business strategies (Venkatraman & Henderson, 2000).

### 2.3 Strategic Alignment Model (SAM)

There are theories which help to understand how strategic position analyses for ICT can be done. The literature suggests that organizations cannot be competitive or successful if their business and ICT strategies are not aligned (Sabherwal & Chan, 2001). One commonly used theory is the resource-based view (RBV), which focuses on organizations' capabilities and resources that can be correlated to organizational performance in ICT functions (Bharadwaj, 2000). In aligning business and ICT strategies, proper technical skills as well as a centralized portfolio and project management are needed for challenging suppliers and partners in place (Cloux et al., 2013). The Strategic Grid is a well-known model which allows visualization of the relationship between ICT strategy and business strategy, while considering both present and future situations (McFarlan, 1984). Though there are many choices that can be used in explaining IM transformation, this dissertation is focusing on strategy alignment because there are fewer studies of the use of SAM, especially in smaller public organizations.

The strategic alignment model describes a model in which a company strategy and ICT are aligned. It also explains how to cope with the very problematic interplay of business and ICT domains in companies (Henderson & Venkatraman, 1993). SAM suggests how to fit together the organization's structure and the strategy and carry out integration between business and ICT. The model argues that business has a leading role; ICT is seen as a support function for it. However, both need to play leading role in defining the business platform, and that role must be continuous. Strategic decisions are needed to get clarity between organizations' different parts (Venkatraman & Henderson, 2000). SAM has an external dimension consisting of products, competencies and governance and internal dimension, which includes infrastructure, processes and the needed skills. The key in applying SAM is to find a fit between strategy and structure as well as functional integration. Strategic alignment is more a process than an event (Henderson & Venkatraman, 1993). The key part of the model is described in a matrix (figure 2), which designs four perspectives for alignment: strategy execution, technology transformation, competitive potential and service level type of alignment. That model is extensively referred to as the ICT alignment model (Chan & Reich, 2007; Reynolds P, 2009). The strategic alignment model has undergone limited evolution (Hirschheim & Sabherwal, 2001; Maes, 1999; Maes et al., 2000; Reynolds, 2009).

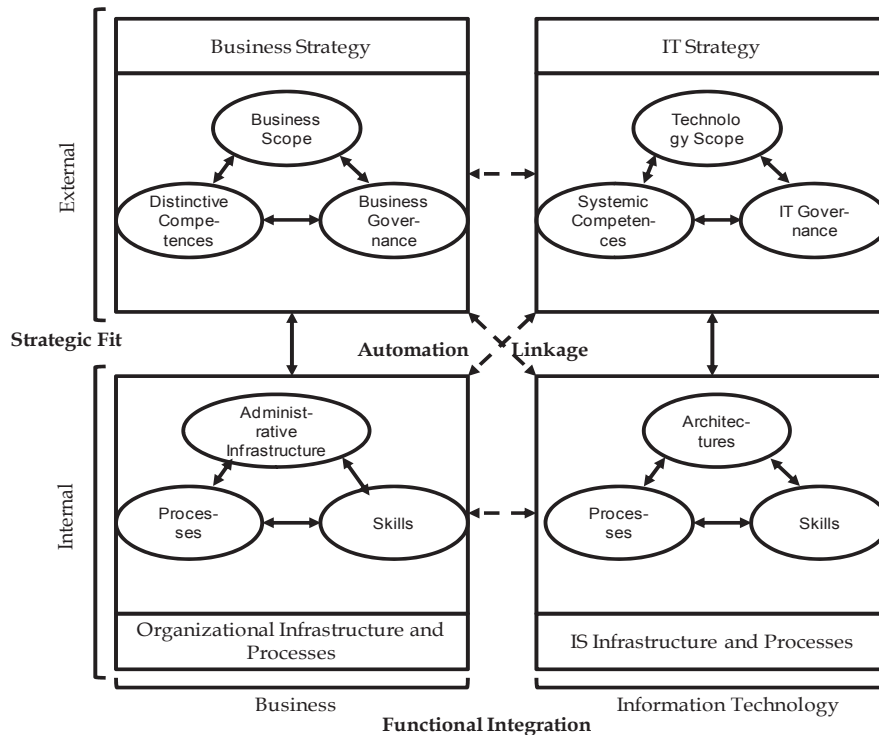


FIGURE 2 Strategic Alignment Model - SAM (Henderson & Venkatraman, 1993)

The critique of the strategic alignment model is that it considers alignment on a single level and does not consider different business units inside the company. The model has been modified to be used not only on a corporate level but also on a business unit level, and it has been found that alignment between corporate and business unit levels can be different (Reich & Benbasat, 1996). Some critique has been expressed against SAM's staging order of ICT alignment process, which commences with ICT strategy, followed by an adjustment to business strategy or ICT infrastructure. The likelihood is not high for an ICT strategy alone to define the capabilities that would provide competitive advantage through their unique positioning in the external environment, independently of any complementary business capabilities. As such, SAM may include paths that are not viable in practice. Instead, we may assume that ICT capabilities would create value through complementary relationships with business capabilities (Reynolds, 2009; Clemons & Row, 1991).

Alignment between business strategies and ICT is still emerging, and we need more understanding and explaining of this phenomenon (Gutierrez et al., 2009). Organizations, both public and private, need to improve their efficiency by investing on ICT, but ICT can also be an enabler for totally new business models and processes (Sambamurthy et al., 2003). Though SAM has been widely referred to, practical examples of how it is used are limited (Avison et al., 2004). SAM has been modified and explained in further studies (Maes et al.,



2000; Hirschheim & Sabherwal, 2001; Reynolds, 2009) as being a more dynamic model for aligning ICT and business topics. However, SAM has been widely generalized and is not as such applicable for explaining e.g. dynamics of different business units' needs vs. corporate strategy alignment with the organization's ICT (Reynolds, 2009). Little empirical evidence exists that would relate collaborative business and ICT planning to higher ICT success (Sabherwal, 1999). Several studies focus on the corporate unit level and not on a single business unit (Hodgkinson, 1996). Broadbent & Weill (1997) researched ICT structures, and Ross et al. (2006) studied Enterprise Architectures. Alignment takes place poorly in practice, as 66% of organizations do not even formulate an ICT strategy (Hochstraser & Griffiths, 1991). Both private and publicly-owned organizations have many ICT-enabled processes implemented, but they have their own characteristics and ways to create strategies. Public organizations are more regulated (Hyvönen & Hokkanen, 2011), which makes public organizations' decision making more complex.

Strategic alignment and its linkages between business and ICT objectives have two dimensions; 1) intellectual, where the content of information technology and business plans are internally consistent and externally valid and 2) social, where ICT and business executives understand each others' objectives and plans (Reich & Benbasat, 1996). Even though ICT's strategic importance is well known, current studies suggests that business management participation in ICT planning may be weak and e.g. CEOs appear to articulate for support while apparently not providing it (Kearns & Lederer, 2003). ICT projects are seen as problematic, their success rate is low and there is no or very little uniformity in the form that ICT projects have been selected (Laurindo & Moraes, 2006). A few success stories and many horror stories have been told, particularly about the failure of ICT groups to meet time and cost targets (Nord et al., 2007). Therefore, common governance between business and ICT is necessary: a good relationship between the CIO and business managers and their decision-making capability regarding ICT infrastructure investments will reflect in better IS effectiveness (Sääksjärvi, 2000).

Strategies are needed in public organizations, especially in designing e-government, because they provide objectives for agencies and governments' organizations. The degree of centralization or decentralization is a key component in e-government management (Seifert & McLoughlin, 2007). ICT alignment is seen as problematic in practice, as there are only few practical examples about how to build continuous alignment between business and ICT, about a proper follow-up of the results and about realization of the strategy execution plan. In practice, a strategy alignment is done once and covers the whole corporation instead of different business unit's needs (Avison et al., 2004). It is mandatory to continuously align the business strategy with a transforming delivery strategy, ideally with each business unit (Cloux & Eberhardt, 2013). This is seen as a shortfall of the SAM theory in practice, especially in the alignment of business and ICT strategy in multi-business organizations. Differences in how strategic alignment should be done, can be seen e.g. in e-business, where executing a

strategic plan requires that the customer has to be on the central focus of the business and related knowledge management. This should be highlighted throughout the whole company and its strategy (Jutla et al., 2001).

The Dynamic Alignment model (DAM) builds on SAM and considers coherence between corporate and strategic business units as well as the fit between business and ICT capabilities (Reynolds, 2009). The benefit with using this model is that both corporate strategy and business units' strategies are involved with the alignment and also complementary capabilities are considered. According to Reynolds (2009), SAM focuses on external markets where its suitability between strategy and structure is assessed whereas DAM focuses on organizational capabilities and on the fit between strategies within organization's different levels. Alignment is a process, and the same ICT strategy cannot fit for all types of businesses; one strategy cannot serve multiple business units as they are at different stages (Bruce, 1998).

## 2.4 Collaboration networks governance

We meet networks everywhere in business, science and in our life (Barabási, 2014). Networks are rich and powerful, and we can observe strong trends of networked phenomena also in ICT leadership and strategy alignment in organizations. Implementation of strategies takes place through networks, which can be social, political or economical. Networks research is very wide and can be applied not only to economics, politics, culture, chemistry, genome research, communication, and logistics but also to information systems. Many studies have been done to explore self-organizing and evolving networks with fat-tailed distributions of connections. The key network theories include those of random universe, small-world, fat-tail, hubs and power-law. These have been proposed to explain for example how internet is evolving or how diseases spread (Dorogovtsev & Mendes 2013). Networks are very compact and have no well-defined metrics. Networks have several levels of structural organization in several scales: the local structure of the connections of a vertex, the structure of connections in its environment, and the long-range structure of network. This study focuses on collaboration networks, and the related mathematical analyses are not explored further. A scale-free model can explain some of our observations.

Among the definitions of collaboration is the following (Thomson et al., 2009): *Collaboration is a process in which autonomous or semi-autonomous actors interact through formal and informal negotiation, jointly creating rules and structures governing their relationships and ways to act or decide on the issues that brought them together; it is a process involving shared norms and mutually beneficial interactions.* The nature of networks is described well by the following (O'Toole, 1997): *Networks are structures of interdependence involving multiple organizations or parts thereof, where one unit is not merely the formal subordinate of the others in some larger hierarchical arrangement.*

Barabási & Albert (1999) when observing their research nodes which have more connections than others referred to them as “hubs”. They created the term scale-free networks, by which they meant networks with a strong power-law degree distribution. These networks have also sub-nodes, which can be local and are called clusters. In the proposed scale-free network model, preferential attachment and strong hubs explain the growth of complex networks. Random network models assume that the probability that two vertices are connected is random and uniform (Barabási & Albert, 1999). In contrast, most real networks exhibit preferential connectivity. Networks expand continuously by the addition of new vertices, and new vertices attach preferentially to already connect sites (Dorogovtsev & Mendes, 2002). That can explain some behavior in complex collaboration networks, including information management ecosystems, as growth and preferential attachment are mechanisms common to a number of complex systems, such as business networks, social networks (describing individuals or organizations) and transportation networks. Networks are growing where new edges become preferentially attached to vertices. This means that more densely connected vertices have better chances to get new connections (Dorogovtsev & Mendes, 2013). In real life, people or organizations can be connected to several types of hubs that may be different by their nature (e.g. business, political and social). Collaborative network organizations require the ability to understand complexity in order to develop models but especially to improve their decision making (Camarinha-Matos & Afsarmanesh, 2007). Networks management varies, depending on how networks are structured. Three models (figure 3) for structuring collaboration networks have been proposed: 1) “Self-Governed, 2) “Lead Organization” and 3) “Network Administrative Organization” (Milward & Provan, 2006).

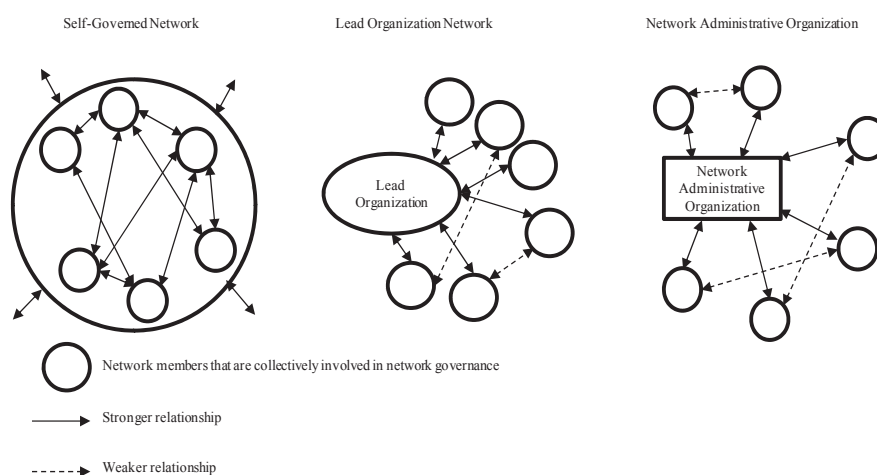


FIGURE 3 Networked collaboration models (Milward & Provan, 2006)

Organizations that make successful investments in ICT have a careful, transparent and deliberate process of governance by information technology councils or

steering committees, among others (Weill et al., 2002). Lack of coordination can hinder effective progressing of strategic change activities, and successful implementation requires managers from both domains to collaborate during the entire planning and implementation cycle (Radeke, 2011). Organizations with higher information intensity have greater alignment participation by business executives and the CIO (Kearns & Lederer, 2003). Most authors agree on ICT governance being a top management concern for controlling ICT's strategic impact and its value delivery to the business. ICT has to be led with well-structured and consistent policies, processes and governance among and between business units, especially when making and implementing decisions regarding goals, processes, people and technology on a tactical and strategic level (Simonsson & Johnson, 2008).

It has been claimed that there is a lack of communication between business and ICT groups, and ICT people are perceived to be highly technically focused and lacking business knowledge (Nord et al., 2007). Strategy execution has to be measured, and the balance scorecard as part of a management system translates strategy to understandable performance measures (Kaplan & Norton, 1996). In the last decade, balance scorecard has been applied to information technology, and it is seen as a powerful tool for ICT management in measuring the performance of ICT. These measures can be financial or non-financial. Besides business strategy and Balanced Scorecard, ICT can also have its own scorecard, which consists of user's orientation, operational excellence, future orientation and business contribution (Grembergen & Saull, 2000). Individual, team and departmental goals and incentives need to be linked to the attainment of strategic objectives (Kaplan & Norton, 2004). Business value measurements and scorecard metrics consist of vision, mission and strategy-based business value, which should be aligned between business and ICT (Bricknall et al., 2007). The strategic grid framework provides executives' access to the current strategic impact of the organization's ICT (McFarlan et al., 1983).

## 2.5 ICT outsourcing

ICT outsourcing has been extensively studied during the last decades since Kodak Eastman outsourced their ICT to IBM in 1989 (Dibbern et al., 2004). Outsourcing, in its most basic form, can be conceived of as purchase of goods or services that were previously provided internally (Lacity & Hirschheim, 1993). Company strategy defines its long-term goals and targets. In a similar way, also outsourcing agreements are for lengthy periods (Lacity & Hirschheim, 1993). Outsourcing is built on three theories: Transaction cost theory (Williamson, 1985), Resource-Based view (Barney, 1991) and the theories of the organization and the firm (Hymer, 1976). These create, accordingly, three objectives: cost savings, process improvement and flexibility and capability enhancement (Hätönen, 2008). A key part of strategy execution is to analyze whether ICT is

done internally or by buying services from the markets (Williamson, 1985; Graf & Mudambi, 2005).

Outsourcing, especially in ICT, is a rapidly expanding trend in businesses (Fill & Visser, 2000), (Lacity et al., 2008). Several surveys have been carried out on the success of implementation of outsourcing projects. The results, however, show quite a low success rate. Of the subjects of public sector outsourcing and contracting out, e-government and portal services are becoming more commonplace, along with the attendant benefits and risk (Seifert & McLoughlin, 2007).

In the early 1990s, the research focused on the determinants of ICT outsourcing, on ICT outsourcing strategy, and on how to mitigate ICT outsourcing risks. From the mid-1990s to the late 2000s, the key themes have been best practices and client and supplier capabilities. Recent studies have centered on off-shore outsourcing, business process outsourcing and the rise, decline and resurrection of application service provision (Lacity et al., 2009). Cloud computing and related applications as a service, platform as a service and infrastructure as a service have also been widely studied recently.

Outsourcing of ICT services requires definition of its core, and that requires a very different relationship between the supplier and the customer than was the case earlier (Vagadia, 2012; Graf & Mudambi, 2005). Relationship management has proved to be a perennial and challenging issue for over nearly 20 years (Lacity et al., 2009). In larger organizations, global presence and the requirement to deliver outsourced services impacts on sourcing decisions. According to recent studies, outsourcing success rate has been on a relatively low 40-60% level in the studied cases (Vagadia, 2012). However, not feeling the need to define the scope of outsourced services on an adequate level, many executives believe that ICT is evolving quickly into a utility and can be outsourced easily (Lacity & Hirschheim, 1993).

Large ICT giants such as IBM, Hewlett-Packard and, more lately, Indian companies such as TCS and HCL have built large outsourcing businesses. That requires assimilating the staff of outsourced units into their culture (Kaplan & Norton, 2004). The dominant ICT suppliers influence the ICT management's role by determining the range of technological architectures and solutions available within the organization (Jeanne & David, 1999). It is recommended that every case of outsourcing should involve both technical and legal expertise (Lacity & Hirschheim, 1993). Executing a strategic plan when ICT is in direct interface with the customer requires vendor involvement (Jutla et al., 2001). Outsourcing is a controversial issue in public organizations, and it appears that the outsourcing level or use varies from all-comprehensive to little or no outsourcing (Seifert & McLoughlin, 2007).

## 2.6 ICT leadership and CIO role

Leadership can be defined generally as “a process of social influence in which one person is able to enlist the aid and support of others in the accomplishment of a common task” (Chemers, 2000). ICT leader’s role has been scaled up from cost-center-specific support-function manager to value-adding profit center and strategic partner in companies’ organizational hierarchy, and the role, on the whole, is now oriented more towards shaping up organizations’ ICT strategies (Jeanne & David, 1999; Kaplan & Norton, 2004; Sobol & Klein, 2009). For a long time, ICT was considered to be a tool for automate back-office activities, e.g. payroll and accounts payable functions, but recently it has become important in defining and building new strategic opportunities and capabilities needed to execute them (Applegate et al., 2007). Across a wide spectrum of markets and countries, ICT is transcending its traditional "back office" role and is evolving towards a "strategic" role with the potential not only to support chosen business strategies but also to shape new business strategies by creating competitive advantage against competitors (Henderson & Venkatraman, 1993). Organizations aim to increase efficiency, and therefore the alignment between ICT and business is necessary. Nevertheless, different aspects such as the size of the organization, its growth phase and the industry where it operates all have to be considered (Bruce 1998). Well-functioning integration of business and ICT management with infrastructure roles has clear positive impact on IS effectiveness. This is significantly more pronounced in information-intensive industries, where ICT infrastructure roles on the whole are better developed than in other industries (Sääksjärvi, 2000).

Gradually, the role of information management has veered towards business management (Earl & Feeny, 1994; Nolan Norton institute, 2001). ICT has made its presence felt during the last decades, and ICT management has to know the latest technologies well enough in order to translate the technology potential to business executives. The CIO has a key role in translating the newest ICT for business executives in order to create competitive advantage. When IM and ICT are clearly involved in a strategy, then CIOs also will find it more enjoyable to work with top executives (Teo & Ang, 1999). In case a clear strategy for the whole organization is missing, it can be interpreted to mean that working with the top management has not been very successful (Sääksjärvi, 2000). CIOs nowadays work with a multitude of company processes and spend less than half of their time with traditional ICT issues; they spend 44% of their time with IT, 10% with external customers, 36% with non-ICT stakeholders and 10% for managing company processes (Weill et al., 2009). In organizations of different size, ICT management and the role of CIO have different contents in ICT management functions.

Senior management responsibility is crucial when an organization's objective is to maximize the value from investing on ICT. This can be achieved through proper governance with well managed portfolios and well-explained role of



ICT (Weill et al., 2002). It includes communicating about the contribution for business (articulating mutual benefits), ensuring that the objectives of the ICT group are aligned with the goals of the business units (demonstrating commitment), and communicating this all to the business (sharing knowledge). In order to make this possible, there is a need to have common governance and agreed forums between ICT and business (Nord et al., 2007). In organizations, CIO is the person responsible for the provision of ICT services and has the leading role in information management. CIO acts as a link between the ICT organization and its top management (Hunter, 2007; Arnett & Jones, 1994).

The CIO role has been emerging from the 1970's, when the role was established, enlarging towards a set of issues that is wider than that of most other managers (Jordan, 1993). CIOs are considered as ICT executives controlling the information flow throughout the organization with the help of information technology. This investment is aimed to aid the business and create competitive advantage with the alignment of ICT strategies. CIO is an executive, who has a leading role in organization's information processing needs (Arnett & Jones, 1994) and a functional senior manager expert who is valued as a contributor to business thinking and operation. The position of CIO as an alignment process facilitator between ICT and business cannot be overestimated (Earl & Feeny, 1994). CIO's role is more leadership than technology focused (Nolan Norton institute, 2001). The strategic role of CIO is becoming even more complex, requiring an expansion of the organizational and structural niches to fit that role (Gottschalk & Taylor, 2000). The various CIO roles can be concluded in six categories (figure 4).

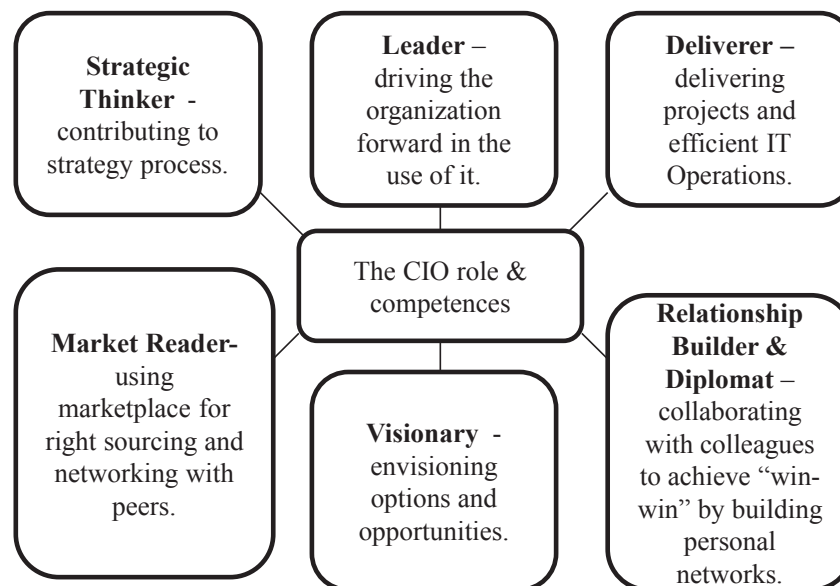


FIGURE 4 The CIO role and key competences in organization ICT management (Pepard, 2010)

**Strategic Thinker** - *contributing to strategy process.* The CIO is typically a member amongst executives and recommends ICT strategy for the top management while having also a key role in making sure that the ICT strategy is aligned with the overall business strategies (DeSutter, 2003; Reynolds, 2009; Luftman & Brier, 1999). The CIO is seen as a change leader (Byrnes, 2005), leading change through the organization. The CIO must be conversant with the strategic goals of the business and with other ways that the organization can meet those strategic goals. The leader has to be personally engaged, deeply committed and well-conversant with the business strategies (Bossidy & Charan, 2011). CIOs have stressed the importance of business impact through various means. Large transformation projects and application implementation projects with ERP, CRM, BI and many other solutions have clearly worked towards helping businesses to generate additional revenue or reducing costs (Vaidya, 2012). Nonetheless, there have been great difficulties in defining business value in relation to ICT investments, as ICT investments provide value that cannot be measured in financial terms alone. Thus the need arises for a method or methods that take into account not only the financial aspects of an investment but also the intangible benefits like customer (Bricknall et al., 2007).

**Relationship Builder & Diplomat** - *collaborating with colleagues to achieve "win-win" by building personal networks.* Because there has been a lack of shared knowledge between business and ICT and a lack of organizational linkages between them as well, both a longer term and operative partnership in context and in action have been "established" (Venkatraman & Henderson, 2000). CIO's position is that of a specialist functional manager contributing to business needs (Earl & Feeny, 1994). CIOs are expected to be business strategists that collaborate with senior business executives to shape ICT-enabled competitive moves (Sambamurthy et al., 2003). CIOs with wider strategic ICT- and business-related knowledge are found to enjoy significantly greater collaboration in top management teams, and such knowledge has also significantly influenced the extent of ICT deployment in business strategies and value chain activities (Teo & Ang, 1999).

**Visionary** - *envisioning options and opportunities.* Decision-making in information technology is the joint responsibility of business executives and ICT management (Weill et al., 2002). The role of CIO was established as a critical executive position in most organizations, giving the CIO the responsibility to help to shape up the organization's ICT strategy. The changing technology has led to major changes in the responsibilities of the CIO (Jeanne & David, 1999), although those changes are seen to be indirect (Jeanne & David, 1999). The CIO role will be more at the hands of customer-focused, non-ICT stakeholders managing company processes and less with ICT transformation and ICT topics (Weill et al., 2009). ICT management has to ensure that information infrastructure stays flexible while supporting innovation and experimentation; simultaneously, it has to be standardized to maximize the benefit obtainable (Pralhad & Krishnan, 2002).



*Market Reader* – using marketplace for right sourcing and networking with peers. The CIO identifies and interprets the trends in the ICT environment, and in doing so assists the business managers to understand potential opportunities and threats from the perspective of ICT (Henderson & Venkatraman, 1993). The role of the ICT manager should be that of a technology architect acting as a catalyst. As globalization has been progressing and business has become more global and networked, also ICT management has been impacted by that trend. This brings new challenges to ICT management and the CIO role. Businesses are going more global, and additional challenges have emerged. Value chain changes have profound effects on information systems, and the way they are deployed together with the cultural and attitudinal diversity present change management issues (Vaidya, 2012).

*Deliverer* – delivering projects and efficient IT Operations; The CIO has an emerging role as a senior executive who is responsible for identifying, planning and budgeting ICT needs and delivering services to meet needs that contribute sufficient business value with increasing efficiency and lowering cost. The CIO needs an ability to lead, good knowledge about the enterprise and the competitive environment and also a vision of how ICT support can lead to business growth (Broadbent & Kitzis, 2005). Sääksjärvi (2000) defined three roles reflecting the IS communality (“common IS core”), strategic (“strategy enabler”) and flexibility (“flexible platform”) dimensions of corporate-wide ICT infrastructures. In a statistical study, these roles have been positively related with IS effectiveness (Sääksjärvi, 2000). The CIO's wide role exerts pressure to make companies at the same time more agile, global and profitable (Weill et al., 2009).

*Leader* – driving the organization forward in the use of IT. The CIO is most often also the line manager to ICT professionals' team. People management and leadership is one of the key tasks the CIO has, but many CIOs direct their attention mostly to technical aspects while ignoring the people and organizational challenges (Cloux & Eberhardt, 2013). The CIO has to be an executive level leader. In this respect, technology has had a strong impact on the transformation, especially in technology-focused companies, which need CIO leadership in the company (Burn & Szeto, 2000). The CIO is ensuring that ICT resources at the right level are appropriately distributed (Applegate et al., 2007). The CIOs role is to lead the ICT function that designs an appropriate company structure and human skills in order to position ICT as a strategic differentiator (Agarwal & Sambamurthy, 2002). Whether organizations insource or outsource their ICT services, there is still need for a CIO (Applegate et al., 2007).

## 3 RESEARCH METHODOLOGY AND SCOPE

### 3.1 Literature Review Process

As information systems research is a combination of two other sciences, business and computing, systematic review methodology has not been developed (Benbasat & Zmud, 1999). Often in IS research, relevant research topics are chosen first and only after that literature reviews is carried out (Benbasat & Zmud, 1999). This approach was also applied in these studies. However, the value of conducting a proper literature review is useful from many viewpoints: to obtain an academic degree, to apply funding or to justify an article for journals and other publications. A systematic collection and review of literature enable the establishment of theoretical foundations and context for research questions (Okoli & Schabram, 2010).

Following the eight-step model of Okoli & Schabram, (2010), we carried out a systematic literature review for dissertation literature. The steps consisted of:

- 1) Purpose of the literature review: our need was to find relevant publications for explaining *“How ICT and CIO in his role execute strategies of networked public or private organizations”*. This brought strategy alignment research well into sight.
- 2) Protocol and training: first we produced a protocol for searching relevant lists of literature in e-papers, database reviews and Google scholar search engine results. The purpose was to find what had been studied and written around our research question. When using digital libraries for searching information, we need to pay attention to effectiveness, efficiency and satisfaction (Jeng, 2005). Google Scholar was chosen because it offers an efficient way to find access to other information sources (Pomerantz et al., 2006).
- 3) Searching for the literature: the search for papers and verification of the comprehensiveness of that search was done by the author of the dissertation. The search included online databases such as ACM, Scopus, Elsevier, JSTOR

and ProQuest. When a relevant paper was found, it was reviewed by a) reading the abstract, b) reading the whole text, c) making needed references and citations to the most relevant topics. The keywords used for this study were strategy alignment, ICT role, CIO role and outsourcing.

- 4) Practical screen: based on the reviewed articles, the relevant studies found were considered for a further review, and the rest were eliminated without further examination. The main criteria were relevance based on the abstract, publishing year, number of citations. The total number of the screened articles was 242.
- 5) Quality appraisal: The articles were scored with + (=low), ++ (=medium) and +++ (=good) for their quality, depending on the research methodologies employed by the articles. Whenever there was not a proper quantitative or qualitative research and the scoring was low or when there were only a small number of references (less than 20), the article was not normally included or it was given less focus.
- 6) Data extraction: during reviews and especially once all the studies had been reviewed, the applicable information from each study was in the form of notes on a MS Excel spreadsheet.
- 7) Synthesis of studies: the method to combine facts from extracts was based on a qualitative technique and the findings were listed on a MS Excel spreadsheet.
- 8) Review writing: once the facts had been combined and the selected articles reviewed, the findings were collected to a folder and the results were used in writing the chapter for "Background of the study".

### 3.2 Qualitative analyses and case studies

Qualitative research involves analyzing and interpreting texts and interviews in order to discover meaningful patterns descriptive of a particular phenomenon. Qualitative researchers take seriously the need to understand the role of the interviewer in the production (Hollway & Jefferson, 2000). In IS, the number of studies published where quantitative research methods are used is higher than the number of studies using qualitative methods (Fink, 2005). As we wanted to find more rich data to do analyses based on our hypothesis and findings which then could be applied to practical improvements, we nevertheless turned to qualitative methods. When doing qualitative studies, rich data is essential (Miles & Huberman, 1994). In our articles' case studies, we wanted to ensure the right level in interviewees' selection and a good understanding of research topics. The dissertation progressed through the design of a hypothesis that generated studies where qualitative research was based on the following five steps (Aurbach & Silverstein, 2003):

- 1) A literature review was conducted by us and the research issues were identified. We reviewed the research literature to locate areas where concepts still

remain open and unclear, where perspectives have been left out and assumptions need to be challenged. Based on those preliminary findings, we chose the research issues in order to explore specific areas of interest. However, some preparation for papers took place concurrently because the formulation of research questions and also some data collection preceded the wider literature review.

- 2) We defined our research concerns by exploring our research issue through the experience of people who know about it in their own lives. Thus, we also investigated their subjective experience.
- 3) We created a narrative interview by constructing a list of questions, which took our research participants through their experience with our research concern.
- 4) We identified and chose a research sample based on our research concerns that was found to be useful for developing or testing the related theory. In cases 3 and 5, the availability of interviewees to get an access to was limited. If we found a need to use a sample of convenience to facilitate our research, we included that to the interviews among the next research samples to further develop the theory formulated from our initial research sample.
- 5) When we found that our research participants were not able to provide new data to expand or refine our theory, a decision on sample size was made and interviews and data collection were discontinued. Some supplementary literature was added to the study.

In our study, we wanted to highlight why things are as they are described and what this means in practice. Therefore a qualitative approach was chosen. Our aim was to get interviewees to "tell it like it is" (Hollway & Jefferson, 2000) in order to create a right type of hypothesis and draw appropriate conclusions from the interviews. Rather than using structured questions, we frequently used open-ended questions. We had totally four cases in five studies (table 3).

TABLE 3 Case studies in the dissertation

Case Nr.	Public or Private sector	Case study data collection year(s)	No. of interviewees or data sample	ICT case study topic
1	Municipal	2010	23 (cases / municipalities)	Strategy, Outsourcing
2	Municipal	2010-2011	23 (the same as in case 1)	Strategy, Methodologies
3	Private	2011	7 (interviewees, 7 case companies)	Strategy, Business Models
4	Private	2014	5 (one case, 5 interviewees)	Outsourcing
5	Both	2011-2013	36 (interviewees)	Leadership, Strategy

The first two cases were for building hypotheses around smaller municipalities' strategy in their ICT. Also we wanted to find out why they do not outsource their ICT functions based on potential organization strategy to reach target determinants such as cost-efficiency, speed for execution and availability of competences required. The third set of cases dealt with large and strategic global implementation of a growing, outsourcing-type business model enabled by ICT solutions both from the supplier's and customer's point of view. The fourth was an action research case with one of the biggest international ICT supplier in an outsourcing project of a large global company. The fifth set of cases included a set of questions related to how IM is managed and to the CIO's emerging key leadership role in strategy and ICT alignment.

Our research and arguments are based on multiple-case studies and analysis of small and medium municipalities, large international companies faced with outsourcing decisions or with potential to use outsourcing and experienced ICT leaders (CIOs) with strategy alignment issues in their organizations. The selection of participants was planned thoroughly to include mainly persons directly involved in those issues. In addition, we collected data from municipalities to get a more in-depth view into their ICT architectures and application integrations.

The interviews were based on a list of questions in a semi-structured form. All question templates can be seen in attachments 1-5. After each interview, the interviewee had an opportunity to review the notes immediately or at the latest a few days after the interview had been carried out. We gathered additional data about municipalities by e-mail and by phone conversations; in the Operations & Maintenance study, also companies' web sites were used for additional data. Analyses were created with the help of a rich data source of real-life practitioners' experience and by consulting views on how ICT from a strategic viewpoint exists in organizations. This brought a fresh perspective to the analysis (Yin, 2003; Benbasat et al., 1987) and allowed empirical studies focusing on explaining why and how things are (Järvinen, 2004).

In Article 1, the content was not that clear to the researchers and the exploratory case study approach was applied (Benbasat et al., 1987; Yin, 2009). For the researchers, it was important to learn and understand how a public organization works and how to get the required case study data collected. In Article 2, to get comprehensive data from the municipalities, our study was conducted in an iterative way (Glaser & Strauss, 1967). Based on interviews and documentation from the first round of interviews, the second round was carried out to find out more data from the architectures and system landscape. Once all the data and conclusions for the article had been collected, the data was organized to find relevant patterns for further conclusions and pattern matching (Yin, 2009).

### 3.3 Selection of the target group

The selected cases are distinct because there is a need to validate, in a broader way, why and how things are. Both public and private sector data from small, medium and large organizations were collected. The municipalities were included because of an assumption that they would be one of the key interests for researcher's own stakeholders (Benbasat et al., 1987) in the university faculty. For the past few years, municipality structures and also the overall existence of smaller municipalities have been under frequent discussion in Finland. When we started our first research project, there was a clear target by our faculty for project deliverables to find out the level of strategic planning in municipalities. Accordingly, in Article 2, our aim was to provide clear results for further use of practitioners. The number of municipalities from which the data was collected for Articles 1 and 2 was 23.

In Article 3, there was a clear target to provide deliverables, which the practitioners and their stakeholders could utilize from the research findings (Benbasat et al., 1987). The questions based on the preliminary literature review were defined by the authors and then reviewed together with one company's operational development managers who had experience in operating and maintaining business as well as in outsourcing. The results from the case studies are used to improve the involved companies' capabilities to run their O&M business supported by ICT. The number of case companies was seven. Of these, five were supplier companies and two customer companies.

Article 4 studies a project where we were heavily involved in outsourcing of a large set of infrastructure to a global ICT supplier. We used the action research method, and we, as researchers, were involved in the project. For the study, we collected data from five key people: four of them were customer employees in charge of the project and one external consultant hired for the project. The interviewed CIOs were selected based on their experience in information management and their role as CIOs or equivalent. Access to them was another criterion in the selection, as we did not know all the CIO executives before. The number of CIOs in Article 5 is 36.

The additional analyses in the dissertation are to get a deeper understanding about what the strategies for small public organizations can be. Based on two first studies of the municipalities' ICT, we could detect a need to analyze more where a strategic alignment could be done. This supplementary analysis was done based on a review of recent information in literature and publications on the web.

### 3.4 Data collection and analysis

The first and the second study having mainly the same data source, focused on public sector to examine whether small and large municipalities differ from



each other. The focus was on two key areas: small public municipal organizations and large privately-owned companies. All in all, there are 320 municipalities (Kunnat.net, 2013) in Finland. The smallest is Kaskinen (1,382 people) and the biggest is Helsinki (603,968 people). In 2012, the average population size of a municipality was 16,151 people. Municipalities are quite small but independent organizations. They get their income mainly through taxes, and their biggest spending area is social- and healthcare as well as education (Kuntaliitto, 2011).

Middle-Finland has 23 municipalities, and there are 274,400 people living in the region. Only four of its municipalities are bigger than average in Finland. The biggest one is Jyväskylä with 132,000 people, and the smallest one is Luhanka with 802 people. The data collection was arranged by interviewing municipal employees who had the best understanding about how ICT was arranged in their organization. In smaller municipalities, also the head of the municipality was interviewed. The sample of these 23 municipalities describes quite well the situation also in other regions. There are big variations in how ICT is arranged and managed in them.

We interviewed persons responsible for ICT in 23 municipalities in Central Finland and collected data on how their information management is arranged. All interviews were recorded, and the interviewees were able to see notes to selected questions during and after interviews. The results were collected together on one spreadsheet and analyzed by three groups of researchers. The first interviews were carried out in 2010-2011 by three researchers.

Once the first interviews had been carried out, reported and analyzed, there were also further and extended data collection rounds concerning architectures and related data. Based on interview data and data collected by email questionnaires, we were able to write Article 2, which is focused more on municipalities' architectures and recommendations.

The second data collection, for Article 3, was done by one researcher in 2011. The focus was on large companies involved in examining how to get their strategies with ICT aligned. The format for the interviews was semi-free and involved five persons in the companies and two of their customers, all on the level of Vice President. The companies were large (revenue > € 1billion), multinational and well-experienced as outsourcing suppliers or customers. All the data were collected together and analyzed in a form of a large spreadsheet in order to find relevant data to the research question. All interviews were recorded, and the interviewees were able to see the notes to selected questions during and after interviews.

The fourth data collection was done by the author of this dissertation and was based on the selection criteria of an outsourcing project. We wanted to know, for future cases, on what to focus and why before selecting a supplier for our large ICT outsourcing task. As everything wasn't yet clear in the project, we wanted to collect information to find out what criteria the five key participants would weight differently.

The data in each of the studies was structured with the key determinants, and the results were collected from spreadsheets. With the information from the interview notes visible in each of the spreadsheet, it was easier to analyze what things influenced the hypothesis and why. In case studies 1 and 3, several researchers analyzed the data. In case study 2 and 4, one researcher made key notes on the interviews for conclusions and findings.

The third data collection, for Article 5, was done by two researchers in 2007-2012. All together, 36 experienced CIOs (or professionals in equivalent position) were interviewed. Our literature review showed that the CIO role and work changes are driven by certain identifiable variables. For these reasons, we chose the Leavitt's model (Leavitt 1965). The questionnaire had 51 questions. All the responses were recorded and written to a question template, which was reviewed by the interviewee during the interview or soon after the interview. All the results were entered into a spreadsheet and analyzed by two researchers. The interviews were recorded and the interviewees were able to see the notes to selected questions during and after interviews.



## 4 OVERVIEW OF THE ARTICLES

### 4.1 Article I: Why to Outsource? Case municipality's IS in one region of Finland

Hyvönen H. and Hokkanen P. (2011). Why to Outsource? Proceedings of 34<sup>th</sup> Information systems research seminar in Scandinavia (IRIS). Turku, Finland, August 16-19.8.2011

#### Research Objectives

The aim of this paper is to investigate why public sector municipalities couldn't outsource more or why they don't do that. In addition we wanted to find out how their ICT is aligned with their strategy or whether they have ICT-related strategies at all. Many small municipalities are in a difficult financial situation, trying to increase their efficiency to the desired level. During our study, a nationwide ICT functions' improvement program by SITRA, which aimed to create and deploy country-wide shared ICT systems for municipalities, was established. The program could be described as a kind of strategy by an external contributor to increase efficiency. However, our study findings show that resistance to change was high amongst municipal organizations.

There are many studies on outsourcing. The taxonomy and the framework of outsourcing reasoning (Lacity & Hirschheim, 1995; Dibbern et al., 2004) was used to find out what the motivation for outsourcing is. Strategy alignment studies focus on larger private companies, and fewer studies have been done for the public sector (Gutierrez et al., 2008). Only a few short studies related to small municipalities were found.

The data was collected by interviews in meetings with ICT personnel of Central Finland municipalities and their personnel in management positions. A data sheet was created, and the researchers with their supervisors produced key findings from the collected qualitative data. For creating the paper, a multiple case study approach was used.

## Findings

Based on the findings, there seems to be no remarkable difference in outsourcing activity levels between large and small municipalities. The findings of the study were analyzed using a model for strategy framework (Clemons et al., 1995). The framework aims to explain what is meant by strategic risk. The model enables us to discover political and functional risks. The more the strategy used differs from the strategy espoused, the more there are political risks, i.e. change resistance. We found big shortcomings in adapting to common ICT systems use, especially amongst organizations of small municipalities. A comment from one ICT professional was: *"What will we do then if we join KPK ICT? Will I spend my days sitting in the library, or what?"* Small municipalities, in particular, use very few resources. Their ICT spending is only 0.92% of the total annual budget, while the spending norm in organizations is 3.0% (Lacity et al., 2009). There is big potential in joining forces, but co-operation between municipalities was found to be irregular. There were several answers to why the use of a common system is not suitable for a specific municipality. We also found that in many municipalities there was no strategy to improve efficiency by using ICT. We found an important factor affecting trust-building between the country-wide strategy and municipalities, our interview results showing that the reason not to outsource is more a political one than a cost issue. The findings were presented to SITRA in an attempt to address change management issues more thoroughly by creating successful show cases and improving trust between organizations.

The research results led to an improved and renewed strategy in the Central Finland Regional Council, and an action list was created to improve the situation. A group of the municipalities' heads present approved a generally redesigned strategy for execution.

## Summary and the relation to the whole

Summarizing, this study was to analyze, with the help of the case study method, what the ICT-related strategy in municipalities is and how to improve the situation. This is especially pertinent to small municipalities, as they do not have a clear strategy framework and their strategy in-use and strategy espoused gap is high. Aligning ICT strategy is difficult to achieve before a commonly agreed strategy for municipalities is adapted. An ongoing development program by an external actor like SITRA is seen by the researchers as a potential solution, but before getting SITRA's strategy and municipalities' strategies aligned, trust between parties needs to improve.

## **4.2 Article II: Information System Implementation Model and Observations: Case Health Care, Social Services and Other Service Processes in Smaller Municipalities**

Nieminen J and Hyvönen H. (2012). Information System Implementation Model and Observations. Proceedings of 4<sup>th</sup> Well-being in the Information Society (WIS) Conference. Turku, Finland, August 22-24.8.2012

### **Research objectives**

This paper investigates how smaller public organizations are able to further develop their ICT systems usage. Based on our previous research with 23 municipalities (Hyvönen & Hokkanen, 2011), small organizations are not well-aligned to develop ICT or deploy it efficiently in order to enable the organizations' strategies. Only 26% of small enterprises in the UK had a formalized ICT strategy (Cragg et al., 2002) that could be aligned with business strategy. In this study, we investigate the status of information systems in municipal governance and architecture management. Based on our findings, the situation with systems landscape and architecture is very scattered. The municipalities do not make their ICT architectural decisions or outsourcing decisions in a systematic way. The municipalities are independent in their decision making and strategies when ICT services are both local and outsourced. The government encourages co-operation between the municipalities and for nationally provided services. Our aim was to find out the key elements and capabilities in planning an IS implementation which smaller municipalities should consider, with a special focus in decision making. Also there is the need to explain how the municipalities can overcome the challenges and gaps in practice when needs to new ICT systems implementation arise. The data, used to find the biggest challenges and gaps, was collected from interviews carried out in Central Finland's 23 municipalities in 2011. We decided to use the eight-step method by Eisenhardt (1989) to create a model to support our hypothesis in a systematic way. The municipalities' software's and applications that were in use were collected for analysis, and we did the analysis in a table form. The scoring was based on how often an application was found in the sample and on the number of users. We used case studies (Yin, 2003) and the work system framework theory (Alter, 2008) in the paper as a foundation. Added to that were relevant parts from widely used models, such as CobIT, ITIL and Lifecycle Cost Management.

### **Findings**

As the findings of the paper indicate, the resources for ICT are adequate only for running the operations but not to improve the present status. The municipalities use only 12 percent of their ICT budget on development and the rest are used on operations. Therefore, the municipalities need tools and methods to

create architectures and ICT systems. Only three out of 23 municipalities have documented descriptions of their ICT architecture objectives. In our interviews with the municipalities, we did not find roadmaps or plans for the strategy period, i.e. for 3-5 years. The municipalities agree on the need for common systems, but in practice there were very few of them. The most commonly used application was for library users, but that is not among the key application areas. The largest application is for social security and healthcare, the regional healthcare organization having expanded their common application tools for social and healthcare processes during the last years.

We found it necessary to propose and develop a model for these small organizations. The model is targeted to provide one possible and practical way for identifying, selecting and implementing an information system. The model builds on the assumption that the needs for an information systems arise from organizations' strategies. It supports the organization's enterprise architecture (EA) and proposes key activities needed in implementing an information system, leading from the organization's strategy all the way through to the operation and use of the system. The key decision-making points are identified and presented.

### **Summary and the relation to the whole**

Summarizing, this paper analyzes the current situation with smaller municipalities' ICT, especially their ICT applications, and produces a model which can be used for decision making and developing small public organizations' ICT systems to respond better for the needs of users and processes. This was a practical study of the information systems in the smaller municipalities of the Central Finland region. It was done from the systems viewpoint as well as from the operational and managerial viewpoints. Based on the findings and supported with a theoretical framework, a practical but high-level model for operations was proposed. The current status of IS operations in the municipalities was compared with the model and some recommendations were proposed. The paper includes a consolidated and concrete method developed by the researchers proposing how to transform a strategy to concrete plans and actions with ICT. This will considerably help the municipalities to improve the alignment of their ICT with organizations' strategy.

### **4.3 Article III; Operations & Maintenance Business Model Transformation - Multiple Case Studies**

Hyvönen, H (2014) Operations & Maintenance Business Model Transformation - Multiple Case Studies. *Modern Economy Journal*, December 2014, 5, 1161-1170

## Research Objectives

The purpose of this paper is to study which capabilities, including ICT, are the most relevant for the studied case companies when a capital good company transforms and expands its business model to offer outsourcing services. The benefits of outsourcing are not always clear. The major issues are loss of flexibility and inability to adapt to the extent, nature or need of the business services which outsourcing delivers (Tan & Sia, 2006). The concept of competitive advantage (Porter, 1985) categorizes organizations' functions in primary and secondary activities. However, the situation can be different and change when a company has a strategy to move from product-oriented towards service-oriented business. The Operations & Maintenance (O&M) business model requires, both from the service supplier and the customer, strategic level investments and co-operation for building required capabilities. Large technology companies have developed and augmented the O&M business model further by offering continuously remote processes, related information analyses and support by utilizing the latest information and communication technologies. However, to realize the outsourced O&M business model has turned out to be a complex combination of technology and human skills calling for high quality business processes and governance with well-defined roles and responsibilities (Earl, 1996; Arnold, 2000; He & al., 2007; Oliva & Kallenberg, 2003). Outsourcing in ICT business has been widely studied during the last three decades (DiRomauldo & Gurbaxani, 1998; Dibbern et al., 2004) and has gained considerable management attention since the 1980s. Usually non-core ICT functions, such as desktop support, user support, network operations and application development have been sourced from external service vendors. On the other hand, there are very few studies found about outsourcing a business model where ICT is one of the key enablers in the creation of outsourced service.

The empirical part of the study was carried out by interviewing executives of five large companies offering global O&M and executives of two large companies using these services. A multi-case approach was used and the interviews were semi-structured. To find out which outsourcing elements are the most highlighted and the most common, the results were analysed using a three-dimensional model for transforming a product-oriented company to a service-oriented one (Oliva & Kallenberg, 2003). The three-dimensional model to describe outsourcing dimensions consists of the contracting & governance, capabilities and product-offering dimensions. This theory was chosen as a framework for our investigation to find out the biggest differences and the most common areas in outsourcing cases.

## Findings

Outsourcing contracts of the O&M type are very strategic and valuable, and their duration is long (Prahalad & Hamel, 1990). The O&M business model requires strategic level engagement from both parties. Governance and reliability,

enabling the O&M business model in building and maintenance of ICT systems come under focus. Companies' functions, especially ICT, have to enable the new business model. O&M cases are challenging for ICT because case companies' O&M customers are located globally in many different countries. The O&M contracts in the researched companies were mainly transacted in green-field sites, where there is a need to build new infrastructure. ICT's role was seen as a key, and there was both positive and negative feedback on how well ICT was able to serve business needs in these cases. In the O&M cases, the key selling arguments seem to be technology leadership and good references. A proper governance model between the supplier and the customer was seen as an important dimension, especially with inexperienced customers. One of the critical success factors is what kind of people global HR function is able to recruit locally for O&M site positions.

ICT has to form part of a wider business model and its transformation (Cross et al., 1997). However, not all customers allow suppliers to use their data gathered from their processes. Customers want to keep their operations data in their own databases; if there is a potential supplier change or contract renewal phase, it is much easier to make changes if the ownership of the data is on the customer's side. This is a complex matter, because process data in a process-based industry is naturally one of the key factors.

### **Summary and the relation to the whole**

ICT tasks have evolved further than earlier. In the past, ICT focus has been to satisfy corporate ICT requirements mainly, but more recently CIO and his team have worked closer to business managers (Dahlberg et al., 2015). When a company chooses a strategy which includes new areas such as O&M services for customers, there is a need for cooperation between the company ICT and business management to create capabilities to match with specific business model needs. ICT function is not the only support function the importance of which has been growing. Also Human Resources as well as Health and Safety functions were highlighted in our cases. Without traditional support functions' involvement, a new business model and its capabilities can even fail. ICT is not an independent function or focused only on corporate ICT. We suggest ICT to be a key contributor when creating new and expanded business areas.

## **4.4 Article IV: Significance of Supplier Selection Criteria Evolvement in IT Outsourcing to Emerging Economies - Lessons from a Global IT Outsourcing Project**

Hyvönen H., Helminen M., Watanabe C. (2015) Significance of Supplier Selection Criteria Evolvement in IT Outsourcing to Emerging Economies - Lessons



from a Global IT Outsourcing Project. Paper accepted to Journal of Technology Management for Growing Economies (JTMGE), April 2015.

### **Research Objectives**

This paper examines one outsourcing case, which was aligned with a private company global strategy. Most of the large companies have outsourced or planning to continue outsourcing their ICT or part of it (Palugod & Palugod, 2011). ICT services outsourcing requires a relationship, which is very different from its earlier relationship, between the supplier and the customer (Vagadia 2012, Graf & Mudambi 2005). Still, there is an understanding, especially amongst executives, that ICT is evolving quickly into a utility and can be outsourced easily without defining the scope of outsourced services on an adequate level (Lacity & Hirschheim 1993). That kind of assumption easily leads to over-optimistic expectations, which creates mistrust between and cause damage for the parties of the outsourcing agreement, especially when the agreement should demonstrate expected results. This can lead, in some cases, to a change of supplier or even return to the in-sourced operating model. Continuously growing needs for outsourcing bring up situations where service providers are evaluated. We, as researchers, were involved from the beginning to the end in an ICT infrastructure outsourcing project to a complex global environment. The research method used was action research. The key research questions concerned what practitioners can do and how in an ongoing project it is possible to improve the results and speed for the outsourcing project, especially when there is case targeting to emerging markets business enabling. Also we considered how the key participants from the customer side see the weighting of selection criteria before and after the whole project.

### **Findings**

The outsourcing project was quite successful from the viewpoints of budget, scope and schedule. However, we point out that if the right people and competences as well a proper documentation and plan are in place right from the beginning, the results will be reached earlier and with less effort and frustration. The criteria which was seen important and focused on during the selection phase included supplier background, pricing, global coverage and processes. After the project, capacity, technical architecture and human labor were seen clearly more important. In suppliers selection criteria, weighting of global coverage was overestimated contrary to underestimation of human factors

### **Summary and the relation to the whole**

Action research seems to be a practical way to follow and to improve practices in actual cases. It requires close participation and involvement of researchers (Simonsen 2009). We propose that more regular reviews are needed to reveal which corrective actions should be done and to find out whether we are getting

what we want and sustainable efforts in conceptualization of IT outsourcing mechanism should be endeavored. Customers play a key role in the final results, and we need to ask whether the customers are doing their share in ensuring the desired outcome. In-depth understanding of institutional systems in emerging economies should be further endeavored. In the beginning, there is a need to follow how the customer's culture and supplier company culture can be matched. Most of the improvements should target the "labor/people" category. When we have the right people with right mindsets, skills and governance, projects can be executed within shorter time and with less effort. Optimal resources allocation is needed in both supplier and customer so as to satisfy condition for creative moment.

#### **4.5 Article V: Tasks and Roles of CIOs: An Evolutionary Model and Its Use**

Dahlberg T., Hokkanen P., Hyvönen H., Newman M. (2015). The Tasks and Roles of CIOs: An Evolutionary Model and Its Use. Paper submitted to Human Technology Journal. May 2015.

##### **Research objectives**

This paper examines how ICT is managed and what the role of the Chief Information Officer, the key ICT manager, is. The CIO profession emerged decades ago. CIO has the key role in implementing ICT to satisfy the needs of an organization's strategy (Jeanne & David, 1999; Applegate et al., 2007; Henderson & Venkatraman, 1993). Earlier studies have been done about the CIO's role, tasks and changes in them. These have been linked to technology developments, organizational and strategic thinking and (ICT) governance and managerial practices (Chun & Mooney, 2009; Gottschalk, 1999).

A striking feature in literature published since the 1980s is that the role of the CIO is described as that of a strategic and business-oriented executive with the understanding of technology. According to that role, the CIO works enterprise-wide with all the functions to deploy ICT in order to better implement and align the strategy of the enterprise and to support and enable the achievement of its objectives (Benjamin & Scott Morton, 1986; Bock et al., 1986; Couger & Amoroso, 1989; Declan & O'Riordan, 1987; Henderson & Venkatraman, 1989; Rockart et al., 1982; Synnot & Gruber, 1981; Welter, 1987). The role of CIOs is still to act as a strategy- and business-oriented executive whose specialty is to understand how ICT can be deployed. During the 2000's, ICT strategy issues such as governance, enterprise architecture and the ability of ICT to create value and to support innovations were investigated as new CIO tasks (Agarwal et al., 1998; Byrnes, 2005; Chatterjee et al., 2001; Dittmar & Kobel, 2008; Feldhues, 2006; Gottschalk & Taylor, 2000; Polansky et al., 2002; Weiss et al., 2002).



As continuous development within organizational context characterizes CIOs' work, we sought a theoretical basis for our research from organizational diagnostic models. Leavitt's diamond (Leavitt, 1962) model was chosen for our theoretical framework, but with some modifications to its wording. We collected data from individual interviews with 36 Finnish private and public sector CIOs to understand what factors determine their organizational role and tasks. The interviewed CIOs' careers extend from 1970s to the current date, and we were able to obtain information for our findings over the last four decades.

## **Findings**

In this paper, we propose that the contents of strategy, business orientation and technological understanding change over time. The generic organizational role of CIOs was found to be stable, whereas the role and tasks of CIOs change over time. By supporting and enabling all units and functions of an enterprise to deploy ICT and by managing ICT services, CIOs participate in the execution of enterprise strategies and in the achievement of business objectives.

We clarified how strategy, business models and governance have changed from the perspective of the CIO role over time. In the past, the CIO role was low in strategy execution and was seen as a support function. We found that CIOs understand strategy, business models and corporate governance better than before and that this factor clearly influences their work. In organization's tasks, CIOs play important role in mergers and acquisitions (M&A), which are usually highly ICT-dependent and where business continuity needs to be ensured. Considering change in people management, CIOs work with business managers, who understand ICT much better than before. Also, ICT organizations contribute towards business changes more than before. Technology and available services create new opportunities for business, and CIOs contribute towards understanding how new technologies can enable new strategic businesses and business growth.

## **Summary and the relation to the whole**

Summarizing, both literature and our study support the conclusion that the role of CIO has become more strategic and the CIO's role and tasks have changed significantly during the last four decades. The CIO's role has increased in the execution of business strategies and in aligning ICT with them. Whilst the CIOs role has remained unchanged in deploying ICT strategically, the work entails closer co-operation with other parts of the organization. We did not see any remarkable differences between public and private organizations for the strategic role of CIO. Leavitt's model with modified wording provides a good model for practitioners to follow in their further studies of the CIO role.

## 4.6 Contributions in joint articles

Hyvönen, the author of this thesis, collected the data and wrote Article 3 fully by himself. In the rest of the articles, the author's contribution was as follows.

For Article 1, Hyvönen collected the data and Hyvönen and Hokkanen jointly wrote the article.

For Article 2, Nieminen and Hyvönen jointly collected the data and wrote the article.

For Article 4, Hyvönen and Helminen designed the survey questions and were both involved in the case project. Hyvönen conducted the second round of data collection from the project participants. Hyvönen was the main contributor in writing the article first version with Helminen and Professor Watanabe made a remarkable portion in adding emerging economies view and clearer structure when paper was finalized to publishing in the journal.

For Article 5, Hokkanen created the first set of questions and conducted some interviews. Hokkanen and Hyvönen modified the design of the case study interview questions and jointly collected the data. First versions of the submitted paper were jointly written. Dahlberg, Hokkanen, Newman and Hyvönen contributed and improved the last submitted version, where Hyvönen was acting as a corresponding author.

## 5 CONCLUSIONS, LIMITATIONS AND FURTHER STUDY

### 5.1 Contributions of the study

This research consists of five studies and includes four sets of cases, which contribute to better understanding of the strategies' alignment approach, ICT leadership and the building of a networked ecosystem with the help of outsourcing. The research approach here is mainly theory testing (Järvinen & Järvinen, 2012). We explain the key characteristics and patterns in the planning and management of ICT of smaller public organizations' ICT. Large global private companies outsource their ICT services but also evolve their business model, offering outsourcing services where ICT has a key role. The research includes a study about the CIO's role in ICT management. Table 4 below shows the key findings and contribution to the existing theories and studies.

TABLE 4 The key findings and contribution

Findings	Research impact on theory	Theory	Reference
Small public organizations need to be aligned with a common and shared strategy, as their own strategies are often missing	Theory complementing	Strategic Alignment Model	Henderson & Venkatraman, 1993
Small public organizations need to join in lead organization networks	Theory complementing	Scale-free networks	Barabási et al., 1999
Support functions in global service-related business models have become highly critical	Theory testing	Interrelationships through organizations	Porter, 1985

		via a horizontal organization	
Our empirical research reveals that the specific content of the CIO role has a stronger strategic business focus than ever before.	Theory testing	The six CIO competences	Peppard, 2010
For CIOs, contemporary technology consists of ICT technologies, services and information. We enlarged the wording describing the technology factor to reflect this. In summary, we modified the structure into a strategy, business model and governance; task into tasks and processes; and technology into technology, ICT services and information.	Theory complementing	Leavitt's model for organizational development	Leavitt, 1965
Outsourcing success and trust is highly dependent on "people" criterion and issue focusing in "Decision Process" phase when choosing outsourcing partner	Theory complementing	Stage model of IS outsourcing	Dibbern et al., 2004

## 5.2 Strategic alignment

The SBA model explains a generic way of alignment, but the opinions about how to interpret the model vary a lot. Strategy alignment in small public organizations is not evident: the municipalities in question have no distinguishable strategies. However, in large multinational companies, strategy alignment has emerged to be a part companies annual planning and is well established and managed.

The ICT supplier in the outsourcing cases cannot fulfill the role of a "strategic partner" because the profit motive is not shared (Lacity & Hirschheim, 1993). Smaller municipalities, especially, do not have a clear strategy to follow up or strategies to align with ICT. Also, being public organizations, they are not expected to make profit and, therefore, targeted savings can be counted. In our cases, we found no sharing mechanism for accumulated savings between the supplier and the customer in public organizations.

In private companies, the situation is different. During the last decades, bigger companies have built governance and a strategy. Strategies are created annually, and strategy processes can take several months. Strategy communication and action planning reaches the lowest levels of organizations. Information management with ICT is teamwork, which has to be taken into account. In our studies, we found companies where even the ownership of the strategy process and its facilitation were among the CIO's responsibilities.

Our case studies indicate that previously ICT had separate strategies which were not necessarily aligned with business strategies. We found that more than half of the researched companies have a "one company" agenda. Those companies aim to have unified processes, standards and ICT solutions. The O&M study enhanced our understanding of business ICT, which is derived from companies' strategies to move towards a new business model. Implementation of ICT is a key enabler for its realization.

Private business is still carrying out large ICT projects of long duration. In most of the companies participating in our interviews, redesign of the ERP system or its implementation was ongoing. Earlier, there was a clear difference between corporate ICT and business ICT. Nowadays, companies' ICT teams collaborate closely with business teams on a strategic level when creating ICT systems which enable business models to enlarge their traditional role, including running e.g. office systems and basic infrastructure. ICT management needs to have skills and knowledge to help businesses to come up with right types of solutions and contracts.

### 5.3 ICT leadership and networked IM

Global business models and global company presence makes ecosystems in ICT functions more complex. The older theories are not applicable as such. Complex networks are connected to each other through different vertices and nodes. There are elements of networked models to be found in all the five studies. Municipalities in Finland are interconnecting through their networks, and there are several instances of established projects to unify the public sector ICT. However, these structures seem to be quite loose. The self-structuring model has not been successful or efficient in the creation of larger networks of ICT functions in municipalities. It has been suggested that strong local municipalities, with a coordination role in larger projects, are needed as hubs and to enable the ICT required by smaller municipalities. A strong organization, with a leading role over different sizes of municipalities, is required to run the development forward.

To facilitate the adoption of new digital services, there is a proposal to invest on broadband connections for every household. Whilst at the moment that is seen as an expensive investment, it should be seen as a mandatory infrastructure to be built for the future in a way similar to building highways and bridges for transportation. The target, which has received strong support, is that in the

end of 2015 approximately 99% of municipal households are within 2 kilometers from 100 Mbit/s connectivity (Liikenne ja Viestintäministeriö, 2008).

Finland has good opportunities to develop further ICT services for public sector. Finland also has good ICT skills and competences, the Nokia cluster having produced a vast amount of professional ICT capability in the country. For example, there are 7,900-10,000 SW programmers working in Finnish companies (Softaa koneisiin, 2009). We should be able to utilize these resources in the creation and deployment of ICT services. Although smaller public organizations do not have their own strategies clearly established for the alignment of ICT, there are wider strategic programs that these smaller organizations can follow and join into. These strategies are regional, national or even EU-wide.

On private sector, large companies tend to choose a supplier which has established a global networked organization. The main targets for outsourcing include cuts in operative costs and availability of special knowledge and resources. This study found that the prime target of outsourcing in the private company case was to get connected to networks, which reach several countries and are scalable for the organization's expansion. This also speeds up the implementation of the capabilities needed, without having to resort to the building of in-house capabilities. In studies 3 and 4 of the dissertation, the key objective is to find a supplier which can offer a well-organized network in order to meet the requirements. However, already when choosing a suitable outsourcing partner, it is highly important that a right type of strong collaboration network is sought in the contracting phase. Organizations' cultures have a strong impact on outsourcing project success. Also the people of the own organization have to be prepared for creating good collaboration. In the studied collaboration cases, understanding supplier culture and network is a key success factor.

Leading information management by the CIO role is equivalent to leading complex networks. The CIO role is no longer that of an ICT technology specialist. Strong leadership and collaborative role for people and virtual organizations' networks is required. The CIO's role is evolving also by networking with the help of professional social network tools and through personal networking with other colleagues. These networks are still emerging globally, and rapid development and expansion of collaboration tools, like LinkedIn or Facebook, have a strong role in that. Use of professional social media tools in a more structural way consolidates the customer's voice viz-a-viz the voice of the suppliers, enabling better matching between customer requirements and supplier's services. This kind of utilization of CIOs' network is emerging now and can further increase.

Recently conducted research on the CIO's present functions indicates that the CIOs have shifted from their operational responsibilities to a more strategic one. This was confirmed by our own study. The CIO of today needs to focus more on future-oriented questions than on everyday problems and move closer to the organization's top level management.

We found that the leadership role is influenced by organization's size and governance. The role of CIO in large companies is strategic. The CIO has a role

even in new business models and innovations management. In smaller municipalities, that role was missing in more than half of them. The management of ICT had been assigned to the head of the municipality or financial director, who in most cases don't have any deeper competences regarding ICT planning or management. It is very unlikely that we could come across well-aligned strategies when the leaders who do not have the necessary skills to carry out changes by utilizing ICT as an enabler for change. A more comprehensive approach is needed, an approach where municipalities' ICT leadership and strategies are adopted by external organizations. However, as municipalities' decision making is at the hands of politicians, nationwide regulations and laws are necessary to make this happen.

ICT has to be managed in accordance with the agreed governance and processes and the highly demanding role of ICT executive is a must. The CIOs' roles are now undergoing their 4th wave of change (Andrews & Carlson, 1997). The authors stated that the first wave saw CIOs as glorified data processing managers, the second wave as technocrats and the third wave as business executives. The fourth wave now characterizes CIOs as both technocrats and business executives. The CIO role as such has not become stabilized. The role has been taking off during the last decades and still continues its emergence, not least because of the changes in information technology (Dahlberg et al., 2015; Jeanne & David, 1999). Figure 5 illustrates how CIO roles in the public and the private sector have evolved during the last decades.

Private Sector	<ul style="list-style-type: none"> <li>• Narrow focus on ICT application and technology</li> <li>• Loose integration with strategy process</li> <li>• Development by own professionals, low outsourcing level</li> <li>• CIO role very operational</li> <li>• Long-lasting development cycles</li> </ul>	<ul style="list-style-type: none"> <li>• CIO has a key role in companies strategy processes</li> <li>• Demand for networking e.g. by using social media</li> <li>• Selective outsourcing instead of total outsourcing</li> <li>• CIO s widened role covering all processes, related technologies and business ICT</li> <li>• Urgency and continuous demand for efficiency</li> </ul>
Public Sector	<ul style="list-style-type: none"> <li>• Independent ICT teams</li> <li>• Programming focus</li> <li>• Loose connection with organizations management</li> <li>• Low-level IT understanding by users and stakeholders</li> <li>• Loose connections with strategy planning</li> <li>• Low level of integrations</li> </ul>	<ul style="list-style-type: none"> <li>• Health Care ICT challenges</li> <li>• Laws and regulations (e.g. In procurement)</li> <li>• Growing share of outsourced ICT</li> <li>• Users and stakeholders variable requests from basic to very demanding</li> <li>• CIO role emerging in strategy processes and innovating new ways to work</li> </ul>
	1980's	2010's

FIGURE 5 The CIO role comparison between the public and the private sector 1980-2010



In CIO interviews, we found evidence that organizations understand ICT and its influence on business results better than before. In recent decades, the organization as a whole has not understood what ICT entails, but now, through alignment and collaboration, there is better understanding of ICT and how it supports business. In the O&M case, we found that separation of corporate ICT and business ICT is no longer supported in information-intensive business models. The same supplier can fulfill needs for both types of typical ICT requirements.

#### **5.4 ICT outsourcing**

Whilst outsourcing and its evaluation have been studied over the past decades, still remarkably few outsourcing projects reach their objectives. As practitioners and action researchers in outsourcing projects, we found that commercial and technology criteria get most of the focus when choosing an outsourcing partner, but in the post-agreement phase project success is heavily dependent on what kinds of people and skills there are in the project. Good governance is also needed to rapidly handle issues between parties. The situation is very similar to that of a traditional company offering outsourcing to their customers.

Lack of flexibility in outsourcing deals has become an issue. There are topics which need to be considered as strategic maneuvers. Having several vendors, retaining in-house ICT competences with loose coupling and a degree of interchangeability make changes easier while avoiding overdependence and minimizing customization (Tan & Sia, 2006). There is a growing trend towards outsourcing of entire business processes, including human resource activities and ICT operations (Feeny et al., 2005), but the findings of our study suggest selective outsourcing as the best choice. In global business models, such as O&M, well-functioning ICT and human resources management are mandatory as business enablers.

#### **5.5 Implications for private and public ICT**

The Strategic Alignment Model (SAM) is dynamic and, according to Henderson & Venkatraman (1993), needs to be applied to business environment. However, for small public organizations, fitting SAM in is problematic as there is no clear business strategy or ICT strategy. When the included case studies and findings are verified from the viewpoint of strategic alignment model theory, we find that strategic alignment does not exist in small public entities. Also decision making takes place across multiple layers (politicians and the municipalities' own personnel). Private organizations can plan much further into the future and also make rapid changes based on SAM. Another aspect is that these small public organizations need to be looked at from a larger viewpoint instead of



trying to fit a strategy just for one municipality. Therefore, “Kuntien Tiera”, which started in 2010, is a right type of move towards a common strategy covering several municipalities and the related external ICT fit. Public sector ICT solutions could be more consolidated and strong hubs in collaboration networks should be created. “Small-world” networks, where few small municipalities are collaborating, should be linked to a nation-wide ICT service provider or at least with a bigger town which could take care of the ICT development and operation for a larger number of small municipalities. These lead-organization hubs need to be strong enough for making a preferred attachment to enable growth. Right now, there are approximately ten different SAP installations for the municipalities' ICT organizations even though a single one could handle the transactional platform for all Finnish municipalities. The situation is even more fragmented with the municipalities' collaboration systems such as e-mail and document management. There is room to increase efficiency by consolidating services and contracts. However, this seems to be quite challenging as long as there are not strong service providers who can take the leading role in the network (figure 6).

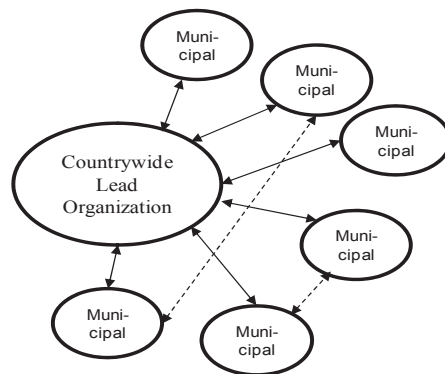


FIGURE 6 Lead-organization hub model

As ICT is in the front end of vendor contracts, the value of ICT management to facilitate the flexibility requirement in outsourcing is important, especially where external environment is very dynamic (Tan & Sia, 2006). Therefore, there is a need to clarify the requirement for flexibility already when planning strategic outsourcing decisions.

Relying on the studied cases, this study brings better understanding to the complexity of managing ICT. Those case studies indicate that organizations' strategy has to be aligned with information management plans. Network management with well-defined methodologies, models and cultural characteristics of networked organizations need to be considered.

## 5.6 Limitations of the study and suggestions for further studies

The research for municipalities was carried out in one region of a country. Also the number of the larger municipalities included was limited. We could not, in all the cases, be sure we had selected the right interviewees as there was quite a lot of diversity in their roles and positions. Some of those interviews addressed small groups and some were done in one-to-one sessions. Every interview and all data were analyzed similarly. Public sector ICT is required to increase its own efficiency but also be able to provide efficient solutions for public sector processes. ICT is one of the major contributors for better-functioning public sector services. Therefore, more research is needed also on the public sector.

In the O&M study, the number of companies was quite small. Two out of the total of seven companies were customer companies. However, the aim of the study was not to bring in a large number of customer companies, just to enhance the hypothesis by interviewing not only suppliers but also customers. The interviews of the supplier companies preceded those of the customer companies. As services-based business models are undergoing rapid global evolution, the roles of their support functions turn out to be critical. This provides good topics for researchers and in this way helps organizations to keep focus on relevant things.

In our interviews, we had quite a unique possibility to get access to experienced CIOs. However, there is a remarkable diversity among participants' age, experience in years and background as well. This diversity is reflecting the reality within organizations' ICT leadership. We did not want to limit or omit any participants in cases where the organization was suitable for our study. More focused research on industries where CIOs work is proposed.

In the action research study, we are strong practitioners even though our experience of carrying out action research is not long. The outsourcing case where the findings came from was limited to one case, but that is typical in action research studies. We mainly studied what happens from the customer's point of view and the supplier's viewpoint was not dealt with.

There are many areas which merit more study. CIO's leadership role evolves and changes when new solutions and technologies are adopted by users, for example in the case of "Social Media" technologies, which continue to expand. Outsourcing is a widely studied subject, but still there are areas where further studies have their place. In most of the outsourcing cases, there prevails an urgency to start project immediately without thoroughly addressing human topics. Case studies comparing human resource activities before and during a project would be useful, as they would offer a better correlation of outsourcing cases with the success criteria. Also, public sector ICT has many areas of high interest for IS researchers, areas which can be linked to the redesign of municipalities' ICT and processes. Restructuring is urgently needed, and for this IS research can produce useful findings, proposals and results which can be put in practical use.

## YHTEENVETO (FINNISH SUMMARY)

Moitteettomasti toimivan tietohallinnon ja sen johtamisen merkitys on sekä yksityisellä että julkisella sektorilla kasvanut viime vuosikymmeninä ja olemme yhä riippuvaisempia tietotekniikasta ja sen sovelluksista. Tutkimustyö pitää sisällään modernin tietohallinnon tapaustutkimuksia, joita on tehty sekä yksityisen sektorin suurehkoiden yritysten hankkeisiin sekä julkisen sektorin kuntaorganisaatioihin. Työssäni olen hakenut tietoa ja tarkastellut ilmiöitä miten ja miksi jokin oletama toteutuu sekä analysoinut kerätyn tiedon perusteella mitä niistä voidaan oppia ja miten saatuja kokemuksia voitaisiin hyödyntää. Tutkimustapa on ollut pääasiassa tapaustutkimusmalli. Kaikkiaan julkaisuja on viisi ja niistä jokainen liittyy tietohallinnon prosesseihin, johtamiseen, strategiseen viitekehukseen tai käytettyihin menetelmiin. Työssä on tarkasteltu kahta teoriaa. Ensimmäinen on tietohallinnon strategioiden linjauksen teoria (SAM) eri organisaatioihin ja toinen on Ekosysteemiteoria. Tietohallinto ja sen hankkeiden rooli osana tutkittujen organisaatioiden strategista viitekehystä toimii väitöskirjatyön johdantona ja punaisena lankana työssä esitettyjen tutkimusten välillä.

Tietohallinnon strateginen asema on muuttunut teknologisen edistymisen myötä. Tehtyjen tietohallintopäälliköiden haastattelujen perusteella tilanne on alkanut merkittävästi muuttua siirryttäessä 1990 luvulle ja mitä lähemmäs tätä hetkeä tullaan, sen lähempänä tietohallinnon rooli on myös yrityksen johtoa. Yritysten tietohallintostrategiat ovat tänä päivänä hyvin integroituneet yleisen strategiakehukseen ja -toteutukseen. Perinteiset yritykset, jotka aiemmin ovat toimineet lähinnä tuotteiden ja niihin suoraan liittyvien palveluiden sekä kunnossapidon alueella, ovat tulleet ulkoistusliiketoimintaan mukaan tarjoten asiakkailleen ICT-pohjaisia palveluja. Suomalaiset yritykset toimivat nykyään hyvin globaalissa toimintaympäristössä ja siten ovat osa maailmanlaajuisista verkostoista, jossa tietotekniikka ei pelkästään mahdollista toimintaa vaan on myös merkittävä kilpailutekijä.

Tilanne ei ole aivan sama kunnissa, joita ohjataan laeilla ja säännöksillä. Niillä ei ole yksityisten yritysten tapaan joustavuutta ratkaisujen toteutuksessa. Tutkimuksissamme huomasimme, että varsinkin pienemmillä kunnilla ei ole mahdollisuuksia tietotekniikan avulla päästä merkittävästi tehostamaan toimintaansa, koska saatavilla olevat panostukset menevät olemassa olevien järjestelmien pyörittämiseen. Väitöskirjassa esitetään malli miten pienen kunnan tulee suunnitella ja toteuttaa tietohallintoaan ja -arkkitehtuuria. Myöskään kuntasektorilla on saatavilla hyvin vaihtelevasti osaamista sekä resursointi oli useassa tapauksessa riittämätöntä. Tällöin pienillä kuntayksiköillä on talouskurimuksessa vaihtoehtona liittyä suurempiin yksiköihin, joissa hankkeita voidaan toteuttaa ja rahoittaa yhteisvastuullisesti ja tätä kautta saada aikaan tuloksia pienemmillä panostuksilla. Tutkimuksen aikaan kunnissa vallitsi syvä epäusko yhteisten hankkeiden toteutukseen. Myöhemmin oikeita hankkeita on jopa saatu aikaiseksi.

Ulkoistusten rooli tietohallinnon toteutustapana on edelleen merkittävä. Edelleen suurin osa ulkoistushankkeista epäonnistuu. Huomasimme tutkimuk-

sissamme kuinka edelleen hankkeiden linkityksessä organisaatioiden strategioiden toteutukseen ja niiden suunnitteluun vähemmälle painoarvolle jää miten työ organisoidaan ja hallinnoidaan sekä millaisia osaajia ja osaamista ulkoistushankkeisiin tulee sekä asiakkaan että toimittajan puolelta sitouttaa. Tutkimme ulkoistushankkeen päätöksentekoa ennen ja jälkeen projektin ja huomasimme että osaamisen ja oikeiden osaajien merkitys oli ulkoistushankkeen toimittajan valinnassa aivan liian pieni.

Strategian linjauksen malli - teoria ei sellaisenaan selitä sen sopivuutta varsinkaan pieniin julkisiin organisaatioihin. Niissä tulee tarkastella strategia linjauksia yli useamman organisaation, koska pienillä organisaatioyksiköillä ei ole riittävää osaamista ja kykyä toteuttaa strategisen tason suunnittelua ja toteutusta. Verkostoteoria on yhä tärkeämmässä osassa koska sekä yritysten sisäinen kehittäminen sekä liiketoiminta ovat muuttuneet yhä enemmän globaaleiksi verkottuneiksi hankkeiksi, joissa yritys on yksi osa globaalia verkostoa ja aikaisemmista tukitoiminnoista, kuten ICT:stä ja henkilöstöhallinnosta onkin tullut tärkeä kilpailutekijä.

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## APPENDIX 1. MUNICIPAL ICT - QUESTIONS IN THREE MAIN CATEGORIES

	<b>Kunta;</b>	
	<b>Paikka;</b>	
	<b>Mukana;</b>	
	<b>Päivämäärä;</b>	
	<b>IT:n hallinnointi ja budjetointi</b>	<b>Tulos 1</b>
1	Mikä on kuntasi budjetin suuruus (keur)	
2	Mikä on IT kustannusten (lähinnä tietokoneet ja työasemat, ohjelmistot, tietoliikenne, IT-henkilöiden palkat, IT-konsultointi, IT-palveluiden osto, puhelinkulut) osuus koko budjetista (%)	
3	Mikä (arvio) on IT kulujen osuus koko budjetista kolmen vuoden kuluttua (%)	
4	Paljonko IT kustannuksista kohdistuu uusien palveluiden kehittämiseen (%) - "tulos 1" ja paljonko palveluiden tuotantoon % - "tulos 2"	
5	Mikä on oman työn osuus ICT kustannuksista (%) - "tulos 1" ja mikä on hankintojen osuus (%) - "tulos 2", summan ollessa 100 %	
6	Mitkä ovat allaolevien ICT osa-alueiden kustannusosuudet (%)	
7	- konsultointi	
8	- laitteet	
9	- ohjelmistot	
10	- tietoliikenne	
11	- IT palvelut	
12	- en osaa sanoa	
13	Arvioi kouluarvosanalla (4-10) kuntanne ICT hallintomalli (roolit, vastuut, oikeudet) toimivuus	
	Mikä on työasemien määrä	
	<b>Henkilöstö</b>	
1	Kunnan IT henkilöstön määrä tällä hetkellä	
2	Kuntasi henkilöstön kokonaismäärä	
2	Monellako henkilöllä (arvio) IT henkilöstön määrä muuttuu seuraavan 3-5 vuoden aikana (+/- lkm)	
	Kuinka paljon seuraavia IT kyvykkyyksiä kaivataan kuntasi ICT toiminnoissa; 1) ei ollenkaan, 2) vähän, 3) jonkin verran, 4) paljon, 5) erittäin paljon	
3	- Arkkitehtuuri (prosessi-, tieto-, infra-, data-...)	
4	- Järjestelmäkehitys (jos tässä korkea tarve, millaisia ohjelmisto-osajia tarvitaan?)	
5	- Järjestelmien käyttöönotto	
6	- IT projektien suunnittelu ja johtaminen	
7	- IT palveluiden tuotanto ja sen johtaminen	
8	- IT Hankinnat	
9	- IT käyttäjä tuki	
10	- Tiedon johtaminen (järjestelmissä olevien tietojen harmonisointi, raportointi)	
11	- IT:n johtaminen	
12	- Muut kyvykkyydet (mitä?)	
13	Onko kunnassasi nimetty IT päällikkö (kyllä/ei)	

	Sisältö	Tulos 1
	Miten arvioisit seuraavien ICT toimintojen tilan kunnassasi (kouluarvosana 4-10) ->"tulos 1"sekä seuraavien IT järjestelmien ulkoistusaste (asteikko %) - > "tulos 2"	
1	- ICT hankinnat, toimittajan- ja sopimuksenhallinta ja osto-osaaminen (sis. ICT ulkoistus)	
2	- Projektinhallinta	
3	- Kokonaisarkkitehtuuri	
4	- Tietoturva ja IT- riskienhallinta (virustorjunta, toiminnan jatkuvuus, SPAM)	
5	- Käyttäjätukimalli ja tapahtumanhallinta (sis. service desk)	
6	- Sovellusten ylläpito, kehitys ja käyttöönotto	
7	- Infrastruktuuri	
8	- Asiahallinto (ml. arkistointi)	
9	- Talous- ja henkilöstöhallinnon järjestelmät	
10	- Kunta-asiakkaiden sähköinen asiakaspalvelu (ml. sähköinen asiointi)	
11	- Palveluohjaus ja palvelusetelijärjestelmät	
12	- SOTE/Perusterveydenhuolto	
13	- SOTE/Erikoissairaanhoido	
14	- SOTE / Sosiaalityö	
15	- SOTE / Vanhustyö	
16	- SOTE / Kotihoito	
17	- SOTE / Päivähoito	
18	- SIVISTYS / Perusopetus	
19	- SIVISTYS/ Toinen aste	
20	- TEKNINEN TOIMI / Yhdyskuntatekniikka	
21	- Hankintatoimi ja logistiikka	
22	- Paikkatietopalvelut	
23	- Yhteisölliset työkalut & etäpalvelut	
24	Entä mikä on laajakaistan tilanne tällä hetkellä (asteikko 4 heikko-10 kiitettävä)	
25	Onko kuntasi halu panostaa rahallisesti laaja-kaistan investointiin asteikko (4 vähän -10 erittäin paljon)	



Yleistä		
1	Millaista palautetta paikalliset yrittäjät antavat kunnan IT palveluista - (asteikko 4 huonoa -10 kiitettävää)	
2	Tuleeko kunnan lisätä ICT tukea alueen yritysten suuntaan jatkossa - (1=paljon, 2=jonkin verran, 3= ei muutoksia)	
3	Jos palvelut ovat riittämättömiä, niin missä ovat suurimmat ongelmat 1) IT infrastruktuuri, 2) tietojärjestelmät ja sovellukset, 3) IT palvelut ja palveluprosessit - kouluarvosana-asteikolla kysymällä millaiseksi seuraavien palvelun laatu on arvoitu ...	
4	Oletko saanut riittävästi tietoa SITRA / KPK valtakunnallisista hankkeista 1) ei ollenkaan, 2) vähän, 3) kohtuullisesti, 4) paljon, 5) erittäin paljon	
5	Oletko saanut riittävästi tietoa Valt.varainministeriö/KuntaIT valtakunnallisista hankkeista 1) ei ollenkaan, 2) vähän, 3) kohtuullisesti, 4) paljon, 5) erittäin paljon	
6	Oletko saanut riittävästi tietoa Valt. varainministeriö/ValtIT valtakunnallisista hankkeista 1) ei ollenkaan, 2) vähän, 3) kohtuullisesti, 4) paljon, 5) erittäin paljon	
7	Mitä tietoa pitäisi saada enemmän?	
8	Näetkö, että kuntasi IT toimintoja pitäisi muuttaa / tehostaa 1) ei ollenkaan, 2) vähän, 3) kohtuullisesti, 4) paljon, 5) erittäin paljon	
9	Oletko valmis liittämään kunnan ICT palvelut suurempaan kokonaisuuteen (1=lähes varmasti ... 5=lähes varmasti ei)	
10	Milloin tämä voisi olla ajankohtaista? Kun muutosta toteutetaan, minkä ICT osuuden (%) kuntanne yleensä ostaa ulkopuolisilta seuraavista muutoksen vaiheista;	
11	- kehitys	
12	- käyttöönotto	
13	- tuki	
14	- ylläpito ja jatkokehitys	
	Kuinka tärkeitä ovat seuraavat asteikolla 1=ei lainkaan tärkeä ... 5=erittäin tärkeä;	
15	- kustannus	
16	- palvelun häiriötön toiminta	
17	- palvelun laatu	
18	- palvelun muunneltavuus	
19	- asiantunteva käyttäjätuki	
20	- varmuus kehityksestä mukaan lukien lainsäädännön muutosten toteuttaminen	
21	Käytättekö KL-Kuntahankinnat OY:tä hankintoihin? (1= ei koskaan ... 5= kyllä aina)	
22	Tarvitaanko muutoksen tekemiseen paikallista / maakunnallista toimijaa (1= ei koskaan ... 5= kyllä aina) - ja miksi Keiden seuraavista pitäisi toimia muutoksen veturina asteikolla 1-5 (1=e-i lainkaan panosta ..5=erittäin suuri panos)	
23	- maakuntaliitto tai kuntien välinen yhtymä	
24	- valtakunnallinen KPK ICT	
25	- muu julkinen toimija, esim yliopisto	
26	- joku muu (mikä)?	

## APPENDIX 2. MUNICIPALITIES ICT – TABLE FOR ICT APPLICATIONS IN 23 MUNICIPALITIES

No of systems	Application	Cov of population	Service process	No of systems	Application	Cov of population	Service process
22	KuntaNet	117700	technical services	1	GIS	10800	technical services
18	Aurora	221200	library system	1	Facta	20200	technical services
18	Pro Economica	108400	financial services	1	Exchange	2600	other services
15	ProConsona	85300	social services	1	- unknown -	22900	library system
15	Primus	226800	school system	1	Apache, Joomla, MySql	20200	desktop publishing
13	Pegasos	69100	payroll services	1	Economa	20200	financial services
10	Wilma	86500	school system	1	Elisa HelpNET	2300	other services
9	Dynasty	85300	municipal office	1	Kassapankki	20200	financial services
9	Effica	205300	health care	1	Comp	129600	financial services
9	ProConsona	70100	daycare	1	Langaton Vaihide	2300	other services
8	Basware	331200	financial services	1	Basware	3400	payroll services
8	Effica	190800	senior citizen services	1	Basware	3000	health care
7	Kurre	157600	school system	1	AGS	20200	financial services
6	Abilita Vesihuolto	30200	technical services	1	- unknown -	3400	technical services
6	Pegasos	39700	health care	1	Impressio	5500	desktop publishing
6	MapInfo	24200	technical services	1	Sharepoint	129600	municipal office
5	Effica	180500	social services	1	SecretNet	20200	financial services
4	ProCapita	18400	school system	1	SAP	129600	payroll services
4	Pegasos	18200	senior citizen services	1	SSL VPN	7200	electronic transactions
4	KuntaToimisto	147700	municipal office	1	Titania	10700	daycare
4	Effica	165700	daycare	1	Pro Economica	5100	payroll services
4	Peda.net	30100	school system	1	ProConsona	5100	health care
4	CMS	10000	desktop publishing	1	Titania	4000	social services
3	ProConsona	36400	senior citizen services	1	Titania	800	payroll services
3	iManager	22500	desktop publishing	1	PlaNet	129600	technical services
3	Xcity	159000	technical services	1	- unknown -	1900	municipal office
3	Web-sivusto	139700	electronic transactions	1	Persona Regime	9200	payroll services
3	Pro Excellenta	34400	payroll services	1	Koululiitu	20200	school system
2	Pegasos	6300	financial services	1	Typo3	10800	desktop publishing
2	SAP	135100	financial services	1	Pala	20200	payroll services
2	Titania	3600	other services	1	WinHIT	22900	health care
2	Vesikanta	25900	technical services	1	Workflow	9200	other services
2	Koki kiinteistöpito	30900	technical services	1	Palvelukassa	129600	financial services
2	Effica	28400	other services	1	Mediatri	20200	health care
2	Web-sivusto	26300	desktop publishing	1	Media Cabinet	1600	desktop publishing
1	Jamix	2300	other services	1	Lotus Notes	129600	other services
1	Intime plus	9200	financial services	1	LIS	22900	other services
1	- unknown -	10800	electronic transactions	1	Sonet	20200	financial services
1	Facta	2300	other services	1	DL	5100	technical services
1	Prime	129600	desktop publishing	1	Personec	129600	payroll services
1	JD-Kustannuslaskenta	129600	technical services				

## APPENDIX 3. O&M BUSINESS MODEL - QUESTIONS

Benchmark interview xx  
 Participants xx, interviewer  
 Date and place;

Background of interviewee

-

Questions and answers in interview

### Service Provider Understanding

What is your primary goal, whether to offer strategic long-term solutions or do you aim to provide separate projects or deliveries? And could you tell why and which criterias steer your desired mode of operation with customer?

-

What are your assets which you consider that makes you the most desirable supplier for customer, ie. what is your value proposition?

-

What is your key factor(s) in your chosen earnings logic (eg. spares, knowledge, performance, safety/environmental)? What kind of estimation tool /configurator(central-distributed)/ model you have in calculation O&M TCO

-

Do you offer services / O&M as a closely connected offering beside CAPEX/project and if so, what is driver/process/incentive to sell a common solution to customer?

-

How do you consider potential risks regarding geographical, financial, legislation / IPR risks and how they are involved in calculations, eg "risk factor index"?

-

How do you manage service product portfolio and what kind of service products you have?

-

How do you manage your Customer Relationship Management (CRM) through the whole lifecycle? Is there a consulting company between your company and customer?

-

### Business Infrastructure / Capabilities

What are the key processes and elements (eg strategic-tactical-operative) of governance model implemented btw supplier/customer and do you have a specific Service Level Agreement / KPI's structures implemented with your customer

- .

Do you prefer Remote Monitoring and/or Controlling concept based approach vs strong local market area based support in establishing successful O&M site operations?

- .

What are your key succes factors in O&M IT services and do you prefer internal vs external, global vs local service provider(s) and resources?

- .

How deep level you consider maintenance /DCS (operating system) information to be analysed and what kind of IT solutions you have to keep that tracked? How do you develop /optimize customers processes utilising remote monitoring ?

- .

How do you manage O&M information flow and systems integration to customer direction and internally?

- .

How do you manage modular IT architecture with modular products?

- .

What kind of differences do you have in staffing between different countries, due to different management and skills expectations? In which positions do you have expatriates?

- .

Other

- .

Can you see, that benchmark could be discussed also with your customers?

Duration of this interview was appr x hours xx mins.



## APPENDIX 5. CIO ROLE - QUESTIONS

### Nimi

### Pvm ja paikka

Yritys, tunnusluvut 2011 (tai vastaava): hlömäärä, liikevaihto, tulos

### Taustaa (aikajänne 10 v?)

1. Mikä on koulutuksesi ja kauanko olet ollut IT-tehtävissä?
2. Minä vuosina johdit IT-yksikköä? / Mistä vuodesta alkaen olet johtanut IT-yksikköä?
3. Kuinka monta vuotta olet toiminut tietohallintojohtajana?
4. Montako alaista sinulla oli kun työsi alkoi/nyt ?
5. Kuka on esimiehesi (CEO, CFO, joku muu)?
6. Miten oma organisaatiosi on muuttunut sinun aikanasi?
7. Miksi se on muuttunut?

### II Johtamisviitekehys

8. Mitkä olivat silloin, kun tehtäväsi alkoi, ATK-toiminnon suurimmat haasteet?
9. Haasteesi nyt?
10. Mitä osaamista tarvittiin?
11. Osaamistarpeet nyt?
12. Mikä oli yhtiön johdon käsitys ATK:n tarpeesta/ nyt?
13. Minkälainen on hyvä johtaja?
14. Minkälaisia johtoryhmiä silloin oli ja kuinka niissä käsiteltiin IT-asioita?
15. Minkälaisia johtoryhmiä on nyt?

### III Strategiakysymyksiä

16. Mikä on yrityksesi strategia tänä päivänä?
17. Miten arvioisit silloisen ATK-osaston kykyä strategiamuutoksiin?
18. Entä tänä päivänä?
19. Entä johtajiston?
20. Oliko IT mukana strategiatyössä/ entä nyt?
21. Jos on, niin miten?
22. Minkälaisia toiminnan mittareita silloin/ nyt käytettiin?
23. Tukiko IT silloin mielestäsi tehokkaasti yrityksen päämääriä?
24. Tukeeko nykyään?
25. Teknologian muutoksen vaikutus yrityksen strategiaan?

### IV Arvostus

26. Kuinka silloista ATK-yksikköä arvostettiin?
27. Kuinka sitä arvostetaan tänä päivänä?
28. Miten arvioisit ATK:ta koskevan ymmärryksen tilan silloisessa johdossa?
29. Entä nykyään?

30. Minkälainen rooli ja vastuu ATK:lle annettiin?
31. Entä nykyisin?
32. Oliko IT-johtaja myös ylimmän johdon edustaja?
33. Onko nyt?
34. Oliko IT-johtaja konsernin johtoryhmässä?
35. Onko nyt?
36. Ymmärsikö ylin johto IT:n yhteyden tuottavuuden kasvuun?
37. entä nyt?
38. Ymmärsikö ylin johto IT:n yhteyden liikevaihdon kehittymiseen?
39. entä nyt?

#### **V Muutokset ajassa ja paikassa**

40. Onko yhtiössäsi ollut merkittäviä fuusioita/divestointeja aikanasi?
41. IT:n ulkoistamisia?
42. Miten hallitset verkostoa yrityksen sisällä ja ulkona?
43. Mikä oli yhtiön taloudellinen tilanne?
44. Entä nyt?
45. Miten muutokset ovat vaikuttaneet IT-osastoon?

#### **VI Haasteet nyt ja tulevaisuudessa**

46. Yrityksesi suurimmat haasteet nyt?
47. Tällä hetkellä suurimmat haasteesi CIO:n/Tietohallintopäällikön roolissa?
48. Mitä tehtäviä kuului ja kuuluu nyt? entä tulevaisuudessa?
49. Millä tavalla olet mukana businessin johtamisessa?
50. Entä millä tavalla olet mukana business IT:n johtamisessa?
51. Näkymät tulevaisuuteen?

#### **VII ICT ja Globalisaatio**

1. Miksi yritys lähti kansainvälisille markkinoille?
2. Miten yrityksen kansainvälistyminen on muuttanut yrityksen toimintaa?
3. Miten yllä oleva kehitys on muuttanut Tietohallinnon roolia ja vastuita kuluneina vuosikymmeninä?
4. Vaikutukset tietohallinnon henkilöstön osaamiseen
5. Vaikutukset tietohallinnon Tehtäviin ja prosesseihin?
6. Vaikutukset tietohallinnon Strukturiin?
7. Vaikutukset tietohallinnon Strategiaan?
8. Vaikutukset CIO:n omaan tehtäväkenttään, rooliin, osaamiskenttään?



# **ORIGINAL ARTICLES**

## **I**

### **WHY TO OUTSOURCE?**

by

Harri Hyvönen & Päivi Hokkanen, 2011

Proceedings of 34<sup>th</sup> Information Systems Research Seminar in Scandinavia  
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## Why to outsource? Case municipal's IS in one region of Finland

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Jyväskylä University  
Information Technology

**Abstract.** Although Information Systems (IS) outsourcing has been researched widely during the last decades, the public sector emphasis in IS outsourcing literature has been lacking. In this paper we aimed to find reasoning for outsourcing based on theories which have been developed to explain the motives of outsourcing. We found that cost cuttings and efficiency are not seen a primary reason why decisions of outsourcing have been taken instead of doing the work internally. Instead of cost cutting there are reasons such as capabilities, quality of IS services and technology, which explain the growth of the outsourcing business.

The Finnish public sector IS has an increasing pressure to develop its capability to support wider processes for municipals. At the same time there is a strong demand to keep the cost level down or even decrease it. We collected data through interviews from 23 municipals in one region in Central Finland. Our cases demonstrate that the present costs are not the most critical issue but the capability to enable more efficient processes is important especially in the smaller municipals. We also researched the strategic position of IS in a municipal's hierarchy. By using a strategic framework approach it can be seen how functional and political risks are different in larger and smaller municipals. Based on our findings the conclusion can be drawn that the best choice especially for smaller municipals is to join a nationwide operator. However, friction amongst municipals to join or not can clearly be seen at the time interviews were carried out.

**Keywords:** IS Outsourcing, public sector, IS capabilities

## 1 Introduction

### 1.1 Motivation to this research

The reasons why companies do outsource their information systems (IS) functions have been an object of several studies during the past 20 years. According to Lacity, Khan and Willcocks [11] cost reduction has been the most common motive identified by researchers despite any other rhetoric. However, some studies support the approach of using outsourcing as a strategic tool to improve information quality and to create more value to the company [20]; [13]; [4]. Interestingly is also the dilemma that if IS costs represent only three percent of company's annual revenue on average [11] how is it possible that reducing this cost is the driver for any actions in a company.

In our case study we have 23 Finnish municipals who have currently the opportunity to join the merger of ICT functions so that their independent ICT infrastructure and sourcing tasks could be partly aggregated to a new company owned by Finnish municipals and facilitated by the Finnish innovation Fund, SITRA. When the data collection and interviews were done in autumn 2010, none of these 23 municipals in scope established their willingness to join in the new company. This result cannot be interpreted as a cost issue.

This situation attracted our interest and created also our research questions:

1. Why Finnish municipals in researched region are not interested in larger scale to outsource their IS or part of that?
2. What are the reasons besides cost reduction why outsourcing could be a tool for IS leaders and particularly in municipals in Finland?
3. Do municipals in Finland see IS as strategic level function or enabler and does that impact on outsourcing decisions?

### 1.2 IS outsourcing background

The IS outsourcing market has been growing rapidly since the end of 1980's and its growth has been significant also in the first decade of year 2000 [4]. This market began to evolve already in 1963, when EDS and Blue Cross Pennsylvania made an outsourcing deal where EDS took over the responsibility of Blue Cross IS people. In 1989, when Kodak announced its outsourcing to IBM, DEC and Businessland, it gave a boost and a legitimation to the whole outsourcing market and currently the market size is globally several hundreds of billions of dollars. [4]; [5]; [13]; [14]; [20].

In its broadest dimension, IS outsourcing means the provision of all ICT services including assets, processes and personnel, i.e. total outsourcing according to a taxonomy of sourcing decision options developed by Lacity and Hirschheim [12]. The original definitions by Lacity and Hirshheim are shown in brackets. Their definition of the taxonomy of sourcing decision options is shown in the Table1.

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**Table 1.** Taxonomy of sourcing decision options

Sourcing decision option	Description
Total Outsourcing (Total Outsourcing)	the decision to transfer to external ICT provision is more than 80% (The vendor is in total charge of a significant piece of IS work)
Total In-sourcing (Body Shop)	the decision to keep internal ICT provision on the level of more than 80% (Outsourcing is used as a way to meet short term demand by management)
Selective sourcing (Project Management)	external ICT provider's share is between 20-80% of ICT functions (A specific project or portion of IS work is outsourced and vendor is responsible for managing and completing the work)

According to Lacity and Wilcocks [13] selective sourcing decisions achieved expected costs savings more frequently than total outsourcing or total in-sourcing. Earl [6] calls selective sourcing as smart outsourcing and sees it as a way to simplify ICT function when it creates operational performance and the outsourced object is not central to company's strategy.

Since the early days of IS outsourcing it has been used widely as key tool when enterprises have been searching improvements in efficiency with their IT functions. It has been also widely researched during the last 20 years and that has created a good understanding why companies outsource. The main reasons according to research done are costs reduction, to have an access in needed resources and refocus internal resources on more strategic work [11].

This paper seeks to understand of why this industry of outsourcing has become such a popular tool for companies and their IS leaders and what is the reason why public organisations are less willing to do it. This study is structured so, that first there is a short description of frequently mentioned issues in the research papers. Chapter two concentrates to underlying theories of IS outsourcing. In chapter three there is the empirical study of Finnish municipals in Central Finland and after that in chapter four is presented findings from our study. Chapter five is our suggestion for discussion and further research in the field of public sector outsourcing.

### 1.3 Determinants, risks and reward issues

Dibbern et al. [4] have recognised three reasons to question "Why an organisation might consider IS outsourcing". These are *conditions* or *situations* (i.e. determinants or antecedents), *risks* and *rewards* (or advantages and disadvantages) which may lead a company to a decision to outsource. In this study the framework of Dibbern et al. [4] is used while describing the other frequently mentioned issues in the outsourcing literature related to our case study.

The determinants may be external to the company like industry level institutional pressures or country level diffusion drivers. These determinants may also be internal to the company but outside the IS level, like costs and financial situation, financial impact, strategy, size or business sector. And lastly, the determinants may be IS level, like asset characteristics, beliefs associated with outsourcing, perceptions towards environment or perceived risks of outsourcing. Lacity et al [11] conclude in their review of ICT outsourcing literature the same determinants, i.e. industry, financial and size attributes.

Risks are generally defined as the probability that an action will adversely affect an organisation [11]. Earl [6] describes 11 different internal risk factors in a company or its IS function, such as weak management, inexperienced or outdated skills of IS function, uncertainty of business or IS capabilities and loss of innovative capacity of IS function. Total outsourcing with a single supplier can be considered as a high-risk strategy including among others organisational, contractual, managerial, technological and financial risks. Some of the risks of this kind can be mitigated before contracting by using a multi-vendor approach or by a selective outsourcing with short-term contracts. [22]. However, the thumb rule is that the client company as an initiator of the deal is always responsible for outsourcing and therefore it has to know and be capable of managing the IS services first [11].

The advantages of IS outsourcing are generally seen as reduced costs or increased service levels including time schedule accuracy, even though success of cost reduction has been quite low. In the study of Lacity et al. [11] one of the most important findings was the reciprocal relationships among mutual trust, contract governance and IS outsourcing success. The trust between parties and the contractual governance seemed to lead higher levels of IS outsourcing success. Also to gain the trust the evaluation process for selecting suppliers seemed to be a consistent predictor for success.

In the following subchapters the most relevant determinant and risk factors for our case study are looked more closely.

### 1.3.1 Strategy issues

According to Dibbern et al. [4] interest in IS outsourcing is a consequence of a shift in business strategy and best understood as a management decision. Lacity & Willcocks [13] have found two primary phenomena to answer the question “Why to outsource?”. Firstly, senior executives have a tendency to believe that they have to concentrate on what the organisation is doing better than anyone else and outsource the rest. Secondly ICT’s value delivered is unclear and therefore it remains as an overhead and these costs should thus be minimised. Whatever the reason is the research of outsourcing has revealed that top management commitment and support in IS outsourcing is a critical factor for success [11]. The first phenomenon is an external determinant to IS organisation while examining it through the framework of Dibbern et al [4]. But the second one can be evaluated as a consequence of IS organisation’s internal determinant, being incapable of creating IS as a valuable asset.

Collectively CIOs face a serious demand for both value creation and cost cutting and they need to consider how to deliver stable and well functioning ICT services at a

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lower price. Dibbern et al. [4] call this a sourcing dilemma. So, at the end of the day, the question for CIOs is not “what to outsource” but “how should we source” as Wibbelsman and Maiero (1994) has put it [4].

#### 1.3.2 Capability issues

The highly internal IS function's determinants are the issues of capabilities. Outsourcing is not a simple straightforward transaction to transfer agreed ICT services to a supplier. It is a complex bundle of different kinds of tasks of managing the transfer of ICT services delivery within a fairly long period of time [21]. IS outsourcing has been evolving from technology management focus to managing capabilities, with which the resources can be transformed into specific business activities. According to Willcocks, Reynolds and Feeny [23] these capabilities can be developed using three primary mechanisms which are processes, culture and structure. In addition to that, instead of being part of outsourced function, middle managers are the key resource for coordination the change and managing the risks [21].

While planning outsourcing, it is not enough to concentrate on resources like physical facilities, technologies, tools and workforce. Both the client and the supplier should pay attention to capabilities like a set of human based skills, orientations, attitudes, motivations and behaviors which can transform resources into specific business activities. [21]. In the research of Lacity et al. [11] they found IS technical and methodological capability most frequently mentioned while considering the operational capability of both parties. However, the most important capability for client organisations is the capability of supplier management after the outsourcing decision. Accordingly the most important capability for a supplier organisation is the IS human resource management [11].

Feeny and Willcocks [7] have defined nine core IS capabilities named leadership, informed buying, business systems thinking, relationship building, contract facilitation, architecture planning and design, vendor development, contract monitoring, making technology work. After that the research of IS capabilities have been extended to include BPO, ICT off-shoring and high-performing providers [23].

#### 1.3.3 Contractual issues

The second most important IS organisation's internal determinant is the ability to contract. This issue could be examined also under capabilities, but being one of the significant determinants of successful outsourcing it is studied separately.

The underlying concept of IS outsourcing is the acquisition of services through continuous interactions between the client and the supplier as specified in the outsourcing contract [10]. The objective of the study of Lacity and Willcocks [13] was to develop an indicator of success in outsourcing and one of those indicators they found was the contract type meaning the level of details written in the contract. The detailed contracts where the contract includes special clauses for the scope, service levels, performance measures and penalties showed to be the most successful ones.

Also they found that contract duration matters in a way that short term three year contracts had a higher frequency of success than the long-term contracts.

The disadvantage of these findings is that the detailed contracts take a long time to be negotiated and the IS leaders have to know the target well enough to be able to take major requirements into account. Also renegotiation practically every second year takes time and effort from IS leaders. Therefore these aspects might affect the quality of the contract and the willingness of IS leaders to outsource.

While this study concentrates on the public sector, it must be mentioned that public sector acquisition differs from the private one. Especially in Europe, public sector procurement is regulated and controlled with laws and rules [15] which are not binding in the private sector at all. As few examples in EU, the government in UK has set out a rule that all the public contracts need to be public and Finland has the law for public acquisitions, which regulates the procurement process also for IS sourcing.

## 2 Underlying theoretical framework

Dibbern et al [4] classified all IS outsourcing research during the years 1992-2000 by the reference theory used in those papers and they found that transactional cost theory and strategic management theory are the most referred ones. Trying to answer the questions “*Why municipals are not interested to outsource*” and “*What are the reasons besides cost reduction why outsourcing could be a tool for IS leaders and particularly in municipals in Finland*” and being encouraged by earlier research, this paper concentrates on strategic management issues in outsourcing.

Traditionally, in 1970’s strategic management was defined as a formal strategy planning process, in a form of sequenced steps building on objective settings and analysis, through the evaluation of different options, and ending with the careful planning of the strategy implementation [8]. In 1990’s Johnson and Scholes [8, p. 22] defined strategic management as a process by which strategies develop in organisations on the basis of managers’ experience, their sensitivity to changes in their environments and what they learn from operating in their markets.

Burrell and Morgan [2, p. 151] describe Simon’s concern of building a realistic administrative behaviour theory, taking sufficiently care of a theory of human choice or decision making. For Simon the behaviour of managers in organisations is a kind of bounded rationality: human beings “satisfice” instead of maximize their work behaviour. i.e. the behaviour of individuals in an organisation never reaches any high degree of rationality. In our study we emphasize that the concept of bounded rationality has to be taken into account while evaluating the reasons for IS outsourcing.

In the study of Teng et al. [20] strategic management is looked as a concern of strategic deployment of resources, i.e. both resource-based and resource dependence theories point of view. In *resource-based theory* resources provide competitive advantage if they are valuable to the company, if they are unique or rare among the company’s competitors, if they are not imitable and if they cannot be substituted with another resource by competitors. *Resource dependence theory* emphasise the



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necessity of adapting to environmental uncertainty, coping with the complex interdependence and actively managing resource flows.

Teng et al. [20] in their research come to a conclusion that information quality and IS support quality may be important reasons for IS outsourcing, whereas a company's cost considerations including financial performance may not be as important in motivating outsourcing. This means that if IS ability to provide high quality information and support service is low in the company there might be a stronger tendency to take advantage and use outsourcing as an instrument to better quality.

The other perspective of strategic deployment of resources is the effect of outsourcing on the current ICT organisation. Quite often companies downsize their ICT workforce and the remaining people take new roles and tasks for resizing the ICT organisation. Outsourcing part of the ICT personnel may also break informal social ties which have been built over many years. If the ICT resizing is not done with care it can lead to loss of trust and reduced commitment among retained ICT employees and thus cause a potential loss of valuable expertise [19].

In the research of DiRomualdo and Gurbaxani [5], they argue that while the importance and growing role of information and communications technologies are being recognized, the question of business performance must be raised as a strategic intent of IS outsourcing. IS outsourcing is filling the gap of disparity of necessary capabilities and skills needed and the reality of their in-house competencies. According to DiRomualdo and Gurbaxani [5] the other aspects of strategic intent of outsourcing besides business performance are IS improvement by means of cost reduction and commercial exploitation of leveraging technology related products and services in the marketplace. Even though Lacity et al. [11] criticize the outcome of DiRomualdo and Gurbaxani saying that many of their example companies actually have been failed to deliver the expected benefits in a long run, the strategic intents are still valid. And these intents are not carved in stone, but they are evolving over time and therefore both formal and informal outsourcings relationships must change to stay align with the changing intentions [5].

Quinn's approach in his research [18] is that outsourcing is a strategic decision. He claims that "properly developed, strategic outsourcing substantially lowers costs, risks and fixed investments while greatly expanding flexibility, innovative capabilities and opportunities for creating higher value-added and shareholder returns". Quinn uses Dell as an example of that. Even the statement sounds a bit idealistic for us as researchers and practitioners each having more than 30 years experience in the field, the bottom line is that outsourcing can be used as strategic decision in company's management boards.

Clemons, Thatcher and Row [3] state in their study of risks in big-scale IS projects that a company's future strategy or operating environment are restricted by the company's current strategy, business environment and technical capabilities. They say that most companies have at all times two classes of strategy held by personnel, strategy espoused and strategy in use. The first one is the official truth and the latter describe what personnel actually believe about the future.

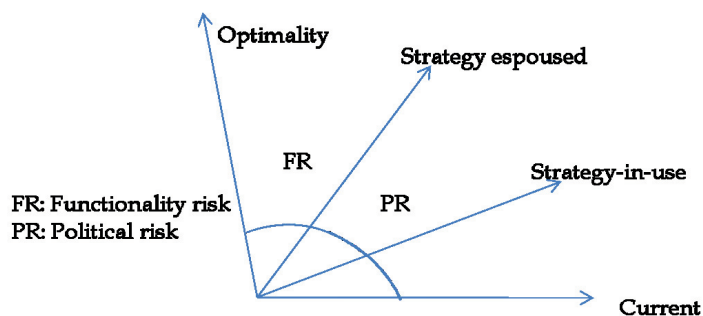


Figure 1. Strategy framework [3]

In this strategy framework [3] two kinds of risks are demonstrated. The more the strategy-in-use differs from strategy espoused the bigger the political risk in the organization. If the change resistance is sufficient the organization fails to implement the projects consistent with the proposed strategic reorientation. The more the strategy espoused differs from the optimal the more the future of the whole organization is risked. This gap shows the level of change that the organisation has not even acknowledged it needs to make.

### 3 The empirical case study

We used multiple case study method [9] while collecting data. We created structured questionnaires with which the municipals representatives were interviewed. The interviews were done during the autumn 2010. The collected data is qualitative and based on the answers to the interviewees. Our target in the research is to test existing theories how well they fit to our findings based on collected data.

#### 3.1 Case description

Finland is divided to 19 regional councils. We had a possibility to collect the data in one of those councils which consists of 23 municipals. All these municipals are independent in decision making but decisions and municipal processes and functions are regulated by laws and rules.

A municipal ICT has been developing during the last decades from strictly mainframe based infrastructure and applications to distributed ones. Every municipal has their own rights to choose ICT vendors and their products independently and this is seen as a problem today in municipals themselves because of poor compatibility and a wide demand of different system knowledge.

The Finnish Innovation Fund, SITRA, is an independent and public fund, which has a target to improve the welfare of Finnish society. SITRA established in the

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beginning of 2009 a program called KPK ICT for merging municipals ICT functions, infrastructure and sourcing into a new company. The program was initiated by calculations that Finnish public sector could save billions of euros on public sector [16]. Municipals have had an opportunity to review the offering of the KPK ICT and during the program ramp-up phase over 100 municipal entities has established their aim in the letter to intent to join in this new municipal owned company, which was established in 15.9.2010.

None of these 23 municipals in scope established their willingness to join in this new KPK ICT during autumn 2010. However, many of them were interested to see, what this new operator would bring to public sector ICT field.

At the same time there is also a massive infrastructure program in Finland. The Finnish government has decided that until the year 2015 more than 95% of Finnish households shall have an opportunity to join in less than 2 km distance to a wide band network, in which available capacity has to be more than 100 mbps. Municipals have to react to this initiative and to find ways of organising the wide band network. One of the issues is the geopolitical situation in Finland having a lot of sparsely populated areas in the municipals.

### 3.2 Data gathering

In our multiple case studies we interviewed in all of those 23 municipals during autumn 2010. The Regional Council was a key stakeholder in our study. We went through all of the 23 municipals ICT structures and the result of this study led also to update ICT Strategy for the Regional Council. We created an interview consisting of 78 questions and these were reviewed by Jyväskylä University Information Technology leading faculty professionals. At first we tested our interview method with two municipals (one fairly large and one small municipal).

We got valuable review comments and test results and the list of questions was updated to respond better our needs. The results are collected to attachment 1 and an example of data collection sheets is in attachment 2. After that we carried out interviews which took maximum three hours and depending on the municipal there were normally ICT manager or municipal manager, financial manager, administrative manager at present. The received answers were entered to data collection sheet and mutual key comments were filled in as fulfilling information to data collection sheet. However the interviewed teams differed depending on municipal and the size of it. These interviews were carried out in four months during September - December 2010. Overall the number of interviewed people was 51. Average length of interviews was 2,5 hours. The transcripts were attached to interview blankets as interviewer's notes.

The municipal interviews were done in slightly different ways, because not all the municipals wanted to come to face-to-face meetings they proposed different way to provide needed information, which was agreed with research team. 14 municipals were interviewed in single municipal interview and seven municipals were carried out in two larger interviews. In the first interview there were five municipals in place and in the second there were two municipals. With the rest, two municipals we agreed to advise them how to fill in interview questionnaire after which they sent their responses and we reviewed open topics with them later on.

The most relevant questions with calculated results which are used in our analyses and findings are listed in the attachment 1.

## 4 Findings

### 4.1 General Findings

We decided to examine municipal IS using two different frameworks. The first one is the framework of Dibbern et al. [4] defining three reasons for outsourcing, determinants, risks and rewards. We are assessing our findings in determinant categories, which are defined as external, internal at municipal level and internal at IS level. The second one is the strategic management framework of Clemons et al. [3]. The reason to use strategic management framework was based on our findings in gap between municipal's IS personnel's opinion in interviews and information and strategies we found in nationwide plans how municipal's IS will be re-structured. One example was by a middle size municipal's ICT manager: *"In case we would be a part of coalition between municipals that could create political situation quite surely"*.

The municipals have big differences in personnel and budget size. The biggest municipal's total personnel count is 7500 people and budget size is 924M euro while the average (without the biggest municipal) personnel count is 400 and budget size 40M euro. However, size does not seem to affect the findings except when separately stated.

The IS outsourcing contractual status of municipals is not known, it was not covered in data collection.

### 4.2 External Determinants

In our case study the external determinants for municipals are KPK ICT Oy as a new operator providing services and other existing external IS providers, but also the laws and rules in Finland and in EU and finally the other municipals. In large IS sourcing decisions municipals are forced by law to lead a public process of bidding and competing IS vendors. This affects to small municipals ability to organize and implement IS outsourcing project.

Municipals overall outsourcing level based on our data collected from municipals IS professionals was 33,4 %. The highest outsourcing grade 80,7% was in expertise healthcare and the lowest one 10,0% was in IS architecture management. Municipals were relatively satisfied with their external suppliers average being 3,6 (scale from 1 poor -5 excellent) but mostly external service providers were seen highly expensive and unresponsive when a contract or delivery was closed. This raises a question, what is the capability of ICT supplier management especially in small municipals. However, sourcing is seen as challenging in larger municipals such as one statement by the large municipal's CIO sounded: *"We are clearly under resourced in sourcing concerning our number of ICT contracts"*.

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Our interview conveys that cooperation across municipals was quite limited. Municipals prefer to have a leading role local/regional operator than a country level operator. Based on our interviews using a regional level leader vs. country wide operator was 3,9 vs 2,0 – (scale 1 - not preferred 5 - highly preferred). There were comments when data was collected, that IS personnel in municipals were worried about their jobs if the municipal will join in bigger operator. Without real results external operator KPK ICT Oyj had not earned trust and this came up in comments as well.

#### 4.3 Internal determinants at municipal level

Internal determinants at municipal level are a municipal's IS budget and political decisions. Finnish municipals invest very limitedly in their ICT having ICT cost percentage 0.92 % of their budgeted revenue while the average spending in most companies is three percent of their revenue per annum on ICT [11]. ICT budget growth is also seen in some municipals necessary. As an example, one head of smaller size municipal said, that it is necessary to arrange slightly growing budget from 1% level to the 1,2-1,3% level. Also based on our study, 84% of the municipals' annual spend are directed to operating and maintaining the current systems. Municipals can invest only 16% of their yearly ICT cost budget on developing new IS, which could enable municipals processes to get developed further. In these percentages there were no differences between big and small municipals.

Especially in smaller municipals there is no nominated IS managers, who has ICT responsibility. In total, only eight municipals out of 23 have a CIO or ICT manager position established. Five of those eight were in large municipals category (over 10000 people) and 3 small municipals had ICT manager amongst 17 municipals in small category. This situation demonstrates that ICT function is not seen as a strategic function in municipals' organisational hierarchy. This also means that municipals' leaders should be able to negotiate the outsourcing contracts and manage the suppliers' services after the outsourcing.

We found also that the average willingness to invest to wide band network in municipals was 7,6 with a traditional Finnish scale used widely at school grades 4 (nothing) -10 (all what is needed). The interesting perception was that big municipals (more than 10 000 people) were very reluctant to invest in enabling high speed IS infrastructure to people who does not live centrally. The average result in big municipals was just 5,8 compared to the response of 8,2 from small municipals.

#### 4.4 Internal determinants at IS level

Internal determinants in IS organisations are the number of personnel and competences. IS capabilities are very modestly resourced in municipals. Our finding is that there is only 0.61 full time equivalent IS persons per 100 municipal worker and the average IS personnel size is 3,7 FTE within all municipals and 2,2 FTE if the largest municipal is not included. Regarding the plans to grow the headcount of IS

persons it was planned only in five municipals, 16 planned to stay flat and two planned to cut the amount of IS personnel.

However, information systems, infrastructure and new technology such as mobile devices, demand more service capability and wider knowledge from IS experts in municipals than earlier based on our interviews. As an overall understanding of this finding we state that the internal IS expert head count and IS budget of these municipals is too low to enable needed development of IS assets in these municipals excluding the three biggest municipals. Teng et al. [20] state in resource-based theory, that resources provide competitive advantage if they are unique and cannot be substituted. Based on the results of our interviews there is a lot of cumulated experience in very few hands in municipals' ICT functions and if changes in IS structures and organisation are not done with care, this can lead to loss of trust and motivation. When planning the change this potential risk of losing motivation must be considered thoroughly. As example in one smaller municipal, the ICT manager said: *"Our virus scanning and security works but continuity arrangements are very weak"*.

Only in eight municipals out of 23 have a CIO or ICT manager position been established. Therefore it is probably fair to draw the conclusion that IS decisions are mainly done by municipal leaders, not in specific ICT functions. Further, this affects our understanding of the overall position of the IS function, its value creation and cost evaluations.

Both to the questions of costs and quality with the scale of 1-5 (1= not important, 5=very important) municipals' answers were quite similar. IS cost factor average score was 4 and IS quality factor was even more, 4,3. Based on our interviews, municipal leaders were somewhat satisfied to their current status of IS function (score average of 3) and they resist having a country level operator (score average of 2). Our interpretation of these results is that even though municipals understood the value of IS quality and they were not too happy with their current position but they were afraid of joining to a country level organisation KPK ICT. Our conclusion is that municipals do not trust the KPK ICT organisation by means of cost savings and quality at the time the interviews were conducted.

#### **4.5 Strategic Management Framework**

The strategic framework [3] earlier described in this paper also includes a hypothesis for several type of situations, depending on how much proposed strategic business reengineering requires competence-destroying change in the organization. In case of smaller change it will be less resisted and the political risk is decreased while strategy in use is closer to strategy espoused. Our interviews indicated that especially in the smaller and mid-size municipals the common worry among personnel is losing jobs to some external suppliers or operators. Our case study results also indicate that the willingness to choose a regional operator instead of a country level operator like KPK ICT is very high. The local leading force is seen much more desirable, although they both can have the same goal to get needed consolidation development to happen.

In the framework [3] it is also stated that in radically changing environmental conditions, avoiding competence-destroying change will lead to a big gap from an optimal new strategy. The Finnish public sector needs clearly radical changes and if

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municipals will not accept clearly needed changes, the functional risk will stay and even grow in coming years which means that public sector will not progress.

During autumn 2010 a work group worked out an ICT Strategy for these 23 municipals. The strategy paper was shared with municipal managers and the relevant ICT persons. This paper includes execution plan for getting the consolidation development ahead. The planning for the next steps is ongoing and Regional Council is going to organize planning and related execution resources. We can identify based on our data two categories of these municipals:

- 1) Large or mid-size municipals having more than 10 000 people. In our research material six municipals belong to this category. Characteristics for these municipals are larger amount of IS personnel (3-37), IS budget size average 1,1% of total budget, new IS solutions like electronic on-line services quality of 6,7 (scale 4 poor-10 excellent).
- 2) The same characteristics for category 2 municipals are small amount of IS personnel (0-2,5), IS budget size average 0,8% of total budget, new IS solutions like electronic on-line services quality of 5,7 (scale 4 poor-10 excellent).

We could clearly identify that the bigger municipal the better capabilities to provide IS. Therefore we decided to use the strategic framework [3] from these two categories point of view and to create an evaluation of the current situation in municipals based on the framework.

#### 4.6 Optimality

The optimal situation from our point of view would be a government wide consolidated IS operator offering high quality services including infrastructure covering all municipals needs. This would include a fluent cooperation over municipals borders and usage of shared resources. Also health care sector would be integrated enabling patient information sharing between regional and municipals health care points. The precondition for success is a good detailed contract with defined service level agreements. All IS decisions could be based on common Enterprise Architecture definitions. Municipal could have also development capabilities resourced adequately and development projects managed under systematic governance model and portfolio management.

#### 4.7 Strategy Espoused

The strategy espoused is regional IS development and operations centers, where needed capabilities would have been searched from the present professionals and their capabilities would have refreshed in cooperation with local university. In this model there is a need of clear governance, a well functioning steering body and defined responsibilities. Also common Enterprise Architecture and portfolio should exist.



#### 4.8 Strategy in-Use

Strategy in use by municipals shows low level cooperation between a few municipals and especially in sharing any infrastructure. There is a little application provision by the bigger municipal with smaller municipal. There is no visible resource sharing between municipals. Enterprise Architecture is scattered and only partly existing. Limited resources are used to do mostly urgent tasks and the majority of ICT infrastructure services are arranged or negotiated separately by each of the municipals.

#### 4.9 Current

The current situation is very close to the present Strategy in-Use situation and political risk is very low, when municipals have not clearly expressed their will to change their way to operate. The current way of working does not lead to any remarkable change and thus, it does not bring the capability destroying risk to the ICT personnel. Limited resources are doing mostly urgent tasks and majority of ICT infrastructure services are arranged or negotiated separately by each of the municipals.

#### 4.10 Functional and Political risk

The functional risk in the present situation is very high and political risk is very low. However, about half of Finland's municipals are in financial crisis. According to the Statistical Centre of Finland, all municipals total financial coverage was only 96% of depreciations and the financial coverage was only 48% of investments. The numbers are seemingly unhealthy. There is also very strong pressure to improve the public sector's processes and service provision, especially in the health care sector. According to the National Institute for Health and Welfare (THL) the calculated total spend of health care was 15, 5 billion Euros, which means 8, 4% of GDP in Finland in the year 2008. Without decreasing the functional risk which clearly leads to an increase of political risk, the situation is not going to improve as required in public sector processes.

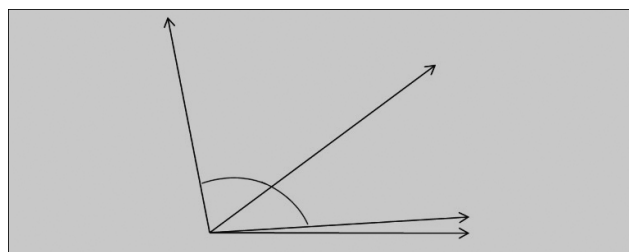
According to our research, municipals have the biggest gap in system capability in electronic on-line services and related processes. The grade we got for this capability was 5.9 (scale 4=lowest, 10 highest). This is alarming because of planned improvements to be developed for electronic on-line services. Based on this finding one criteria to outsource their IS development or part of that is to get capability to be able to develop these services in shorter time with continuous support.

Our analysis and findings above described the following strategic framework for Finnish municipals ICT status. The category 2 municipals have the current situation and strategy in-use very close to each other. Political risk is quite modest but functional risk is very high. Therefore we think that they should urgently find the ways to lower functional risk even though the political risk may be raised.

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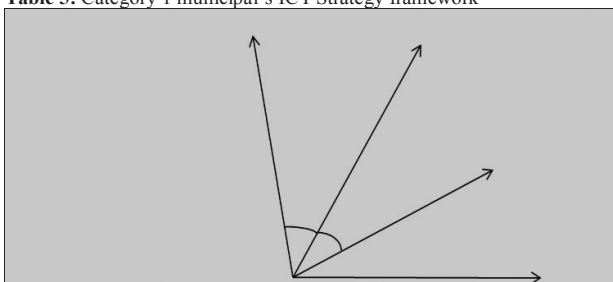
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**Table 2:** Category 2 municipal's ICT Strategy framework



The category 1 municipals have the strategy in-use and strategy espoused closer to each other and in that sense the status is better than in category 2. These category 1 municipals are closer to their present strategy in-use and strategy espoused the optimal one. Political risk is higher than in category 2 municipals but on the other side, the functional risk is lower. In this category the choice to use selective outsourcing is better.

**Table 5:** Category 1 municipal's ICT Strategy framework



## 5 Discussion

In our research we aimed to find the reasons why Finnish municipals are not interested in large scale outsourcing of their IS even partly, and why outsourcing still could be a tool for IS leaders in municipals. Also is the IS function seen as a strategic function and how is that affecting outsourcing decisions? As a start we analyzed relevant literature and theories of IS outsourcing and studied the basis why to outsource in Finnish municipals. We also collected empirical data from municipals to find out how these theories could work in practice.

We found, especially in small municipals, IS departments were so small that there are no needed resources and thus, no capabilities even to take care of the new IS

needs in the municipal area. Therefore it might be hard to them to create needed processes and structures for outsourcing and furthermore, vendor management after the transition. Probably also the ability to contract at the needed detailed level is difficult. We found also mistrust to external consolidations and change resistance. Because of these internal determinants in the IS function the municipal leaders should commit and take part of the outsourcing strategy and start to think IS as a strategic enabler to fulfill the service needs in municipals. Currently municipals handle IS as a strategic enabler in very limited ways. As stated also in the literature chapter, it is known that top management support in IS outsourcing is a critical factor for success in outsourcing.

While the Finnish public sector has an urgent need to renew structures and related processes these require changes in IS structures and new IS development. This new value creation can be done efficiently only by utilizing limited resources more efficiently and by agreeing that the service provider provides solutions for a large number of municipals. Our conclusion is that outsourcing in public sector and municipals in Finland needs a wider set of criteria's than just cost savings.

The strategic framework by Clemons et al. [3] can be applied as an approach to look at what is the strategic position of IS in municipals. We found that this framework is used rarely in other research. However, it gives a good understanding why transformation of services in a municipal's IS has not proceeded as fluently as expected. In our category of smaller municipals the functional risk is very high and most of the municipals are in urgent need of expanding new IS enabled processes to inhabitants who might live far from municipals' centres. They also need to increase the efficiency in public services such as health care by renewing processes and IS. Therefore we conclude that because of the lack of resources and competence to provide this value-addition, the best solution is to join in municipals owned KPK ICT Oyj.

The strategic framework also considers important factors such as political risk, which has a strong influence on success in transformation. There is a need to negotiate continuation for the present IS personnel and offer further education to more value-adding tasks in municipals processes when a municipal joins in KPK ICT Oyj. In that way, the municipals can continue keeping the experimental knowledge, which importance e.g. Alaranta and Järvenpää [1] have found critical in their longitudinal case study in a Finnish public sector organisation's IS outsourcing. Our findings demonstrate that cost alone is not in this case the key driver and the continuation of services need to be focused on especially.

The public sector is ahead of large transformation and IS has a key role in making it happen. We found quite a limited number of articles, which researched public sector IS outsourcing, especially focusing on municipals transformation. Instead, there is large number of papers, which handles the topic generally. Therefore we find it necessary that existing theories and models tested with empirical cases as well as new theories and models development should continue in coming research work especially on public sector and with municipals' IS functions. Further research is needed especially in trust factors between outsourcing parties and in the contract negotiation phase. Currently these negotiations seem to be opportunistic approaches for both parties creating mistrust already in early phases. Also topics to be researched further

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could be the development of life-cycle cost analyses and calculation models in IS outsourcing.

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<b>Henkilöstö</b>		
1	Kunnan IT henkilöstön määrä tällä hetkellä	1
	<i>pieni prosentti hallintojohtajalta lisäksi</i>	
2	Kuntasi henkilöstön kokonaismäärä	150
2	Monellako henkilöllä (arvio) IT henkilöstön määrä muuttuu seuraavan 3-5 vuoden aikana (+/- lkm)	0
	Kuinka paljon seuraavia IT kyvykkyyksiä kaivataan kuntasi ICT toiminnoissa; 1) ei ollenkaan, 2) vähän, 3) jonkin verran, 4) paljon, 5) erittäin paljon	
3	- Arkkitehtuuri (prosessi-, tieto-, infra-, data-...)	4
	<i>tulevina vuosina tarvitaan lisää, prosessipankkia käytetty ja on hyvä. Ratkaisut jotka tehty tehty aikoinaan ja tähän asti ok ja nyt niitä pitää uudistaa</i>	
4	- Järjestelmäkehitys (jos tässä korkea tarve, millaisia ohjelmisto-osaajia tarvitaan?)	1
5	- Järjestelmien käyttöönotto	3
	<i>hyvin tuettu ja toimittajan puolelta ja toimii</i>	
6	- IT projektien suunnittelu ja johtaminen	3
7	- IT palveluiden tuotanto ja sen johtaminen	3
	<i>4 palvelinta omassa hoidossa, pieni määrä hyödynnetään, esim sähköposti toimittajan hoidossa</i>	
8	- IT Hankinnat	3
	<i>hankintarenkaassa mukana (liittymät, kännykät, läppärit), järjestelmät hankitaan itse</i>	
9	- IT käyttäjä tuki	5
	<i>tämä perustyötä mitä tehdään</i>	
10	- Tiedon johtaminen (järjestelmissä olevien tietojen harmonisointi, raportointi)	4
	<i>tätä tarvittaisiin kovasti</i>	
11	- IT:n johtaminen	4
	<i>kasvavassa määrin tulee olla</i>	
12	- Muut kyvykkyydet (mitä?)	
	<i>muutosvastarinnan torjunta</i>	
13	Onko kunnassasi nimitetty IT päällikkö (kyllä/ei)	0
	<i>Hallintojohtajalla tietohallinnon johtaminen</i>	

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Sisältö	Tulos 1	Tulos 2
Miten arvioisit seuraavien ICT toimintojen tilan kunnassasi (kouluarvosana 4-10) ->"tulos 1"sekä seuraavien IT järjestelmien ulkoistusaste (asteikko %) -> "tulos 2"		
1 - ICT hankinnat, toimittajan- ja sopimuksenhallinta ja osto-osaaminen (sis. ICT ulkoistus)	8	0
<i>peruslaitteistot ok, saadaanko järjestelmistä riittävästi irti</i>		
2 - Projektinhallinta	9	50
toimittajan projektipäälliköt toki mukana		
3 - Kokonaisarkkitehtuuri	6	0
<i>arkkitehtuuri kuvaus ja toimintasuunnitelma retuperällä</i>		
4 - Tietoturva ja IT- riskienhallinta (virusorjunta, toiminnan jatkuvuus, SPAM)	8	0
<i>toiminnan jatkuvuus haasteellinen</i>		
5 - Käyttäjäkukimalli ja tapahtumanhallinta (sis. service desk)	9	0
<i>ollaan tyytyväisiä, tapahtuman hallintaa ei tarvita, sähköpostilla hoituu</i>		
6 - Sovellusten ylläpito, kehitys ja käyttöönotto	8	100
<i>Toimittaja pitkäaikainen kumppani, koulutus haasteellinen. Pitäisi kyseenalaistaa ja pitäisi osata vaatia. Kunnassa n 50 erilaista tietojärjestelmää, n 1 järjestelmä per henkilö.</i>		
7 - Infrastruktuuri	8	0
<i>työasemat ja ohjelmistot ok, tietoliikenne jäänyt jälkeen</i>		
8 - Asiahallinto (ml. arkistointi)	5	0
<i>projekti käynnissä, hyvin sisköasteella mutta paranemassa. Nyt verkkolevytasolla</i>		
9 - Talous- ja henkilöstöhallinnon järjestelmät	7	100
<i>irralaan toisistaan mutta integraatio järjestelmien välillä keinoa, ohjelmien välillä manuaalisyötä. Raportointi on oleellinen, hallinto ei itse ota raportteja vaan taloussihteeri hakee raportit esim toteumista. Sähköiset laskut ei käytössä.</i>		
10 - Kunta-asiakkaiden sähköinen asiakaspalvelu (ml. sähköinen asiointi)	6	0
<i>pilotti sähköiseen rakennuslupahakuun, kysely kuntalaisille</i>		
11 - Palveluohjaus ja palvelusetelijärjestelmät	5	0
12 - SOTE/Perusterveydenhuolto	na	100
<i>kuntayhtymän kautta, xxx järjestelmäpohjaisia</i>		
13 - SOTE/Erikoissairaanhoido	na	100
14 - SOTE / Sosiaalityö	8	0
<i>xxx järjestelmä, SHPn kautta, hidas on infraangelmia</i>		
15 - SOTE / Vanhustyö	8	100
<i>xx järjestelmä, SHPn kautta</i>		
16 - SOTE / Kotihoito	8	100
<i>effica, SHPn kautta. Mobiiliratkaisujen tarve.</i>		
17 - SOTE / Päivähoito	7	0
<i>ei erillistä järjestelmää, kaupungin kanssa seudullinen ratkaisu mutta tietojärjestelmää ei otettu käyttöön, Toimittaja olisi ottanut tästä xxxxx euroa.</i>		
18 - SIVISTYS / Perusopetus	8	50
<i>sähköpostitse hoidetaan tiedonvaihtoa. XX toimittaja toimittaa ja hoitaa tuen, softa omilla servereillä.</i>		
19 - SIVISTYS/ Toinen aste	na	na
20 - TEKNINEN TOIMI / Yhdyskuntatekniikka	7	0
<i>rakennusvalvontaan voisi tuoda sähköisen asiointin kautta apua</i>		
21 - Hankintatoimi ja logistiikka	5	0
22 - Paikkatietopalvelut	7	0
<i>ei käytössä kutenXX kaupungilla, esim vapaat tontit ei käytössä. Toimittajan kunnanet, vesisofta . Karttaohjelmaa hyödynnetään</i>		
23 - Yhteisölliset työkalut & etäpalvelut	4	0
<i>ei ole saatu eteenpäin, ei ratkaisua. Koko henkilöstön etäkäyttöä olisi tuettava. Tämä asia pitäisi jollakin aikataululla saada eteenpäin.</i>		
24 Entä mikä on laajakaistan tilanne tällä hetkellä (asteikko 4 heikko-10 kiitettävä)	8	
<i>Laajakaista parantunut viime kuukausina. Mokkuloiden käyttö pelaa syrjäkylilläkin, ADSL rakennettu kylillä (2mbs) 2005, nyt Operaattori kerää kuparia pois täälläkin.</i>		
25 Onko kuntasi halu panostaa rahallisesti laaja-kaistan investointiin asteikko (4 vähän -10 erittäin paljon)	8	

Yleistä		
1	Millaista palautetta paikalliset yrittäjät antavat kunnan IT palveluista - (asteikko 4 huonoa -10 kiitettävää)	na
2	Tuleeko kunnan lisätä ICT tukea alueen yritysten suuntaan jatkossa - (1=paljon, 2=jonkin verran, 3= ei muutoksia)	3
3	Jos palvelut ovat riittämättömiä, niin missä ovat suurimmat ongelmat 1) IT infrastruktuuri, 2) tietojärjestelmät ja sovellukset, 3) IT palvelut ja palveluprosessit - kouluarvosana-asteikolla kysymällä millaiseksi seuraavien palvelun laatu on arvoitu ...	na
4	Oletko saanut riittävästi tietoa SITRA / KPK valtakunnallisista hankkeista 1) ei ollenkaan, 2) vähän, 3) kohtuullisesti, 4) paljon, 5) erittäin paljon	4
<i>tietoa on tullut runsaasti, ei ole oltu aktiivisesti kuntiin yhteydessä. Seudullinen yhteistyö parempi ratkaisu. Nähdään peikkona.</i>		
5	Oletko saanut riittävästi tietoa Valt.varainministeriö/KuntaIT valtakunnallisista hankkeista 1) ei ollenkaan, 2) vähän, 3) kohtuullisesti, 4) paljon, 5) erittäin paljon	2
<i>saisi kyllä tulla tietoa enemmän</i>		
6	Oletko saanut riittävästi tietoa Valt. varainministeriö/ValtIT valtakunnallisista hankkeista 1) ei ollenkaan, 2) vähän, 3) kohtuullisesti, 4) paljon, 5) erittäin paljon	2
7	Mitä tietoa pitäisi saada enemmän?	
<i>selvityksiä, visioita tulee liikaa, prosessipankki on hyvä</i>		
8	Näetkö, että kuntasi IT toimintoja pitäisi muuttaa / tehostaa 1) ei ollenkaan, 2) vähän, 3) kohtuullisesti, 4) paljon, 5) erittäin paljon	3
<i>ei itseisarvo ja parantaa samalla toimintaa</i>		
9	Oletko valmis liittämään kunnan ICT palvelut suurempaan kokonaisuuteen (1=lähes varmasti ... 5=lähes varmasti ei)	3
<i>tietyissä rajoissa, jos on hyvät ratkaisumallit</i>		
10	Milloin tämä voisi olla ajankohtaista?	0-10v
Kun muutosta toteutetaan, minkä ICT osuuden (%) kuntanne yleensä ostaa ulkopuolisilta seuraavista muutoksen vaiheista;		
11	- kehitys	100
12	- käyttöönotto	100
13	- tuki	50
<i>tarvitaan ehdottomasti lähituki</i>		
14	- ylläpito ja jatkokehitys	100
Kuinka tärkeitä ovat seuraavat asteikolla 1=ei lainkaan tärkeä ... 5=erittäin tärkeä;		
15	- kustannus	4
16	- palvelun häiriötön toiminta	4
17	- palvelun laatu	4
18	- palvelun muunneltavuus	2
19	- asiantunteva käyttäjätuki	5
20	- varmuus kehityksestä mukaan lukien lainsäädännön muutosten toteuttaminen	5
21	Käytättekö KL-Kuntahankinnat OY:tä hankintoihin? (1= ei koskaan ... 5= kyllä aina)	1
<i>Mahdollisesti lisenssien kautta ja tulostimet. Tällä hetkellä ei olla mukana.</i>		
22	Tarvitaanko muutoksen tekemiseen paikallista / maakunnallista toimijaa (1= ei koskaan ... 5= kyllä aina) - ja miksi	4
Keiden seuraavista pitäisi toimia muutoksen veturina asteikolla 1-5 (1=ei lainkaan panosta ...5=erittäin suuri panos)		
23	- maakuntaliitto tai kuntien välinen yhtymä	4
24	- valtakunnallinen KPK ICT	1
25	- muu julkinen toimija, esim yliopisto	4
26	- joku muu (mikä)?	4
<i>iso kunta, ulkopuolinen toimija. Voisi olla paikallisia tekijöitä.</i>		
27	Kuinka tyytyväinen nykyisiin ICT palveluiden ja tuotteiden toimittajiin olet yleensä (1=erittäin tyytymätön, 5=erittäin tyytyväinen)	3
<i>Yksi iso toimittaja, hinta kova, ei yhteensopivuutta. Toisaalta pitäisi itse osata "kykyttää".</i>		

## **II**

### **INFORMATION SYSTEM IMPLEMENTATION MODEL AND OBSERVATIONS**

by

Jouko Nieminen & Harri Hyvönen, 2012

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# **Information System Implementation Model and Observations**

## **Case Health Care, Social Services and Other Service Processes in Smaller Municipalities**

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**Abstract.** Public sector in Finland is under heavy pressure to get more efficient and customer oriented. Information systems and their development is one possibility to improve municipalities' own processes and their service offering to the inhabitants. In this study we investigated what is the status of Information Systems in municipal governance and architecture management. The situation with systems landscape and architecture is, based on our findings, very scattered and municipals do not make their decisions, for example outsourcing decisions, in a systematic way.

Based on those findings, especially in small municipalities, we created a model, which municipal ICT responsible professionals can follow-up and use when improving their architectures and system landscape to be better planned and managed, also with lower costs.

Keywords: Public sector, information systems, architecture, modeling, outsourcing

## **1 Introduction**

### **1.1 Agenda**

The country of Finland, with current population of 5.4 million, consists of 336 municipalities. These are larger cities and smaller countryside villages. As the figures reveal, the majority of the municipalities are quite small in size. However, each is required to deliver the basic social and communal services to the inhabitants.

The social and communal services are supported with information technology (IT) enablers. The IT capabilities in the municipalities vary. The municipalities are independent in their decision making and IT services are both local and outsourced. The government encourages for co-operation between the municipalities and for nationally provided services.

In the County of Central Finland, as part of a public sector strategy creation work in autumn 2010 (Hyvönen et al. 2011), the county wide service process and IT services status were analysed. The results showed several opportunities for improvement and development.

Single municipalities in the Central Finland County are in a challenging situation. Costs need to be kept under control, process and service continuity needs to be ensured, the government presents new requirements. Shared services as those in health care provided by the central hospital require compatibility in processes and in IT. Municipalities need to maintain and improve the service processes and related IT systems and services with quite limited (operative) resources and knowledge and experience.

## 1.2 Research questions

This paper builds on two parallel tracks and on an analysis, presented in figure 1. The first track builds foundation from existing literature and models and proposes a method for the smaller municipalities to use in their coming decisions and implementations of information systems. The second track provides data and analysis of the current situation of information systems in the municipalities in the County of Central Finland. The analysis with findings and conclusions compares the current situation against the proposed model and proposes practical next steps.

By building on the assumptions that

- smaller municipalities are quite heterogeneous in comparison with each other, in the area of service processes; and
- smaller municipalities are guided, even forced towards more common information systems (IS) and technology (IT) to support the service processes;

the research questions of this study are:

- What are the key elements and capabilities in planning an implementation of an IS which a smaller municipality should consider? With special focus in decision making regarding the implementation.
- In which of these key elements the municipalities have biggest challenges and gaps?
- How can the municipalities overcome the challenges and gaps in practice when new IS implementation needs arise?

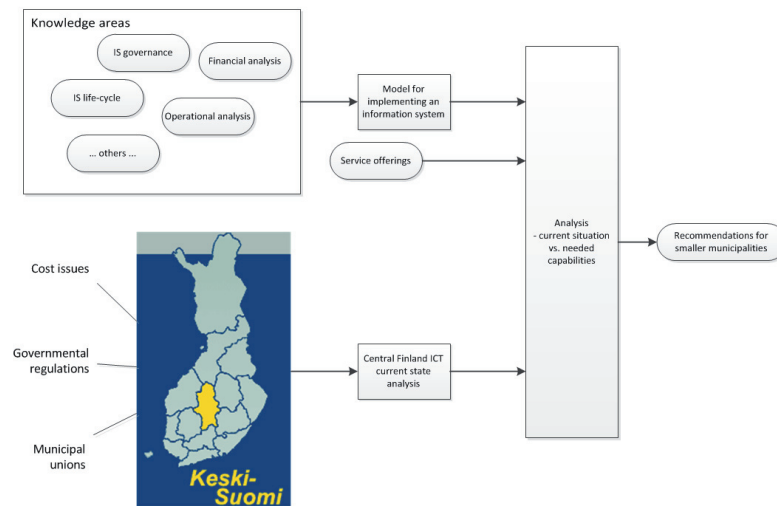


Fig. 1. The leading idea of the study

In the context of this study the term small municipality refers to 22 out of 23 municipalities in the county of Central Finland which are smaller in size than the city of Jyväskylä. Largest municipality in this class is Jämsä with 22 621 inhabitants (Väestörekisterikeskus 2011). In comparison to national level this definition of a small municipality refers to 293 municipalities (87%) of the total of 336. The small municipalities cover 37% of the total national population of 5,4 million.

## 2 Underlying theoretical framework

### 2.1 IT outsourcing

IT outsourcing has several definitions. In this study IT outsourcing is scoped to include the services which are sourced from external sources for the organization. In some cases outsourcing is usable when certain support functions can be delivered faster, with better quality or cheaper than own functions are able to do that. If tasks in question are not organization's core competences then those tasks are candidates for being contracted out (Lankford et al 1999).

Traditionally the key reason to outsource IS has been cost efficiency and savings. However during the last decade reasons have been more linked to strategy, availability for new technologies, competencies or speed. (Dibbern, Goles, Hirschheim, Jayatilaka, 2004).

Transactional Cost Theory (Williamson 1985) defines three dimensions why IT outsourcing happens. Those are transactions frequency, specificity, uncertainty. The

biggest reason to cause uncertainty is lacking information. In case a decision maker could know and handle all the available information the contract could cover all the coming issues. The longer is the contract the more uncertainty there is.

Information Systems (IS) have been created and operated traditionally by company internal IT organizations. Willcocks et al (2004) describes a model which is called “Do-IT-Yourself” (DIY). The potential benefit in this model is to keep easier control over IS but the risk with this model is that competency development is not developing and cost efficiency is not gained because of increased legacy. During the last two decades the outsourcing trends have been growing. The first outsourcing cases were mainly IT operations, such as computing, but Kodak Eastman started a new trend in outsourcing in 1989. IS outsourcing has been transforming to wider form and especially after year 2000 the entire business of business processes has been growing rapidly. For example Business Process Outsourcing (BPO) grew more than 25 percent per annum during 2002–2003 in the United Kingdom (Willcocks et al 2004) and that trend has been continuing.

## 2.2 Information system as a work system

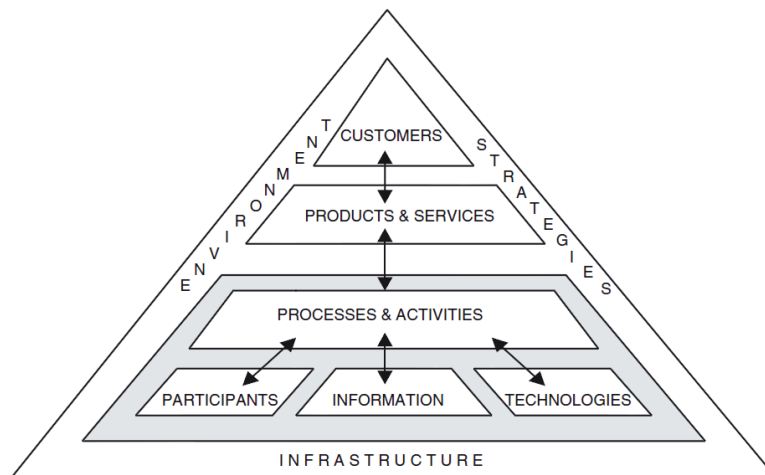


Fig. 2. The Information System structure (from Alter 2008)

The information system (IS) concept used in this paper as a foundation is built on the elements provided by Alter (2008). In Alter’s model the information system is regarded as a case of a work system. The figure 2 presents the different elements of an information system, which are



- customers: the people who are satisfied with the information what the system produces
- products and services: the (value adding) product of the IS
- processes and activities: descriptions of how products and services are created
- participants: people with adequate skills who act as operators of the system
- information: the data in the system
- technologies: tools and applications of the system
- infrastructure: the generic information technology elements and networks
- environment: usually the organization where the system is placed and located
- strategies: provide guidelines and business level requirements for the system

### 2.3 Information system governance and life-cycle

A governance model provides a structure for linking the strategic management of information system with the business objectives of the organization, including the investment decisions.

A widely used framework in IS governance is COBIT (by ISACA) for establishing a set of information technology (IT) controls for different organizations' professionals to use. The COBIT model connects business objectives with information technology strategic levels, which are realized through IT development and operational domains. The COBIT framework is aligned with more detailed methodologies, such as ITIL (itSMF 2007), PMBOK (PMI 2008), CMMI and TOGAF (OpenGroup 2010).

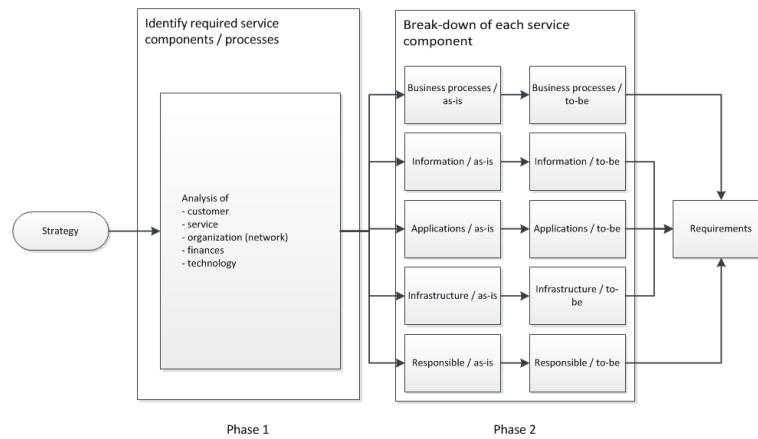
Life Cycle Costing (LCC) refers to total cost of ownership. This way of calculating and estimating costs cumulating over investment life time refers often to total cost of ownership (TCO). This approach offers methods to estimate also other costs than capital costs of acquisition, such as maintenance, operations, ramp down and also business interrelationships to avoid the situation or errors in calculation, where low development costs may lead to high life time costs, e.g. in maintenance. LCC takes account of timing of cost flows and also includes cost risks (Norris 2001). Because it is critical but complex to calculate benefits during outsourcing life-cycle, some methods have been developed. PENG model (Dahlgren et al 2002) support decision making by calculating gross benefits, including direct, indirect and difficult valued costs are compared to of benefits. The calculated net benefit is the key to make the right decision.

Several models have been created for IS life-cycle management. In a model by Alter (2008) the basic structure of the life-cycle is iterative, containing phases from initiation, through development and implementation, to operation and maintenance. New needs for re-design will re-start the cycle.

For managing a portfolio of Information Systems, both design and operations, the IT Infrastructure Library ITIL provides a widely adopted iterative life-cycle model (itSMF 2007). The life-cycle evolves through stages of strategy to design, to transition, to operation. Each of the stages and the whole life-cycle has a built-in continual improvement element.

## 2.4 Information system requirements

Since strategies are the directions for business operations and the supporting activities in an organization, the existence and development of services enabled with the information systems should derive from these strategies. Referring to Heikkilä et al. (2011) the key requirements for the different service components in an information system can be defined in a logical way, in two main phases. These successive phases are (1) the analysis of the business model and (2) a closer operational analysis for each service component. Figure 3 highlights the key elements of these two phases.



**Fig. 3.** IS requirements derived from the organization's strategy

The business model analysis of the strategy derives answers to a set of key questions. The analysis is made from a customer orientation view and covers the areas of

- customer
- service
- organization (network)
- finances
- technology

This is done by defining and breaking down the strategic elements into manageable targets and needs. From IS perspective the definition of required processes forms the basis for IS development and for IS delivery.

Our focus is in the service definition. For each business or customer segment a question of "What are the service components for the customer segment?" will be answered. In addition, across all customer segments, common service component needs will be recognized and noted.

In the operational analysis, each of the recognized service components will be analyzed for the current as-is and the required to-be status. Each service component is broken down in further detail levels of analysis, as shown in the table 1.

<i>RESOURCE ORIENTATION</i>	<i>Service component A</i>		<i>Service component B</i>		<i>Key Performance Indicators</i>
	<i>As-is</i>	<i>To-be</i>	<i>As-is</i>	<i>To-be</i>	
<i>Business processes</i>	What processes there are?	What processes there should be?	What processes there are?	What processes there should be?	Metrics for measuring the success in terms of strategic goals
<i>Applications</i>	What applications are used?	What applications are needed?	What applications are used?	What applications are needed?	Metrics for measuring the success in terms of strategic goals
<i>Information</i>	What information is available?	What information is required?	What information is available?	What information is required?	Metrics for measuring the success in terms of strategic goals
<i>Hardware</i>	What hardware/infra is available?	What hardware/infra is required?	What hardware/infra is available?	What hardware/infra is required?	Metrics for measuring the success in terms of strategic goals
<i>Organisation</i>	Who is responsible?	Who should be responsible?	Who is responsible?	Who should be responsible?	Metrics for measuring the success in terms of strategic goals

**Table 1.** Service component break-down (from Heikkilä et al. 2011)

The analysis levels actually define the layers of a typical Enterprise Architecture, such as TOGAF (Hirvonen 2005, OpenGroup 2010), with some enhancement to socio-technical areas in form of roles and responsibilities. The analysis also provides the requirements for further planning and definition work. The further work can utilize delivery methods such as EA Grid by Pulkkinen and Hirvonen (2005), and operational methods of project management as described in the next chapter.

## 2.5 Information system projects

Project mode is a typical working mode for implementing an IS (Standish 1995). This chapter shortly describes the characteristics of project work with focus on IS cases. The model builds on the reference from the Project Management Institute (PMI 2008).

Figure 4 presents typical core phases of a project. A project, by nature, is a temporary arrangement organized to achieve a set of target. Traditionally the focus in projects has been in the execution, in the “hard” back-end. However, nowadays the criticality of the “soft” front-end is gaining increasing importance (Morris 2010). Front-end is the initiating and planning part of the project where different options and analysis are evaluated and the readiness for actual execution is prepared. The front-end focuses in ensuring that the right projects will end up being executed, thinking of “doing the right things”. This phase of a project can be quite fuzzy since options can be many and risks difficult to evaluate.

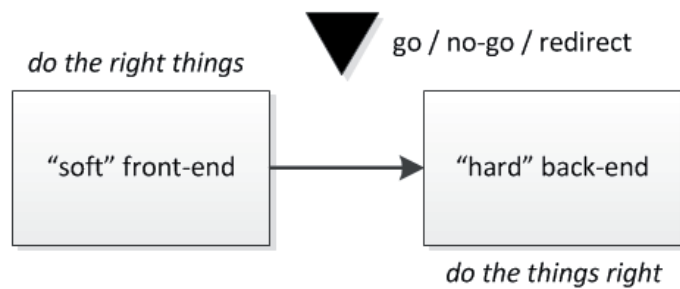


Fig. 4. Core phases of a project

The back-end execution phase (Figure 5) focuses in management of the actual delivery of the project, in the most effective and reliable way possible, thinking of “doing the things right”. Problems will arise during the project execution, new possibilities will emerge, changes will happen. These will need to be handled, thus the plans and specifications will need to be maintained accordingly and the project work managed.

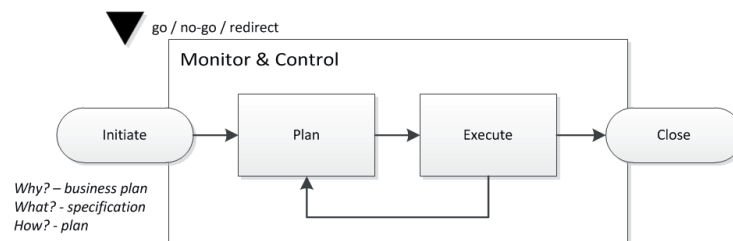


Fig. 5. Back-end of a typical project

As in any typical IT project, some critical areas require special caution to ensure project success (Johnson 2006, Standish 1995). Proper user involvement is essential in understanding the needs of the final end users and in preparing the users for the coming new system. Support and sponsorship from the executive management is critical in order to succeed in the project in general. The reason and need for the project needs to be identified, understandable and shared. The correct requirements need to be identified and the scope of the project shall be limited to fulfilling the requirements with optimized effort.

### **3 The empirical case study**

In the study we researched 23 municipalities in Central Finland.

Multiple case study method (Järvinen P 2004) was chosen while collecting data. In our project we had no or little control over the phenomenon. Yin has described in his book (Yin 2011) that case study is a suitable approach when the key questions are “how” and “why”. Both of these questions are valid to our study and to the targeted model creation.

#### **3.1 Case Central Finland municipal ICT**

##### **3.1.1 Research process**

We decided to use the eight step model by Eisenhard (1989) to be able to create a model to support our hypothesis in a systematic way. Firstly, we created initial research questions in broad terms. The second step was to define whether to include all the 23 municipalities or part of them. With help of our sponsor in the county, we ended up to include all 23 municipalities. The third step was to choose right protocols, a list of questions with criteria for interviews. As a fourth step an e-mail data collection questionnaire was created about municipals used applications for supporting the service processes. Step number five was to choose interviewees. In order to get wide enough data, interviewees were chosen to be municipals responsible IT manager or a person who was in other role but in charge of IT. After finding the right interviewees, researchers entered the field and most of the interviews were done face to face. For two municipalities the information was collected by using e-mail. Information about the applications was collected and reviewed by email. The collected data is qualitative and based on the answers of interviewed persons. In addition, IT application information was collected by using a form. Email was used as the primary means for collecting the data and reviewing it. Step number six was to analyze data using spreadsheets. The criterias and priorities to choose the most relevant findings were agreed between researchers based on their findings. When having data, we analyzed that and step seven was for shaping hypothesis and in step eight we searched articles and literature for finding the relevant existing theories. The last step was to close the study and finalize our paper.

##### **3.1.2 Case data**

Operational and financial data of the interviews was collected on a template including 78 questions. All the questions were defined and planned in beforehand to widely answer “why” and “how” a municipality has structured its IS. The questions are in MS-Excel spreadsheet format and the results were entered to the same document. When all the interviews were done, the results were analyzed using spreadsheets and a collection sheet was produced.

The collecting of the service processes and IT applications data was smoothened beforehand in face-to-face interview meetings by discussing, reasoning and motivat-

ing. The actual data was collected by distributing system data questions on an Excel spreadsheet. The data was transferred to an Access database, normalized and sent back to the municipalities for inspection. Different reports of the data were created and distributed to the participants for feedback.

In collecting the system data the focus was in identifying the applications which were acting as enablers in a number of service process areas. In addition general IT infrastructure information was requested, as well as information of possible external parties providing the service or support. The municipalities were also requested to list on-going or planned implementation projects.

The service process areas were selected as listed below. The list originates from a survey made by Sitra, the Finnish Innovation Fund (Sitra 2010), with an aim of compatibility in collected data.

- municipal office
- daycare
- school system
- technical services
- social services
- health care
- senior citizen services
- library system
- payroll services
- financial services
- desktop publishing
- electronic transactions
- other services

### 3.1.3 Summary of data

#### *Operational and financial data*

Finnish municipalities spending in their ICT (information and communications technology) is low with the ICT cost percentage of 0.92 % of their budgeted revenue while the average spending in most companies is three percent of their revenue per annum on ICT. Our study shows that 84% of the municipalities' annual spendings are directed to operating and maintaining the current systems. Municipalities can invest only 16% of their yearly ICT cost budget on developing new information systems, which is on very low considering high need to develop the municipal processes further.

#### *Service processes and IT applications*

The primary data exploited out of the collected IT system data was the application data. The IT system data was viewed with connection to the number of systems in the county and with connection to the size of the population in the municipality. The col-

lected general infrastructure data was not utilized. The result of collected development project data can be summarized with a conclusion that the municipalities had development projects of their own, and typically not shared with other municipalities.

No of systems	Application	Cov of population	Service process	No of systems	Application	Cov of population	Service process
22	KuntaNet	117700	technical services	1	GIS	10800	technical services
18	Aurora	221200	library system	1	Facta	20200	technical services
18	ProEconomica	108400	financial services	1	Exchange	2600	other services
15	ProConsona	85300	social services	1	- unknown -	22900	library system
15	Primus	226800	school system	1	Apache, Joomla, MySql	20200	desktop publishing
13	Pegasos	69100	payroll services	1	Economica	20200	financial services
10	Wilma	86500	school system	1	Elisa HelpNET	2300	other services
9	Dynasty	85300	municipal office	1	Kassapankki	20200	financial services
9	Effica	205300	health care	1	Comp	129600	financial services
9	ProConsona	70100	daycare	1	Langaton Vaihde	2300	other services
8	Basware	331200	financial services	1	Basware	3400	payroll services
8	Effica	190800	senior citizen services	1	Basware	3000	health care
7	Kurre	157600	school system	1	AGS	20200	financial services
6	Abilita Vesihuolto	30200	technical services	1	- unknown -	3400	technical services
6	Pegasos	39700	health care	1	Impressio	5500	desktop publishing
6	MapInfo	24200	technical services	1	Sharepoint	129600	municipal office
5	Effica	180500	social services	1	SecretNet	20200	financial services
4	ProCapita	18400	school system	1	SAP	129600	payroll services
4	Pegasos	18200	senior citizen services	1	SSL VPN	7200	electronic transactions
4	KuntaToimisto	147700	municipal office	1	Titania	10700	daycare
4	Effica	165700	daycare	1	ProEconomica	5100	payroll services
4	Peda.net	30100	school system	1	ProConsona	5100	health care
4	CMS	10000	desktop publishing	1	Titania	4000	social services
3	ProConsona	36400	senior citizen services	1	Titania	800	payroll services
3	iManager	22500	desktop publishing	1	PlaNet	129600	technical services
3	Xcity	159000	technical services	1	- unknown -	1900	municipal office
3	Web-sivusto	139700	electronic transactions	1	Persona Regime	9200	payroll services
3	Pro Excellenta	34400	payroll services	1	Koululiitu	20200	school system
2	Pegasos	6300	financial services	1	Typo3	10800	desktop publishing
2	SAP	135100	financial services	1	Pala	20200	payroll services
2	Titania	3600	other services	1	WinHIT	22900	health care
2	Vesikanta	25900	technical services	1	Workflow	9200	other services
2	Koki kiinteistöopito	30900	technical services	1	Palvelukassa	129600	financial services
2	Effica	28400	other services	1	Mediatri	20200	health care
2	Web-sivusto	26300	desktop publishing	1	Media Cabinet	1600	desktop publishing
1	Jamix	2300	other services	1	Lotus Notes	129600	other services
1	Intime plus	9200	financial services	1	LIS	22900	other services
1	- unknown -	10800	electronic transactions	1	Sonet	20200	financial services
1	Facta	2300	other services	1	DL	5100	technical services
1	Prime	129600	desktop publishing	1	Personec	129600	payroll services
1	JD-Kustannuslaskenta	129600	technical services				

**Table 2.** IT applications in the County of Central Finland

The Table 2 presents the summary of the IT application data. For each Application two score values are presented. The Number of systems is a simple sum of occurrences for the application in the county. The same application can be in use in several service process areas and therefore the name of the application can appear several times in the table. Coverage of population sums up, for each occurrence, the size of the population in the respective municipality. This way the coverage describes the size of the population within which the application is in use. Service processes list the processes which the application supports.

Primary target for collecting the system data and analysis was to gain first time, even rough, understanding of the current situation across the county. The service pro-

cesses were assumed to be similar in municipalities since majority of the processes originate from legislation requirements.

Since the fields in the data collection table consisted primarily of free form fields were the names of the applications delivered in a variety of forms. This led to interpretation of the names and this led to using quite generic application names. Version differences and configuration variants were not studied – that can be done in the next phases of the study where a limited set of service processes may be studied in more detail. This interpretation led to lower granularity of the data, but the big picture in understanding the current situation was achieved.

The service process and application data presents that the variety of applications is large even when the underlying service process needs were very much the same. Another finding is that in the majority of cases the municipalities manage and operate the applications and underlying information technology by themselves, not sharing the service and its cost with another municipality.

## **4 Findings**

This chapter presents the findings and consequent conclusions, based on the theoretical framework of chapter 2 and on the case study results of chapter 3.

### **4.1 Findings from the empirical case study**

To build basis for answering the research questions the relevant key findings are presented here.

The overall findings of the case study in the area of operational and financial data show that ICT resourcing is not a strategic focus area for municipalities. We found in our study that only three of the 23 municipalities have clearly mandated professional in position, which is for managing and leading information systems in municipality. In smaller municipalities we did not get evidence that this kind of managing position exists. With this low level of resourcing the focus of the ICT professionals is very operative and is in installing and supporting the infrastructure and applications. Decisions to supply ICT solutions are done by other persons than ICT persons in a small municipality.

The other finding is related to investments for ICT in municipalities. The average investment to develop compared to operations is only 12 percent of the ICT budget. With that 12 percent investment municipals have to also execute the mandatory requests for changes, which they receive from government offices or ministries. The average of ICT investment is very low, only 0.92% of the overall budget. This is very low compared to e.g. with industry standard 3.5 - 4.5% of the total budget. This low level of ICT investment does not allow any bigger development steps in one municipality alone.

Only 3 of 23 municipalities have some documentation of their system landscape. We found architecture descriptions only in three bigger municipalities. These documentations were mainly lists of systems - architecture objectives descriptions did not



exists where e.g. integrations would have been documented. This kind of architecture documentation is a resource demanding effort and that is one reason why that had not been done. In one municipality ICT planner stated: “We do not have time to do any documentation, all the information is in my head”.

Though municipalities admit, that their processes should be very similar ones, they have only few common and shared applications in use. Those shared applications are such where some external from municipality is leading the function. One very well working application was for libraries but that is very small area. The largest one is for social and healthcare where regional healthcare organization has expanded their common application for social and healthcare processes during the last years.

The service process and application data presents that the variety of applications is large even when the underlying service process needs were very much the same. More than half of the different applications in use are used only in one municipality. In these cases supporting the service process area with a shared application would require change of application. The applications which are in use in several municipalities are still mostly local installations. With these applications the sharing of services could take place without a major tool change.

Only one municipality had done total outsourcing amongst the smaller 22 municipalities. They did not have any IT people in their organization. There were seven which had outsourced the main part of their infrastructure (incl. networks and servers). The rest had both applications and infrastructure operations hosted in-house. Some of the municipalities, especially in northern part of the county, had negotiated agreements with suppliers commonly but the rest had done outsourcing activities separately.

In our interviews with municipalities we did not find roadmaps or plans for the future, i.e. for 3-5 years. This kind of planning was remarkably missing in small municipalities. Also life-cycle cost management or planning was missing, according to our findings, which makes a systematic planning and fact-based outsourcing decisions difficult.

#### **4.2 Method for smaller municipalities**

The first research questions is “What are the key elements and capabilities in planning an implementation of an IS which a smaller municipality should consider? With special focus in decision making regarding the implementation.” To answer the question a method was created by pulling together from the theoretical framework of the chapter 2, focusing in the areas of findings of the case study of chapter 3.

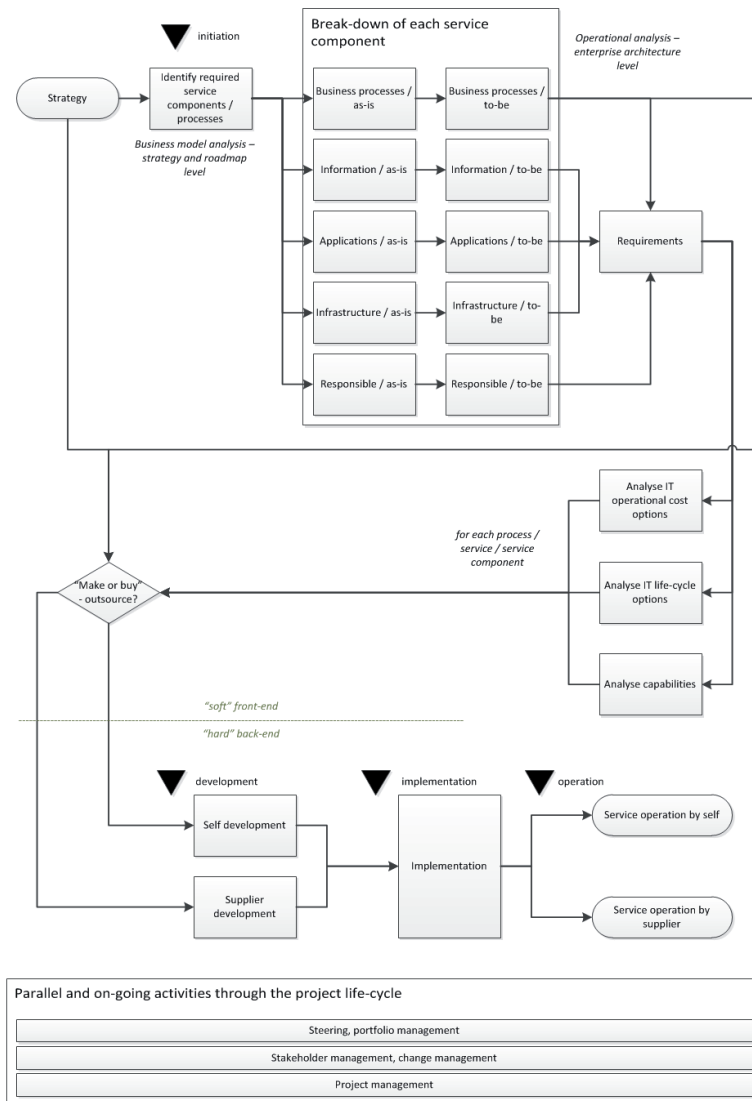


Fig. 6. Model for municipal Information System creation

The figure 6 presents the model which is created by summing up the previous chapters. The model is targeted for smaller municipalities, to provide one possible and practical way for identifying, selecting and implementing an information system.

The model proposes key activities needed in implementing an information system, leading from the organization's strategy to all the way through to the operation and use of the system. Key decision making points are identified and presented.

Parallel to the key activities lays a set of continuous activities. These have on-going characteristics; they are needed throughout the whole life-cycle of the information system creation. These activities include such activities as steering and portfolio management for the governance of the municipal IS.

The model builds on the assumption that needs for information systems raise from the organizations' strategies and support the organization's enterprise architecture (EA). Business model is a description of the strategy in practice. First step is to identify or review the required services and service components which are needed to support and realize the business model. Once identified, the service elements are broken down and analyzed. The analysis is made for the current state (as-is) and for the targeted state (to-be). The analysis areas are those of typical enterprise architecture, with additional emphasis in the people area for roles and responsibilities.

High-level requirements for the information system are derived from the enterprise architecture break-down analysis. The next step is to find out the mode of service creation and operation: "make or buy", that is whether to outsource (large or small) parts of the service creation and/or operation or not. The decision has a connection to the organization's strategy and to the nature of the business processes the information system is expected to support and enable. The analysis covers areas from IT operational cost perspective, across the whole life-cycle of the service, including as-is analysis and to-be calculations linked to strategic roadmap of the services.

According to the outsourcing decision the development of the system will be performed by the organization itself, by a supplier, or as a combination of these. Implementation can be supported by external parties but is always central for the organization itself; therefore the organization has the primary role in implementation. Service operation can be delivered, again, by the organization itself, by a service provider, or as a combination of these.

The IS creation projects or programmes can be several in an organization at a given time. The on-going projects form a portfolio which can be managed as an entity, ensuring resources and adequate management attention.

### **4.3 Findings in comparison to the proposed method**

The second research question is "In which of these key elements the municipalities have biggest challenges and gaps?" The key elements refer to the model presented in the previous chapter. To answer the question the key elements are compared with the findings in the small municipalities.

The model builds on the strategy of the organization as the starting point in creating a new IS or updating a current one. The strategy is supported with a holistic system architecture and with an implementation roadmap. In the smaller municipalities,

according to the evidence discovered, these elements were not tied together, not all existing and primarily the strategy and related decision making dealt with single and separate IS decisions. Decision making focuses in budgetary decisions, holistic service process decisions are rare. IS development budget in general was minimal in the municipalities, as well as the management time allocated for it.

Evidence for enhanced requirements identification and development was not discovered. Typically the high level needs for the IS were identified and the details were worked out by the supplier and during the implementation work. Primarily the high level needs were governmental regulations.

Proper cost analysis from budgeting perspective was typically done covering the implementation and use costs of the IS. However, make or buy decisions were typically dictated by the very limited available own resources – thus pushing the decisions in the direction of subcontracting. Also since the holistic architecture and respective development roadmap were scarce was the cost analysis done quite narrow-sighted. Capability to study possible co-operation with other municipalities was typically very limited although exceptions existed and co-operation was done in form of shared services.

According to received information majority of the IS development and deployment work was done with a subcontractor or by the subcontractor. The range of subcontractors was wide, from international players to very local shops. This leads into losing ownership of critical information to the subcontractors and increases the challenges in managing the holistic architecture and related implementation roadmap.

The service operation phase was supplied both by the subcontractors and by the own organization and staff. In a typical case the first tier support was provided by the own staff and the second tier by a subcontractor or the application supplier. The evidence showed some but quite limited co-operation across several municipalities in sharing the service operation effort and cost.

#### **4.4 Recommendations**

The third research question is “How can the municipalities overcome the challenges and gaps, in practice, when new IS implementation needs arise?” Based on the findings and on the proposed operational model the following key points are suggested as focal points when improvements in IS implementations in the municipalities are considered.

The proposed model provides one solution for the whole chain of main events in the development and deployment chain. The municipalities can consider using the model very much as it is or adopt selected elements which are missing from their current practices.

In addition the following key points should be considered:

- high-level holistic architectures and development roadmaps – to better understand the big picture and connections across all the service processes
- in the IS requirements consider also the other municipalities – enable for the benefits of larger and shared systems

- consider the life-cycle costs in decisions of make-or-buy and co-operation – to improve cost structure
- consider co-operation with the other municipalities in general – to minimize re-inventing the wheel, to utilize the existing learnings and experiences

## 5 Discussion

The target was a practical study of the information systems in the smaller municipalities in the County of Central Finland. This was done from the systems point-of-view as well as from the operational and managerial views. Based on the findings and supported with a theoretical framework a practical but high-level model for operations was proposed. The current status of the IS operations in the municipalities was compared with the model and a recommendations were proposed.

The first research question of “What are the key elements and capabilities in planning an implementation of an IS which a smaller municipality should consider? With special focus in decision making regarding the implementation” was answered with the proposed management model. The model presents all the key elements and the related capabilities. The structure and the key elements of the model can be challenged and other options can be presented. However, we claim that the proposed model is practical, covering and feasible for use. It also provides all parties who are using it a shared language and process as a building block in co-operation.

The second research question is “In which of these key elements the municipalities have biggest challenges and gaps?” Gaps and challenges were identified by comparing the proposed model with the actual findings. These identified gaps were the bridge to the third research question of “How can the municipalities overcome the challenges and gaps in practice when new IS implementation needs arise?” As a solution a proposal of using the model was put on the table with some additional recommendations.

The studied topic and the proposed solutions are significant for the municipalities. The expectations for improved and lower cost operations are mounting up. An increase in co-operation is expected and therefore enhanced skills in managing IS development and a supporting model with shared language are needed. The academic significance of this study lies in applying a number of theories into one practice, thus testing the theories and recognizing potential new research areas.

The study was the very first of its kind in the county. The study was done as part of defining the ICT strategy for public sector. The current state of IS systems and operations was unknown and the first sweep in getting some overall understanding was needed. The results and data are numerous without a great detail but general understanding and a basis for further studies was reached. The study was a success and fully supported the strategy work and its approval.

Topics for possible further studies are several. The proposed model can be tested in practice in a selected service process area and validated and improved. The study can provide a current state analysis supporting planning of further co-operation across municipalities, covering areas such as architectures, roadmaps and life-cycle costs.

The model and the theories can provide tools for this work and the theories and their applications can be tested and reported.

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### **III**

## **OPERATIONS & MAINTENANCE BUSINESS MODEL TRANS- FORMATION - MULTIPLE CASE STUDIES**

by

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# Operations & Maintenance Business Model Transformation—Multiple Case Studies

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## Abstract

Capital goods companies' service offering has been mainly to provide spare parts and maintenance work. In search of growth, these companies have expanded to new areas, such as Operations & Maintenance. Instead of operating and maintaining e.g. production processes itself, a customer can outsource a wide variety of managed services based on agreed service levels. There has been a special focus on global information management know-how, governance, process know-how, physical assets, and spare and wear parts. In order to get a good coverage of case studies, we selected five large global suppliers and two customer companies in telecommunication, energy, mining, and pulp and paper business. By implementing the right capabilities in information management and human resources, by managing contract through governance models and by offering right products, a traditional company can transform to the Operations & Maintenance business model.

## Keywords

Governance, Service, Information Management, Outsourcing, Innovation

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## 1. Introduction

Different outsourcing cases have been widely researched during the last 20 years, especially in IT business [1]. Outsourced activities are normally routines; they are well delineated, can be measured and managed at arm's length and are readily provided by established suppliers in a competitive environment [2]. One widely referred definition is: ... "a company by outsourcing its processes is targeting to focus on core competences and to increase company's competitiveness." [3] The decision to outsource is largely a consequence of a shift in business strategy. Strategic outsourcing has also been carried out by many companies who have recently abandoned their diversification strategies to focus on core competencies [4]. In trade between companies, there are costs due to

add-on goods or cost incurred by searching, monitoring and negotiating services, among other things. However, markets are efficient by nature, and often it is cheaper to contract out than hire [5].

The concept of value chain [6] embraces primary activities focusing on demand-supply chain management and secondary activities such as infrastructure, human resources and technology development. However, large traditional companies have made a strategic move from product-based sales to expanded service offering. Operations & Maintenance (O & M) is a typical example of these expanded services and raises up a new challenge of how to build up these capabilities. The secondary activities defined earlier have a mandatory role in the new business model.

## 2. Background

From the viewpoint of a customer, sourcing operations and maintenance follow the logic of strategic outsourcing [7]. “Maintenance” means the control of the process operations and consists of proactively planned actions to keep and potentially replace production equipment and machines before they fail [8]. “Operations” includes those activities which are needed to plan, implement and run production and related services. Before signing contracts on O & M, business risks have to be evaluated, key measurements defined, and governance has to be agreed upon. Suppliers’ earning logic is mainly aimed at high-quality maintenance to operate customer assets efficiently and to maximize production and quality with respect to key performance indicators (KPIs) [9]. For both parties, the earning logic depends on what kind of a contract has been signed between them [10].

Large technology companies have developed and augmented the O & M model further by offering continuous remote process and related information analyses and support with the help of the latest information technologies (IT). However, the realization of the outsourced O & M business model has turned out to require a complex combination of technology and human skills, calling for high-quality business processes and governance with well-defined roles and responsibilities [11]-[14].

As a consequence, service-based business has been growing strongly during the last decades, especially in developed countries and in the Business-to-Business sector. For example, in the US, which is the biggest service market, almost all new jobs have been created in the service sector. According to recent statistics, the number of new jobs in the private service sector, compared to those in the private goods production sector, was more than double during the last quarter of 2011, and the service sector also employs more than twice as many people as manufacturing [15].

In the literature, there can be found strategies that companies have been using to create value while leveraging their resources in an outsourced mode. The following motivations to extend the value chain through outsourcing are proposed [3] [16] [17]:

- 1) Maximizing the utilization of internal resources by concentrating investments and activities on what the enterprise does best;
- 2) Building on well-developed competences to create barriers against present and future competitors;
- 3) Utilizing external suppliers’ investments, innovations and specialized professional capabilities that would be expensive or impossible to acquire internally;
- 4) Outsourcing in a changing environment to decrease risks, shorten cycle times, lower investment costs and create better responsiveness to customer needs.

O & M business risks can be financial, geographical, organizational and people-related technological and cultural uncertainties. Outsourcing-related risks [2] are mainly seen as loss of critical skills, as loss of cross-functional communication (the traditional lines of communication being redrawn), as loss of control over a supplier if the supplier gets into a too dominant position or ends up in a position to transfer customers’ accumulated knowledge to competitors. Hence, a company should not outsource anything which might give a competitive advantage to present or potential competitors. It should decrease the above risks by selective outsourcing, which, while meeting customers’ needs, minimizes the risks associated with total outsourcing approaches [18].

Outsourcing contracts are normally for a long term, up to five years or even more [19]. Therefore, it is important to choose a right negotiation strategy aiming to a win-win, or risk-sharing, situation and to avoid typical “cost plus” contracts, especially from the customer’s standpoint. In contract negotiations, there should be clarity of the lowest acceptable conditions and of how to get away from the present contract if the contract is no longer acceptable for one of the parties.

Maintenance contracts are categorized into different types, depending on the nature of the relationship, knowledge and type of service [10]. In case a customer has a deep understanding and knowledge about maintenance, then 1) a *work package*—type model is likely to work. With a sourcing contract based on a work package, the customer is responsible for planning, controlling and monitoring. The supplier acts as a mere provider of maintenance. When the contract stipulates the desired performance (not merely what should be done and when); 2) a *performance-based contract* is applied. The main emphasis is on defining the revenue stream between the customer and the supplier, and the contract is typically a long-term one; finally, in 3) a *facilitator contract*, the customer is only using or utilizing physical assets which are owned, maintained and even operated by the supplier. In this case, the contracts are also typically long-term.

Some behavioural assumptions of governance and contractual processes of O & M can be described in terms of transaction cost theory [20]. In general, when bounded rationality prevails, planning does not work, whereas promises, competition, and governance are viable mechanisms. If opportunistic behaviour is suspected, relying on the counterparty is not wise, and contractual arrangements are called for. In a situation with high asset-specificity, relying on the competition is very difficult. For all existing situations, the only common means to tackle these issues is governance [14] [20] [21]. In O & M-type outsourcing cases, the assumption is that all the behavioural situations can exist simultaneously, and it is important to establish strong governance structures with good relationship management [22] [23].

The following four key dimensions of O & M are important when an organization invests heavily on physical assets in maintenance environment [24]:

1. Service delivery options;
2. Organization and work structuring;
3. Maintenance methodologies;
4. Support systems.

These four key dimensions can be reviewed both from the perspective of the knowledge potential and that of information system flow. The present information system enablers, such as global data networks (internet, WAN's, LAN's) with integrated applications and service providers' processes [25], allow the major part of work to be done remotely and efficient utilization of the common infrastructure and knowledge by many customers. When information technology is used as an enabler to manage enterprise systems, and maintenance plays a key role in it, we can refer to it as "e-maintenance" [24].

### 3. Research Methodology

Our research methodology is based on dimensions around outsourcing. Oliva & Kallenberg [14], in their research, studied how in the transformation of a product-oriented company to a service-oriented one the importance of capabilities, product management and also contractual topics becomes highlighted. Because these issues are still encountered in outsourced service business, we applied, in our case studies, a framework to study three-dimensional models in more detail, the studied dimensions being capabilities, contract with governance and product offering described in Figure 1.

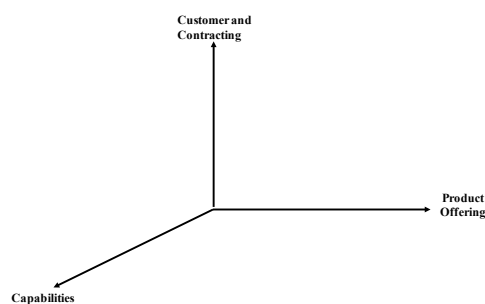


Figure 1. Studied dimensions.

As a starting point of our research, we searched for O & M offering in internet and, based on our findings, investigated 20 large multinational companies' websites which offer O & M services. Most of those companies' O & M offering is for energy business. Also pulp and paper, mining and construction businesses were found frequently. We also met professionals in a mining industry company, which is in the process of building capabilities for outsourcing business. Our aim was to find out, through practical cases, which factors are highlighted most by the selected companies' executives. Therefore, we used case studies instead of survey-based research, and consequently our study is built on multiple case studies [26] [27]. We formulated semi-structured, free-form questions in close cooperation with O & M specialists in the mentioned mining industry company, the focus being on success factors. The questions chosen were based on characteristics which appear mostly in outsourcing-related studies. Those questions dealt with contractual, governance and risk management topics, and the key dimensions were supplemented with human capital issues and especially with the topics related to IT. We reviewed the questions also with people from the global mining industry company referred to, and, based on their guidance, several changes were made before the final set of questions was agreed upon.

The selection criteria for the researched companies consisted of global presence, large size and long-term familiarity with O & M business processes. We wanted to find also companies from different kinds of businesses for our study. Also, potential interviews with O & M professionals with higher and broader views on O & M business were sought. "Supplier" (henceforth one of S1-S5) companies mainly operate in telecommunications, pulp, paper, mining and energy industry. "Customer" (henceforth one of C1-C2) companies operate in pulp and paper industry. The value of O & M contracts for the interviewed companies varied from several 100,000's euros up to 20 million euros, and the contracts' sizes were in the large-size category. The case companies are described in Table 1.

All the interviewees worked for their companies' operations and maintenance activities or very close to them. The interviewees' minimum position in the organisational hierarchy was that of a director; some of them were vice presidents and had gained extensive experience in O & M-related business models for 6 - 20 years, 12.6 years being the average. The customer company interviewees were senior managers of a production site with 25 years experience in pulp and paper industries.

The average duration of the five supplier interviews was 2 hours 14 minutes while the duration of the two customer interviews averaged around 1 hour 40 minutes. Answers to the semi-structured interview were considered together with the interviewees so that they could see the results immediately, during the interview. The written interview reports were re-checked after the interview by the researcher, and the final interview document was sent to the interviewees for comments. In three cases, the researcher got comments back, and minor changes were done to the documents.

Once all the interviews had been completed, the results were collected in a table to find out the key success factors raised up and documented by the interviewees. As the interviews were semi-structured and the questions to the interviewees were the same, the biggest deviations and commonalities could be analysed. The results were

Table 1. The chosen case companies

Company	Turnover 2011 (b€)	Case Companies Description		
		Number of Personnel	Industry	Global Presence (Operations at Least on Two Continents)
S1	38	74,000	Telecommunications	Yes
S2	6	17,000	Pulp and Paper	Yes
S3	10	50,000	Mining Industry	Yes
S4	7	30,000	Metal Industry	Yes
S5	12	18,000	Energy	Yes
C1	10	18,000	Pulp and Paper	Yes
C2	1	1000	Pulp	Yes

also reviewed and discussed with the O & M people from the mining industry company, and they helped in structuring the questions.

## 4. Interview Findings

All interviewed supplier companies were focusing on strategic long-term solutions/change. Operations & Maintenance business was generally regarded by several of them as a “low profit” business where the suppliers want to make long-term contracts and this way get to a position where they can invest on cost-efficient delivery service. In telecom business, there are competitive and regulatory issues, but agreements on the scope and operating model of the service with the customer can be made in a number of flexible ways. Transactional costs are quite high: for example, contracting and basic infrastructure build-up before launching into operations normally takes almost a year. Customers had two key reasons for O & M, and these also came up in the interview: cost-efficiency to prevent product margins from shrinking and the need to ensure technological leadership and operations’ reliability.

### 4.1. Capabilities

#### 4.1.1. Information Management

Customer Relationship Management (CRM) seemed to be problematic in all the interviewed companies. CRM systems had not been implemented properly, and as a consequence, relevant information in these companies was not shared further with relevant stakeholders, for example about meetings with customer representatives. Also, keeping history records intact did not seem to be a common practice. Poor “one company” culture came up in several interviewees’ comments. For example, S4 stated: “...*other parts of the company are not willing to share memos and information with the rest of the organisation*”. As this was brought up in customer interviews as well, there is a need for improvement. CRM roles are often local or regional, and some of the companies have an “account director” for coordinating large customers’ needs.

“*Word remote is not allowed*”, stated one interviewed supplier (S2) representative. That statement demonstrates a need to be close to the process and not be “remote” mentally. However, all the companies had some remote services available for their customers. Some were monitoring and some were even running customer processes with the help of global IT systems and networks. Today’s integrated and distributed systems allow that. When the number of contracts is growing, remote processes are perceived as more valuable. In one case company with over 400 contracts to operate, an on-site O & M was no longer a realistic option. When there are just a small number of contracts, operating only locally is possible with the help of global process professionals who have access to customer processes. The most usual arrangement is a combination of remote access and support by global professionals, with the key roles present on-site. Well-functioning inter-operable IT systems are a must for O & M business. Two interviewed companies, both of them in pulp and paper industry, had moved from centralized remote IT centres to virtual facilities. The rest of the companies had remote IT centres in place, and they believed it to be the right way to run and grow the business.

All the interviewed supplier companies (S1-S5) have, within their service business, dedicated IT professionals. Some of those individuals strongly emphasized that they were not willing to let the corporate IT to be the only provider in IT issues. The important thing is that the IT professionals understood the business model well and were able to provide a fast service in a responsible way. Integrating supplier systems to customer databases was the biggest IT challenge within O & M. However, the interviewed customers regarded all the key IT solutions in the production as the customer’s property which should be built or maintained by their own experts. If case partnerships changed, all the information would still stay in the customer’s ownership. A supplier with its own systems was regarded as a big risk: information could be lost and continuity could be disturbed. Based on the topics above, the importance of well-functioning interfaces between the supplier’s and customer’s systems is considered next.

Three suppliers (S1, S2, and S4) calculate O & M offers by using their home-made information systems based on MS-Excel spreadsheets. Two of the companies apply their service/spare part sales software. For cost and price estimation, there does not seem to be any unified toolset in the Operations & Maintenance business. Risks are managed very thoroughly in all the researched businesses, but only half of the companies clearly calculate risks when pricing their offers.

One O & M supplier has specified in the contract that they need to have daily access to customer site informa-

tion. The customer's database is consolidated to include information from many suppliers. Based on long experience in the business, access to customer process data is a must to the supplier. However, the customer representative's opinion is that process data, mostly, is only for the customer's use. All the data is available for the supplier on-site, only if mutually agreed.

There are big differences between companies in how openly data can be shared. In three of the cases (S2, S3, S5), information from the customer site is packed and sent to databases frequently, e.g. once per minute or less frequently. In one business, already in the manufacturing phase, there is an in-built standard interface in delivered machines and equipment for data collection. In the telecommunication business, interfaces to ticketing systems (S2) are available right from the beginning. Information from several customer sites is extremely valuable for suppliers and can also be transferred to R & D, where the collected data can be used for industry benchmarking information to help a wider set of customers. Generally, it can be gauged from the suppliers' opinions that too little IT development has taken place in this area. Customer representatives understand that IT has a very important role in the customer's business today (C1). The interviewed sites are using company-wide IT architectures, and process automation systems are implemented locally.

#### 4.1.2. Human Resources

Recruitment support is considered very important, and one of the interviewees stated that human capital is one of the most important business enablers (S5), thus emphasizing the important role of human resources. The customer interviewees expect the most-skilled persons (might be expatriates) launch activities and processes, especially in the beginning of the relationship. Thereafter, trained local people could take over to assume major roles after the ramp-up (C1).

All supplier companies prefer to have an employed, local manager for O & M because expatriates are expensive and most often temporary. The rest of the personnel can well be "externals", i.e. (sub-) contracted employees. Customer knowledge is crucial and can be obtained by training or moving company people temporarily to the customer site and transfer that knowledge from the field to the organization. Service mindset is very important, too. One company had special training for changing project-oriented personnel's mindset towards a more service-oriented way of thinking.

#### 4.2. Contract Management and Common Key Performance Indicators

Capital expenditure (CAPEX) delivery means project delivery, which can be to a totally new (referred to as "greenfield" by the interviewees) or already existing (referred to as "brownfield" by the interviewees) production site. Once CAPEX delivery is completed, the next step is to deliver the contract based on the operational expenditure (OPEX) phase, including long-term services delivery between the supplier and the customer. There can be combinations, containing both CAPEX and OPEX parts, in the same contract. There is a big variation among industries, companies and governance cultures. In the telecommunication and energy industries, targeting to a combined model is a very natural part of the whole contracting procedure. In the pulp and paper as well as in the mining industries, cooperation between CAPEX business teams and OPEX business teams has improved during the last 10 years, but, according to the responses, the situation is still not satisfactory (S3, S4). Service with O & M proposals in customer negotiations come clearly after CAPEX sales, if at all. The customer and industry culture must be considered here (S4, C1, C2). Some customers want to buy project delivery and operations service as separate entities, with separate contracts and deliverables. One interviewed customer (C1) wanted to keep these as separate items to get better terms and contract conditions, but the other interviewees highlighted the importance of bundling CAPEX and O & M type offerings in order to ensure maximum value for their investment.

Greenfield projects are, however, seen as the best "platforms to success" both by suppliers and customers. A supplier delivering CAPEX with maintenance that covers production processes and technology management from the start-up phase onwards, has the means to better influence the agreed warranties and commonly agreed key performance indicators. Key performance indicators are implemented as part of O & M contracts to form a basic element of governance in all companies (S1-S5). Most of the interviewed companies (S1, S3, S4, S5) had the same key performance indicators for all their customers. The usual indicators are availability, production per day and response times to recorded issues. The typical ways to control and follow-up the contracts are weekly meetings with on-site managers, a monthly meeting with contract managers and an annual meeting where penalties and the longer-term development is reviewed, including determination of bonuses or penalties. In the annual

steering meeting, participants are normally account directors or employees in comparable positions. KPIs, which are defined in contract, are typically mill- or site-based (bonus metrics); they are linked to process availability, quality metrics and savings in energy and chemical consumption (S4, C2). A leading principle from the interviews (C2) was: “Our interest is not to pay for work; our interest is pay for the result”.

### 4.3. Product Offering

Supplier (S#) companies handle their product portfolios in very different ways, too. The pulp and paper technology company (S4) had focused on creating good practices in service product information management in workgroups, the energy technology company (S5) approached their products from the standpoint of contract management and standardization, and the mining technology company (S3) concentrated on service products categorized according to different customers. The fourth company stated that “there are many non-standard products desired by customers” (S1). In energy business, production process output was clearly in focus, whereas, in pulp and paper, physical service products such as spare parts after CAPEX deliveries seemed to be more central. All these products had to do with greenfield deliveries. Brownfield delivery in O & M is much more challenging, especially if the customer has many supplier technologies and solutions in use. In telecommunication business, it is quite normal that the customer has strong legacy ties when O & M contract starts. In other businesses, maintenance could be arranged for brownfield sites, but operating was not desired by the supplier in the contract as it was considered to contain too many risks related to personnel, product management and contracting.

## 5. Conclusions

“Maintenance” business model belongs to every company’s offering, but there is a remarkable difference between companies in the way “Operations” is considered as part of outsourced service offering. The key success factors are shown in the three-dimensional, better-detailed (product, capabilities and customer and contracting details) model below. We analysed how often they got highlighted as key factors (both “Supplier” and “Customer”) in the interviews. This allowed us to arrange the studied cases according to the most notable similarities between them, as shown in Figure 2. In each category, the commonalities are listed in a descending order.

O & M contracts are very strategic and valuable, and their duration is long [28]. This kind of a business model requires, from both parties, strategic level engagement. The customer relies on the supplier’s capability and does not invest on own skills, and the supplier invests on building the needed infrastructure and governance. Therefore, the duration of the contracts’ governance is normally very long.

The key selling argument seems to be technology leadership and good references. In the researched companies, mainly O & M contracts were signed in greenfield sites. A sale of a CAPEX delivery typically starts a long cooperation. From the customer’s side, decrease in costs was regarded as a key driver for O & M. This was

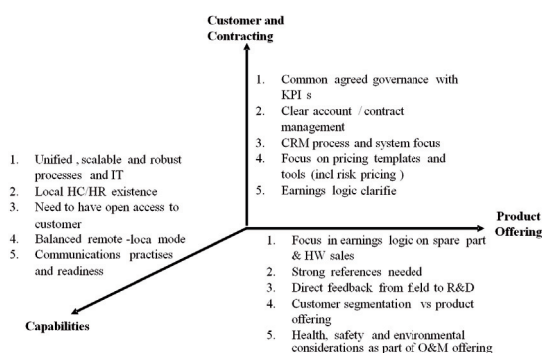


Figure 2. Three-dimensional models for O & M-focused success factors.

achieved mainly by removing present legacy systems and replacing them with the supplier’s infrastructure and modern technology. The “Investment Characteristics” theory [20] is not applicable as such here, but a transformation can be detected during the contract lifecycle. At the beginning, following the project delivery, investment is rather particular and occasional, but gradually it will transform towards a more mixed and recurrent form.

Most of the interviewed companies admitted that they could better utilise the information related to their customer relationship management (CRM). This was also the customers’ view. If the supplier has interfaces to the customer and they do not know each other well, that will create mistrust and misunderstandings on the customer side.

Behavioural assumptions related to asset specificity, bounded rationality and opportunism have strong influence on how well the contract will succeed [20]. Based on the O & M case interviews, in most of the companies, proper governance is mandatory if these behavioural patterns are detected during a contract.

Proper governance in the decision making of an inexperienced customer was seen as an even stronger determinant than technology leadership. Common key performance indicators are one of the key enablers to get a contract implemented. The following model Figure 3 proposes a governance practice. It is proposed for the commonly agreed contract and relationship management scheme.

Still the hard facts such as cost decreases, efficiency and performance, instead of environmental and health and safety topics, were the key drivers for customers. Sales of concrete items, especially those of spare and wear parts, were the most important topic in suppliers’ earning logic. In the sales phase, several customer companies highlighted the need for good references.

A contradiction in the existing O & M business model was found. Suppliers (S1-S5) are aiming to utilize economics of scale by building, e.g. remotely-managed processes and functions, while customers (C1-C2) want to ensure undisturbed operations and highlight the supplier presence on the site. The most workable solution seems to be an agreement to interface the supplier’s IT systems to customer operations management systems and ensure that the supplier has access to on-line information for analysis. Well-functioning IT is a mandatory part of a wider business model and its transformation [29]. However, some customers (C1-C2) did not want to allow the suppliers to use the data gathered from the customers’ processes. Those customers wanted to keep their operations data in their own databases to be able to change the supplier in the contract renewal phase. Changes are much easier to execute, if the ownership of the data is on the customer’s side. This is a complex and contradictory issue because process data is naturally one of the key factors in process-based industry.

Both human and technology factors need to be well addressed, and all the interviewed companies pointed this out [4]. One of the critical success factors is how well global HR systems are able to recruit locally for O & M site positions and how suitable the people recruited are. Use of expatriates is not a very popular way of resourcing. Instead, companies want to find local people educated as their site’s key personnel as soon as possible. Also, we found out that the companies with the longest experience in O & M business had invested on training programs or packages for their own and their customers’ personnel.

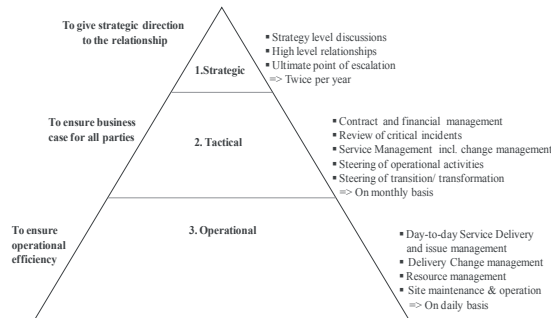


Figure 3. Proposed governance model in O & M contract and relationship management.



## 6. Summary and Further Research

This paper discussed the key O & M capabilities on the basis of interviews with senior management responsible for O & M in five supplier and two customer companies. In this study, we had a special and valuable opportunity to run interviews and analyze O & M top level professionals from both customers' and suppliers' point of view, allowing us to propose the most common factors for transforming the product-based business model to a service-based one. Our view is that the secondary activities defined in widely used competitive advantage theory [6] have to be prioritized. The data in our study indicates that secondary capabilities in O & M type business are mandatory. We did not try to change nor challenge any general theories but to deepen our understanding about how large global companies see the service business and, especially, the capabilities, such as IT, that are required. Operating and maintaining the customer's process is clearly a complex combination of several influencing factors, see **Figure 1** and has to be managed well. The biggest variations in the findings concern management of product data, centralized way of working and, particularly, use of CRM and customer cultures in adapting to new ways to deliver services. The common areas of importance were found to be human capital, need for governance, and focus on IT solution. Special emphasis was placed on governance and reliability to build and maintain IT systems which enable the O & M business model.

Suppliers benefit from arranging remote operations globally, but customers want services locally. Suppliers are willing to collect data and produce information for a wider use, but customers are hesitant to let suppliers to use their data. A true win-win situation requires deep trust between parties. However, well-functioning and proven relationships are needed before trust can be achieved and, before that, mutually agreed governance structures must be in place. New business models create challenges also for companies' IT and business infrastructure functions and for their ambitions to global reach. Again, there are huge differences in IT tools in-use, in service delivery processes and in focusing on greenfield or brownfield deliveries.

Several large companies are moving in value chain from a traditional goods and project delivery model towards the O & M business model. Some of the traditional global companies are enhancing their offering by extending their activities to customer processes operations. As a consequence, the services and their implementation worldwide form a key growth business area also in capital goods industry. There is a growing body of research especially around IT outsourcing, and there is more room for O & M-contracted activities. Ample opportunities exist for further research not only in organizational, IT and business fields but also in strategy and management.

Further research is needed, especially on life-cycle costing and funding mechanisms and also on how to govern long and large outsourcing services contracts. The number of interviews in this study was limited. To be able to generalise these kinds of results, the amount of data and the number of interviewed companies should probably be larger. The use of mathematical modelling and simulation and development of practical methods for industries' use would also be required. In the interviews, it came up several times that better governance equals better cooperation, and that can lead to targeted win-win situations. Therefore, it would be necessary to study how the relationships between customers and suppliers are longitudinally developed during contract lifecycles.

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## **IV**

### **SIGNIFICANCE OF SUPPLIER SELECTION CRITERIA EVOLVEMENT IN IT OUTSOURCING TO EMERGING ECO- NOMIES - LESSONS FROM A GLOBAL IT OUTSOURCING PROJECT**

by

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# Significance of Supplier Selection Criteria Evolution in IT Outsourcing to Emerging Economies - Lessons from a Global IT Outsourcing Project

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## Abstract

*In line with the increasing significance of the acceleration of information technology (IT) advancement and also of harnessing the vigor of emerging economies, IT outsourcing to emerging economies has become global concerns. This enables global companies to enjoy a critical competitive edge by choosing the best option in outsourcing strategy and supplier selection. Consequently, supplier selection criteria have become critical issues for both suppliers and customers.*

*This paper attempts to provide insightful suggestions to these issues. An empirical analysis was conducted taking supplier selection criteria evolution in global IT outsourcing project focusing on action research in a multinational company.*

*Noteworthy findings include impacts of manager's change, identification of creative moment and weighting of supplier selection criteria.*

**Keywords:** *IT outsourcing, emerging economies, supplier selection criteria, project management, action research*

## INTRODUCTION

Outsourcing to emerging global markets has been rapidly becoming popular in high-technology industry (Javalgi et al., 2009). This is particularly the case in information technology (IT) industry corresponding to the dramatic advancement of the Internet and cloud computing system (Zhao et al., 2013). With US driven global simultaneous stagnation in 2007-2008 and Europe's economic crisis emerged in 2010, established IT companies, particularly multinational companies look more to emerging markets for outsourcing partners (Grossler et al., 2013). Activating trend in the bottom of the pyramid, especially of the middle of the pyramid (Prahalad, 2004) accelerates this concern. Thus, IT outsourcing to emerging economies has become global concerns (Watanabe et al., 2014).

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Each economy, both developed and emerging, has unique economic, political, and socio-cultural issues that define institutional systems of respective countries (Hofstede, 1991). Successful outsourcing necessitates co-evolution between suppliers and customers by adapting respective institutional systems (Watanabe, 2009).

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Under such circumstances, supplier selection criteria adapting institutional systems have become critical issues for both suppliers and customers for successful IT outsourcing, particularly to emerging economies. In order to correspond to this critical task, elucidation of IT outsourcing mechanism and conceptualization thereon would be essential.

IT outsourcing is widely studied as a general phenomenon during the last decades (Dibbern et al., 2004). Outsourcing, in its most basic form, can be conceived as the purchase of a good or service that was previously provided internally (Lacity and Hirschheim, 1993). Outsourcing agreements have normally long duration, require good governance and are strategic (Lacity and Willcocks, 1998, Levina and Ross, 2003, Teng et al., 2005). Outsourcing has been researched from several viewpoints in the literature (Lacity et al., 2009), like why organizations outsource, how companies benefit from IT outsourcing, what firms outsource and how firms measure the success (Dibbern et al., 2004). While the recent studies have developed around offshore and nearshore outsourcing, business process outsourcing and the provision of application services (Lacity et al., 2009, Rottman and Lacity, 2006), studies on outsourcing to emerging economies have been gaining special attention (Javalgi et al., 2009, Grossler et al., 2013).

The overall key theme for outsourcing studies during the last two decades has been how to leverage continuously expanding services market with significant business value (Lacity et al., 2008). During the last years, the cloud computing and related applications as a service, platform as a service and infrastructure as a service have been widely studied. Still the whole effect of cloud computing success and adoption is to be seen.

Since outsourcing is widely used in companies, most of the large companies have done or planning to continue outsourcing their IT or part of that (Palugod and Palugod, 2011). Already 96% of large companies have outsourced part of their back office IT or support functions and 72% are going to increase significantly or moderately their outsourcing operating model (KPMG State-of-Outsourcing, 2014). It is generally seen that only half of IT outsourcing projects succeed (The CIO Insight, 2012). Also only 44% of the Finnish companies, which have recently carried out outsourcing projects, agree on that their results for outsourcing can be measured (TTL, 2013). When expectations

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have not been met with realized results, relationship between supplier and customer has become challenging.

IT services outsourcing requires very different relationship between supplier and customer than earlier (Vagadia, 2012, Graf and Mudambi, 2005). The relationship management between the client and the supplier has been a common and challenging issue throughout the last decades (Hatonen, 2005, Lacity et al., 2009).

While outsourcing services can be managed easier as far as such services are located in one or few countries, complexity increases dramatically in global outsourcing particularly in emerging countries (Zhao et al., 2010). Furthermore, many executives believe that IT is evolving quickly into a utility and can be outsourced easily without defining the scope of outsourced services on adequate level (Lacity and Hirscheim, 1993). This deficiency leads easily over-optimistic expectations, which cause mistrust and damages between parties in outsourcing agreement and can lead in some cases to change of supplier or even back to in-sourced operating model.

Thus, outsourcing projects have several dimensions which need to be addressed i.e., technology, behavioral, financial, legal and strategic dimensions. If one of these dimensions fails, the whole project will fail.

In larger organizations, global presence and requirement to deliver standardized IT services significantly impact on outsourcing decisions. During decades, large IT companies like IBM, ICL, Hewlett-Packard and recently Indian companies such as TCS and HCL have built large outsourcing services. Global IT giants have operations both in developed and emerging countries and they can offer global customer capabilities to deliver centrally managed but locally delivered IT services which small local IT suppliers are unable to provide. Standard working method of those big service providers requires assimilating the staff of outsourced units into their culture (Kaplan and Norton, 2004). Cultural similarity between the service receiver and provider is no longer a critical predictor once participants experience their partners' organizational culture during the initial relationship period (Lee and Kim, 1999). The dominant IT suppliers influence the IT management's role by determining the range of technologies, solutions and services that are available within the organization. It is also recommended that in every outsourcing case both technical and legal experts should be involved (Lacity and Hirscheim, 1993).

In many cases, IT outsourcing project starts with target settings where achievable success factors are also defined and selected (Chou and Chou, 2009). These factors give good indications for defining criteria to be used in final vendor selection. Different criteria will represent certain vendor character

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and they will get different weights to be used on comparing different vendors. While these indigenous nature of IT outsourcing initiated by large companies primarily to developed countries incorporate supportive suggestions to conceptualizing IT outsourcing mechanism adaptive to outsourcing to emerging economies, none has undertaken systematic conceptualization effort.

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Given the significance of this conceptualization as an essential step for developing supplier selection criteria critical to IT outsourcing to emerging economies, this paper, on the basis of an empirical analysis on supplier selection criteria evolution in global IT outsourcing, attempts to provide insightful suggestions to the foregoing conceptualization. Given the conceptualization objective, action research, instead of normal case study, is focused.

Taking advantage of authors' favorable position to test and apply forefront research method for a strategic outsourcing project in the multinational company for which authors are responsible, key outsourcing success factors were identified and evaluation criteria for vendor selection was created thereon. Then, impacts of the criteria on the project implementation were analyzed during the implementation period. In addition, initial criteria were tested after the project completion.

Section 2 explains action research and the research questions. Section 3 outlines analysis. Findings are demonstrated in Section 4. Implications to outsourcing to emerging economies are summarized in Section 5. Section 6 briefly summarizes noteworthy findings, policy implications and also the points for future works.

### **ACTION RESEARCH AND THE RESEARCH QUESTIONS**

Action research is a research strategy for Information Systems (IS) studies providing first-hand experiences of IS theory in practice (Simonsen, 2009). Action research can be defined as "*an iterative process involving researchers and practitioners acting together on a particular cycle of activities, including problem diagnosis, action intervention, and reflective learning*" (Avison et al., 1999).

Simonsen (2009) has described risks related to action research in IS as follows:

- (1) Action research is a very time-consuming way of producing empirical data and there is a high risk for the project not evolving as planned, which might lead to the failure of acquiring the anticipated empirical data.
- (2) Action research is also personally demanding and challenging because it entails a close engagement with and commitment to collaborating industrial practitioners.

Mandatory to implement and empirical data collection was put the highest priority. Every experience/data was anticipated by empirical data. Authors'

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engagement in the project from the beginning to the end was put the second priority. Whilst authors were responsible for the project, primary aim in the research was not only to analyze, understand, and interpret but also to improve and solve problems relevant to practice. As challenges in outsourcing project still remained low success rate (The CIO Insight, 2012), generalize IT outsourcing projects to achieve easier targets in coming projects was endeavored. This can be done through better understanding of evaluating service providers and also by clarifying which of the tasks need to be considered better in the future projects.

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Combining this kind of research with hectic industry IT outsourcing project with unpredictable phases and practitioners was recognized a challenge. The success depends strongly on the innate characteristics of the novice researchers of what they understand IS and action research (Estay-Niculcar and Pastor-Collado, 2002). While case study would have been another method to accomplish the targeted research in this project, more active role of research was anticipated and both practitioner's and researcher's roles were combined. Therefore action research method was chosen.

Case project data was collected during whole outsourcing project using authors' own plans, documents and notes. Research data as part of project documentation was also collected on continuous basis and analyzed per each checking point chronologically. This was conducted as part of the normal project practices. Every memorandum of the meetings which were held between supplier and customer were stored. The key documents were classified as (i) Request for Information (RFI), (ii) Request for Purchasing (RFP), (iii) Outsourcing agreement with describing Statements of Work (SOW), (iv) Service Level Agreements (SLA) and (v) project steering group materials.

Key research questions in the action research are focused on the following:

- What can practitioners do in ongoing project to improve the preparations for global outsourcing project?
- How key participants from customer side see the of selection criteria before and after the whole project?

## **ANALYSIS**

### **Case Description in the Research**

The case company in this research delivers large technology projects and related products and services globally and increasingly to emerging markets, where local infrastructure and IT services delivery is not highly matured. The case company is amongst leaders in those specific technologies and markets. The company has



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headquarter in Finland and turnover is more than 1 b€ annually. The company had not outsourced its IT operations in wider scale earlier and this project was the biggest outsourcing project in its history.

The IT infrastructure in scope was before hosted and managed mainly in-house and hardware was quite old and subject to refreshment. The company's strategic actions target to global growth of the business in all of the continents and scalability and business continuity are required from IT. This case project was well aligned with company strategy execution plan. Total number of in-house hosted servers in scope was more than 200.

In the middle of 2012, company was evaluated service delivery first for deeper globalization by continuing in-house server hosting mode or by outsourcing that. Driving forces were (i) data center was subject to relocation to new premises, and (ii) one new business model needed a global solution for their IT infrastructure. After several reviews, company's steering group decided to combine these two big changes and select a supplier, which could offer outsourced services for both objectives.

Based on thorough evaluation, Request for Information (RFI) was sent to nine large global ICT suppliers in November 2012. From the beginning, the scopes were focused on both corporate IT and business IT for specific part of the company's global service business. Thus, the outsourcing project consists of two main areas.

The company did an analysis to build a new data center for corporate IT (CorpIT) and those calculations and business case was existing for decision making. There was simultaneously need to build data center infrastructure for providing services in emerging global business model for company's one business unit for operate and maintenance type of business model (BusIT).

The great challenge with mentioned operate and maintain business model is that customer production sites are located in low infrastructure areas. Later on these type of IT delivery models are referred to CorpIT and BusIT. Target statement for the selection by the company Steering Group was: *"To find one, truly global IT Infrastructure Service Provider to design, deploy and deliver all required Infra services and capacities, meeting expected Service Level Agreements with optimized Total Cost Ownership to enable and support business growth."*

The scope of the research is to follow and analyze one outsourcing from preparation to the end of transition and transformation project.

### **Supplier Selection Criteria**

Thorough list of requirements and basic information with the operate and maintain business unit were prepared. Request for Information (RFI) was sent to suppliers in November 2012 and Request for Proposal (RFP), was

sent in January 2013. While in the RFI phase, simple questions to shortlist (the number of potential suppliers from ten , nine to three) were focused, in the RFP phase after RFI phase included more detailed documentation of the technical requirements, timelines, environment description and service level requirements addressing to three selected candidates. The key measurements and success factors were (i) project schedule (*servers transferred before June 2014*), (ii) project cost (*project budget inside +/- 5%*), and (iii) achieving scope related targets (*agreed servers moved, ITIL processes implemented*). No people related targets were defined.

Primary aim of the research was to find out how weight and emphasis of the vendor selection criteria will evolve from the project start compared to situation after project - post deployment. To evaluate vendors based on weights of selection criteria a spreadsheet that was created for evaluation of RFI responses was used. In the spreadsheet, the RFI responses were divided to six key categories: (i) Supplier Background (e.g., geographical presence in different market areas), (ii) Commercial Items (e.g., price breakdown), (iii) Key Descriptions (e.g., ITIL processes), (iv) Capacity (e.g., price for HW, SW and capacity availability), (v) Projects (e.g., capability to plan and implement projects), and (vi) Labor (e.g., personnel competences, price and availability). These categories included totally 61 questions or topics, which were ranked from 1 (poor) to 5 (excellent). Each category has a weight that influenced a lot in selection and was used in total vendor score calculation. Every supplier's responses were in the same form and were conducted a proper analysis what categories were emphasize mostly before handling responses. Five evaluation team members were organized to give weight from 1 % to 100%.

Scoring weights for selection (both BusIT and CorpIT) in the beginning of RFI were as tabulated in Table 1.

Table 1: The First Scoring for BusIT and CorpIT Outsourcing Supplier Selection (RFI phase)

<b>BusIT and CorpIT hosting evaluation RFI</b>	<b>Total before (%)</b>
Supplier background	22.00
Key descriptions	23.00
Commercial	30.00
Capacity	12.00
Projects	8.00
Human labor	5.00
<b>Total</b>	<b>100.00</b>

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Hyvonen, H. In the RFP phase, supplier's responses both from BusIT and CorpIT point of  
 Helminen, M. view with diverse criteria weights were evaluated. This phase was more in  
 Watanabe, C. detailed with 101 combined questions, where both BusIT and CorpIT were  
 involved.

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Tables 2 (BusIT) and 3 (CorpIT) tabulate the results.

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Table 2: The Second Scoring for BusIT Outsourcing Supplier Selection  
(RFP phase)

<b>BusIT hosting evaluation RFP</b>	<b>Total before (%)</b>
Total Cost of Ownership / pricing	27.00
Global coverage	16.00
Change management	13.00
General terms	10.00
IT Service Management	13.00
Governance	13.00
Technical architecture and solution	8.00
Total	100.00

Table 3: The Second Scoring for CorpIT Outsourcing Supplier Selection  
(RFP phase)

<b>CorpIT hosting evaluation RFP</b>	<b>Total before (%)</b>
Total Cost of Ownership / pricing	18.00
CorpIT Data Center Specific Price	16.00
Governance	12.00
General terms	10.00
IT Service Management	16.00
Governance	13.00
Technical architecture and solution	12.00
Total	100.00

Based on those criteria used for vendor scoring, finally one supplier agreed with Letter of Intent (LOI) in April 2013 and started negotiations for agreement.

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**Project Execution**Significance  
of Supplier  
Selection

Participants in the agreement negotiations from supplier included sales manager, account executive, pricing manager, technical architect and project manager 1. From customer side, the participants at this stage were contract owner, ICT manager, sourcing manager, EMEA region ICT head, external consultant who facilitated the agreement process in customer side, and occasionally manager representing business IT and sourcing lawyer. Negotiations took more than four months including summer vacations.

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Even if RFP was well progressed, contractual items took long days before reaching defined and agreed stage. Customer's business IT part was under the pressure because operation and maintenance business unit had got an large order where it was needed IT services installation urgently. Here, the first issue cooperation with supplier was experienced. While account manager in supplier side made promises successively, they were not satisfied. Also there were plenty of open issues to be defined and decided on both sides regarding agreement. As a temporary solution separate document (Interim Agreement) was forced to conclude to get business IT request to proceed. The project progress should have been escalated with experience at that stage. After vacations, open topics were agreed thereby agreement was signed in the end of August 2013.

After the contract was signed, members of the supplier side team changed except account manager and original *project manager1*. When ramping up project for transition phase, project manager 1 continuously gave plenty of promises to improve structure of the project and its documentation. Despite several reminders and comments to account manager there were very little documentation except contractual items after several months. The actual project work was started but progress follow-up and actions planning were difficult as those were not well defined. This important phase in outsourcing process was not done well. The trust for vendor's abilities to execute was not created.

Customer was forced to wait five months after RFP agreement before there were first written draft level project plans in place. This led to a new situation when supplier's *project manager1* changed in August 2013. While a new *project manager2* responded taking customer's viewpoint what he could, it seemed that he was unable to get the rest of supplier organization to follow-up and commit to his plans. In addition, it looked like as if account manager was unable to support new *project manager2* sufficiently. Both of the project managers did not have wider experience of truly global outsourcing cases. From customer side it was needed to follow up more thoroughly the progress and instruct what was needed to do. However, technical architecture work and

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partly ITIL processes planning and implementation progressed in sub teams despite of lacking structure for the whole project. One part of the delay in reaction was customer's limited experience on this kind of an outsourcing and expectations to delivery times.

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In October the situation was analyzed within customer project team and realized that the estimated project deliverables were different than the weighting in RFI/RFP/Contract negotiation phases. Conclusion was that the importance of getting good and motivated people that had internal influence in the supplier onboard had not been highlighted enough. Prospect of the progress and coming success of the project were sincerely anxious about. The first meeting with supplier's Executive Sponsor and Account Executive was held in October 2013. From customer side the participants were contract owner, ICT manager and customer's executive sponsor. Supplier's executive sponsor promised to help but very little visible changes were recognized by customer. The next meeting with Executive Sponsor was held in December 2013. Finally, it was notified in that meeting that supplier's *project manager2* was going to be changed. *Project manager3*, who was going to join the project, was more experienced in leading global projects and not specialist in technical details.

A new *project manager3* who started his responsibility in December 2013 spent a lot of time to collaborate with customer's team members and started to create required documentation. It was noted that he created a lot of new documentation for project management, key documents and templates, and documentation format was changed again.

It was found that the new documentation was good and there were also a large number of participants in project's regular meetings. Cost estimates were provided thereby first reliance relationship was established in February 2014. The mutual trust started to emerge since then.

Customer had also brought new members in the project from the beginning of 2014, which brought customer side relationship management to better shape. Supplier resourced *an assisting project manager* in February 2014 to be responsible for coordinating infrastructure transfer activities, which dramatically speeded-up server moving. The main factor was better project management and follow up of several individual activities. These changes enabled moving forward by getting technical details agreed.

In March and April 2014 one supplier resource and internal project teams were arranged to sit physically in the same room. This resulted in good progress by letting the customer learn supplier's terminology and way of working. Thanks to these supportive actions project results were obtained.

In the beginning of 2014 governance structure, which was already agreed

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in RFP phase, was implemented. It took some time before it started work efficiently. During the most hectic time there was governance for 3 different phases: (i) contract negotiations, (ii) environment and process development, and (iii) deployment of the ongoing service. At that time organization and persons that were going to deliver ongoing services in the future had also become familiar. New people joined in the project to “Ongoing service” side and governance structure. Gradually regular meetings, documentation improvements, versioning, deployment project documentation and status updates started to bring visibility and overall understanding which led to results. It was found that trust started to win back when people started to work with less stress due to the change. When new people in the project learned and understood the start up works which were real needs and priorities in customer side, suddenly progress in excitable speed with project’s activities increased teams motivation. This exact moment can be considered creative moment when new innovation suddenly emerges (Mori, 1997, Ishi, 2009).

Transition project reached overall targeted results well. Planned schedule was enabled to be kept except for the first business IT project which was delayed by four months. However, that was accepted because of customer’s business reasons. Project spend went only 2% over target. Also project scope, server transfers and consolidations targets were reached well. Both global and local ICT services to operating and maintain business model also in emerging markets were enabled to implement.

In the planning phase, before the outsourcing project, five customer’s key people in the process created a vendor selection list of criteria with weights. This list described which were outsourcing key success factors and the most important areas in Request For Information phase (10 suppliers). Two months and several presentations and evaluation sessions later similar list was made with different criteria to be used with a short list of suppliers (3 suppliers) in Request For Purchasing phase.

After the outsourcing transformation and transition project was finalized and ongoing service stabilized, same key participants were invited to re-evaluate their scoring weights. They were instructed to use intuition and whole scale of experience collected in just ended project while answering.

## **FINDINGS**

The action research outlined in the preceding Section was a quite a typical IT infrastructure outsourcing project from the project scope point of view. However, the geographical scope of the outsourcing agreement requires IT services deliverable to all continents with countries in different institutional systems (Watanabe, 2009). Thus, conceptualization of the IT outsourcing

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mechanism based on its elucidation is essential. This is the particularly the case for IT outsourcing to emerging economies.

Experiences of the action research were analyzed in this context with special attention to compare the implications of the change in the evaluation criteria for vendor selection before and after the project implementation.

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The scope of the foregoing action research included some hundreds of servers, supplier candidates were big international IT suppliers. Experiences in confronting beyond anticipation issues have provided an expectation to be able to lead much easier project. Any organization that explores a new sourcing option in terms of new suppliers, new services, or new engagement models with existing suppliers, must plan on false starts and many mistakes (Lacity et al., 2008). While finally a successful outcome was obtained in the preceding experiences, learning exercise provides an expectation to a better position to evaluate how better results with less effort can be obtained. This is particularly important for IT outsourcing to emerging economies.

With such expectation, if we compare the scoring for BusIT and CorpIT outsourcing supplier selection at RFI phase before and after the project, we note the significant differences as compared in Table 4. The largest increase in weights are for “Human Labor” (+10.00) and “Projects” (+7.00).

Table 4: Scoring after Project for both BusIT and CorpIT (RFI phase)

<b>BusIT &amp; Corp IT hosting RFI</b>	<b>Total before</b>	<b>Total after</b>	<b>Change</b>
Supplier background	22.00	13.75	-8.25
Key descriptions	23.00	16.25	-6.75
Commercial	30.00	23.75	-6.25
Capacity	12.00	16.25	4.25
Projects	8.00	15.00	7.00
Human Labor	5.00	15.00	10.00
Total	100.00	100.00	100.00

Scores after the project suggest that outsourcing project execution was highly dependent on people involved in both sides. This fact was not ensured early enough in the beginning of the project. All in all five people in key positions were changed or left the project. Two of those were initiated by customer towards supplier and three people left project because they moved outside their company to other jobs.



Especially in starting the whole exercise, project management work, templates and tools were widely missing from selected vendors. This has to be clearly highlighted in the early phase during supplier evaluation. It is needed to be sure that supplier can execute project work efficiently. All the IT vendors that were part of the RFI have this capability. Client needs to ensure beforehand that selected vendor will utilize those in their project.

Significance  
of Supplier  
Selection

Contrary to these underestimation, “Supplier background” (-8.25) and “Key descriptions” (-6.75) were over weighted. Before RFI phase it was required to have high standards for the supplier’s documentation. In addition, target was to choose a supplier which has basic elements for relationships and business management in good shape.

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Similar comparison was conducted also in RFP phase. In RFP phase supplier was evaluated separately for BusIT and Corp IT. Table 5 compares the case for BusIT.

Table 5: Scoring after Project for BusIT (RFP phase)

BusIT hosting evaluation RFP	Total before	Total after	Change
Total cost of ownership/pricing	27.00	22.50	-4.50
Global coverage	16.00	12.50	-3.50
Change management	13.00	12.50	-0.50
General terms	10.00	8.75	-1.25
IT Service management	13.00	13.75	0.75
Governance	13.00	15.00	2.00
Technical architecture and solution	8.00	15.00	7.00
<b>Total</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>

Clearly we can now confirm that the importance of BusIT “Technical architecture and solution” (7.00) was underestimated. Building a global and local infrastructure simultaneously was a challenging task. In addition, “Governance” (2.00) required more focus than expected before the project. In Business IT RFP evaluation “Total Cost of Ownership/pricing” (-4.50) was focused higher before the project than after the project. In the longer run we are anyway quite sure, that cost efficiency will be important. Another criteria with lower weight was “Global coverage” (-3.50). This criterion was high before the project as it was required to find a supplier with global capabilities. It was found that all of the short-listed suppliers have capabilities to serve anticipated needs but their proposed way to deliver that varies.



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Table 6 compares the case for CorpIT.

Table 6: Scoring after Project for CorpIT (RFP phase)

CorpIT DC hosting evaluation RFP	Total before	Total after	Change
IT service management	16.00	10.00	-6.00
CorpIT datacenter specific price	16.00	11.25	-4.75
Transition and transformation	16.00	15.00	-1.00
Governance	12.00	12.50	0.50
General terms	10.00	11.25	1.25
Technical architecture and solution	12.00	16.25	4.25
Total cost of ownership/pricing	18.00	23.75	5.75
<b>Total</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>

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Evaluation for Corp IT showed that “Total cost of ownership/pricing” (5.75) and “Technical architecture and solution” (4.25) were considered more important after project more. The whole pricing for services in the outsourcing RFI-RFP-Contract was a challenging part of the project. For customer it was difficult to stay on track what was promised and to which price in RFP versus in contract’s price letters. The additional price items were also raised up which were not listed up nor agreed on in RFP when comparison between suppliers was done. Technical architecture was also demanding after the project as there were plenty of technical details which it was needed to get solved when going live with project.

Before the project, all were very convinced that supplier needs to be strong with its process capabilities. Implementation of processes took time but went quite well. The next time it would not necessarily weight “IT service management” (-6.00) that high since there are always work for customer specific settings that need to be done. No matter how significant the processes are. In addition, we evaluated “CorpIT data center specific price” (-4.75) higher than after project. These criteria could have been combined with “Total cost of ownership/pricing” criteria as those specific prices were discussed with supplier in the same negotiations.

Whilst the beginning was difficult, at the end the results were good. In the beginning it was trusted that the supplier will lead project with well developed practices and tools, with skilled and motivated people but reality was something different. Especially after the first half of the project duration, the executive sponsor was escalated when it was found something was wrong. In addition, more thorough following was endeavored that there was well

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documented plans and project governance was in place. Customer has also some responsible of the outcome.

When right people in the project on both sides were obtained, works were started to make progress. It can be concluded that with proper documentation and project plans, the target was attained much easier. Also better plans made are easier for customer to avoid resource shortages, which were experienced in March-April time. Even though it can be considered to have selected a correct vendor, or at least good enough at the moment, some self study is in place.

During the long transition and transformation project implementation should have stopped several times and really evaluated the progress of the project. Time could have shortened thereby certain activities took and in a way helped supplier/provider to get things finalized earlier. This help would require an active role of the customer as well to get things done. On the other hand this statement is in conflict with the idea of buying outsourcing services from a vendor. It could be that this is not achievable at least when outsourcing would mean jobs to be fled to offshore site. In the end this transformation phase and coming change management process will be key topics when evaluating success of whole vendor relation scope. The proposed evaluation in the critical phase of the project should be based on the same criteria that were used in the scoring. Purpose of this evaluation should be:

- Are we getting what we wanted?
- Are we doing our share to ensure the outcome?
- What changes or corrective actions should be performed?

However, with revised criteria weights and checked scoring it would still end up selecting the same vendor. This indicates that there is no perfect match in IT outsourcing, just close enough and a lot of work to make it succeed. In the end it is customer who is building the outsourcing results to its own benefits. Literature describes many scenarios where persons in client side consider outsourcing company as a threat which effects working moral (Taylor, 2007).

To summarize the key findings and learning it can be concluded that in this case that changing to right type of project manager would have impacted to better and faster progress in the project. When right people both from supplier and customer side learned a common way to work for common goals, very rapid progress in project tasks was attained.

According to these findings, especially in the beginning of the project “global coverage” was overestimated. It can be concluded that this is partly paradox because implementation of outsourced services will happen in very different markets. After project it can be seen, that delivering ICT services is at the first place depending on how well supplier’s key account and service

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Hyvonen, H. people build up processes and capabilities. When those are in place, required  
Helminen, M. services can be delivered accordingly also to company's needs in emerging  
Watanabe, C. markets.

### **IMPLICATIONS TO OUTSOURCING TO EMERGING ECONOMIES**

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In outsourcing projects to complex environments particularly to emerging markets, it was demonstrated that action research offers much better insight to researchers. Given the increasing significance of IT outsourcing to emerging economies, intensive action research should be encouraged for conceptualization of outsourcing mechanism.

Foregoing research suggests that the project or activities where researchers are actually involved with certain duration would be suitable. It is advisable that a project with duration of about 1 year is good to make required analysis and findings. Preceding experiences suggest that majority of the improvements efforts should focus on "labor/people" category. Need to create solid project teams with comprehensive collaboration, management support, enough project allocated time and global governance on both sides should not be underestimated. Furthermore, it should be reminded that it is quite common that people will be changed in project roles. The cultural things are often very complex and difficult to understand because it encompasses a wider range of behavioral territory than other studied organization capital issues (Kaplan and Norton, 2004). It was experienced that traditional Finnish originated culture met American IT giant with its processes and way to operate with people's mindset suggesting closer culture match will make things easier. However, increasing significance of IT outsourcing to emerging economies necessitates difficult tasks: matching with heterogeneous culture. In this context, sustainable efforts in conceptualization of ICT outsourcing mechanism play decisive role for adapting to institutional systems in both supplier and customer side thereby co-evolutional dynamism between supplier and customer can be expected as a consequence of outsourcing to emerging economies.

Final success in preceding project can be attributed to this co-evolution. It was demonstrated that the better the combination of technical skills and project management competences, the better a result can be. It was also demonstrated that trust can be created only by working with facts and keeping promises i.e., create documentation, which is required. Also documenting plans and agreed items are necessary for a common language. This creates more transaction costs especially in the beginning but is absolutely needed to ensure progress without continuous escalations and need to find out what has been written in contracts.

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Even though the preceding challenges confronted unexpected difficulties beyond anticipation during the project implementation, it can be strongly recommend that opening up the project key success factors to counterparts in outsourcing game, particularly to those in emerging economies.

Significance  
of Supplier  
Selection

Noteworthy key success factors include significant impacts of managers change notwithstanding common practice, experience of creative moment emerged when trust restarted by new people learned and understood setup works thereby people started to work with less stress, and global coverage was overestimated contrary to underestimation of human factors.

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## CONCLUSION

In line with the increasing significance of the acceleration of IT advancement and also of harnessing the vigor of emerging economies, IT outsourcing to emerging economies has become global concerns. Expanding business areas to emerging markets enables global companies to enjoy a critical competitive edge by choosing the best option in outsourcing strategy and supplier selection. Consequently, outsourcing partner selection criteria have become critical issues for both supplier and customer.

This paper attempted to provide insightful suggestions to these issues. An empirical analysis was conducted taking supplier selection criteria evolvement in global IT outsourcing project focusing on action research in a multinational company.

Noteworthy findings include:

- (i) Significant impacts of managers change during the course of project implementation notwithstanding common practice,
- (ii) Emergence of creative moment when trust won back by new people learned and understood setup works thereby all people involved started to work with less stress, and
- (iii) In suppliers selection criteria, weighting of global coverage was overestimated contrary to underestimation of human factors.

These findings provide following policy suggestions suggestive to companies IT outsourcing:

- (i) Sustainable efforts in conceptualization of IT outsourcing mechanism should be endeavored,
- (ii) In-depth understanding of institutional systems in emerging economies should be further endeavored, and
- (iii) Optimal resources allocation in both supplier and customer so as to satisfy condition for creative moment.

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In order to complement the weakness of this research based on one example initiated by Finland multinational company, further work should focus similar action research taking other companies initiatives.

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**THE TASKS AND ROLES OF CIOS: AN EVOLUTIONARY  
MODEL AND ITS USE**

by

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# THE TASKS AND ROLES OF CIO: AN EVOLUTIONARY MODEL AND ITS USE

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*Abstract: Research about the tasks and roles of CIOs have been conducted ever since the CIO concept emerged. As the deployment of ICT has grown, changes related to these tasks and roles have been acknowledged. Several CIO role models and descriptions of the evolution of CIOs' work have been published. We consider them to be characteristic to the usage of certain technologies or to certain periods of times. We applied Leavitt's model to describe factors that define the tasks and roles of CIOs over time and technologies and made two modifications to the wording of the original model. We used the model to categorize earlier research findings and to analyse data collected from interviews with 36 CIOs within six industries. We discovered that the model was able to both categorize the findings of prior studies and to describe the tasks and the roles of the interviewed CIOs.*

*Keywords: CIO profession, CIO tasks, CIO roles, CIO competencies, qualitative interview, Leavitt's organizational development model*

## INTRODUCTION

This article focuses on the Chief Information Officer (CIO) profession. One of our team is a practicing CIO and another has chaired the selection of "CIO of the year" for more than the past 10 years and interviewed dozens of shortlisted candidates. As myriad issues appear to impact the CIO profession the motivation for this research comes from the question: *is it possible to model factors that define the CIO profession and variations in the roles and tasks of CIOs?* We define role as the organizational status and influential possibilities within an organization. For tasks we refer to work content, that is, what a CIO actually does in his/her profession.



Ever since the CIO concept emerged research has been conducted on what CIOs do or should do (Ahn, 1997; Carter, Grover, & Bennett, 2011; Croteau & Bergeron 2001; Peppard, Edwards, & Lambert, 2011; Polansky, Inuganti, & Wiggins, 2004; Ricciardi & De Marco 2012; Welter, 1987), what kind of professional and personal competencies they should have (Boyle & Burbridge, 1991; Brown, 1993; Iwasaki 2014; Peppard 2010; Todd, McKeen, & Gallupe, 1995) and whether the CIO belongs to the executives of his/her organization or not (Bock, Garpenter, & Davis, 1986; Gottschalk & Taylor 2000; Hunter 2010; Rockart, Ball, & Bullen, 1982; Romanczuk & Pemberton, 1997; Stephens, Ledbetter, Midra, & Ford, 1992). Other investigated research questions include questions such as, are there differences between corporate and public sector or between developed and developing economy CIOs (Cook & Sutherland, 2014; Estevez & Janowski, 2013). In these studies researchers have attached various attributes to the CIO position holders, their competences and organizational roles.

During the past five decades the deployment of information and communication technologies (ICT) has grown, widened and deepened. Correspondingly, the significance of ICT has increased, as more organizational activities have become ICT dependent (Chatterjee, Richardson, & Zmud, 2001; Gottschalk & Taylor, 2000). Within an organization the CIO is typically one of the key persons responsible for the management and deployment of ICT (Bock et al., 1986; Rockart et al., 1982). Thus, it is logical to reason that constant growth of ICT usage will also impact the work of CIOs. Indeed, research has shown that the number of issues that CIOs need to manage have increased over the years (Ahn, 1997; Brown, 1993; Couger & Amoroso, 1989; Fisher, 2003; Penrod, 2003). Similarly, changes in the perceived focus of CIOs' work have been reported (Agarwal, Ross, & Sambamurthy, 1998; Brown & Ross, 1999; Byrnes, 2005; Chatterjee et al., 2001; Henderson & Venkatraman, 1999; Hirschheim, Porra, & Parks, 2003; Ross & Feeny, 2001). Consequently, recommendations for the IS curricula, such as the ACM IS curriculum (Longenecker, Feinstein, & Clark, 2012; Topi et al., 2010), and for CIO competencies, such as the CIO Council Clinger-Cohen list (CIO Council 2013; Iwasaki 2014), have been modified several times. Changes in the CIO profession appear to be related to technology advancements, ever-increased deployment of ICT, but also to the evolution in organizational and strategy thinking and in governance and managerial practices. Nonetheless, it is legitimate to ask if we have really been able to model how the tasks, roles and content of the CIO profession became defined in general and within organizations in particular - and especially how and why changes occur over time. This was the starting point of our research. We felt and it appeared to us that although the CIO task and role models as well as the IS curriculum and CIO competence recommendations change constantly there should be deeper theoretical understanding about the CIO profession and the factors that change it.

Several models of the role of ICT, the ICT function and CIOs have been proposed. In general, most of them either suggest alternative roles for a CIO or describe the changes and evolution of issues that CIOs need to consider. Previous studies have suggested that CIOs could have one (Brown, 1993), two (Broadbent & Kitzis, 2005), three (Stephens et al., 1992) or four (Carter et al., 2011; Chun & Mooney, 2009; Weill & Woerner, 2013), five (Guillemette & Pare, 2012; Peppard et al., 2011) or six (Gottschalk, 2000) alternative roles. We categorize them as CIO role studies. Table 1 summarizes CIO role studies. Previous studies have also described the changes and growth of ICT deployment and the impact of this on the work of CIOs, (e.g. Applegate & Elam, 1992; Chen, Preston, & Xia, 2010; Grover, Jeong, &

Kettinger, 1993; Hirschheim et al., 2003; Polansky et al., 2004, Rockart et al., 1982; Ross & Feeny, 2001; Longenecker, 2012). We categorize these as evolutionary CIO studies.

**Table 1.** CIO role studies and CIO types proposed in them.

	<b>Researchers</b>	<b>Research</b>	<b>CIO Types</b>
<b>One CIO type</b>	Brown (1993)	Research integrates the organizational and individual perspectives as well as the CIO partnership role.	General manager
<b>Two CIO types</b>	Broadbent and Kitzis (2005)	Research is recognizing different kind of organisations which require different behaviour and actions from CIOs.	Demand-side leadership for shaping and managing expectations Supply-side leadership for delivering cost-effective services
<b>Three CIO types</b>	Stephens et al. (1992)	Researched how MIS managers and CIOs use their work time within IT and outside IT and how close the activities are compared with CEOs work.	CIO in decisional role, MIS manager, CIO interacting outside IT function
<b>Four CIO types</b>	Chun and Mooney (2009)	Introducing the CIO types according to company's IT strategy and how the IT infrastructure is managed (divergent or orchestrated)	Innovator & Creator, Opportunity Seeker, Landscape Cultivator, Triage Nurse & Fire Fighter, Innovator & Creator, Landscape Cultivator, Opportunity Seeker, Landscape Cultivator
	Carter et al. (2011)	The study points out three traditional IT management roles: Decisional, Informational and Interpersonal, and suggesting a new business technology strategist	Interpersonal CIO/ Leader, Informational CIO/Spokeperson & Monitor, Interpersonal CIO/Liaison
	Weill and Woerner (2013)	A study of CIOs role from digital economy point of view; Identifying key activities for four type of CIO's and how CIO's should spend their time across these activities.	Embedded CIO ICT services CIO, External customers CIO, Enterprise processes CIO
<b>Five CIO types</b>	Peppard et al. (2011)	A study of ambiguous role of a CIOs; "CEO's need to understand what type of CIO is appropriate at a particular point in the organisation's journey"	Utility IT Director, Agility CIO, Innovator CIO, Evangelist CIO, Facilitator CIO
	Guillemette and Pare (2012)	The objective of the study is to offer an explanation of the contribution of the IT function in organizations with a typology of ideal profiles.	Partner, Systems provider, Architecture builder, Technological leader, Project Coordinator
<b>Six CIO types</b>	Gottschalk (2000)	A study of IS/IT leadership roles, analysing how the individual, position and organisation characteristics predict the CIO role in an organisation.	Product developer, Technology provocateur, Chief operative strategist, Chief architect, Technology provocateur, Change leader, Coach Product developer

CIO role studies describe how ICT deployment and CIO work is related (Carter et al., 2011, Peppard et al., 2011) or how CIOs use their time in organizations (Weill & Woerner, 2013). Characteristics investigated include how ICT and innovation intensive organizations or industries are (Agarwal et al., 1998), how much they rely on ICT in business process management (Brown & Ross, 1999), or how ICT sourcing is managed (Lacity, Khan, & Willcocks, 2009). Evolutionary CIO studies refer to the characteristics of ICT and especially to the changes in the deployment of ICT, often in relation to new emerging technologies, during a specific time period (Hirschheim et al., 2003) and/or within a specific managerial context (Guillemette & Pare, 2012). These contexts include the use of ICT to execute business strategy (Polansky et al., 2004), to manage risks (Dittmar & Kobel, 2008; Weiss & Anderson, 2002) or to manage information (Boyle & Burbridge, 1991; Kettinger, Zhang, & Marchand, 2011). We feel that the descriptive validity of both the role model and the evolutionary CIO studies are limited to certain types of organizations or to the deployment of ICT in a specific

way or for specific purposes, and/or at a specific time. Changes in the priorities of an organization, which reflect changes in its environment, may change the tasks and the roles of the CIO in a short time, even several times. Furthermore, it is likely that evolutions in ICT, strategic management thinking as well as in organizational behaviour, skills and processes could make these models outdated. Indeed as our conclusion, CIO roles and tasks proposed in studies conducted from the 80s to 00s appear no longer describe what most CIOs do today. Therefore, we ask if it possible to craft a more generic model, which describes factors impacting the CIO profession. This would include: over time across organizations and industries; changing ICT and organizational environments; and evolving strategic management thinking and practices. We claim that such a generic model offers both researchers and practitioners a robust means to define factors that shape the tasks and the organizational role of the CIO in general and within a specific organization. This is in contrast to models, which rely on technologies, deployment of ICT and/or managerial thinking prevailing at a specific time, even though these models were descriptively more accurate.

The work of the CIO is conducted in an organizational context with the overall objective to deploy ICT for the benefit of the organization. Specifically, the need to respond to continuous changes in technologies, services and user expectations from the perspective of organizational performance improvement is probably a most accurate description of a CIO's work. Hence, changes in the business environment of an organization and in the strategy of the organization influence what a CIO needs to do. Such changes might affect even the CIO's organizational status and power structure. Motivated by these reasons, we decided to seek the theoretical basis of our research from organizational diagnostic models since they capture organizational evolutions. Organizational diagnosis means that the organization's current level of functioning and activities are assessed in order to design appropriate efficiency and effectiveness improvements (i.e. interventions) such as ICT service improvement. Evolutionary IS theories, for example Jaspersen, Carter, and Zmud (2005), Leonardi, and Barley (2008) or Wheeler (2002), are alternatives to evolutionary organizational theories. We chose the latter due to the organizational nature of CIOs' roles and tasks.

From the organizational diagnostic models we selected Leavitt's model (Leavitt 1965). It has become established during the past decades both in organisational and IS-research (e.g. Drazin, and Van de Ven, 1985; Markus, and Robey, 1988). Leavitt's model has also been used in previous information systems (IS) research to investigate stationary contexts (e.g. Wigand, 2007), punctuated changes (e.g. Lyytinen, and Newman 2006, 2008), and evolutionary changes (e.g. McLeod, and Doolin 2012; Orlikowski, 1996), which helps to relate our work to past research. Finally the model fits well to analyse our empirical data and past CIO studies as later sections of this article will show. We modified the wording of the factors in Leavitt's model to include concepts becoming used during the last five decades, such as governance.

The 36 interviews of CIOs provide an additional motivation for the use of the Leavitt model. Each interview covered the entire career of the interviewee as a CIO. We noticed already during the first interviews that the tasks and roles of each CIO were different, reflecting the variability in the business imperatives of the organization. In addition to variability, the tasks of a CIO typically changed in relation to technology evolution and especially in relation to the changes in the business imperatives of the organization such as the economic cycle, customer demands, the need to improve productivity, etc. The tasks of some interviewees had

changed significantly and several times whereas there was more stability in the careers of other interviewees. Both the CIO role and evolutionary CIO studies were useful but insufficient to describe our data. Our findings were also in strong contrast to our initial assumption that changes in ICT would define the CIO profession and dominate changes in their tasks and roles. Leavitt's model provided a framework, which was able to capture the variation in the tasks and roles of the interviewees as well as changes in them.

Our research question is "*What factors shape CIO's tasks and roles within an organization?*" The main contribution of our research is to use the Leavitt diamond as the generic model explaining factors, which define the work of CIOs. To demonstrate the contribution of the proposed approach, we used the modified Leavitt model to analyze both the findings of prior research and our interview findings from 36 Finnish CIOs.

## **THEORETICAL BACKGROUND WITH THE MODIFIED LEAVITT MODEL**

### **CIOs' tasks and roles change in details and remain stable as a whole**

Electronic data processing (EDP) manager, EDP director and IT director were some of the titles used for the head of the ICT function prior the CIO term, which was introduced by Synnot (Synnot, & Gruber, 1981) as one of the first. During the last 30+ years, the use of the CIO term has raised the status of the ICT function head conceptually to the level of other C-level executives (Ricciardi, & De Marco, 2012). Yet, still today several interpretations about the tasks and roles of CIOs exist. This probably results partly from the fact that enterprises deploy ICT in different ways and for different purposes and partly from variations in the history of ICT deployment between and within enterprises. We reviewed close to 50 articles from the beginning of the 1980s to recent times in order to understand how the work of the CIOs has been described by researchers during the last four decades.

Benbasat, Dexter, and Mantha (1980), analyzed data collected during the 1970's. Significantly, they stressed the importance of the people and business perspectives. The striking feature of literature published during the 1980s is that the role of the CIO was described as a strategic and business oriented executive who has a good understanding of technology and who works enterprise-wide with all functions to deploy ICT in order to better implement business strategy and to support the achievement of business objectives (Benjamin, & Scott Morton, 1986; Bock et al., 1986; Couger & Amoroso, 1989; Declan & O'Riordan, 1987; Henderson & Venkatraman, 1989; Rockart et al., 1982; Synnot & Gruber, 1981; Welter, 1987). The strategic stance of ICT was already being emphasized, mirroring current concerns. There has been a strong consensus among researchers that the role of the CIO has emerged gradually and also that the role of the CIO changes over time as the volume, depth and maturity of ICT deployment increases. Researchers have studied changes in CIO work from a variety of perspectives, which range from technological to organizational. Consequently, many factors have been proposed to act as the underlying explanatory reasons for the change in the roles and in the tasks of CIOs. As stated earlier, we feel that most of the models are both historically descriptive and bound. They characterize technologies, organizational practices etc. that described the CIO work during specific periods. Cumulatively, these models appear to reflect the continuously growing deployment of ICT in enterprise activities and the related increase in the number of issues that CIOs need to address and manage.

During the 1990s, CIOs' competences and personal skills including interpersonal skills were investigated (Boyle & Burbridge, 1991; Todd et al., 1995). Other new issues addressed included CIOs' capabilities to manage the complexity of technology (Ahn, 1997; Romanczuk & Pemberton, 1997) and to establish co-operation between business and ICT (Boyle & Burbridge, 1991; Ross & Feeny, 2001; Stephens et al., 1992). During the 2000s the governance of ICT, enterprise architecture and the ability of ICT to create value and support innovations were investigated in the context of CIOs' work (Agarwal et al., 1998; Byrnes, 2005; Chatterjee et al., 2001; Dittmar & Kobel, 2008; Feldhues, 2006; Gottschalk & Taylor, 2000; Polansky et al., 2004; Weiss & Anderson, 2002). Fuelled by so called business ICT such as digital business, web-service technologies, digital data explosion, Internet of things and other developments, many issues concerning the CIOs' profession have re-emerged into research. CIOs' role in enterprise transformation, in information asset and capabilities management as well as in the creation of IT and digital understanding among business executives are new or reinvented demands placed on CIOs (Banker, Hu, Pavlou, & Luftman, 2011; Carter et al., 2011; Guillemette & Pare, 2012; Hunter, 2010; Kettinger et al., 2011; Peppard, 2010; Peppard et al., 2011; Ricciardi & De Marco, 2012). Against the background that the role and the tasks of the CIO changes, it seems remarkable that what was written about the role and the tasks of the CIO during the 1980s appears fresh and valid in 2015. Our conclusion is that concrete everyday roles and tasks of ICT technological understanding as well as strategy and business orientation have changed over time and will continue to change. At the same time, the generic organizational role and tasks of the CIO remains unchanged. For example, in the 1980s, ICT technological understanding focused on mainframe and minicomputer environments and on internal software development. The importance of mainframes has drastically decreased, minicomputers have vanished and software application development is largely outsourced. Today, the range of necessary technological understanding is significantly wider with a focus on the Internet, web services, enterprise architecture, mobile technologies, business ICT, digital and big data, cloud services, etc. Similarly, during the 1980s, strategy and business orientation focused on value chains, competitive advantage and business-IT relations. Globalization, value and business networks, digital strategy, electronic business, business models, ICT-enabled business transformations characteristic for today were not on CIOs' agendas. In summary, the generic organizational role and tasks of the CIO is still to act as a strategy-oriented and business-focused executive whose specialty is to understand how ICT and digital data can be deployed. By supporting and enabling all units, functions and stakeholders of an enterprise to deploy ICT, by managing ICT services and by helping to establish IT governance, CIOs participate in the execution of enterprise strategies, the achievement of their business objectives as well as to promote product, service and process innovations.

### **The Modified Leavitt Model**

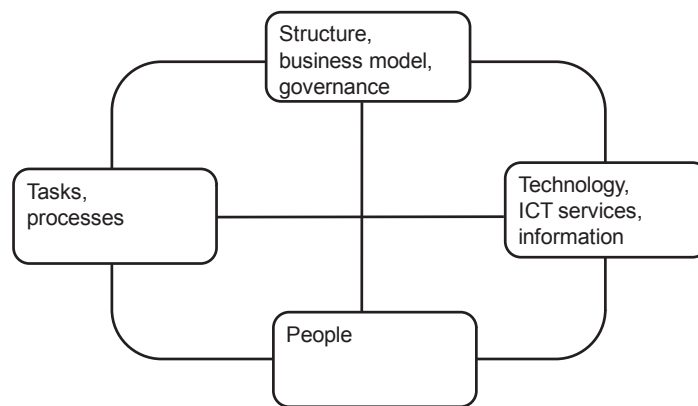
Within the CIO's generic organizational role, changes to CIO's everyday work happen in order to improve the enterprise's performance. This calls for the use of organizational diagnostic models, also known as organization development models. Our literature review suggests that changes in CIOs' everyday roles and tasks are driven by certain identifiable factors. For this and for reasons given earlier we chose the Leavitt's model (Leavitt, 1965). Instead of

case specific forces, Leavitt's model identifies four factors, which describe organizational development. They are structure, task, people and technology. Leavitt's model is also known as the diamond model, where the shape comes from the interrelations between the model's factors. The diamond shape means that if one of the factors of the model changes, this has potential to affect all other factors of the model and they will also change. All relations between the factors of the model are bidirectional.

Leavitt's model was presented in 1965. After that time, new constructs such as business models and corporate governance have been introduced and become established. This motivated us to modify the wording of some factors in the model. For CIOs contemporary technology consists of ICT technologies, services and information. We enlarged the wording of the technology factor to reflect this. For the same reason we modified structure into strategy, business model and governance; task into tasks and processes. Please, note that we regard this as an update of wording, which reflects currently used constructs, not a significant contribution. The modified Leavitt model is shown as Figure 1.

The strategy, business model and governance factor includes the governance and management systems of an enterprise, its communication systems as well as its work, material and money flow steering structures. The task and processes factor refers to all tasks and sub-tasks and their sequences that are associated with the products and services of the enterprise including their design, sales, manufacturing, delivery etc. The people factor consists of people as actors in the organization and organizational arrangements used to carry out the tasks and processes of the enterprise both within the enterprise and between enterprises. Finally, the technology, services and information factor includes all equipment, hardware, software, facilities, services, data and information used to conduct the tasks and processes of the enterprise.

**Figure 1.** The modified Leavitt diamond model.



The model shown in figure 1 is also useful in describing and categorizing the findings of both the CIO role and evolutionary CIO studies. For example, Weill and Woerner (2013) proposed four roles for CIOs on the basis how CIOs allocate their time between various tasks. These



roles are embedded, ICT services, external people and enterprise process CIO roles. Similarly, as an example of CIO evolutionary studies, Ross, and Feeny (2001) described changes in technology and how those had impacted strategy, people (CIOs) and processes. According to the authors, technology change has been the driving force for the work of CIOs from the very beginning (Ross, and Feeny, 2001). Constant and fast technological changes obviously establish one of the key factors - technology, ICT services, information - that affect enterprises' strategies and tasks as well as how people work and how work is organized.

By looking at the history of the ICT function, one sees that it is among those functions that have changed most during its short existence as compared with other significant enterprise functions such as accounting (Agarwal et al., 1998; Chatterjee et al., 2001; Gottschalk & Taylor, 2000). ICT has been considered to be in wider use in business processes and to be more integrated and more complex to manage (Romanczuk & Pemberton, 1997). Enterprises have always developed operational processes but ICT has provided entirely new means to automate and restructure them (Lacity et al., 2009; Romanczuk & Pemberton, 1997). For example, technology has enabled the global economy to flourish by providing networks for rapid exchange of vast amounts of data between enterprises and their stakeholders. For enterprises, this has provided opportunities to redefine strategies, to increase revenue streams and profits. In addition to the transformation of existing markets into electronic markets, ICT development has also helped to create totally new markets such as digital content (Kien, Kiat, & Periesamy, 2010). The deployment of technology in alignment to business strategy enables an enterprise to differentiate its operations from competitors (Henderson & Venkatraman, 1999). Consequently, CIOs not only need to consider a wider set of issues than most other executives but they are also the chief information system strategists in their enterprises. In this capacity they meet a set of expectations, the content of which evolves constantly since the information needs of the enterprise and the technologies used in its systems are in constant flux (Gottschalk & Taylor, 2000). The factors of the modified Leavitt's model capture forces mentioned in these studies.

In summary, we have discussed why we chose Leavitt's model as the theoretical basis of our research. We explained why and how the wording of the basic model was updated to better suit the research on the CIO profession. We also showed that the findings of previous studies are in line with this model. We next show that the modified version of Leavitt's model provides the means to understand what factors shape the everyday roles and tasks of the CIO within an enterprise as they appear in our interview data. We also propose that the modified version of Leavitt's model captures how information technology developments impact the other organizational factors shown in the model, and that therefore the model is well suited to describe both the generic organizational role and tasks of the CIO and changes in their everyday roles and tasks. We finally propose that the model is able to explain why the lag between technology development and its deployment exists. The model suggests that persons responsible for ICT deployment – most notably CIOs - need to consider strategy, the business model and governance, tasks and processes, and people issues in addition to technology, all of which requires time.

## **RESEARCH METHOD: THE CIO INTERVIEWS**

To understand how the work of CIOs has changed over the years and to evaluate the usefulness of the modified Leavitt model in the analysis of these changes we interviewed 36 Finnish CIOs from six industries mainly during the years 2011 – 2013, with four interviews prior the year 2011. Industries are media, public sector organizations (government, agencies, municipalities), finance, manufacturing, wholesale and retail sale commerce (in Finland a few branded coalitions dominate the markets) and services. A summary over interviewees is shown in table 2. Detailed data on each of the 36 CIOs is provided as appendix 1.

**Table 2.** Summary of interviews and interviewees (me = Millions of Euros).

Industry: CIO #s	Dates of inter- views	Time period covered	Average Years as CIO	Gender	Age at the time of the interview	Size of the compa- ny (revenue)
Media: CIO1-CIO5 (n=5)	03/11- 08/12	1997- 2012	8	3 Males 2 Females	1 age 30-39 4 age 50-59	1 > 1000 me 3 100–1000 me 1 < 100 me
Public sector: CIO6-CIO10 (n=5)	10/11- 09/12	1984- 2012	14.8	5 Males 0 Females	5 Age 50-59	2 > 1000 me 2 100–1000 me 1 < 100 me
Finance: CIO11-CIO14 (n=4)	11/11- 06/13	1987- 2012	10.75	4 Males 0 Females	1 age 40-49 3 age 50-59	2 > 1000 me 2 100–1000 me
Manufacturing: CIO15-CIO24 (n=10)	03/09- 11/13	1976- 2012	10.55	9 Males/ 1 Female	4 age 40-49 4 age 50-59 2 age 60>	10 > 1000 me
Commerce: CIO25-CIO32 (n=8)	10/06- 06/13	1956- 2012	14.63	8 Males/ 0 Females	2 age 40-49 4 age 50-59 2 age 60>	4 > 1000 me 4 100–1000 me
Services: CIO33-CIO36 (n=4)	08/07- 07/12	1991- 2012	14.75	3 Males/ 1 Female	1 age 30-39 2 age 40-49 1 age 50-59	3 > 1000 me 1 N/A

Table 2 describes the number of CIOs interviewed in each industry and the time span of interviews. The table also shows the time period covered by the interviewees in the CIO profession and the average work experience of CIOs in years by industry, the distribution of gender and the age groups as well as the size of the enterprises measured by their revenue. All empirical data were collected with personal face-to-face interviews. An interview lasted typically two hours. We first selected industries and then stratified the collection of enterprises according to deemed privileged access to them. Since two of the authors have worked as CIOs for several years we know most of our colleagues. We used this infrequent opportunity to invite recognized CIOs with long CIO careers from the leading enterprises in their industries to interviews.

The industries were chosen to represent the diversity of ICT deployment and the CIO profession. Interviewees include both group level and divisional, corporate and public sector as well as national and global level CIOs. We opted to interview several CIOs from one industry in order to remove possible enterprise idiosyncrasies. The idea was also to collect data across several industries in order to find similarities between industries but also to understand whether the characteristics of specific industries impact how the CIOs of that industry perceive their roles and work. During the time span we conducted the interviews, the media industry experienced the pressures of business transition from print media to digital services. Public sector organizations faced severe cost issues and the transfer of services from manual



to electronic. Manufacturing companies had shown good results year after year and focused on further process improvements and on an increase in service business. The finance industry had transformed most of its services into electronic channels but struggled with increased regulations, lower margins and the consequences of the recent economic downturn. The future looked promising for the commerce industry with expansion opportunities in new geographical markets. Cost pressures and business transition of digital services were typical challenges in service industry enterprises.

We followed the methodological principles of semi-structured interviews as outlined by Yin (2003) and expanded on by Myers, and Newman (2007). With the interviews we tried to capture the historical evolution of each issue to the extent that the interviewee had personal experience. Several questions were therefore formulated in two ways; how was the issue managed in the past and currently. Appendix 2 lists our survey questions.

The final interview questionnaire evolved over time. The first five interviews were used to learn what kinds of survey items are useful for our study. These five interviews constitute our pre-study. Therefore, the first interviews were conducted with an open question formulation. Interviewees were asked to compare the past and the present for each topic, 46 in total. On the basis of the experiences of the first five interviews, to avoid situations where interviewees told long and as such interesting and amusing narratives sometimes for several hours, which often fell outside the scope of our research, we limited the interview time to two hours. In this way we refined the survey instrument to a semi-structured interview questionnaire. Interviewees were still asked to compare the past and the present for each topic. We added 4 questions to the 46 questions on the basis of the pre-study and had thus 50 questions. The final version had 51 questions. The last added question asked the interviewees to explain how ICT technology has affected and affects the strategy and the business models of their enterprise. Of the 36 interviewees, 22 answered this question and consequently we do not have the answers of 14 interviewees to this question. All of these interviews were conducted in the years 2012 -2013.

During the interviews we used a projector and screen as we wrote down their responses *verbatim*. Thus in real time, an interviewee saw what was written and was able to correct possible misunderstandings. This technique shortened answers and the interviewees considered more carefully what s/he said. The adopted approach helped the interviews to focus on the questionnaire questions. We also used a digital recorder and recorded the discussion (interviewee permission was sought and obtained). Recordings were used as backups and to complete transcripts written during the interviews. Each interviewee except the first five was given the opportunity to modify the transcript of their interview and twelve of them used this opportunity.

At least the following related questions arise from the evolution of the survey instrument and the change of the interview procedure. Is it possible to use the data from the five first interviews as they were carried out earlier and with a different interview procedure? We opted to use also the data of the five first interviews. Most of the survey items are the same, 46 out of 51. Thus we do not have data on five questions from five respondents. Secondly, we investigate what factors influence the role and the tasks of the CIOs with a proposition that those factors have been the same over decades rather than what issues CIOs meet at a specific time. By including all interviews we are able to cover time from the 1960s to present. Why through away these unique insights? It is still worth to notice that the choreography of the early inter-

views was different and that this impacts the responses of these interviews. We had to do more work to interpret long narrative responses. When interviewees saw their responses verbatim on a screen their awareness over the response content was higher and they corrected immediately what the interviewer had written.

The CIO experience of six interviewees was less than five years whereas five had over 20 years of experience with the overall average of 12.25 years. Four interviewees (11.1%) were females. According to Pemberton (1992) a typical CIO is highly educated. In contrast to that finding, twelve (33%) of our interviewees did not have a university degree. However, the remaining twenty-four interviewees had cumulatively 31 university degrees including four doctoral degrees. Three interviewees had retired and three more planned to retire in the near future. The status for 72 % (26) of the interviewed CIOs had changed, whereas the enterprise and the CIO status had remained unchanged for only ten interviewees. This finding is in line with Peppard et al., (2011). At the time of writing, two interviewees are deceased and four others have retired.

Those who had long history in ICT explained that the main reason to acquire computers in the first place was to reduce accounting related manual work. At that time it was logical that the head of ICT reported to the CFO. Even today, thirteen of the interviewees reported to CFOs, whereas eleven reported to CEOs and twelve to other C-level executives. Only a handful of them had been either executive committee or board members in the beginning of their CIO careers or were invited to participate in executive committee meetings and/or to business unit steering committee meetings. Almost all interviewed had experienced restructuring of their ICT organizations during the time they had acted as the CIO, but the reasons varied. Some restructurings were related to business strategy changes and some to mergers and acquisitions (M&A) including divestments.

## FINDINGS

### CIO tasks and role perceptions

We analyzed the interviews by counting how many similar answers we received to each question. More than half (24) of the respondents described their current and future role to be something other than the traditional technology-oriented CIO role. The common feature of these responses is that the CIO work was described as a business executive role, which is related to the industry of the enterprise. For example CIO29 said that *“Our executive committee only consists of book sellers, who have different areas of responsibility, such as IT, finance or logistics of the book selling business.”* The role and responsibilities of some CIOs transcended ICT and included logistics, business intelligence, purchasing or process development to name a few examples. All ten CIOs of the manufacturing industry worked in global or regional enterprises and seven of them were either responsible for process development or heavily involved in it. CIO20 stated that *“There has been a clear demand for global processes and global IT among business leaders already for several years.”*

Although the business environment of the enterprises within an industry was similar, the tasks a specific CIO performed differed. For example CIO11 - CIO14 were from the finance industry. CIO11's main task was to develop enterprise architecture and data security, whereas CIO12's focus was on off-shoring activities and application integration. CIO13 focused pri-

marily on internationalization as the company was involved in an M&A process. CIO14 did not work in the industry anymore. We asked what have been and are the biggest challenge for the interviewee as the CIO. The change in business operations or in ICT's way of working was challenging for eleven respondents when they started their career as CIOs. Twelve thought them to be major challenges still today or at the end of their CIO career. Fourteen respondents mentioned that at the beginning of their careers the creation of ICT services from scratch or the development of ICT services to business had been demanding. Fifteen interviewees regarded the development of ICT services to business still challenging. Nine respondents considered that cooperation with business had been the toughest challenge in the beginning of their career. Seven still felt the same way. Competence development was the next often mentioned challenge at the start of the career and it was almost as important currently. Twenty-six interviewees mentioned that access to deep technical skills had been important at the beginning of their careers. Project planning, project management and supplier management were also mentioned several times and they were still considered important skills. Only four respondents felt that business skills had been important earlier, whereas fifteen considered them important currently. Probably the most significant change is the increase in the number of skills needed. "*Managing the whole*", "*customer service skills*", "*ability to demonstrate technology opportunities*", "*innovation management*", "*service management*", "*network management*", "*information management*", "*international business-IT knowledge*", "*architecture skills*", "*data security*", "*communication skills*", "*negotiation and contracting*" and "*legal skills*" are just a few of the mentioned skills needed currently.

### **CIO Tasks and Roles Classified with the Leavitt Model**

**Strategy, Business Models and Governance:** We asked respondents to describe how much business executives and managers needed ICT in the past and currently. Twenty-three interviewees told us that in the past ICT was seen as some kind of necessary evil, a technology tool, a support function or a cost centre. Only a few explained that in the past, ICT was considered important or critical to business or for automation. Some also pointed out that ICT people were considered "snobbish" like CIO12 who told us: "*We were respected because no one understood what we were doing.*" Most of the interviewed CIOs think that current business executives believe that ICT is deployed to create new digital services and new business opportunities. Echoing others, CIO21 said: "*Nowadays business leaders see two roles for ICT. On (the) one hand, basic IT services exist in every enterprise and on the other hand ICT has the capability to create new strategic opportunities. I need to manage both these roles of ICT in a balanced way.*" Thirty interviewees told us that they currently – that is, either at the end of their career or at the time of the interview if they still held the CIO position - participate into the business strategy process. Some enterprises have a separate ICT strategy, which is aligned with business strategy. In some other enterprises, business strategy also covers ICT and there is no need for a separate ICT strategy. A few CIOs explained that ICT and processes are now recognized to be a critical part of the business strategy. Still, the interviews provide inconclusive evidence on this topic. Therefore it is safe to report only that CIOs understand strategy, business models and corporate governance better than previously and that this factor clearly influences their work.

**Tasks and Processes:** The task and process factor was partly covered above with its interconnection to the strategy, business models and governance factor. According to our interviews it appears that CIOs are heavily involved in M&A activities, especially within media and retail industries. CIOs' involvement in M&A's becomes understandable when one considers that it is necessary to secure the continuity of processes, which are usually heavily ICT-dependent. Faster than normal changes to processes could also be required. As CIO15 explained: *"We have done a lot of divestments, M&A's and (organization) structure changes within the last 15 years and I've been heavily involved in these."* We also found that many CIOs considered processes to be a natural part of their current work, even though the relation of their role to processes was not asked directly in our questionnaire. CIO22 commented: *"At first the challenge was to align IT and processes. Currently, globalization, open network, data security and information management are the ones."* The tasks and processes factor clearly impacts the work of CIOs.

**People:** We asked how ICT functions are valued earlier and currently and how well business managers understood ICT in the past and now. During the early days of the CIO profession, those holding business manager positions had not received any ICT education in universities or elsewhere. Twenty-three respondents thought that in the past business managers understood ICT poorly or not at all. Similarly, ICT organizations' contribution to business was poorly valued. The current situation is totally different. Thirty-two interviewees expressed that business managers' current ICT understanding is clearly better. Almost the same number (28) of interviewees felt that the ICT function is valued higher. Several CIOs, like CIO15 and CIO33, said that *"ICT is a normal part of our business structure."* CIO19 stated: *"Should business slow down, which one is easier to replace; sales persons or ICT systems?"* As these quotations show, the people factor also shapes the work of the CIOs.

**Technology, ICT Services and Information:** Of the 36 interviewees we asked 22 to describe how technology is related to business strategy with the last survey item. Twenty-one responded that technology enables business or creates new opportunities for business and new technology-enabled services which can be launched into markets, and thus allowing the business to grow. For example CIO3 said: *"All the time, (the) bigger part of our business rests on technology... it has changed our value chain in the market."* Only one CIO said that technology has no major role in their organization and one who commented that technology has a negative impact on their business as it cannibalizes their current arrangements.

### Results Classified with the Modified Leavitt's Model

We then used the modified Leavitt's model to classify the CIO interviews. Three researchers reviewed the fully transcribed interviews independently and classified the impact of each factor on a CIO's work into weak, mediocre or strong for each interview. The interpretations were then compared and agreed if there was a difference. The three interpretations were fairly consistent. Out of 144 (4 x 36) values only 16 (11%) were discussed and there were no weak – strong differences between the individual interpretations. The cumulative outcome of all classifications is shown in Table 3.

**Table 3.** Summary of Results Classified with the Leavitt Model.

	Strategy, business model, governance	People	Technology, ICT services, information	Tasks, processes
Weak	6	6	4	8
Mediocre	11	19	10	12
Strong	19	11	22	13
Total	36	36	36	33

We discovered that the technology, ICT services and information factor had the biggest impact on the interviewed CIOs' work. Twenty-two CIOs expressed that technology strongly influences their work. The impact of the strategy, business model and governance factor was almost equally strong. Thus, both business strategy and technology drive CIOs work. This is in line with the earlier reported finding that several CIOs participate into their company's strategy process in a similar way to other business executives. Interviewees described the impact of the people and task as well as the processes factor to impact their work less than the business strategy and the technology factors. However, people and tasks as well as processes are also important determinants for the work of CIOs. Almost all CIOs participated in the meetings of their company's steering group and / or had established ICT steering groups to interact with other people. They also felt that business leaders understand ICT increasingly better. Our questionnaire did not include questions, which directly address the processes of an organization. Probably for this reason three interviewees did not mention processes as Table 3 shows. Thirteen CIOs emphasized that their organization's processes impact their work strongly.

**Roles and tasks mentioned within the context of the strategy, business models and governance factor:** Interviewees mentioned multiple specific everyday CIO roles and tasks when they described the impact of the strategy, business model and governance factor. We have compiled those mentioned tasks into Table 4. We applied the roles proposed by CIO role studies in the design of Table 4 and added tasks that were not covered in those studies at the end of the table. An interviewee typically mentioned two or three strategy-related tasks. Especially those interviewees who had been CIOs several decades ago described that their task was to strategically manage ICT – called EDP, IS or IT at that time.

**Table 4.** Everyday CIO roles and tasks mentioned by interviewees in business strategy context.

Strategy, business model, governance: Role proposed in literature and/or task described in interviews	Author of the CIO role study	Role and/or task referred by the interviewed CIO
CIO's formal resource allocation authority	Stephens et al. 1992	Not mentioned explicitly in interviews
CIO as chief operating strategist	Gottschalk 2000	Not mentioned explicitly in interviews
Opportunity seeker (drive strategy) Technology provocateur (embedding IT into the business strategy)	Chun and Mooney 2009 Gottschalk 2000	CIO2, CIO3, CIO5, CIO10, CIO15 (Brand, challenge eBusiness, value chain)

CIO as product developer (helps define the company's place in the emerging digital economy)	Gottschalk 2000	CIO1, CIO2, CIO3, CIO4, CIO5, CIO7, CIO8, CIO13, CIO14, CIO16, CIO17,
Innovator and creator (new revenue from new products etc.) – digitalization	Chun and Mooney 2009	CIO18, CIO21, CIO22, CIO24, CIO25, CIO26, CIO28, CIO30, CIO31, CIO33, CIO35 (digitalization; products, services, innovations, ...)
Innovator (IT enabled processes, innovative services, products)	Peppard et al. 2011	
Business technology strategist (use technology as a tool to create competitive advantage)	Carter et al. 2011	
Decisional role activities (entrepreneur – resource allocator)	Carter et al. 2011	CIO2, CIO4, CIO7, CIO35 (cost savings)
Decisional role activities	Stephens et al. 1992	
Embedded CIO (focus on strategy, business process execution, innovation).	Weill and Woerner 2013	CIO6, CIO8, CIO9, CIO10, CIO13, CIO14, CIO15, CIO16, CIO19, CIO20, CIO21, CIO22, CIO25, CIO28, CIO29, CIO36
Mergers and acquisitions, major internal structural changes in organization & ICT, alignment of global and local, group and Bus		CIO1, CIO10, CIO11, CIO12, CIO13, CIO16, CIO18, CIO19, CIO22, CIO25, CIO27, CIO28, CIO32, CIO34
Customers or other stakeholders as the basis of business strategy with IT enablement		CIO7, CIO17, CIO26, CIO30, CIO36
Climate change, real-time economy and other global drivers		CIO19, CIO21, CIO33, CIO35
Managing technology challenges as a whole with a business strategy perspective		CIO3, CIO4, CIO12, CIO15, CIO21, CIO27, CIO32

Note that this and the three other similar tables relate our data only to CIO role studies.

**Roles and tasks mentioned within the context of the tasks and processes factor:** Interviewees mentioned seven organizational tasks and process related everyday CIO roles and tasks. Five of them are covered in the reviewed literature: landscape cultivator by Chun, and Mooney (2009); facilitator by Peppard et al., (2011); opportunity seeker by Chun, and Mooney (2009); product developer by Gottschalk (2000); and enterprise process CIO by Weill, and Woerner (2013). Interviewees also described process harmonization in M&A integrations and process governance tasks. Table 5 provides the summary.

**Table 5.** Everyday CIO roles and tasks mentioned by interviewees in tasks and processes context.

<b>TASKS, PROCESSES: Role proposed in literature and/or task described in interviews</b>	<b>Author of the CIO role study</b>	<b>Role and/or task referred by the interviewed CIO</b>
Landscape cultivator (applications and processes)	Chun and Mooney 2009	CIO3, CIO4, CIO5, CIO6, CIO15, CIO16, CIO21, CIO27, CIO29, CIO32, CIO36 (educator-facilitator, competence developer, ...)
Facilitator (of process improvement, empowering and enabling business with information capabilities)	Peppard et al. 2011	CIO1, CIO2, CIO3, CIO7, CIO8, CIO9, CIO11, CIO12, CIO15, CIO16, CIO17, CIO19, CIO20, CIO21, CIO22, CIO23, CIO25, CIO26, CIO29, CIO31, CIO33 (participates into/or facilitate process development)
Enterprise process CIO (manages non-IT tasks such as sourcing, shared services)	Weill and Woerner 2013	CIO14, CIO17, CIO26
Process harmonization in M&A integrations		CIO24, CIO33
Process governance (allocation of tasks and responsibilities to units & persons)		CIO1, CIO2, CIO9, CIO12, CIO15, CIO21, CIO27



**Roles and tasks mentioned within the context of the people factor:** CIOs described eleven people-related everyday CIO roles and tasks all of which are covered in the reviewed literature. Stephens et al., (1992) investigated CIO’s level of peer acceptance; Brown (1993) showed the CIO as a leader and manager; for Gottschalk (2000) the CIO was a change leader; Chun, and Mooney (2009) pictured the CIO as a landscape cultivator able to lead change; for Gottschalk (2000) the CIO was a coach; Carter et al., (2011) called the CIO an informational spokesperson – monitor; for Carter et al. (2011) the CIO became an interpersonal leader – liaison; Peppard et al., (2011) pictured the CIO as an evangelist; for Chun, and Mooney (2009) CIO was a landscape cultivator – educator; Weill, and Woerner (2013) showed the CIO as an external customer CIO; and for Chun, and Mooney (2009) the CIO was an innovator and creator. Table 6 summarize these findings.

**Roles and tasks mentioned within the context of the technology, ICT services and information factor:** Not surprisingly interviewees mentioned as many as fifteen technology related everyday CIO roles and tasks. Twelve of them are covered in the reviewed literature. Gottschalk (2000) described CIO as a chief architect; Chun, and Mooney (2009) as a landscape cultivator with technical improvement and IT architecture management; Gottschalk (2000) as a technology provocateur; Broadbent, and Kitzis (2005) as ubiquitous presenter of technology; Broadbent, and Kitzis (2005) as technology downturn; Chun, and Mooney (2009) as triage nurse and fire-fighter; Peppard (2011) et al., as an agility leader; Gottschalk (2000) as a technological change leader; Peppard et al., (2011) as a utility leader; Weill, and Woerner (2013) as IT services CIO; and Carter et al., (2011) as interpersonal technology leader. Interviewees mentioned also technological governance of ICT and data, data security and access as well as data analytics and data search. These findings are compiled into Table 7.

**Table 6.** Everyday CIO roles and tasks mentioned by interviewees in people context.

<b>PEOPLE: Role proposed in literature and/or task described in interviews</b>	<b>Author of the CIO role study</b>	<b>Role and/or task referred by the interviewed CIO</b>
CIO’s level of peer acceptance	Stephens et al. 1992	CIO1, CIO3, CIO4, CIO5, CIO6, CIO7, CIO8, CIO10, CIO12, CIO13, CIO14, CIO15, CIO16, CIO17, CIO21, CIO22, CIO24, CIO27, CIO28, CIO29, CIO30, CIO33, CIO34, CIO35, CIO36 (Status in various committees and strategy process)
CIO as a leader and manager	Brown 1993	CIO12, CIO13, CIO14, CIO16, CIO17, CIO21, CIO24, CIO32
CIO as a change leader	Gottschalk 2000	CIO9, CIO19, CIO34
CIO as a coach	Gottschalk 2000	Not mentioned explicitly in interviews, mentioned in the context of processes
Informational (spokesperson – monitor)	Carter et al. 2011	CIO1, CIO2, CIO3, CIO4, CIO5, CIO6, CIO7, CIO8, CIO10, CIO21, CIO22, CIO24, CIO27, CIO28, CIO29, CIO30, CIO31, CIO35, CIO36 (influence behaviour, relationship building)

Interpersonal (leader– liaison)	Carter et al. 2011	CIO1, CIO3, CIO4, CIO5, CIO6, CIO7, CIO8, CIO10, CIO12, CIO13, CIO14, CIO15, CIO16, CIO17, CIO21, CIO22, CIO24, CIO27, CIO28, CIO29, CIO30, CIO33, CIO34, CIO35, CIO36 (participation into committee work and strategy process)
Evangelist (educate people)	Peppard et al. 2011	Not mentioned explicitly in interviews, mentioned in the context of processes
External customer CIO (works with external customers/partners, sells)	Weill and Woerner 2013	Not mentioned explicitly in interviews

Finally, with Table 8 we return to Table 1 and show how according to our understanding CIO role studies reviewed in the article can be placed into the modified Leavitt Model. Cumulatively Tables 3-8 and the everyday roles and tasks of CIOs outlined in them show how diverse the work of CIOs have been and still are. It is almost self-evident to state that such evolutions will continue also in the future. Our point is, however, that the Leavitt model will probably capture them as factors that define the roles and tasks of a specific CIO in a particular organization also in the future. The everyday roles and tasks of a CIO reflect the strategy, objectives, history and other characteristics of the organization that employs the CIO. This is also the answer to our research question, “*What factors shape CIO’s tasks and roles within an organization?*”

**Table 7.** CIO roles and tasks mentioned by interviewees in technology, ICT services and information context.

<b>TECHNOLOGY, ICT SERVICES AND INFORMATION:</b>		
<b>Role proposed in literature and/or task described in interviews</b>	<b>Author of the CIO role study</b>	<b>Role and/or task referred by the interviewed CIO</b>
CIO as a chief architect	Gottschalk 2000	CIO12, CIO14, CIO15, CIO17, CIO21, CIO23, CIO31 (Enterprise architecture, process, data, application, infrastructure, integration architecture)
CIO as a technology provocateur	Gottschalk 2000	CIO2, CIO3, CIO4, CIO6, CIO17, CIO10, CIO20, CIO28, CIO29, CIO30, CIO33, CIO36 (Challenger with eBusiness, digital products and services)
Ubiquitous presence of technology (impact on business – IT alignment)	Broadbent and Kitz is 2005	CIO5, CIO8, CIO13, CIO22, CIO35 (Usability, mobility, BYOD)
Technology downturn (Impact on business – IT alignment)	Broadbent and Kitzis 2005	CIO4, CIO7 (shared services) see also the entries of the next row
Triage nurse & fire-fighter (keep lights on and minimize costs)	Chun and Mooney 2009	CIO9, CIO11, CIO17, CIO18, CIO19, CIO20, CIO26, CIO27, CIO28, CIO31, CIO35 (Consolidation, cost cutting, centralization to reduce costs)
Agility (agile infrastructure, organizational information and technology requirements)	Peppard et al. 2011	CIO2, CIO3, CIO4, CIO5, CIO6, CIO8, CIO10, CIO11, CIO12, CIO13, CIO14, CIO17, CIO20, CIO21, CIO25, CIO30, CIO33, CIO35



Model of CIO tasks and roles

Utility (technologies, services)	Peppard et al. 2011	CIO1, CIO5, CIO7, CIO8, CIO11, CIO13, CIO16, CIO23, CIO31, CIO32 (Legacy renewal, technological agility)
IT Services CIO (provides It services, manages IT unit and vendors)	Weill and Woerner 2013	CIO1, CIO5, CIO7, CIO8, CIO9, CIO11, CIO13, CIO15, CIO16, CIO17, CIO18, CIO19, CIO20, CIO23, CIO26, CIO27, CIO28, CIO31, CIO32, CIO35 ((includes transformation from internal to external services)
Technological governance of ICT and data		CIO1, CIO15, CIO16, CIO19, CIO25, CIO26, CIO27, CIO29, CIO33, CIO34 (an aspect of IT governance)
Data security and data access		CIO10, CIO22
Data analytics, data search		CIO5, CIO12

**Table 8.** CIO role studies classified with the modified Leavitt model

	Re-searchers	Research	Strategy, business model, governance	Techology, ICT Services, information	People	Task, processes
<b>One CIO type</b>	Brown (1993)	Research integrates the organizational and individual perspectives as well as the CIO partnership role.	General manager			
<b>Two CIO types</b>	Broadbent and Kitzis (2005)	Research is recognizing different kind of organisations which require different behaviour and actions from CIOs.	Demand-side leadership for shaping and managing expectations	Supply-side leadership for delivering cost-effective services		
<b>Three CIO types</b>	Stephens et al. (1992)	Researched how MIS managers and CIOs use their work time within IT and outside IT and how close the activities are compared with CEOs work.	CIO in decisional role	MIS manager	CIO interacting outside IT function	
<b>Four CIO types</b>	Chun and Mooney (2009)	Introducing the CIO types according to company's IT strategy and how the IT infrastructure is managed (divergent or orchestrated)	Innovator & Creator, Opportunity Seeker	Landscape Cultivator, Triage Nurse & Fire Fighter	Innovator & Creator, Landscape Cultivator	Opportunity Seeker, Landscape Cultivator
	Carter et al. (2011)	The study points out three traditional IT management roles: Decisional, Informational and Interpersonal, and suggesting a new business technology strategist	Decisional CIO/Entrepreneur & Resource Allocator, Business Technology Strategist	Interpersonal CIO/Leader	Informational CIO/Spokesperson & Monitor Interpersonal CIO/Liaison	
	Weill and Woerner (2013)	A study of CIOs role from digital economy point of view; Identifying key activities for four type of CIO's and how CIO's should spend their time across these activities.	Embedded CIO	ICT services CIO	External customers CIO	Enterprise processes CIO
<b>Five CIO types</b>	Peppard et al. (2011)	A study of ambiguous role of CIOs; "CEO's need to understand what type of CIO is appropriate at a particular point in the organisation's journey"	Innovator CIO	Utility IT Director, Agility CIO	Evangelist CIO	Facilitator CIO
	Guillemette and Pare	The objective of the study is to offer an explanation of the contribution of the IT function in organizations with a typology of ideal profiles.	Partner	Systems provider, Architecture builder,	Project coordinator	Project coordinator

	(2012)			Technological leader		
<b>Six CIO types</b>	Gottschalk (2000)	A study of IS/IT leadership roles, analysing how the individual, position and organisation characteristics predict the CIO role in an organisation.	Product developer, Technology provocateur, Chief operative strategist	Chief architect, Change leader, Technology provocateur	Change leader, Coach	Product developer

## DISCUSSION

Both the literature and interviews show that the specific content of CIOs’ roles and tasks has changed significantly during the last four decades. Although information technology development is an almost self-evident factor in the evolution of the CIO profession, it is not the only one. Technology is interrelated with changes in enterprise strategy, tasks and processes and people and organizational changes. At the same time, the underlying role of the CIO has remained unchanged – to deploy ICT in a strategy-oriented and business-oriented executive role. Thus, as the answer to our research question, what factors shape CIO’s tasks and roles in an organization, we showed that the factors outlined in the modified Leavitt model perform this role. The model provides a solid basis to understand these phenomena and to describe factors that shape the concrete content of the CIO’s roles and work in an enterprise at any specific time and over time as these evolve. This is also the main contribution of our research. Both CIO role and evolutionary CIO studies describe the impact of specific technologies, organizational practices etc. that prevailed during specific periods of time, whereas Leavitt’s model captures the factors that appear as those specific technologies, organizational practices etc., that emerged and evolved over time. We feel that the modified Leavitt model will help to describe the everyday tasks and roles of CIOs impacted by the digitalization of business, Internet of things, BYOD, robotics, etc.

The other contributions of our research relate to the findings of the 36 CIO interviews. One of the contributions and also surprising findings of our research concerns the significance of the technology factor. Evolving and emerging information technologies create new business opportunities for organizations and technology appears to dominate the CIOs’ work. We discovered, however, that the strategy factor is almost equally important for them and that processes and people factors also have a significant impact. Echoing other recent studies (Banker et al., 2011; Carter et al., 2011; Guillemette, and Pare 2012; Kettinger et al., 2011; Peppard et al., 2011), our empirical research revealed that the specific content of the CIO work has a stronger business strategic focus than ever before. CIOs perceive that they are more involved in the strategic management of their enterprises and are able to provide greater value than in the past.

We also found a slightly contradictory position from the interviews. Even though CIOs were taking part in the business strategy processes, still only eleven out of thirty six were reporting to CEO and only five were members of group level executive committees or boards. This might reflect the difference between the CIO’s own evaluation and the CEO’s evaluation of the strategic importance of ICT. Another surprising finding was that the industry had no clear impact within the 36 interviews. Within all industries the roles and tasks of the interviewed CIOs varied greatly with no clear pattern. We also discovered that the tasks of some

CIOs had changed several times during their career within an organization whereas the tasks of some other CIOs had remained stable. The reasons why tasks of some CIOs changed several times were often based on business strategy changes, e.g. the enterprise wanted to expand its market share in international markets. In more stable business environments, CIOs' tasks were thus also more stable.

In our study we couldn't find any clear disjunctive factors that could explicate the differences in tasks of CIOs at the industry level. However, those factors were found at company level. While CIOs reported to take part of business strategy process, CIOs still did not have clear formal position of power as a member of group level executive boards. In addition to Leavitt's model other organizational diagnostic models could be useful. Thus, future studies could consider these issues in more detail.

Our research is also subject to limitations. Due to the interview method and the relatively low number of interviewees, statistical analysis methods were not applied. Above we also discussed the limitations related to the inclusion of the five early interviews. Secondly, the length of the CIO experience and the ages of the interviewees varied. Younger CIOs with shorter CIO experience do not have the same perspective. The relatively small size of the Finnish economy with its relatively homogeneous leadership behaviour could be related to this issue. Finally, although many of the enterprises in the interview sample are global or regional, the empirical evidence is from a single country origin.

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## Appendix 1

### CIO Profiles

Sector	Date	Timeframe of the answers, then - now	Years acting as CIO	Gender	Age Group	Size of the company (revenue)
<b>Media</b>		<b>average:</b>	<b>8</b>	<b>3 Males, 2 Females</b>		
CIO1	09/03/11	2005 - 2011	6	Female	50-59	Large <500me
CIO2	26/06/12	2000 - 2012	2	Male	30-39	Large <500me
CIO3	21/06/12	1997 - 2012	15	Male	50-59	Large <500me
CIO4	07/08/12	2001 - 2012	11	Female	50-59	Large >1000me
CIO5	13/10/11	2005 - 2011	6	Male	30-39	Large <100me
<b>Public sector</b>		<b>average:</b>	<b>14.8</b>	<b>5 Males, no Females</b>		
CIO6	01/08/12	2006 - 2012	6	Male	50-59	Large >1000me
CIO7	24/10/11	1984 - 2011	27	Male	50-59	Large <500me
CIO8	27/07/12	1995 - 2012	17	Male	50-59	Large >5000me
CIO9	29/06/12	2008 - 2012	4	Male	50-59	Medium <50me
CIO10	12/09/12	1992 - 2012	20	Male	50-59	Large >500me
<b>Finance</b>		<b>average:</b>	<b>10.75</b>	<b>4 Males, no Females</b>		
CIO11	14/11/11	1999 - 2011	13	Male	40-49	Large >1000me
CIO12	26/06/12	1992 - 2012	12	Male	50-59	Large >5000me
CIO13	25/06/12	1996 - 2012	1	Male	50-59	Large <1000me
CIO14	12/06/13	1987 - 2009	17	Male	50-59	Large <500me
<b>Manufacturing</b>		<b>average:</b>	<b>10.55</b>	<b>9 Males, 1 Female</b>		
CIO15	25/10/11	1980 - 2011	22	Male	50-59	Large >1000me
CIO16	18/10/11	1987 - 2011	21	Male	50-59	Large >1000me
CIO17	29/06/12	2006 - 2012	7	Male	40-49	Large >1000me
CIO18	14/10/11	2003 - 2011	8	Male	60-69	Large >1000me
CIO19	16/11/11	1999 - 2008	9	Male	50-59	Large >5000me
CIO20	15/06/12	2010 - 2012	2,5	Female	40-49	Large >5000me
CIO21	14/08/12	2000 - 2012	4	Male	40-49	Large >1000me
CIO22	28/11/13	1976 - 2000	15	Male	>70	Large >1000me
CIO23	28/06/12	2008 - 2012	4	Male	50-59	Large >1000me
CIO24	06/03/09	1995 - 2008	13	Male	40-49	Large >1000me
<b>Retail</b>		<b>average:</b>	<b>14.63</b>	<b>8 Males, no Females</b>		
CIO25	25/06/13	1988 - 2005	17	Male	>70	Large >5000me
CIO26	30/08/07	2005 - 2007	7	Male	40-49	Large >5000me
CIO27	10/10/07	1998 - 2007	9	Male	50-59	Large >5000me



Model of CIO tasks and roles

CIO28	07/08/07	1999 - 2007	8	Male	40-49	Large <500me
CIO29	26/09/11	1999 - 2011	13	Male	50-59	Large <500me
CIO30	25/06/12	2000 - 2012	12	Male	50-59	Large <500me
CIO31	04/07/12	1989 - 2012	26	Male	50-59	Large <500me
CIO32	26/10/06	1956 - 1981	25	Male	>70	Large >1000me
<b>Services</b>		<b>average:</b>	<b>14.75</b>	<b>3 Males, 1 Female</b>		
CIO33	18/06/12	1996 - 2012	14	Male	30-39	Large >1000me
CIO34	18/06/12	1994 - 2012	17	Male	50-59	Medium
CIO35	03/07/12	2002 - 2012	10	Male	40-49	Large >1000me
CIO36	10/08/07	1991 - 2009	18	Female	40-49	Large >1000me
<b>Summary</b>		<b>average:</b>	<b>12.25</b>			

## **Appendix 2**

### **Questionnaire**

<Name>

<Date and Place of an interview>

<Company, KPI's: personnel amount, revenue, profit>

#### **Background (time span 10 years)**

1. What is your education and how long you have been working in ICT field?
2. In which years you led ICT department?/ From which year you have been leading ICT department?
3. How many years you have been working as a CIO/ ICT manager?
4. How many employees you had when your work started/ now?
5. In which role is your superior (CEO, CFO, some else)?
6. How has your organisation changed during the time you have been a CIO?
7. Why it has changed?

#### **II Framework of leadership**

8. Which were the biggest challenges in ICT function when you started?
9. Your challenges now ?
10. What kind of competences were needed?
11. Competence needs now?
12. What was the top management's understanding of the need of ICT then / now?
13. How would you describe a good leader?
14. What kind of steering groups there were and how they dealt with the ICT matters?
15. What kind of steering groups there are now?

#### **III Strategy questions**

16. What is your company's strategy as of today?
17. Was the ICT department able to handle strategy changes?
18. How is it now?
19. Were the company's management able to handle strategy changes?
20. Was ICT department taking part of strategy work / is it now?
21. If it is, how?
22. What kind of KPI's were used / are used now?
23. Did ICT support effectively company's targets?
24. Does it now?
25. How technology's change affects to your company's strategy?

#### **IV Valuation**

26. How the ICT department was valued then?
27. How it is valued now?
28. How would you estimate the ICT savvyness (understanding of ICT) among business leaders then?
29. And now?
30. What kind of a role and responsibility was given to CT department then?
31. And now?
32. Was the CIO also a representative of top management then?
33. And now?
34. Was CIO nominated to groups steering group?
35. And now?
36. Did top management understand ICT's connection to productivity growth?
37. And now?
38. Did top management understand ICT's connection to revenue building?
39. And now?

**V Changes in time and place**

40. Has your company had noteworthy/remarkable M&A's or divestments in your time?
41. ICT's outsourcing?
42. How do you manage your network inside your company and with stakeholders?
43. What was your company's economical situation then?
44. And now?
45. How these changes have affected to ICT department?

**VI Challenges now and in the future**

46. Your company's biggest challenges now?
47. Your biggest challenges in CIO's role now?
48. What tasks belonged earlier to your work? And now? And in the future?
49. How are you involved with leading the business?
50. How are you involved with leading business ICT?
51. What is your outlook to the future?