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SCHOOL OF BUSINESS, ECONOMICS AND LAW

Master Degree Project in Accounting

Opportunities to realize benefits of IT investments

A case study of a shared service center at Atlas Copco

Nathalie Andrén and Johan Nilsson Wall

Supervisor: Johan Magnusson
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ABSTRACT

Thesis: Master Degree Project in Business Administration within the field of Management Accounting at University of Gothenburg, School of Business, Economics & Law

Authors: Nathalie Andrén & Johan Nilsson Wall

Tutor: Johan Magnusson

Title: Opportunities to realize benefits of IT investments - A case study of a shared service center at Atlas Copco

Background and Problem: A large proportion of firms' investments consist of information technology (IT) investments. The direct benefits of IT investments are best captured at the process level and to achieve business value, strategic alignment between business and IT is needed. Statistics show that to control IT investments is not an easy task. IT is complex, it is more than a tool deployed, it is an ensemble of techniques applications and people in their social context. These issues embrace the importance of firms' ability to manage IT resources, which refers to IT capabilities. Research proved the importance of having IT capabilities to generate return and to realize the value of IT investments. Management control systems (MCS) can be used to create strategic alignment, and the design of an MCS depends on several contingency factors. The strategy map based on balanced scorecard is a cybernetic control framework that emphasizes strategic alignment with a multidimensional approach. The framework aims to translate the strategy into objectives within four critical perspectives to visualize the strategic alignment. Further, not only the strategic alignment but also the strategic emphasis is suggested to have an impact on the business value of IT.

Aim of the Study: The aim of this study is to investigate how multidimensional cybernetic control systems can support realization of benefits from IT investments by combining management accounting (MA) and information systems (IS) research.

Methodology: This thesis is based on a single case study of an accounts payable shared service center, which has invested in IT aiming to improve the invoice handling process. Data was gathered from primary and secondary sources and was analyzed through pattern matching. An ensemble view of the IT was adopted.

Discussion and Conclusion: The thesis discusses how a multidimensional cybernetic control system can be supportive in capturing the complexity of IT investments to enable strategic alignment. Additionally the benefits of adopting dual emphasis are discussed. The conclusion articulates the usefulness of a multidimensional cybernetic control system to improve the strategic alignment and enable dual strategic emphasis and in turn realize the benefits of IT investments. Further, it provides evidence of the advantages to combine IS and MA research.

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Nathalie Andrén

Johan Nilsson Wall

DEFINITIONS OF ABBREVIATIONS

BSC - Balanced Scorecard

CSS AP - Center of Shared Services Accounts Payable

EDI - Electronic Data Interchange

ERP - Enterprise Resource Planning

FTE - Full Time Employees

IS - Information Systems

IT - Information Technology

MA - Management Accounting

MCS - Management Control Systems

NPS - Net Promoter Score

RBV - Resource Based View

ROA - Return on Assets

ROCE - Return on Capital Employed

ROS - Return on Sales

R&D - Research and Development

SG&A - Sales, General and Administrative

1. INTRODUCTION

1.1 BACKGROUND

Information Technology (IT) forms a large part of firm's discretionary expenditures (Mithas, Tafti, Bardhan and Goh, 2012), and Saunders and Brynjolfsson (2016) presented statistics from *Bureau of Economic Analysis, National Income and Products Account* showing that 30% of all capital investments consist of IT investments. Firms invest in IT to achieve various benefits and previous information systems (IS) research has shown that the direct benefits from IT investments are best captured at the process level (Barney, 1991; Barua, Kriebel and Mukhopadhyay, 1995; Mooney, Gurbaxani and Kraemer, 1995; Xue, Ray and Sambamurthy 2012; Anand, Wamba and Sharma, 2013). Mooney et al. (1995) argued that the value creating benefits at the process level are; automational, informational and transformational. Automational effects refer to productivity improvements, informational effects refer principally to improvement of managerial support in decision making, and the transformational effect explains IT's ability to facilitate and support process innovation and transformation (Mooney et al., 1995). Xue et al. (2012) highlighted that despite evaluating the performance impacts from IT, research should investigate how different factors affect the value enabled by IT.

Align with Xue et al. (2012) recommendations; studies have been investigating the impact of strategic alignment on the business value of IT. Wu, Straub and Liang (2015) argue that there should be a fit between business strategy and IT to achieve better organizational performance from IT, and Kohli and Grover (2008) argue that strategic alignment is a prerequisite to realize benefits of IT investments. Statistics show that to control IT investments is not an easy task. A vast majority of the investments are late; over budget and 50% of the managers believe that they could achieve the same benefit from the investment but at half of the cost (Maizlish and Handler, 2005). Hence it is not about the technology itself, it is about "getting IT right", it must be controlled and used in the right way to generate returns (Lunardi, Becker, Maçada and Dolci, 2014; Saunders and Brynjolfsson, 2016). But IT is complex, it is more than a tool deployed, it is an ensemble of techniques, applications, and people in their social context (Orlikowski and Iacono, 2001). These issues embrace the importance of firms' capacity to manage their IT resources to realize the benefits from IT investments. The resource based theory consider firms' ability to manage their resources to sustain competitive advantages (Barney, 1991). From the resource based theory, IS researchers developed the concept of IT capabilities that includes how capabilities such as management capabilities and human capabilities support realization of benefits from IT investments (Anand et al., 2013; Saunders and Brynjolfsson, 2016). Saunders and Brynjolfsson (2016) study provided recent evidence on the importance of IT capabilities to gain higher value from IT. Their findings show that firms with the highest IT capabilities enjoyed a remarkable premium of 45% to 76% in firm value.

The Management Accounting (MA) research covers studies about Management control systems (MCS) that are used by organizations to drive performance and to reach organizational goals i.e. to realize organizational objectives, by making behavior consistent with the strategy and holding people accountable (Malmi and Brown, 2008). Contingency factors such as the environment, technology and strategy affect the design of a MCS (Chenhall, 2003). Further, for a MCS to be effective it needs to fit to these contextual factors, and the outcome variable should be connected to the anticipated organizational or managerial performance (Otley, 1980; Otley & Wilkinson, 1998). A good fit results in better organizational performance (Chenhall, 2003).

With regards to the new findings about the relationship between strategic alignment and IT, a control framework that directs attention towards strategic alignment, could be useful to realize the benefits of IT investments. The strategy map based on the balanced scorecard (BSC) is a cybernetic control framework that emphasizes strategic alignment with a multidimensional approach (Malmi and Brown, 2008), where the multidimensionality signals ability to capture the complexity of IT in terms of techniques, applications and people. Cybernetic control systems are characterized by; quantifiable measures, standards or targets, comparisons between standards or targets with outcomes, variance analysis and modification of the behaviors or systems (Green and Welsch, 1988). The BSC framework aims to communicate the strategy and motivate the people within the firm to reach the strategic goals (Kaplan and Norton, 1996). The strategy map is supposed to visualize the strategy of short and long term value creation progress (Kaplan, 2008) by translating the operational strategy into explicit goals and measures within four critical perspectives (Kaplan and Norton, 1996). There are cause and effect relationship between the perspectives (Kaplan and Norton, 2008) that visualize how the resources in terms of strategic initiatives impact the internal processes which in turn influence the customer value, the financial success and the strategic objectives (Kaplan and Norton, 1996).

Mithas and Rust (2016) argue that the IT resources are used for three strategic purposes; increase revenue, reduce cost or increase revenue and reduce cost simultaneously. Their study was based on secondary data of 300 American Fortune 500 firms, and the result was brought out from econometric models where market value and profitability were used as measurements of performance. The study showed that the impact on firm profitability and market value varies for different strategic emphasis under different levels of IT spending. To emphasize cost reduction and revenue expansion simultaneously i.e. having a dual emphasis was shown to be advantageous for several levels of IT investments. Mithas and Rust (2016) concluded that the strategic focus, derived from the major business strategies, affects the management of IT and how the IT resources are shaped. Wu et al. (2015) and Mithas and Rust (2016) stated that more research should be conducted to investigate the relationship between IT, strategy and firm performance. Further, Masli, Sanschez and Smith (2011) suggested that studies should be conducted to show how firms can create alignment between business and IT.

1.2 PURPOSE

The purpose of this study is to contribute to MA and IS research by investigating how multidimensional cybernetic control systems can improve strategic alignment between business and IT, which is a prerequisite to realize the benefits of IT investments. The multidimensional cybernetic control framework refers to the strategy map based on BSC and will be used with the aim to capture the complexity of IT in terms of IT capabilities and benefits of the IT investment. By capturing the complexity the strategic alignment can be analyzed and potentially enhanced. Further, the benefits of dual strategic emphasis will be analyzed. Findings will be drawn from one single case.

1.3 RESEARCH QUESTION

How multidimensional cybernetic control systems can support realization of benefits from IT investments?

1.4 SCOPE

The study applies a multidimensional cybernetic control framework with the aim to capture the complexity of IT in order to investigate how to improve the strategic alignment and in turn realize the benefits of an IT investment in a specific case. The study is incorporating strategic alignment as a prerequisite to realize the benefits of IT investments, while other contingency variables are ignored. Information about the IT investment and capabilities are collected in the perspectives. It is used to determine and discuss performance drivers, outcomes, cause and effect relationship and the strategic emphasis. The IT capabilities in this research refer to management and human capacity to manage the IT resources. The study is characterized by a congruence between IS and MA research, and the findings should be generalized to similar contexts.

1.5 DISPOSITION

This thesis starts with giving the reader a background of the research area including the issues discussed. A purpose and a research question are thereafter presented and the chosen analytical model and methodology is described. The subsequent chapter provides a summary of previous research, which is followed by a presentation of the results. The results and the previous research are discussed in the end of the report, and a conclusion is given. At last the limitations, implications and suggestions for future research are presented. An appendix is attached to the thesis where the applied interview guide can be found.

1.6 ANALYTICAL MODEL

An analytical model is presented below. It will be used to capture the complexity of the IT investment and by capturing the complexity the strategic alignment can be analyzed. The information in the perspective will be used to determine the strategic emphasis and how benefits from IT investments can be realized. The components in the model are presented in the chapter “previous research”.

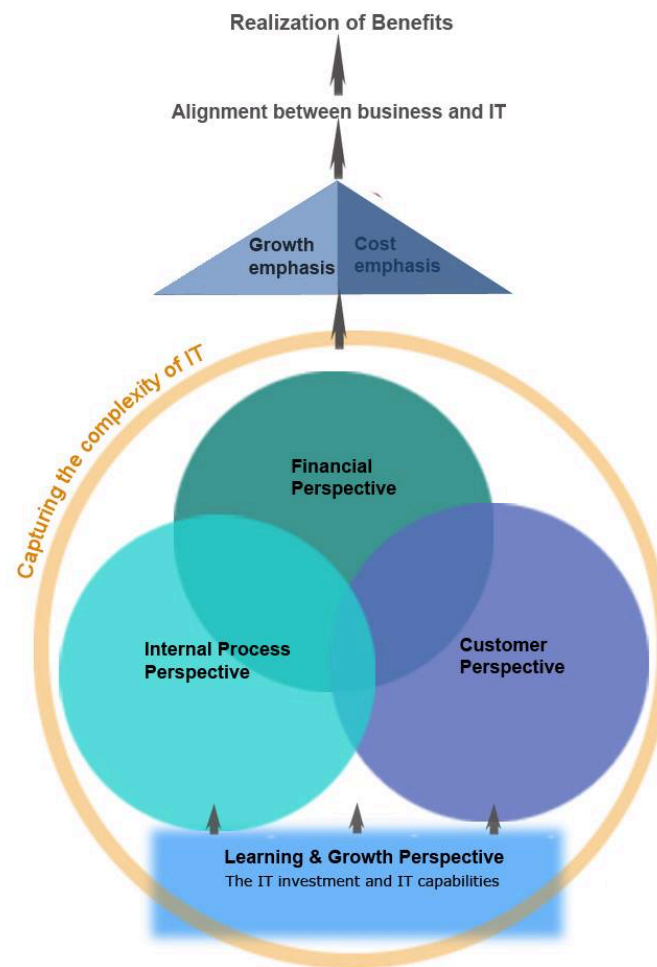


Figure 1. Our analytical model

2. METHODOLOGY

2.1 THE IT ARTIFACT

Researchers have to theorize about IT to understand its implications and make it matter in research; hence IT artifacts cannot be taken for granted (Orlikowski and Iacono, 2001). Therefore, as an initial step in this study, it was determined that the ensemble view of IT will be undertaken. Under the ensemble view IT is more than a tool deployed, it is an ensemble of techniques, applications, and people in their social context. (Orlikowski and Iacono, 2001) Ivan Illich (1973) argue that IT is only one part of a broader package, incorporating other applications needed to apply the IT to a socio-economic activity. Latour (1987) further claims that a package of cooperating forces forms an ensemble, a “machine”. He pushed for the importance to define what is in the “machine” or the “black box” to make it functionate.

In this study the ensemble view of the IT artifact was applied to grasp the overall organizational context of the IT investment in an attempt to get a complete understanding of the IT investment and all potential benefits that could contribute to value of IT. We have studied the surroundings of the IT investment and the benefits in terms of impacts have been identified. The techniques, applications, and people in terms of users and customers were studied. Hence, a broad picture of the benefits from IT was identified, which enabled a profound analysis of the strategic alignment. A narrow view would probably overlook and not capture entire value of the IT investment in terms of benefits. Additionally, it was necessary to apply the ensemble view of IT to gather information that could fill the perspectives in the multidimensional control system selected for this research, hence to capture the complexity of IT in several dimensions. Furthermore, the study acknowledge that the IT artifact is organizational and context specific and therefore differ from one case study to another.

2.2 RESEARCH APPROACH

Our research question will extend the knowledge within IS and MA research and integrates the contingency theory. A qualitative study was conducted which is suitable when the researchers get the opportunity to study the complexity of a business phenomenon in a real-life context, according to Yin (2009). Eriksson and Kovalainen (2008) stated that qualitative studies aim to deal with the social and cultural construction of variables to understand the reality as socially constructed, where the social construct is explained by cultural meanings. Hence, interpretation and understanding are what identifies qualitative studies. The objective of a qualitative study is to get a holistic understanding of the issue studied, which will be dependent on the context that in turn affects the type of research approach, the collection of data and the analysis. There are many types of qualitative research and all have different philosophical background, focus and techniques.

A case study methodology is used in this research since it is appropriate when the focus is on a specific case aiming to answer “how” or ”why” questions according to Yin (2009). This study was investigating a contemporary phenomenon in a real life context where the boundaries between the phenomena and the context were blurred, and then the most suitable methodology is a case study according to Yin (2009). The strongest advantages with a case study are that it incorporates the context, and investigating a contemporary event. This means that more variables are incorporated in the research and it provides multiple evidences in contrast to quantitative research, which include fewer variables. There are both single and multiple case studies, and the methodology of a single case study was used in this research. A case study was used since the researchers got a opportunity to observe and analyze a phenomenon that has not been open to study by others, this refers to the revelatory case study rationale according to Yin (2009). This single case study shows how the complexity of IT can be captured in a multidimensional control system in order to investigate how the benefits of IT can be realize by improving the strategic alignment in the specific case.

2.3 EMPIRICAL SELECTION

The case unit is a Shared Service Center at Atlas Copco Rock Drills AB that serves companies within the group Atlas Copco with accounts payable services. The unit is referred to as CSS AP in this thesis. For a couple of years ago CSS AP made a decision to invest in a new IT application aiming to further automate their invoice process. The IT investment project was in its implementation phase when conducting the study. Hence, we had the opportunity to impact the realization of the benefits, and the case was therefore exceptionally interesting to study. Further, the case was compelling due to the characteristics of a shared service center where the IT investment had the ability to impact many aspects, and was therefore assumed to involve a high level complexity. The shared service center only serves a small proportion of the divisions and companies within the Atlas Copco group. Since Atlas Copco is a large group the shared service center has opportunities to expand their revenues and reach growth within the group, which made the dual emphasis aspect possible to study.

2.4 DATA COLLECTION

In the study both primary and secondary data was used. Primary data is gathered directly by the researcher, and secondary data is gathered through secondary sources (Eriksson and Kovalainen, 2008). To be able to make analytical judgments and interpret the data throughout the data collection phase, the researchers were aware of the theoretical issues, which are suggested by Yin (2009) since it increases the credibility. Further the researchers tried to collect the data in an objective manner since it increases the credibility of the research according to (Yin, 2009). Multiple sources of data were used in this research (see Table. 1), to approach the topic from a multiple point of view, which is recommended by Yin (2009) because it increases the credibility of the research. Key respondents were interviewed in this research, hence multiple sources of evidence was necessary due to interpersonal influence

according to Yin (2009). Further, triangulation of data is the rationale for using multiple empirical sources and was used to see if the data corroborated and lead to one aggregated solution. In doing so the researcher can grasp more than one viewpoint of the reality, which increases the understanding and the quality of the study (Eriksson and Kovalainen, 2008). The different sources of data are presented in the table below and the next sections include explanations of the data collection methodologies.

Data sources	Provider
Product leaflet about invoice automation	IT vendor
IT application evaluations among peers	IT vendor
Internal business case in excel	CSS AP
Internal process schemes	CSS AP
Internal business document	CSS AP
Annual report 2015	External
Interviews	IT vendor, CSS AP, Customers
Physical artifacts	CSS AP

Table 1. Data sources

2.4.1 Primary Data

2.4.1.1 Pre-study

Initially a rigorous pre-study was set up to get in depth familiarity of the topic and context. For instance, the organization, managers' objectives, the IT investment and the IT capabilities were studied. Informal conversations were held over phone where the key respondents (presented below) were able to present what they thought were important to make us understand the context, and we were able to ask questions. Moreover, we were visiting the case unit where more informal conversations were held. At the case unit the key respondents were presenting their business case for the IT investment, as well as providing information about the operational processes. We also got the opportunity to see the office where the processes take place and we met the employees at the unit. The information from the pre-study was valuable to define the concepts and measurements as an initial step of the study, and Yin (2009) argues that it increases the credibility of the research. Further, the information was used when searching for relevant literature as well as when designing the interview guide.

2.4.1.2 Interviews

Interviews were conducted to grasp a profound understanding of the complexity of the IT investment. A semi-structured interview method was applied which consist of prepared questions with the possibility to vary the phrasing and the order of questions according to Eriksson and Kovalainen (2008). This interview method was chosen in order to get a comprehensive and broadly coverage of the topic, but also to encourage emerging themes during the interview, which surveys cannot, according to Eriksson and Kovalainen (2008). According to Yin (2009) questions should be pronounced as “how” instead of “why” to minimize a threatening questioning approach. When following our inquiring, consideration was taken to ask questions in an unbiased manner as suggested by Yin (2009). Before the interviews the questions were sent to two business students with knowledge about IT to confirm the questions potential to capture the phenomena. The respondents that were selected were the persons who have most relevant knowledge within the scope of the study and are presented in Table 2. In depth interviews were conducted with the key respondents, which can be referred to as informants according to Yin (2009). The key respondents provided the researchers with propositions of other sources of evidence (both contrary and corroborating) and other persons to interview. According Yin (2009) such key respondents are important for the success of a case study. The interview guide was conducted before the interviews and can be found in Appendix 1. Focused interviews were held with ordinary respondents, where only a certain set of questions from the interview guide was asked. The interviews with the key respondents were recorded, and admission was given in advance. Notes were taken by one researcher during all interviews, while the other researcher was asking questions. After the interviews the researchers were debriefing to capture the most vocal points, and detailed notes were written down. The key respondents were interviewed simultaneously and all the other respondents’ interviews were held individually. A copy of the summarized data from the interviews and clarifying questions were sent to the key respondents to ensure that no misinterpretation occurred. Yin (2009) recommends that the key respondents should have a possibility to leave feedback of the data collected in order to make sure that the phenomena is accurately captured to increase the credibility.

Position	Organization	Additional information
Key respondents		
Financial software specialist	CSS AP Atlas Copco Rock Drills AB	Working with general AP tasks and with development of processes
Team manager	CSS AP Atlas Copco Rock Drills AB	Responsible for the services at CSS AP. Project leader of the IT investment
Respondents		
General manager	CSS Atlas Copco Rock Drills AB	Responsible for all services at CSS. Was in the steering group accepting the investment.
Customer 1	Controller Atlas Copco Rocktec	Working with performance monitoring, reporting and accounting
Customer 2	Controller Atlas Copco Rocktec	Working with reporting and is responsible for the VAT-accounting
Key account manager	IT vendor	Sold the IT application to CSS AP, and had information about the benefits

Table 2. Respondents

2.4.1.3 Physical Artifacts

To better understand the impact of the IT investment, the features of the application were studied through presentations that the key respondents held. During the presentations the key respondents showed how the new IT application was supposed to functionate and compared it to the old software. Further, the manager of CSS AP showed how he measured the performance of CSS AP in an Excel sheet. According to Yin (2009) physical artifacts can be a significant source of evidence in an overall case.

2.4.2 Secondary data

Secondary data corresponds to information that is produced by another person than the researchers and are; reports, media texts etc. (Eriksson and Kovalainen, 2008). This study gathered secondary data from the case unit in forms of an internal business case, process schemes, and financial data. Further, the IT vendor provided us with product leaflets, marketing material and product evaluation reports. This kind of documentations is strongly recommended to use in case study research as a complement to other data according to Yin (2009). When using this secondary data it was important to have in mind that it was conducted for another purpose than to inform our case study in order to interpret the content correctly. The data sources accuracy and methodology of production was analyzed to understand potential biases and to take them into consideration.

2.4.3 Literature

The literature presented in the in the chapter “Previous Research” was collected from the database “Business Source Premier”. Key words as; Management control, Cybernetic controls, Balanced Scorecard, Contingency, IT investments, Strategic Alignment, Strategic Emphasis and Information Systems were used. We were browsing through the latest volumes of the relevant journals as; MIS Quarterly, Accounting Organizations & Society, Information & Management, Accounting Information Systems and Information System Research, to find recent relevant literature.

2.5 ANALYZING THE DATA

The different analyzing strategies was studied before collecting the data to make sure it was analyzable. Pattern matching was applied to analyze the data, which is a technique used to find patterns in empirical data and compare it with the previous research (Yin, 2009). According to Yin (2009) pattern matching is an accepted analysis methodology that increases the credibility of a study. The data from the interviews was summarized in notes, as well as the information from the physical artifacts, to make it easier to analyze. The data from the secondary resources were already in written form so we did not have to summarize it. To harmonize the data into overall agreements it was sorted into categories coherent with the analytical model. The perverse opinions, together with the data that did not fit into a category, were primarily sorted into a tentative, separate category. The data in the tentative category were further sorted in categories and analyzed to make sure we did not miss any vocal point emphasized in several data sources, before it was definitely deleted. By categorizing the data we got a rich narrative of the nature of the IT investment and its impact. The narrative was further analyzed to find casualties between observed events, which Yin (2009) suggests. While analyzing we found that some important data was missing, hence we went back to the key respondents to ask more questions. We analyzed the data carefully and tried to focus on the most significant aspects of the study in order to produce, what Yin (2009) refers to as a high quality case study. As a final stage in the analyzing the process, one of the researchers got the task to summarize the analysis in our discussion chapter. The other researcher got the task to read through the summary and when opinions between the researchers diverged the topic was discussed, and we went back to the notes from the data collection phase to clarify the issue.

2.6 RESEARCH QUALITY

The methods are explicitly described which creates opportunities to conduct the research over again, and produce the same implications and conclusions. According to Eriksson and Kovalainen (2008) this increases the credibility of a study. The disclosure of the case company is another factor that increases the credibility in a case study according to Yin (2009). However, this study has its deficiency in not providing the reader or following

researchers with any case study protocol or case study database, which is suggested by Yin (2009). Such documents cannot be shared since they include internal documents with confidential information. Unfortunately, this aspect has a negative impact on the credibility of the study. Further, we argue that we have collected sufficient data to merit our claims, which increases the credibility aspect according to Eriksson and Kovalainen (2008). Nonetheless, to complement the qualitative data with quantitative data would further increase the credibility (Eriksson and Kovalainen, 2008).

The level of generalizability of the findings is a critical aspect of the credibility for quantitative studies. Though, generalizability is of less importance for qualitative studies according to Eriksson and Kovalainen (2008) since the purpose is to provide an understanding of the topic rather than to reach generalizability. The specific characteristics of the individual IT artifact narrow the generalizable scope. Nonetheless, we argue that future studies can use our findings and continue to investigate how MA and IS research can be connected by investigating how multidimensional cybernetic control systems can be used to capture the complexity of IT to enable improvement of strategic alignment and in turn realize the benefits of IT investments.

3. PREVIOUS RESEARCH

This chapter provides the readers with an understanding of the potential benefits from IT investments and how they are measured. In the second section an explanation of what firms need to consider in order to realize the benefits of IT investment is presented. In the next section the components of the multidimensional cybernetic control framework BSC is presented followed by a strategy map explaining the relationship between the perspectives. At last the categories of strategic emphasis are presented and it is explained how they impact the business value of IT.

3.1 BENEFITS FROM IT AT THE PROCESS LEVEL

Information system researchers argue that benefits from IT investments is first seen at the process level (Barua, Kriebel and Mukhopadhyay, 1995; Mooney, Gurbaxani and Kraemer, 1995; Barney, 1991; Xue, Ray and Sambamurthy 2012; Anand, Fossa and Wamba, 2013), which is similar to Kaplan and Norton (2001) way of viewing performance. Kaplan and Norton (2001) argue that traditional bottom line measures are lagging and the direct effects from investments are therefore better seen at the process level. Furthermore, the process level excludes the distortion effect of confounding economic and competitive factors, which is a challenge for financial measures such as ROA and ROS (Dehning and Richardson, 2002).

Mooney et al. (1995) and Barua et al. (1995) defined and measured the benefits of IT in different processes, and as a second step they aggregated these benefits to measure the contribution to firm-level performance. Mooney et al. (1995) found that the processes are influenced by IT in three categories of effects; automational, informational and transformational. Automational effects refer to productivity improvements and enabling of cost cutting through reducing labor hours. Informational effects refer to improvement of managerial support in decision making and enabling to increase employee empowerment, decrease use of resources, organizational effectiveness and increased quality. The last effect, the transformational, explains IT's ability to facilitate and support process innovation and transformation. These effects are related to better cycle times; downsizing and product/service improvement that comes as a result from redesign processes and redesign organizational structures. Higher value from IT is primarily gained from the transformational effects, which is created when operational and management processes are merging. The transformational effects are extensions of the informational effects to the operational processes or the automational effects to the management processes. IT's first order effect on operational processes are automational, which as a second order effect creates better information for management that can further transform the operational processes. For the management processes the first order effect of IT is from informational improvements, which reduce the time spending on creating reports etc. and as a second order, affect automational effects are also seen at the management level. In this stage, a third order effect can appear in terms of the transformational effects of new ways of doing business and new capabilities.

Dimensions of IT Business Value			
	Automational	Informational	Transformational
Operational	<ul style="list-style-type: none"> - Labor costs - Reliability - Throughput - Inventory costs - Efficiency 	<ul style="list-style-type: none"> - Utilization - Wastage - Operational flexibility - Responsivenss - Quality 	<ul style="list-style-type: none"> - Product & service innovation - Cycle times - Customer relationships
Management	<ul style="list-style-type: none"> - Admin expenses - Control - Reporting - Routinization 	<ul style="list-style-type: none"> - Effectiveness - Decision quality - Resource usage - Empowerment - Creativity 	<ul style="list-style-type: none"> - Competitive flexibility - Competitive capability - Organizational form

Table 3. Potential IT Business Value Metrics (Mooney, Gurbaxani and Kraemer, 1995)

The benefits of the IT investments vary with the context (Xue et al., 2012) hence the performance measurements on the process level are firm specific (Daveraj and Kohli, 2000) and should be individually evaluated (Mooney et al., 1995; Barua et al., 1995). Researchers have used several different process level measurements when evaluating the benefits of IT investments, presented in the table below. For instance, Xue et al. (2012) study showed that firms use IT to reach benefits from increased efficiency through cutting administrative and selling cost, increase the turnover of payables, receivables and inventory. The efficiency of IT investments can be reached on the customer side, supply side, and in administrative and operational processes (Xue et al., 2012).

Research	IT investment	Process level measurements
Barua, Kriebel and Mukhopadhyay (1995)	IT investments in manufacturing strategic business units	Capacity utilization, inventory turnover, relative inferior quality, relative price, new product as a percentage
Mooney, Gurbaxani and Kraemer (1995)	IT investments in general	Labor costs, inventory costs, SG&A expenses, wastage, quality, cycle times, customer relationship
Mitra and Chaya (1996)	IT investments in large medium size manufacturing firms.	SG&A expenses, total cost per output unit, production cost per output unit, overhead cost per output unit, clerical labor costs
Banker, Bardhan, Chang and Lin (2006)	IT investment in manufacturing plants	Product quality, time to market, plant efficiency
Daveraj and Kohli (2000)	Investment in decisions support systems at hospitals and its interaction with business process reengineering	Net patient revenue per day, net patient revenue per admission, mortality rates, customers satisfaction
Xue, Ray and Sambamurthy (2012)	IT investments in Canada and US.	Payables turnover, inventory turnover, and receivable turnover as relative measurements. SG&A expenditures, R&D intensity, number of patents applied for, Tobins q .
Anand, Wamba and Sharma (2013)	Implementation of healthcare applications	Labor costs, inventory costs, increased reliability, improvement in management processes, changes in structures and processes

Table 4. Process level measurements of potential benefits of IT

3.2 REALIZING THE BENEFITS OF IT INVESTMENTS

Research has adopted the resource based view (RBV) as a theoretical base used to identify the relation between IT and business value. It builds upon the resource based theory, which refers to the combination of valuable, rare, inimitable and non substitutable resources used to reach competitive advantage. To sustain the competitive advantage firms need to use the resources to develop capabilities that implement the strategy. In IS research the concept of “IT

capabilities” is used which in line with what RBV refers to as firms capacity to manage their IT resources to sustain competitive advantage. (Barney, 1991)

Mooney et al. (1995) were early adopters of the resource based view in IS research, but also more recent research has advocated the perspective (Anand et al., 2013; Saunders and Brynjolfsson, 2016). There are several dimensions of IT capabilities such as; personnel expertise, management capabilities, infrastructure flexibility (Anand et al., 2013), organizational capabilities (Aral and Weill, 2007) and internet capabilities (Saunders and Brynjolfsson, 2016) etc. In their study, Saunder and Brynjolfsson (2016) defined IT capabilities as management and human capabilities that facilitate or hinder the benefits of the investment, Internet capabilities and IT used for communication. Their results show that firms with higher IT capabilities have greater market value than firms with lower IT capabilities. Saunders and Brynjolfsson (2016) argue that the market rewards firms with higher IT capabilities because IT capabilities allow better execution of IT than competitors which reflects better management, and allowance for interlocking effect due to the higher risk profile of IT investments. It is important that business managers are able to communicate the benefits of IT investments and connect them to specific business goals to enhance strategic alignment (Luftman and Kempaiah, 2007; Ward, Daniel and Peppard, 2008). The alignment between IT strategies and business objectives enables organizations to achieve their overall strategies and goals (Prasad, Green and Heales, 2012). Further, strategic alignment is a prerequisite to achieve value from IT investments (Kohli and Grover, 2008) and to achieve superior performance from IT (Wu, Straub and Liang, 2015).

3.3 A CONTROL FRAMEWORK FOCUSING ON STRATEGIC ALIGNMENT

A Management control framework that includes both financial and non financial performance measures is the Balanced Scorecard (BSC) (Malmi and Brown, 2008), and it is used to align organizational goals with operative goals (Chenhall, 2003). The BSC holds a multidimensional perspective of performance measurement control (Kaplan and Norton, 1996), and is referred to as a cybernetic management control system by Malmi and Brown (2008). This section presents the components of the BSC, followed by a strategy map explaining the relationship between the themes. These sections are complemented with research about how the BSC can be used as a control tool to reach the benefits from IT investments.

3.3.1 BSC and Strategy

The BSC aims to communicate the strategy and to motivate the people within the firm to work in alignment with the strategic goals (Kaplan and Norton; 1996). The BSC identifies the steps to reach financial success by translating the operational strategy into explicit goals and to set up a few related key measures (Kaplan and Norton 1992; 1996). The operational strategy refers to how firm’s functions contribute to the business strategy and increase the

competitive advantage (Mintzberg, 1978). Masli, Sanschez and Smith (2011) argued that the BSC is useful when examining the relationship between IT investment and business value, since it puts the IT in a business strategy context. According to Kaplan and Norton (1996) the scorecard outcome measures need to be complemented with performance drivers and the other way around. The outcome measures report achievement but the performance drivers tell how to get there. The performance drivers represent the uniqueness of the firm and report the operational improvement. A proper set of performance drivers that function as leading indicators should represent the organization's strategy to drive the desired outcome. Masli et al. (2011) argue that the balance scorecard can direct researchers in selecting interesting themes within the subject of IT and its relationship to business value and in their findings they made propositions for future research. The findings suggest research directions concerning the strategic roles of IT and measurement of IT alignment. Masli et al. (2011) found that there has been paid scarce attention to the strategic role, and reflected if the proportion of the different strategic roles would affect firm performance.

3.3.2 The Financial Perspective

The financial perspective should respond to the question “how do we look to shareholders?” and is typically based on financial measures used to measure productivity and growth (Kaplan and Norton, 2004). The financial perspective should correspond to the long term objectives and it usually includes profitability measures. Depending on the business life cycle the goals can be focused on rapid growth, sustain or harvest. In the growth stage the financial metrics are concentrated on markets shares, new products etc., while in the sustain stage it constitutes of traditional financial measures. In the harvest stage major attention is directed towards stressing the cash flows and short payback periods (Kaplan and Norton, 1996). To achieve the financial objectives firms use three financial themes, which can be applied under all three strategic focuses. The first theme is “Revenue growth and mix” and is associated with activities such as expanding products/services, reach new markets/customers, create new offers and re-pricing. The second theme is “Cost reduction/productivity improvement” and concerns activities aiming to cut costs and share resources. The last theme is called “Asset utilization/Investment strategy” and its efforts focus on lower the working and physical capital in the firm. (Kaplan and Norton, 1996) Later Kaplan and Norton (2001) scaled downed the model by making cost reduction/productivity improvement and asset utilization/investment strategy into one strategic approach concentrated on productivity.

		Financial Themes		
		Revenue Growth and Mix	Improvement	Asset Utilization
Business Units Strategy	Growth	-Sales growth rate by segment - % revenue from new product, services and customers		- Investment (% of sales) - R&D (% of sales)
	Sustain	- Share of targeted customers - Cross selling - % of revenue from new applications - Customer and product line profitability	- Cost vs. Competitors' - Cost reduction rate - Indirect expenses (% of sales)	- Working capital ratio - ROCE by key asset category - Asset utilization rates
	Harvest	- Customer and product line profitability - % of unprofitable customers	- Unit costs (per output/transaction)	- Payback - Throughput

Table 5. The financial perspective (Kaplan and Norton, 1996)

3.3.3 The Customer Perspective

The customer perspective should answer the question “how do customers see us?” and includes; product attributes, customer relationship and image i.e. the value propositions (Kaplan and Norton, 2004). In the customer perspective the customers and market segments where the firm will compete should be identified. The measures should be formed around the targeted customers groups. Market and accounting share, customer retention, customer acquisition and customers satisfaction should be included in the customer perspective. Ultimately, it should lead to customer profitability or new revenue sources measured in the financial perspective (Kaplan and Norton, 2001). To be able to set proper measures, the value proposition has to be completely understood. The proposition consists of attributes that can be categorized in; product/service, customer relationship, image and reputation. (Kaplan and Norton, 1996)

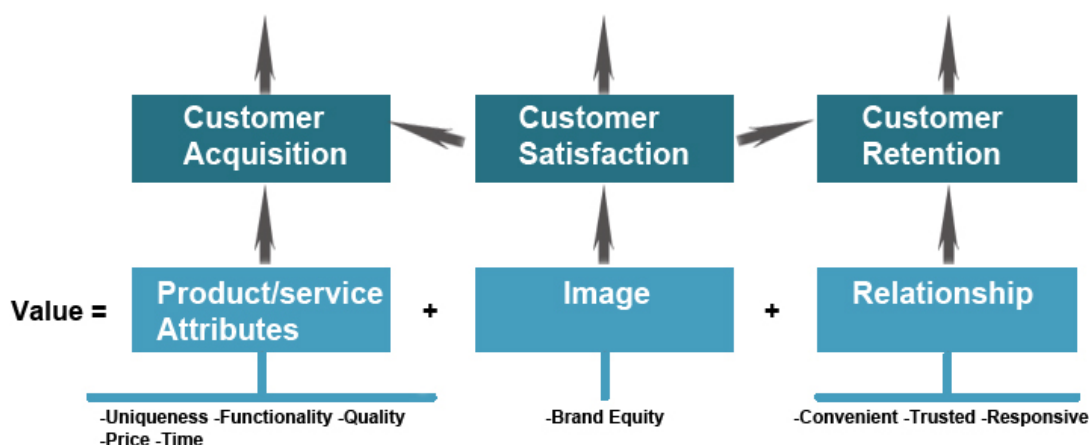


Figure 2. The customer perspective (Kaplan and Norton, 1996)

3.3.4 The Internal Process Perspective

The internal process perspective is connected to the question “what must we excel at?” which should identify key processes aimed to enhance customer value and productivity to reach

financial objectives (Kaplan and Norton, 2004). In contrast to traditional performance measurement methods that merely focus on existing processes, the BSC identifies new processes that firms' need to excel at. The internal processes perspective should incorporate the short wave of value creation by improving operations as well as the long wave of value creation that put emphasis on innovation. (Kaplan and Norton, 1996)

3.3.5 The Learning and Growth Perspective

The learning and growth perspective should answer the question “can we continue to improve and create value?” and pays attention to firms' investments in different resources to achieve long term growth and performance enhancement (Kaplan and Norton, 2004). According to Kaplan and Norton (1996) Firm can usually not rely only on their existing technology and capabilities to reach long term success, and the learning and growth perspective conceptualize the infrastructure that must be constructed. To survive in the competitive environment capability improvements are necessary. The learning and growth perspective consists of people, systems and procedures and it is usually a gap between those and the objectives in the other perspectives. The gap should be filled by investments in employees, IT and systems. Initiatives undertaken in the learning and growth perspective are defined as strategic initiatives (Kaplan and Norton, 2008). In the learning and growth perspective Masli et al. (2011) incorporated the overall IT spending as well as complementary investments in for instance human capital. They argue that there are several external influences that could affect the importance of IT in a firm, similar to how these factors affect other strategic initiatives.

3.3.6 The Strategy Map based on BSC

In a well designed BSC there are series of links between the measurements in the perspectives, they are consistent and mutually reinforcing. The financial perspective can be satisfied by meeting customer requirements that necessitate certain process improvements, which call for investment in human, informational and organizational capital. This is the cause and effect relationship that should “tell the story” of the business unit strategy. (Kaplan and Norton, 1996). In similarity with the generic BSC framework, Masli et al. (2011) argued that firms make IT investments in the learning and growth perspective to drive organizational performance, which cause both non financial and financial outcomes. Masli et al. (2011) emphasized that the framework would be supportive in drawing the cause and effect relationship to increase the understanding of how IT contributes to business value.

Kaplan and Norton (2001) developed a strategy map based on BSC, with the same cause and effect relationship, but mapped in simplified form, easier to apply in reality. Kaplan and Norton (2008) improved the concept of strategy maps by dividing it into strategic themes, and each theme contributes to different strategic objectives. By using this map, lower level managers can adopt the themes to the local conditions but still keep it align with the business strategy, and the short and long term progresses can view through the whole value creation

process. In this manner managers can manage the key elements independently but still make them coherent with the other objectives (Kaplan and Norton, 2008).

Kaplan and Norton (2001) present a basic test to decide if a strategy map based on the BSC is functional or not. The roots of this test follow the framework and should not only specify a collection of measures within each perspective. The test consists of one single reflection; “do I understand the strategy simply by looking at the framework?” Many firms fail this test. For example two public large cap companies Sears and AT&T. Both the companies embraced the customer, shareholder and employee perspective in a balanced manner, where attention to customer and employee satisfaction existed. Nonetheless the drivers of performance were missing. It was not defined how the outcome will be achieved, i.e. how employees, customers and shareholders will be satisfied. The drivers should express the explicit value proposition for instance innovation aspects, which creates new services or improves customer management processes. Investments in accurate expertise and competencies should be done in the learning and growth perspective, in order to enable execution of the strategy throughout the perspectives. If the strategy map based on BSC is applied properly, it will provide a logical description of the strategy. For example, “*if we improve on-time delivery, then customer satisfaction will improve; if customer satisfaction improves, then customers will purchase more.*” (Kaplan and Norton, 2001)

3.4 STRATEGIC EMPHASIS

According to Mithas and Rust (2016), IT applications are general in nature and can be used for different purposes, thus the business value firms receive from IT depends on how firms use their IT resources and with what strategic objective. The use and objective of IT are reflected where the IT capabilities are managed (Mithas and Rust, 2016), and the changes in the organization cause by the IT investment will be contingent on the strategic objectives (Barua, Lee and Whinston, 1996; Kohli and Grover 2008; Kohli and Hoadley 2006; Kohli and Johnson 2011). Mithas and Rust (2016) define the strategic purposes as strategic emphasis and these are defined as revenue expansion, cost reduction, or increased revenue and reduced cost simultaneously (Mithas and Rust, 2016). The strategic emphasis affects the investments decisions, the governance processes as well as the measurement (Mithas and Rust, 2016).

According to Porter (1996) choosing a particular strategy while forsaking others creates an unique combination and a better organizational fit of activities that is harder to imitate for competitors (Porter, 1996). Hence, firms usually chose to emphasize cost reduction, or revenue expansion (Mithas and Rust, 2016). Mithas and Rust (2016) investigated what kind of strategic emphasis that is most effective (i.e. has the highest positive impact on firm performance) by using IT strategy as a moderator for firm performance, and used Kohli, Devaraj and Ow (2012) measurements of firm performance profitability and market value. The strategic emphasis was derived from the dominant strategic objective, which a firm chooses to emphasize in its IT strategy and to identify the strategic focus Mithas and Rust (2016) were viewing the information that was presented in objective metrics.

Mithas and Rust (2016) argue that previous research has indicated that firms with dual emphasis gains higher firm performance from IT for three major reasons. First of all the resource based view (Barua et al., 1996), demonstrate that IT leads to better corporate performance due to greater social complexity, causal ambiguity, path dependence and richer organizational learning, which makes it harder to replicate by competitors. Secondly the dual emphasis creates more opportunities, which leads to reduced diminished returns. This prompts lower cycles times, which generate both higher (Mithas and Rust, 2016), and more stable cash flow as a result of the IT enabled two sources (revenue and cost) of cash flow (Porter, 1985). Finally, the broader scope of the dual emphasis amplify to stretch targets and to receive more for the same amount of investments (Kaplan and Norton, 2006). Tallon, Kraemer and Gurbaxani (2000) showed that firms with focused IT goals receive greater value from IT and Tallon (2007) demonstrated that the strategy should be multi-focused rather than single focused. However, it is not risk free to have a dual emphasis firstly it can lead to confusion (mixed message), secondly the set of system might not provide full integration of data and information (Mithas and Rust, 2016), thirdly it makes hard to chose between IT investments (Ross and Beath, 2002). At last it requires more competence in form of expertise among employees or implementation parties (Mithas and Rust, 2016).

Mithas and Rust (2016) result shows that firms with a dual focus making mean level of investments did not reach higher profitability than those with a single focus. At high levels of investments dual emphasis outperform single emphasis when it comes to profitability. At lower levels of investments there is no such difference. When it comes to market value, dual emphasis has an advantage on all levels of investments, but it is shown stronger when firms spend more on IT. Further, the market is not only favorable to firms that have dual focus over a large range of investments but also to those that have a revenue focus. Some projects initially takes a cost reduction approach but a growth opportunity arises as a second order effect. From the findings Mithas and Rust (2016) concluded that business strategy and IT investment have to be intertwined. The strategic emphasis, level of IT investment and the chosen measurement of firm performance affected the result of their study.

4. RESULTS

The results are drawn from the different sources of data presented in the methodology, and it is categorized into the following sections: The first sections provide the reader with the context to create a better understanding of the studied IT artifact. It follows a presentation of the unit's strategy and thereafter the objectives and measurement are presented in four categories.

4.1 GENERAL COMPANY INFORMATION

4.1.1 The Atlas Copco Group

Atlas Copco develops efficient production solution equipment to customers in 180 countries. The organization consists of four major business areas, that include several divisions which function as operational units. Each division has the global responsibility for its product or service. The group as a whole has 44 000 employees around the world, working in 91 countries. Approximately 4200 of the employees work in Sweden and 12 400 at the mining and rock excavation technique business area, of which Atlas Copco Rock Drills AB in Örebro has 1560 employees. In 2015 Atlas Copco's revenue reach 102 000 MSEK, where Mining and Rock Excavation technique contributed with 27 000 MSEK, and 2000 MSEK consisted of revenues from the Swedish markets. Atlas Copco Rock Drills AB has revenue of 800 MSEK.

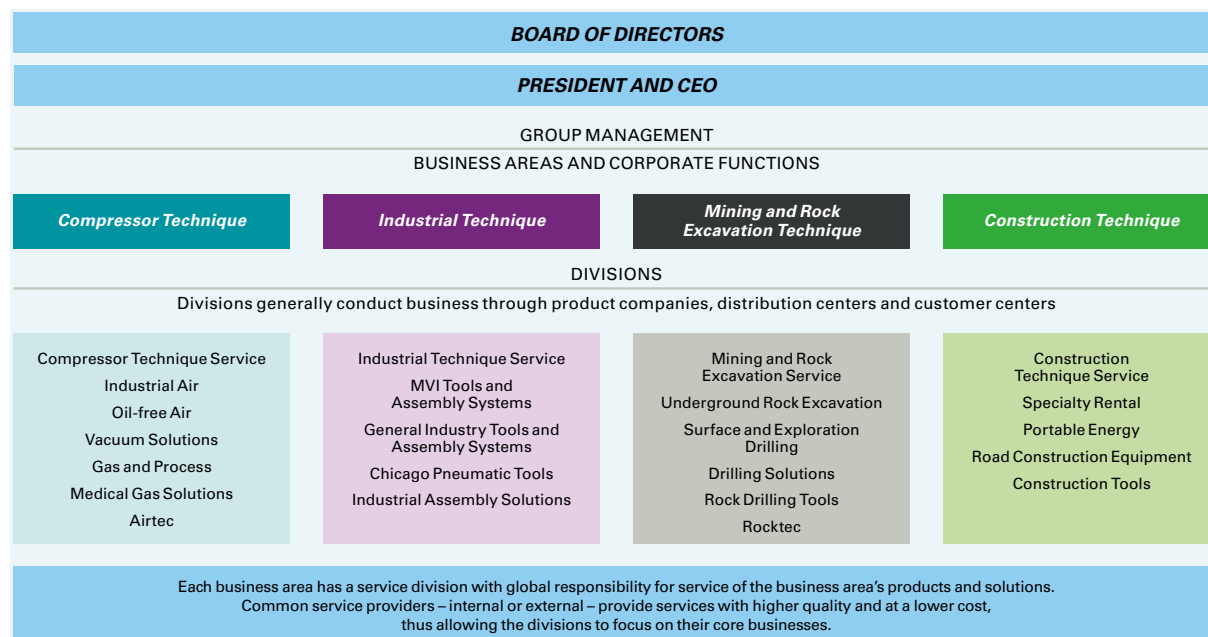


Figure 3. Organization structure Atlas Copco (Annual report, 2015)

4.1.2 CSS AP

CSS AP is an internal service center at Atlas Copco Rock Drills AB serving customers with handling accounts payable tasks. CSS AP serves; Atlas Copco Rock Drills AB, Dynapac Compaction Equipment AB, Atlas Copco Craelius AB and Construction Tools PC AB, which are companies within the Atlas Copco Group. The companies have their own decision-making power of whether they should buy the services from CSS AP, from another internal service center, from an external vendor, or manage the tasks internally. Atlas Copco Business Services is another service center within the group providing similar services internally. CSS AP was founded in 2004 and has at average six full time employees working with invoice handling. The payment CSS AP receives from its customers is based on invoice lines and CSS AP handle at an average 390 000 invoice lines per year and has a revenue of approximately 7 MSEK.

4.1.3 CSS AP's Operations

The key processes for CSS AP are all the steps from invoice registration to payment, and it includes providing support to customers and suppliers. There are two types of invoices; direct order invoices with invoice numbers and indirect invoices without invoice numbers. The direct order invoices should be matched with an order number, and it is accounts payables task to perform the matching. Further, the accounts payable department has the responsibility to allocate the indirect order invoices to the customers who should bookkeep and certify the invoices. After the invoices are matched or bookkept and certified, CSS AP can execute the payment. CSS AP receives paper invoices, EDI invoices, e-invoices and PDF invoices from their customers' suppliers.

The EDI and e-invoices are automatically registered in the system and are automatically matched or sent for bookkeeping and certification. The physical paper invoices are sorted by direct order invoices and indirect order invoices. The indirect order invoices are scanned and sent to the customers for bookkeeping and certification, and the direct order invoices are registered and matched manually by CSS AP. The PDF invoices that include order numbers are printed and then manually registered and matched. The indirect order invoices received on PDF by e-mail are not printed, and are directly sent to the customers for bookkeeping and certification.

4.1.4 The IT investment

CSS AP has invested in a cloud based application, that should help to further automate the invoice handling processes. The automation capabilities are expected to heavily decrease the costs at CSS AP, as well as increasing the quality with more correct matches and bookkeeping on accurate accounts. CSS AP means that if the objective of the investment would merely be to decrease costs it would probably negatively affect the quality of the services. Hence, the

efficiency has to be measured together with the quality and customer satisfaction. The idea is that the new IT investment at CSS AP should first reach stability, secondly reach profitability and finally focus on growth.

4.2 THE STRATEGY, OBJECTIVES AND MEASUREMENTS

4.2.1 The Vision, Mission and Strategy of CSS

Vision	“CSS should be First In Mind – First In Choice [®] as a partner for business support services in Atlas Copco”
Mission	”CSS is a center of excellence and delivers high quality services, continuously improved and always with the customer focus in mind. CSS cooperates with Atlas Copco Business Services where ever applicable and affordable, always with customer’s best as leading guidance.”
Strategy	“CSS should be First In Mind – First In Choice [®] as a partner for business support services in Atlas Copco “ Centre of Excellence. ” The strategy consists of five strategic areas (Customer centricity, process excellence, skilled and motivated people, attractive service offering and reliable delivery, smart and strong partnership).

Table 6. The Vision, Mission and Strategy (Internal business document)

The aim of CSS AP’s operations is to create economies of scale, where the administrative tasks are gathered and investments in technology and competencies can be made since the costs are allocated over more variables. The task allocated on CSS AP is the invoice handling, from received invoice to payment. The major focus for CSS AP is cost and process excellence, where they strive for cost efficiency but also for high quality and continuous improvements. All investment initiatives should initially reach stability, and thereafter reach profitability and finally focus on growth. Growth is important for CSS AP since it makes it possible to increase the economies of scale.

4.2.2 The Financials

Every year the volume of invoices is estimated as well as the cost for handling that volume. The prices are set to cover the cost and result in a *zero bottom line result* at CSS AP. CSS AP has a cost focus referring to decreased *cost/invoice line*. The most significant cost to be covered in CSS AP’s budget is the personnel cost which corresponds to 70% of all costs. Hence, AP CSS has a financial measurement were the *number of full time employees is measured as a cost*. This cost is estimated to decrease after the IT investment.

When it comes to approval of new investment initiatives the group has a policy that says that the investments should have 3 years or less in payback time. For this particular IT investment a business case comprised of present value calculation was conducted to estimate the payback period and the return on investment. The IT investment's *payback time* was estimated to 2 months, but the project has been extended and the cost has increased and the payback period has been prolonged to 6 months. The importance to reach growth is highlighted since it enables higher a degree of economies of scale, which creates cost advantages that is beneficial for the group as a whole.

Measures	Targets
Budget	Zero-result
Cost/invoice line	Decrease
Payback time	2-6 months
Number of full time employees measured as cost	Decrease

Table 7. Financial measurements

4.2.3 The Customers

First of all, CSS AP should target companies using the same ERP system as they have since they have knowledge and models for the integration. CSS AP mainly concentrates on the Swedish customers but it is possible to attract Nordic and American customers, but one prerequisite is that the CSS AP's employees understand the customer's language. The new IT solution creates new opportunities to grow since it is possible to integrate the IT application with several kinds of ERP systems, which the existing technology cannot. However, the service solution must be delivered to units where it is suitable, which is not necessary the case for all divisions in the group. There is a possibility to measure the market shares but they are not used as performance indicators at CSS AP.

The customers buy the services since it is more cost efficient to let CSS AP handle the tasks than to handle them internally. Further, CSS AP offers a low price in comparison to external benchmarks, which is identified as a major competitive advantage. CSS AP has an additional competitive advantage compared to external service providers since they know the processes, rules and policies within the group. The customers can rely on that CSS AP is making the invoice handling as efficient as possible, which is not for granted when using external vendors.

The user friendliness and the quality are important parts of the value proposition and will increase when the new IT application is installed. The accounting quality improvement comes as a result of the user friendliness since it will be easier to find the right accounts in the

bookkeeping process. The bookkeeping of indirect order invoices will be more accurate, and the controllers will not have to make as many corrections. The user friendliness is partly due to the design of the system but also due to the account limits. In the new system the employees bookkeeping the invoices will have customized and limited access to use a set of accounts and cost centers, which should create less errors and better accounting quality. Except for the account limit there will also be an amount limit. Further another quality service improvement is that the certification of indirect order invoices gets faster, much due to the user friendliness and the pre-bookkeeping that is done when entering an indirect order. In addition, the customers' value that the new IT application will have better tools for evaluation and control. It is easier to create reports on proportions of invoices processed and goods consumed before invoiced etc. Further, payment in time is an important aspect of the value proposition.

It is hard to measure the quality of the services and the only existing measure of quality is the customer satisfaction survey. The *customer satisfaction survey* is used to make sure that CSS AP delivers what the customers demand. The surveys consist of several questions producing a Net Promoter Score, which is used as a performance indicator. The Net Promoter Score (NPS) is utilized as a ranking tool (scale range 1-10) where the customers rank CSS AP's services and are subsequently divided into "promoters" and "detractors". CSS AP has a target to reach 25% in their NPS, but they are already at a significantly higher level of 41%. In the surveys the customers have the opportunity to comment on the services.

Measures	Targets
Net promoter score (NPS)	25%

Table 8. Customer measurements

4.2.4 The Internal Processes

The long term objective for CSS AP is to have 100% *electronic invoices* (i.e. no paper invoices) and an important measure is invoices lines per full time employee (FTE). With the implementation of the new IT application one less FTE will be needed at CSS AP. This year's goal is to reach 65 000 *invoice lines/FTE* (55 000 was last year's goal). The *invoice lines/FTE* goal, compared to the amount of electronic invoices, has a maximum level since it could result in adverse effects in terms of too high pressure among the employees and consequently reduced quality. Increased *invoice lines/FTE* is a healthy trend only if it is derived from increased electronic invoices. Further, CSS AP is in need of personnel with system knowledge and capacity to support its customers and suppliers, hence the force of employees should not be heavily reduced.

The largest effect on AP CSS from the IT investment will be the impact on matching process, since it to a large extent is manually handled today. The improvements in the matching process are related to efficiency rather than quality. The new IT application allows the direct

order invoices to be scanned since the system is integrated to a larger extent than before and has the capacity read off the information directly. By scanning the direct order invoices, automatic matching can be performed in the same manner as with the e-invoice and EDI invoices. The aim is that the old manual registration of invoices, the printing of PDF invoices, and the sorting of physical invoices should be removed. Hence the measurement of *proportion of scanned and manually registered invoices* is of interest for CSS AP.

Occasionally the prices on the invoices are not coherent with the orders, and a maximum level of deviation is allowed. When the deviation exceeds that limit it is CSS AP’s responsibility to get in contact with the supplier and handle the deviation. The new IT application on is supportive to detect and reciprocate price deviations, which cause efficiency gains in the matching process. It provides information about on what invoice line the deviation occurs, and adjustments requests can be easily sent to the suppliers, and the system allows AP CSS to monitor when the requested credit invoice is received.

Measures	Targets
Proportion of electronic invoices (EDI, e-invoice, PDF-invoice)	100%
Invoice / FTE trailing 12 months	
Invoice line/ FTE	65 000
Proportion of scanned invoices and proportion of manually registered invoices	

Table 9. Process measurements

4.2.5 The Learning and Growth

For some years ago the most important skill at CSS AP was to be efficient in performing rather basic clerical tasks, but when the IT intensity increased in the processes these tasks became more complex. Hence, the recruitment processes have lately been subjected to find personnel with IT and controlling skills. It has been a step by step change where CSS AP has increased the attention to development of processes, and finding personnel that have the right skills supporting this. Among the employees and managers on CSS AP, there are people that have prior experience with IT projects, as well as people with university education related to business IT. CSS AP has previously been through some smaller IT projects and updating the existing software. The board group accepting the case comprised of managers with experience from consultancy work within business IT. Further, the customers are supposed to learn the new system by using an e-learning portal consisting of a 13 minute video instruction. At CSS AP the co-project leader of the IT investment will be responsible to educate her colleagues in the system.

The economic life of the IT investment is five years, however, CSS AP intends to use the system for 5-10 years. Nevertheless, it is hard to estimate the definite usage in the future since it relies on what other IT projects that are undertaken within the group and the vendor's capacity to properly update the software henceforth. Evaluations have to be done in order to make sure that the processes keep up with the development and stay modern. Designated managers will have responsibility to report at least quarterly to the board group about investments initiatives, or necessary reconfigurations of the system.

Except for the direct improvements from the IT investments in terms of efficiency and quality, it creates future opportunities for CSS AP to incorporate additional value added tasks related to attractiveness in service offering and reliable delivery. For instance, it could be increased interaction with customers that repeatedly makes the same mistakes, and provide the customer with the right tools for better execution and corrections.

5. DISCUSSION

This chapter includes a discussion on how multidimensional cybernetic control systems can be used to capture the complexity of IT and improve strategic alignment and in turn realize the benefits of IT investments. IS research is putted in a MA context to identify the complexity of IT in terms of benefits. The chapter will primarily discuss the overall alignment between the business and the IT investment at the case unit. As a second step the multidimensional cybernetic control system applied in the analytical model (Figure. 1), is used to divide the strategy into components to closer study the alignment. Further, the relationship between the components in the control system will be discussed and at last the strategic emphasis. The discussion provides a roadmap, which is showing the way towards the conclusion.

5.1 STRATEGIC ALIGNMENT

5.1.1 The Strategy

Luftman and Kempaiah (2007) and Ward, Daniel and Peppard (2008) argue that the benefits of IT investments should be connected to specific business goals. The strategy of the IT investment at CSS AP is similar to the business strategy including key objectives such as reduce cost, growth, increase quality and the IT investment in itself could be seen as a continuous improvement initiative. Further, the IT investment in the invoice handling application aims to follow the overall strategy to first reach stability followed by profitability and then growth. At a first glance CSS AP seem to have succeeded in aligning their business and IT strategy, which is a prerequisite to achieve overall strategies and goals (Prasad, Green and Heales, 2012), better firm performance (Wu, Straub and Liang, 2015) and business value (Kohli and Grover, 2008) from the IT investment.

5.1.2 The Financial Perspective

The results of this study show that CSS AP has a zero bottom line budget and uses the measurements; payback time, FTE measured as cost and cost/invoice line that are similar to those that are used in previous research about IT investments, for instance the labor costs measurement applied by Mooney, Gurbaxani and Kraemer (1995) and Anand, Wamba and Sharma (2013) and the measures; cost per output unit and clerical labor costs used by Chaya and Mitra (1996). These are primarily connected to the productivity financial theme defined by Kaplan and Norton (2001), which is a component captured in the multidimensional cybernetic control system. Benefits of IT investments that result from productivity improvements are referred to as automational benefits according to Mooney et al. (1995). Another measurement included in the productivity financial theme developed by Kaplan and Norton (1996) is *cost versus competitors*, which is similar to the relative cost measurement presented by Barua et al. (1995) to capture the benefits of IT. Hence, this measurement could be supportive in better capturing the complexity of IT in the case of CSS AP since they

emphasizes productivity improvements. These measurements reflect process level improvements in financial terms and are therefore included in the financial perspective developed by Kaplan and Norton (1996). Kaplan and Norton (1996) argue that the steps to reach the financial success should be identified in all the perspectives, hence process level measurement contributing to the financial outcomes will be presented in the other perspectives.

The results of this study show that growth is an important financial objective of CSS AP since it creates economies of scale. The multidimensional cybernetic control system developed by Kaplan and Norton (1996) includes measurements connected to the product mix and growth financial theme, hence it can be supportive in capturing the objective of growth at CSS AP. Nonetheless, the non existing profitability focus made the suggested measurements in the financial perspective of the multidimensional cybernetic control system created by Kaplan and Norton (1996) applicable only to a limited extent. According to Devaraj and Kohli (2000) the measurements should be firm specific, and the measurement; *share of targeted customers* presented by Kaplan and Norton (1996) is related to the revenue expansion benefits of IT presented by Mithas and Rust (2016) and would match CSS AP’s long term objective of growth. What leads to the growth opportunities are further elaborated in the sections 5.1.3 and 5.1.6. This indicates that the IT investment in the case of CSS AP, affects both growth and productivity in the financial perspective, and therefore demonstrates the complexity of IT in terms of more benefits in this particular perspective. This constitutes the initial step in capturing the complexity of the IT investment in a cybernetic multidimensional control system, which improves the strategic alignment and in turn realize the of benefits of the IT investment.

The firm level performance in the case of CSS AP is the financial performance of the shared service unit and IS literature express that the aggregated benefits of IT investments at the process level contribute to the firm level performance (Barua, Kriebel and Mukhopadhyay, 1995; Mooney et al., 1995). In similarity, Kaplan and Norton’s (1996) multidimensional cybernetic control system provides a logic explanation where improvements in the other perspectives lead to the financial objectives. The relationship between the strategy, financial objectives and the other perspectives will be further discussed in section 5.1.6.

Measures capturing the complexity in the financial perspective
Share of targeted customers
Cost vs. competitors
Cost/Invoice line*
Payback time*
FTE measured as cost*

Table 10. Measures capturing the benefits in the financial perspective
 *Current measures at CSS AP

5.1.3 The Customer Perspective

CSS AP applies a customer satisfaction measurement (NPS), which is constitutes to the image of the firm in the multidimensional cybernetic control system according to Kaplan and Norton (1996). The surveys that this measurement is based on, include open responses from the customers, hence it potentially also captures the customer relationship. The customer relationship is an important part of CSS AP's value proposition and a previous study has showed that IT investments can have an impact on the customer relationship (Mooney et al., 1995), and the customer relationship is connected to the performance outcome of customer retention in the multidimensional cybernetic control system according to Kaplan and Norton (1996). The results show that the studied IT investment is complex i.e. it will lead to several improvements of the customer value. This insight is derived since the ensemble view of IT pronounced by Orlikowski and Iacano (2001) was adopted. The ensemble view incorporates the benefits of IT in a broader context which in this section refers to the impact on people in terms of customers.

CSS AP articulates the market segments, target groups and the new opportunities to grow with the new IT application, which are considered in the customer perspective in the multidimensional cybernetic control system developed by Kaplan and Norton (1996). However, Kaplan and Norton (1996) suggest that performance outcomes as well as complementing drivers have to be identified to create strategic alignment. Several measurements are suggested by Kaplan and Norton (1996) but what measurements that are appropriate depends on the context according to Xue, Ray and Sambamurthy (2012) and they should be firm specific (Devaraj and Kohli, 2000). For instance, the results of this study articulates benefits of the investment in terms of growth due to IT's ability to integrate more systems, which can be seen as a functionality aspect in the service attributes of the customer perspective created by Kaplan and Norton (1996). Taking these results into consideration measurements like *expanded market segments* and *expanded target group* presented by Kaplan and Norton (1996) in the multidimensional cybernetic control system, could be applied to capture the benefits. According to Kaplan and Norton (1996) the steps to reach financial success should be identified. In the case of CSS AP these measurements can be seen as steps to reach the financial success in terms of the long term objective of growth. These measurements contribute to the customer acquisition according to Kaplan and Norton (1996) and could moreover constitute as what Kaplan and Norton (1996) refer to as performance outcomes, of the benefits in terms of service attributes discussed below since they also are connected to growth. Hence, the measurements of expanded market segments and expanded target group are in this aspect what Mooney et al. (1995) and Barua et al. (1995) refer to as aggregated performance measurements and cannot be connected to any of the direct benefits of IT investments articulated by Mooney et al. (1995)

The most significant advantage of applying the multidimensional cybernetic control framework in the case of CSS AP is its ability to capture the quality in terms of measurements of the service attributes, which are suppose to drive the customer acquisition according to

Kaplan and Norton (1996). In the case of CSS AP, which is having a zero bottom line budget (no profitability objective), the price attribute presented by Kaplan and Norton (1996), is directly translated to the efficiency in the process perspective, hence it will not be discussed further in this perspective. The results of this study articulate the user friendliness of the IT application and its ability to create benefits in terms of accounting quality, efficiency at the customer side, payment in time and good reports. The multidimensional cybernetic control systems could be supportive in capturing such benefits due to the inclusion of measurements of service attributes in the customer perspective. These benefits are similar to the measurements suggested by the IS literature in terms of informational benefits and automational benefits (Mooney et al., 1995), which is further elaborated below. Moreover, the quality of the services in terms of service attributes is similar to the product quality measurement used by Banker Bardhan, Chang and Lin (2006) in their research to capture the benefits of an IT investment.

The first service attribute; accounting quality, is created through the application's ability to make the customers to create less errors by increasing the user friendliness through providing account and amounts limits, which is referred to as informational benefits by Mooney et al. (1995). The improved accounting quality could be captured in performance indicators as implied in Kaplan and Norton's (1996) framework. Moreover, measurements of benefits from IT should be firm specific according to Devaraj and Kohli (2000), hence for CSS AP these performance indicators could be reflected in the *number of corrections by controllers* and the *amount bookkept on residual categories*. The customers probably bookkeep the invoices on residual accounts or on incorrect accounts when they are not certain about what accounts to use. If it is easier to find the accurate account, it can be expected that a larger amount of bookkept invoices will be correctly allocated and therefore the value on the residual accounts will decrease as well as the corrections by the controllers. The second service attribute that could be captured by measurements in the multidimensional cybernetic control framework is the time saving in the bookkeeping and certification processes for the customers that is possible due to the increased user friendliness. These can be seen as an efficiency improvement at the customer side, if compared to the benefits of IT presented by Xue et al. (2012), and it is what Mooney et al. (1995) refers to as an automational benefit of IT. Xue et al. (2012) argued that the measurements of benefits from IT, varies with the context. At CSS AP, the efficiency improvements at the customer side could for instance be measured in; *amount of overdue fees from indirect order invoices* and *payables turnover*. These measurements would not only be what Kaplan and Norton (1996) refer to as performance outcomes of the efficiency, but also what Kaplan and Norton (1996) refer to as performance drivers of the third service attribute of payment in time.

CSS AP articulated the benefit of the application's ability to create good reports, which is an informational benefit according to Mooney et al. (1995) and could be referred to as another service attribute in the multidimensional cybernetic control system developed by Kaplan and Norton (1996). A decision quality measurement could capture such benefits since managers can make better decisions with improved information in terms of good reports according to Mooney et al. (1995). The results of this study show that the reports will provide better

information about for instance proportions of invoices processed and goods consumed before invoiced. Decision quality measurements connected to these firm specific improvements could reflect this benefit and capture it in the multidimensional cybernetic control system. For instance, improvement in decision making in terms of cost control could be seen since the financial managers are provided with better information about the current costs. The financial managers can detect when a unit risks to exceed its cost budget and take action in terms of timely purchasing stops or warnings. Hence, less deviations between estimated and actual costs will occur, and this could be reflected in the measurement *number of budgets exceeded*. This would be what Devaraj and Kohli (2000) refer to as a firm specific measurement of the informational benefit of IT, which is achieved from the better reports articulated in the results of this study.

The benefits considered in the customer perspective show that the IT investment impact people in terms of customers in the context of the IT investment, hence it indicates the impact of IT is shown in numerous dimensions, and therefore demonstrates and reveals the complexity of IT in this particular perspective. The benefits can be captured by viewing the IT investment from a multidimensional cybernetic control system point of view, due to its inclusion of measurements in the customer perspective. By capturing the benefits in this perspective the strategic alignment can be improved and in turn, the benefits of the IT investment can be realized.

Measures capturing the complexity in the customer perspective
Expanded market segments
Expanded target group
Number of corrections by controllers
Amounts bookkept on residual accounts
Amount of overdue fees of indirect order invoices
Accounts payables turnover
Number of budgets exceeded
Net promoter score*

Table 11. Measures capturing the benefits in the customer perspective

*Current measures at CSS AP

5.1.4 The Internal Process Perspective

CSS AP puts emphasis on the process measure invoice line/FTE, which can be viewed as what Kaplan and Norton (1996) define as a performance outcome, since there are according to the results of this study several other indicators that contribute to the result of this measure.

Kaplan and Norton (1996) define indicators as “performance drivers” and one important performance driver at CSS AP is the proportion of electronic invoices, since it contributes to the performance outcome invoice line/FTE. Another performance driver is the proportion of scanned invoices relative to the manually handled ones. The process level measures in this perspective (Kaplan and Norton, 2001) are recommended by IS researchers (Barney, 1991; Barua et al., 1995; Mooney et al., 1995; Xue et al., 2012; Anand et al., 2013) since it captures the direct benefits of IT investments.

The measurement of the benefits from IT should be firm specific (Devaraj and Kohli, 2000), individually evaluated (Mooney et al., 1995; Barua et al., 1995) and adopted to the context (Xue et al., 2012). The results show that the IT investment in the invoice handling application will significantly improve the handling of deviations, which possibly could be seen in an individually designed measurement like *number of credit invoices from suppliers* since the suppliers will be forced to send more credit invoices when deviations are detected. The measurement would be what Kaplan and Norton (1996) identify as a driver of the performance outcome invoice lines/FTE, since it affect the efficiency in the invoice handling process. Such efficiency improvements are what Mooney et al. (1995) refer to as automational benefits. Further, the application produces information about the deviations and that is what Mooney et al. (1995) refer to as an informational benefit. According to the results of this study the information about the deviations is expected to increase the accounting quality, which is another informational benefit that could be captured in the process perspective of the multidimensional cybernetic control system. Nevertheless, as far as the results of this study show, the information will not be significant in decisions regarding new processes and therefore it cannot be considered as transformational.

Another potential performance driver of the outcome invoices lines/FTE that the multidimensional cybernetic control system could capture in the process perspective is the *amount of overdue fees of direct order invoices*. It measures another benefit of efficiency improvements in the matching process articulated by CSS AP which is an automational benefit of IT according to Mooney et al. (1995). As shown several benefits of the IT investment are identified which indicate that the IT investment impacts various aspects in internal processes, hence the complexity of IT is demonstrated and revealed in the process perspective. By capturing the complexity in the process perspective of the multidimensional cybernetic control system, strategic alignment can be improved in this aspect and benefits of the IT investment can be realized.

The identified critical measurements are primarily connected to the short wave value creation since they concern operational efficiency and not innovation, even though Kaplan and Norton (1996) suggest that companies should focus on both the long wave and shortwave value creation. Further, Mooney et al. (1995) articulates that firms could achieve transformational benefits of IT in terms of innovation. Nevertheless, there is no long wave value creation connected to the IT investment at CSS AP, since it is not suppose to result in new processes of innovation. The control system’s ability to capture the complexity in this particular aspect could therefore not be analyzed.

Measures capturing the complexity in the internal process perspective
Number of credit invoices from suppliers
Amount of overdue fees of direct order invoices
Invoice lines/FTE*
Relative amount of electronic invoices*
Proportion of scanned and manually handled invoices*

Table 12. Measures capturing the benefits in the internal process perspective

**Current measures at CSS AP*

5.1.5 The Learning and Growth Perspective

Kaplan and Norton's (1996) framework shows that the components in the learning and growth perspective in the multidimensional cybernetic control system could be supportive in capturing the complexity in terms of necessary resources to create value and continue to improve. Several complementary initiatives such as training and planning for future reconfiguration and investments are identified at CSS AP. For instance CSS AP's seeking for the right personnel as well as competent management could be seen as what Kaplan and Norton (2008) define as strategic initiatives. Human and management initiatives are those defined as necessary to control the IT investment and support realization of benefits (Barney, 1991; Masli, Richardson and Sanchez, 2011; Saunders and Brynjolfsson, 2016). Further, CSS AP articulates opportunities to reach transformational effects of the IT investments (Mooney et al., 1995) in terms of focusing on other value added tasks in their service offering in the long term. Nevertheless, the IT investment in itself would not lead to such changes; hence further elaboration of this topic is out of scope of this thesis.

The aspects included in learning and growth perspective are highly relevant to reach business value from IT since they can be identified in terms of IT investments and IT capabilities. This perspective could define the investment in resources that should fill the gap between the existing resources and the objectives in the other critical perspectives to enhance long term success and competitive advantage (Kaplan and Norton, 1996). Hence, it cannot be further elaborated before drawing the cause and effect relationship between the perspectives.

5.1.6 The Strategy Map

The aim with analyzing the cause and effect relationships between the perspectives through the multidimensional cybernetic control system was to determine if it is helpful in capturing the complexity of the IT investment through all perspectives to enable analysis of strategic

alignment. The multidimensional cybernetic control system aiming to improve strategic alignment should answer the question “do I understand the strategy by only looking at the framework?” according to Kaplan and Norton (2001)

It was evident that CSS AP’s operational measures are aligned with their cost focus, the process excellence and cost efficiency objectives articulated in their strategy. The performance of the cost focus can be referred to as automational benefits expected from IT investments defined by Mooney et al. (1995). The multidimensional cybernetic control system could show how the financial objective to reduce cost per invoice line and the cost of employees, are connected to the price in the service attributes in the customer perspective, which is connected to the measure invoice line/FTE in the internal process perspective, and is finally possible due to the investment in IT and IT capabilities in the learning and growth perspective. Further, the efficiency could lead to payment in time, which is another aspect of the services attributes. The multidimensional cybernetic control system was helpful in capturing that CSS AP succeed in aligning the cost focus strategy with the IT investment. Additionally, it was supportive in identifying some performance drivers and outcomes that are necessary in order to arrive in a complete alignment (see 5.1.2 and 5.1.4).

Yet, the price is only a fraction of the value proposition, and the customers value other aspects of the services. By using the multidimensional cybernetic control system as a lens to capture the complexity, in terms of measurements of the benefits of the IT investments, the cause and effect relationship, and the strategic alignment between the perspectives could be analyzed. For instance, the quality of the services is an important part of the value proposition and it is expected to be improved with the IT investment, which is in line with CSS AP’s strategy that enhances the importance of the quality. Thus, the resources in terms of the IT investments service attributes are in place for quality improvements but the benefits can not be realized if they are not aligned throughout all the perspectives. CSS AP has communicated such benefits of the IT investment, but they are not connecting them to specific business goals, which is needed to create strategic alignment according to Luftman and Kempaiah, (2007) and Ward et al. (2008). As exemplified above the multidimensional cybernetic framework is useful to translate the strategy into explicit goals and key measures (Kaplan and Norton, 2001), which according to Kaplan and Norton (1992; 1996) identify the steps to reach financial success that is similar to the process approach in IS research where the process improvement can be aggregated to firm level performance (Barua et al., 1995; Mooney et al., 1995). For instance, in the case of CSS AP, the quality objectives of the services could be divided into operational goals as improved accounting quality, efficiency at the customer side and better reports. These goals could be measured in less bookkeeping on residual accounts, number of credit invoices from suppliers, less overdue fees and number of budgets exceeded. As argued in previous sections those measurements capture informational and automational benefits of IT presented by Mooney et al. (1995). The quality improvements could lead to acquisition of customers measured in share of targeted customers, which creates financial success in terms of growth and contribute to the overall objective of economies of scale. This measurement together with the measurement of expanded market segments would be supportive in capturing benefits in terms of growth as explained in 5.1.3. The multidimensional cybernetic control system developed by Kaplan and Norton (1996) was supportive in capturing

complexity of IT by measuring several automational and informational benefits of the IT investment articulated by Mooney et al. (1995) in the perspectives. The cause and effect relationship could be drawn by using the information in the perspectives, hence the strategic alignment could be improved and in turn the benefits of IT could be realized.

5.2 STRATEGIC EMPHASIS

By viewing the goals presented in objective metrics in the results of this study it is obvious that CSS AP's dominant strategy is cost reduction, which comes as a result of the automational benefits from IT investments in line with Mooney et al. (1995) research. The cost reduction is one out of the three strategic emphasis according to Mithas and Rust (2016). Mithas and Rust (2016) argue that the strategic emphasis, as well as the use of the IT resources will have an affect on the business value achieved from the IT investment. Moreover, the strategic emphasis affects organizational changes (Barua, Lee and Whinston, 1996; Kohli and Hoadley, 2006; Cederlund, Kohli and Sherer, 2007; Kohli and Grover, 2008; Kohli and Johnson, 2011). Firms usually chose a particular strategy while forsaking others to create a unique combination that is harder to imitate for competitors (Porter, 1996). Nevertheless, by only focusing and measuring the cost reduction improvements, opportunities to reach potential organizational changes and to gain higher value from the IT investments are reduced for CSS AP. Mithas and Rust (2016) showed that firms that focus both on revenue and cost reduction receive higher value, and therefore a simultaneous revenue and cost focus is preferable. Tallon (2007) also support the multi-focused strategy. The multidimensional cybernetic control system is supportive in capturing the complexity in terms of measurements of Mooney et al.'s (1995) automational and informational benefits of the IT investment, and thereby shows that there are opportunities to adopt dual emphasis without any investments in additional resources. CSS AP has the IT-capabilities in place and the IT investment already allows for both revenue expansion and cost cutting and therefore CSS AP do not have to face the difficulties concerned with the dual emphasis brought up by Mithas and Rust (2016) and Ross and Beath (2002). The dual emphasis could lead to better competitive advantage (Barua et al., 1996; Barua and Mukhopadhyay, 2000), and more benefits from the same investment (Kaplan and Norton, 2006), which would be valuable for CSS AP. However, CSS AP mention that they have the idea that the investment in the IT application first should be stable and profitable and then they can focus on growth and other value added activities, and this is what Mithas and Rust (2016) refer to when they explain that some projects start with cost reduction focus and then the growth opportunity comes as a second order effect. The multidimensional cybernetic control system can capture the steps to reach the long term objective of growth.

5.3 SUMMARY OF THE DISCUSSION

The discussion of this thesis is summarized in the analytical model below. The figure presents the measurements capturing the complexity of IT, which were found by combining MA and IS research.

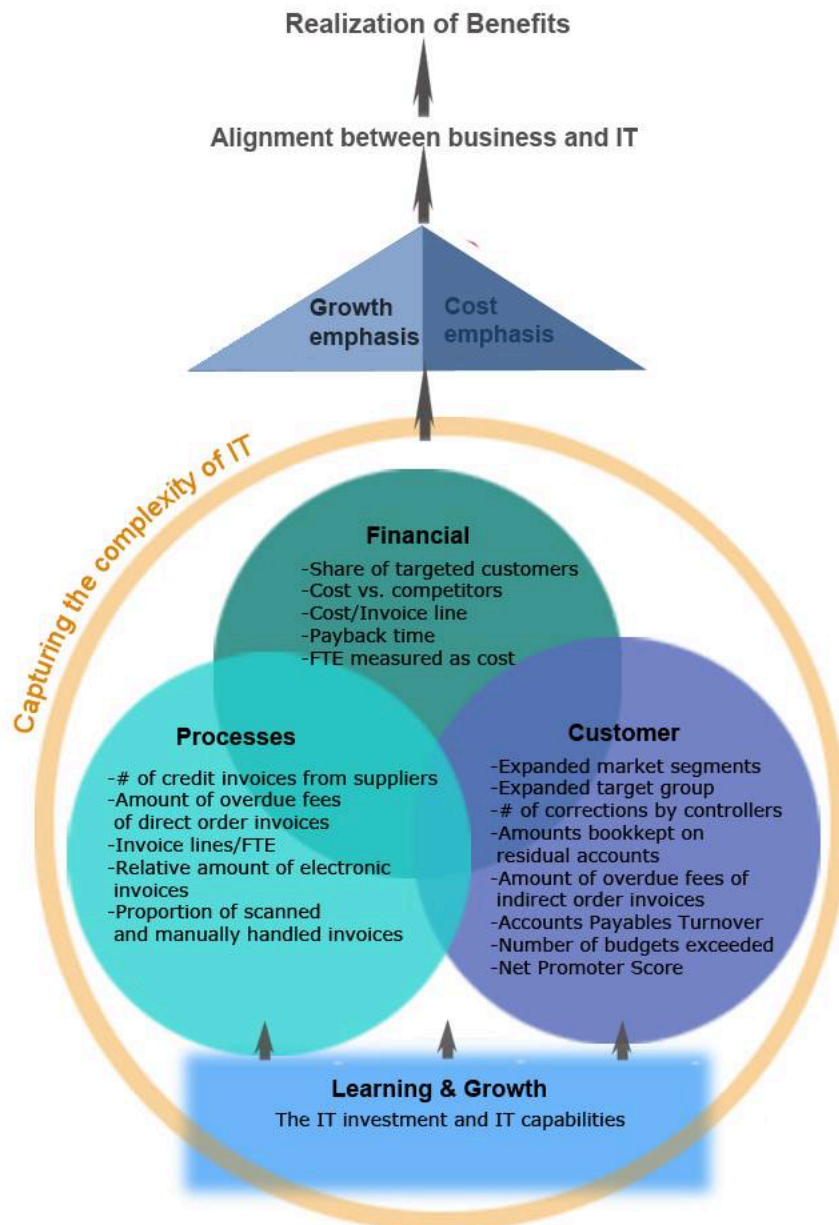


Figure 3. Summary of the discussion in the analytical model

6. CONCLUSION

This study shows that multidimensional cybernetic control systems can be supportive in capturing the complexity of IT. The complexity in terms of benefits of IT and IT capabilities were captured in the dimensions of the multidimensional cybernetic control system by using firm specific measurements. The system was thereafter helpful to identify whether there were divergences between the articulated strategies and the executed strategies presented in the operational measures, and created awareness of several aspects, where the alignment between business and IT could be improved. Hence, by capturing the complexity, the strategic alignment was manageable that in turns created opportunities to realize the benefits of the IT investment. Further, the multidimensional cybernetic control system applied includes components that illuminate the way of how IT can be used to reach both growth and cost reduction. Hence, this study shows how such system could be supportive to capture possibilities to use a dual strategic emphasis, which creates opportunities to reach higher value from IT investments. In summary this thesis contributes with knowledge about how a multidimensional cybernetic control system can assist in defining what is in the black box of IT in order to make it manageable and in turn realize the benefits of IT investments. In the multidimensional cybernetic control system automational and informational benefits of IT were identified while transformational benefits were missing due to the characteristics of the IT investment. Further, some components connected to innovational aspects and financial measurements in the multidimensional cybernetic control system was not of relevance for the studied IT artifact. Hence the control system's ability to capture the complexity of these particular components and potential benefits could not be studied.

This study provides evidence on how IS and MA research can be combined to investigate how firms can reach strategic alignment between business and IT and in turn realize benefits of IT investments. The aspects considered in the multidimensional cybernetic control system were in several ways similar to the ones presented in IS research. The case study showed what specific impacts an IT investment can have on an organization and on its surrounding by identifying benefits articulated in IS research and put them in a MA context. IS researchers apply a measurement approach where process level measurements are aggregated to firm level performance, which is similar to the methodology of defining the steps to reach financial success used in MA research. The process level measurements used by IS researchers could be applied in MA research to complement it with knowledge about benefits of IT. By comparing the two research streams with the results of this study it was found that the measurements developed in IS research for capturing internal benefits also were appropriate to measure external benefits of IT in the value proposition at the customer's side, which are critical to include to enable control of the IT investment and in turn realize the benefits. Further, MA research enhance the importance of managing firms' resources that corresponds to the discussion about IT capabilities in IS research. This study shows that IS and MA research are similar in many aspects, but that they also have complementary components; hence they should take use of each other's findings.

7. LIMITATIONS AND IMPLICATIONS

In this chapter the limitations of the study will be presented followed by implications for research and practice.

7.1 LIMITATIONS

Malina and Selto (2001) discussed about the deficiencies with the BSC and emphasized the risk of creating inaccurate and/or subjective measures. They debated about the uncertainty in communication due to absence of employee participation and the use of inappropriate benchmarks. Nevertheless, the largest issue when adopting the BSC is the probable resistance in the organization and the incorporation of wrong key factors. Norreklit (2003) pronounced additional criticism of the BSC regarding absence of logic and lack of relevance in customer proposition and the cause and effect linkages. These deficiencies with the BSC framework are highlighting the limitations of this study, which the readers should have in mind when using the findings of this thesis.

7.2 IMPLICATIONS FOR FUTURE RESEARCH

The first implication for future research of this study is that the complexity of IT can be captured through measurements in multidimensional cybernetic control system, which enables control of strategic alignment between business and IT. The second implication is that strategic alignment as well as strategic emphasis, are contextual factors that are important to consider to realize the benefits the of IT investments. The third implication is that there are similarities between IS and MA research, but that they also complement each other. By mixing the findings from the research streams, efforts and resources can be saved when defining how firms should manage their IT resources to realize the benefits.

7.3 IMPLICATIONS FOR PRACTICE

This research contributes with implications for practice suggesting managers to take a multidimensional cybernetic approach to capture the complexity of IT and make IT manageable. The multidimensional approach can help managers to improve strategic alignment between business and IT through identifying several measurable performance outcomes and drivers, connected to both revenue and cost. By improving the strategic alignment managers can realize the benefits of the IT investment.

8. FUTURE RESEARCH

The suggested future research should preferably be conducted by mixing findings from IS and MA research, since they are similar in several aspects but simultaneously include complementary components. By intertwining the knowledge the contributions of future studies can be improved.

Orlikowski and Iacono (2001) enhanced the importance to theorize about IT to understand its implications and make it matter in research. Under the ensemble view, IT is defined as a black box where there is a need to define what is in the box to make it functionate (Latour, 1987). In the black box there are techniques, applications and people in their social context (Orlikowski and Iacono (2001). Hence, IT includes several different aspects, which makes it very complex. This research provides further evidence on that the IT is complex since the benefits were captured in numerous perspectives. Hence, The benefits were not uncatchable or abstract only an appropriate control tool that fitted to the context had to be applied. Cybernetic control systems are characterized by quantifiable measures, standards or targets, comparisons between standards or targets with outcomes, variance analysis and modification of the systems or behavior (Green and Welsch, 1988). This study shows that the value from IT can be captured in this kind of control systems, but occasionally it was difficult to find accurate measures and to draw the cause and effect relationship between them, which also are expressed in the criticism of the control framework this research is based upon. Further some aspects of the control system was not of relevance in the case studied. Hence, research should focus on developing similar control systems but that is easier to apply. The control systems should preferably also be customized for different kinds of IT investments in various contexts. By continue to use multidimensional cybernetic control systems as a lens to embrace and dig deeper into the complexity an avenue for more benefits of IT can be illuminated.

Strategic alignment has been proved to be a prerequisite to achieve of value from IT (Kohli and Grover, 2008), and to achieve superior performance from IT. In this study, the managers seem to have understood the importance of aligning the business strategy with the IT strategy, since they are articulated in similarity. However, this study shows that it is of relevance to study the alignment on a molecular level, since the articulated strategies were not entirely coherent with the executed strategies. As a consequence researchers should rethink about how strategic alignment is conceptualized. Qualitative studies should be conducted to investigate the consistency between the articulated and the executed strategies, to define metrics measuring the strategic alignment. A clear conceptualization of the strategic alignment is extremely important to make the results of future quantitative studies correct, unbiased and valuable.

Mithas and Rust (2016) argue that dual emphasis should be applied to achieve maximum value of the IT investments. The study provides evidence of that even though firms have a planned strategic focus (cost, revenue or dual) with their IT investments, benefits disconnected to that focus possibly exists. These benefits can be incorporated as basic product or service attributes of the initial IT investments and they can be achieved without any

additional investments. The strong focus on the initial idea with the IT investment may cause that benefits connected to other strategic focuses are lost. This study shows how an IT investment with a clear productivity focus simultaneously has considerable effects on the growth and revenue side of the business. Further research should be conducted to investigate whether IT investments with a clear revenue or growth focus have an equivalent impact on the productivity and cost side of the businesses.

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9.2 STATISTICS

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APPENDIX

INTERVIEW GUIDE

GENERAL

- What are CSS AP's main tasks?
- What are the objectives with the IT investment?

STRATEGY, MISSION & VISION

- What is the strategy, mission and vision of CSS AP?

THE FINANCIAL PERSPECTIVE

- Does CSS AP have any financial goals?
- Does CSS AP have any financial goals when it comes the IT investment?
- Does CSS AP have any measurements capturing these objectives?

THE CUSTOMER PERSPECTIVE

- What are CSS AP target groups and market segments?
- How will the IT investment impact the target groups and market segments?
- What is CSS AP value proposition and competitive advantage?
- How will the IT investment affect the value proposition and the competitive advantage?
- How will CSS AP measure the IT investment's impact on the target groups, market segments, value proposition and competitive advantage?

THE PROCESS PERSPECTIVE

- What are processes must CSS AP excel at?
- How will the IT investment impact the processes at CSS AP?
- Will the IT investment create any new processes?
- How will CSS AP measure the impacts on the processes?

THE LEARNING AND GROWTH PERSPECTIVE

- What IT competencies and backgrounds have the employees at CSS AP?
- What IT competencies and backgrounds have the managers for CSS AP?
- Have any educational initiatives been undertaken in connection to the IT investment?

- How long is the economic life of the IT investment?
- For how long is CSS AP planning to use the software?
- Does CSS AP plan to update the software?
- How will CSS AP operations look in the future?
- What plans does CSS AP have for the future operations?