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ORGANIZATIONAL AND PERFORMANCE CONSEQUENCES OF MANAGEMENT CONTROL SYSTEMS

ERP in small service companies

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Tiivistelmä – Abstract
The purpose of this thesis was to provide knowledge on the organizational and performance consequences of management control systems. The examination into prior literature yielded information on the benefits and challenges related to ERP systems, the position of ERP systems in the overall control environment of the company, and how ERP influences the ensemble of management control systems. By leaning to the prior work of Chapman and Kihn (2009), a survey research was conducted aiming to discover if information system integration (ISI) embedded in ERP supported the enabling approach to management control, and whether this in turn would result into higher performance and perceived system success. The survey data consisted of 42 small service companies in the building technology industry with a particular ERP system in use. Contrary to the prior research, the results of the Pearson's correlation analysis did not provide support for the relationship between ISI and the enabling approach to management control. This may be caused by the low level of integration in the system. However, the results indicated a statistically significant relationship between the enabling approach to management control and perceived system success. This suggests that by endorsing the enabling approach to management control satisfaction towards the system can be enhanced. Partial support was provided for the relationship between the enabling approach to management control and market performance. The link to financial performance remained unproven which is typical in researching small companies.
While this research has several limitations concerning for example the small dataset of the survey, the results seem to coincide with the results of earlier research thus offering valuable insight into the use of ERP systems.

Key words
Management control systems, MCS, enterprise resource planning systems, ERP, AIS

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CONTENTS

1 INTRODUCTION

1.1 Motivation

The information society we live in has come to mean extensive reliance on information systems. People and technology have connections that not many people would have seen possible a few decades ago. While the evolution of technology's role in accounting functions has not been as drastic as in some other fields, gradually companies are opening their doors to electronic invoices and more sophisticated accounting information systems. For example in Finland, the use of ERP systems has raised from 16 per cent (2009) to 33 per cent (2012) in four years (FIGURE 1). Although the use of ERP systems has become common in organizations of all sizes, it is noticeable that the bigger the company the more frequent the use of ERP is. There are several reasons for this (e.g. big investment, demands heavy resources etc.).

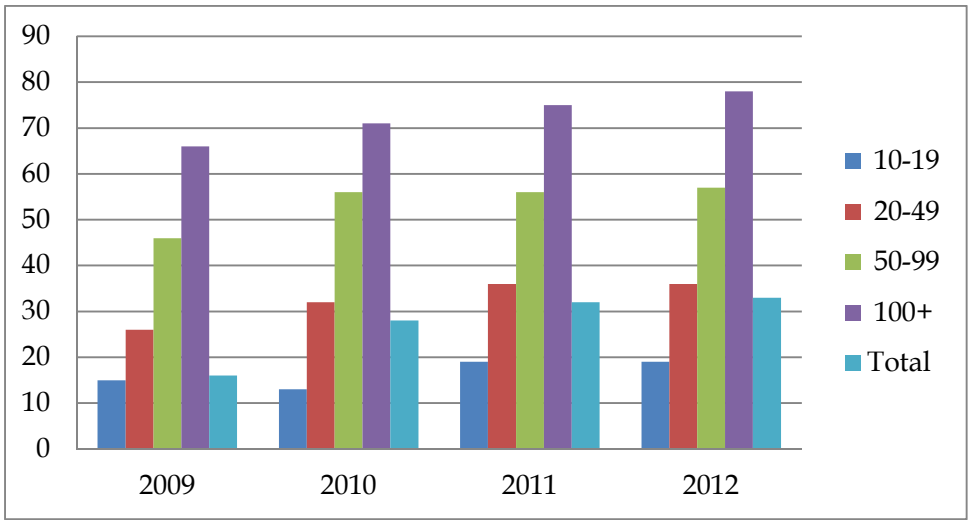


FIGURE 1: Enterprises using ERP in Finland (Tietotekniikan käyttö yrityksissä 2009, 2010, 2011, 2012)

The progress that has taken place in the accounting information systems includes several main points. In short, before the only people who used the accounting information systems were the accountants themselves, the information was typed into the systems from paper receipts and invoices, and then reports were compiled from this information and passed on to the people who needed them. Today, we have electronic invoices and integrated systems where the information flows from one module to another without having to type them into a

multitude of places. Furthermore, automation and the use of bar codes for example have shifted some of the routine tasks from people to computers. Similarly, the users of the systems have multiplied in numbers. This is demonstrated by the fact that data is put into the system by employees in different departments as they do their daily work. Moreover, you do not have to be an accountant to get the report you need out of the system.

Yet another element affecting the use of accounting information systems is the supply of package systems. Today there is no need to have an in-house IT expert to make the application from scratch. This has enabled smaller companies with fewer resources to benefit more from IT also.

All these changes have brought the world to a point where the benefits are within the reach of the companies. But at the same time, in order for the companies to enjoy them they have to get the people to use the systems. People who do not necessarily know how to use them let alone want to. Consequently, companies need to assign their resources not just to buy the software but also to train their staff. Despite the fact that people are using technology more and more in their daily routines, it is still a different thing to use the technology in the work place, especially if it means more work than before, more formalized routines and more errors to fix. This is a real challenge for enterprises all around the world.

1.2 Prior research

Since information technology plays a major role in today's corporate world, it is important to have extensive research material on the subject. Furthermore, research on accounting information systems has raised a great deal of discussion. One of the main points in particular has been the gap between the points of view of information technology and management accounting (Granlund 2011, 3). In a research note by Granlund (2011) several key points are presented about this gap. For example, he criticizes prior research for being unsuccessful in describing the current work practices of management accountants. This, he claims, leads to a situation where the information produced is simply not useful for the practitioners of management accounting. Another matter portrayed as insufficient is the analysis made on the role of information technology in a wider ensemble of management control systems, i.e. the role IT has in the totality, and the ways it affects the other components of the control system (Granlund 2011, 15).

By looking at the narrower field of AIS research; ERP research, it can be seen that prior research has quite heavily been concentrated on the implementation phase and on the other hand on the critical success factors of the implementation. For example, Doom et al. (2010, 380) found over forty possible critical success factors from prior research. They divided them under five categories: 1) vision,

scope and goals, 2) culture, communication and support, 3) infrastructure, 4) approach, and 5) project management.

Another area of interest has been to examine the benefits of ERP system and the overall effects that the system has. This kind of research takes place usually when the system has been in use for a while. In chapter 2.3 some results are presented from the research articles "Assessing and managing the benefits of enterprise systems: the business manager's perspective" by Shang & Seddon (2002) and "ERP in action – Challenges and benefits for management control in SME context" by Teittinen et al. (2012).

Yet another line of ERP research concentrates on the selection phase of ERP systems. When it comes to different contexts the main focus has clearly been on large companies, although recently, a rise has occurred in the research among small and medium sized companies. Similarly, the manufacturing businesses have quite a strong representation compared to service industry (e.g. Chenhall 2007 demands more research into service and non-profit organizations). Another situational factor that has been present in prior ERP research is the motivational aspect. For example, Velcu (2007) divided the implementation of ERP systems into business-led implementation and technologically led implementation and concluded that these two starting points affect the implementation process in a way that in the end the perceived benefits differ from each other.

Finally, another way of looking at the research field concerning ERP is the one by Dechow and Mouritsen (2005, 692). They divide literature on ERP into three strands based on the specific research interest of the field. The first segment is interested in the implementation phase. The focus here is to find a learning curve which would explain the time lag between the implementation and the realized benefits. The second strand is concerned with performance and asks whether ERP will work. And last, the third line of research focuses on how ERP technologies are made to work as 'systems'.

1.3 Research question

This particular thesis is concerned with the organizational and performance consequences of management control systems. By applying the framework of enabling formalization by Adler and Borys (1996) and using it in a similar manner as Chapman and Kihn (2009), this research is trying to discover if information system integration boosts the enabling approach to management control, and whether this, in turn, would result in positive performance effects and perceived system success (FIGURE 2). This matter is addressed by conducting a survey research. Additionally, by exploring prior literature this thesis is trying to discover answers to more general questions of:

- What benefits and challenges are connected with ERP systems?
- How ERP and management control systems connect to each other?
- How ERP affects the control system of the organization?

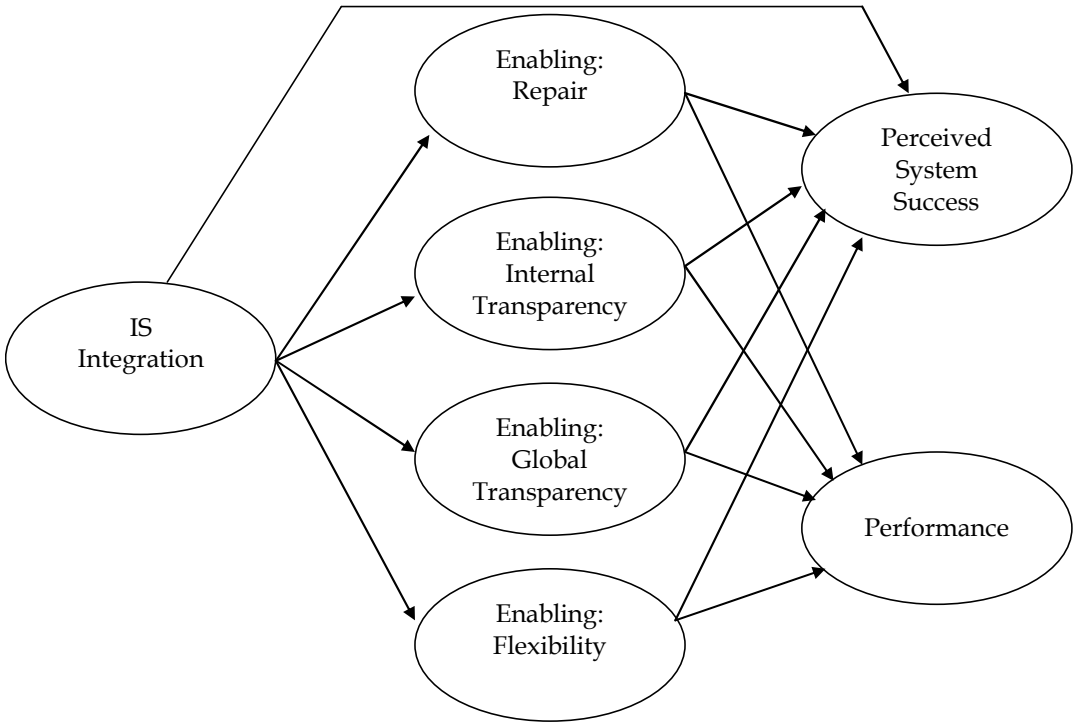


FIGURE 2: Research model (adopted from Chapman & Kihn 2009).

In light of prior literature this research can be positioned in the middle ground of the two research strands presented by Dechow and Mouritzen in the preceding chapter: on the one hand the research interest resides in the performance of the system, and on the other hand in the role of ERP in the organization and the organizational consequences it evokes.

1.4 Structure of the thesis

This thesis consists of five main chapters. In the introductory part the focus is on providing motivation for the subject and describing the research field around this phenomenon. Also, the research question is specified and the position of this particular research in the field is provided. The second main chapter of the thesis offers information on accounting information systems in general and the ERP

systems in particular. The third part of the thesis deals with the concept of management control systems and provides information on how ERP fits into the ensemble, how ERP affects the management control environment of the company and in what way ERP may be seen to support the enabling approach to management control. The fourth part of the thesis consists of the description of the survey research and the results it produced. And finally, a conclusion is drawn based on the results of the survey research and the prior literature.

2 ACCOUNTING INFORMATION SYSTEMS

In this chapter the focus is on accounting information systems: what they are, how they are used and why they are so important to companies. Attention is specifically paid to ERP systems.

2.1 Overview

It is said that accounting is the language of business (Romney & Steinbart 2012, 30). In other words, accounting can be seen as a universal language system that defines entities and works as a tool for communication. What this metaphor implicates in part is that accounting information plays a significant role in organizations all around the world. Further, Romney and Steinbart (2012, 30) continue the expression and refer accounting information systems (AIS) as the information-providing vehicle of that language. With developments in the information technology this vehicle has updated itself to a form of sophistication that enables more things that no one would have perceived possible a few decades ago. What was once a sheer calculation on a piece of paper is now a high-tech report with numerous kinds of drilling and graphics options. We now need to consider what has made these updates possible and how is the cycle of information changed in relation to before. Are these new forms of tools engaging us to the language of business in such a way that it creates more knowledge and understanding? And does this in turn result in better performing companies? These are some of the questions that are discussed in this chapter.

Let us start with the concept of useful information. The importance of capturing useful information can be seen especially relevant today when instead of suffering from a scarcity of information the world is on the contrary encountering quite a massive flood of information. Therefore, instead of having the difficulty of capturing the information in the first place, the greatest challenge today is to separate the right kind of information from the wrong. Notwithstanding all the technological progress that has taken place, it can be said that one fundamental matter has indeed remained the same; i.e. the need to produce useful information. Before looking at the features of useful information more carefully, it may be good to first determine the three levels of information.

The concept of information can be perceived as having three layers: data, information and knowledge. Data, the lowest of the three, is the raw material of information and knowledge. It is often quantitative and it can be stored in databases and operated by organizing and analysing it (Hytönen & Kolehmainen 2003, 13). Turban and Volonino (2010, 41) describe data items as

> elementary description of things, events, activities, and transactions that are recorded, classified, and stored, but not organized to convey any specific meaning.

Data items could be for example quantities of products or hours of work. Information on the other hand is defined as data with a meaning. For example, sales figure is information on the company's performance. When data items are assembled together to create interpretations of some specific phenomenon, in this case company's performance, it becomes information. And finally, the third level of information, knowledge, generates from information through experience and understanding. By having better knowledge of something, people can make better decisions, identify certain patterns of actions, and on the basis of this knowledge choose the right kinds of actions to match the situation in hand (Hytönen & Kolehmainen 2003, 13–14). Turban and Volonino (2010, 41) describe knowledge as consisting of

> data and/or information that have been organized and processed to convey understanding, experience, accumulated learning, and expertise as they apply to a current problem or activity.

When thinking about the concept of useful information again, the words 'right information in the right place at the right time (at the right price)' come to mind. Browsing through the internet this appears to be a somewhat general slogan to companies operating in the field of information technology. In spite of its popular use in marketing, it succeeds in pointing out some relevant attributes linked to the matter in hand. According to Romney and Steinbart (2012, 25), there exist seven characteristics of useful information (TABLE 1). First in the list is relevancy. It relates considerably to the content of the information; furthermore the usefulness is connected to the situation where the information is supposed to be utilized in. Characteristics such as reliability, timeliness and verifiability on the other hand can be seen as connected to the way information is gathered, stored and processed: it needs to be considered what procedures are conducted to make sure that the information is reliable and timely, and what security measures have to be taken to make the information verifiable. And lastly, accessibility and comprehensibility which can be seen as features that show themselves in the effortlessness in using the information. As touched upon, there are certain matters that impose restrictions on this matter, such as money and other real life contingencies that make it difficult to always achieve the right kind of information, especially at the right time.

TABLE 1: Characteristics of useful information (Romney & Steinbart 2012, 25).

Relevant	Reduces uncertainty, improves decision making, or confirms or corrects prior expectations.
Reliable	Free from error or bias; accurately represents organization events or activities.
Complete	Does not omit important aspects of the events or activities it measures.
Timely	Provided in time for decision makers to make decisions.
Understandable	Presented in useful and intelligible format.
Verifiable	Two independent, knowledgeable people produce the same information.
Accessible	Available to users when they need it and in a format they can use.

Another important aspect related to the core of accounting information systems is to comprehend the system as a totality. This leads us to the components of accounting information system:

1. People
2. Procedures and instructions
3. Data
4. Software
5. Information technology infrastructure
6. Internal controls and security measures (Romney & Steinbart 2012, 30).

Here, special attention may be paid to the first component on the list: people. Technology is created for humans, and the goals of the technology are the goals of the people using the systems (Maksimainen 2012). Meaning that, it is very important to be aware of the different users that the system has. By acknowledging the diverse information needs different users possess and the different situations in which the information is used, the rest of the system components listed above can be accommodated to serve this function. In the development of information systems this aspect is taken into account by focusing attention to the social contexts where the system is used; interaction design and the concept of usability. To give an example, accounting information is used both inside the organization as well as by various stakeholders outside the organization. In consequence, different kinds of reporting templates need to be created to match the purpose in hand.

Altogether, when the subject of accounting information systems is under a loop, the focus is not solely on the software, hardware and the zeros and the ones but also very much on the people and specifically on the interface of humans and technology. When these components of information systems are managed to be assembled together in a way that the user of the system is content and the information needs contingent of the situation are met, the system can be considered a success. Some of the main benefits that result from such a situation are:

- improved quality of products or services
- lower costs of products and services
- improved efficiency
- shared knowledge
- improved efficiency and effectiveness of supply chains
- improved internal control structure
- improved decision making (Romney & Steinbart 2012, 31).

Now we have managed to move from the concept of useful information through the components of AIS to the idea of accounting information as a source of value to companies. Next the focus is on the ways information is captured into the system; what happens to information inside the system and in what form it ends up in the hands of the user, i.e. the data processing cycle.

2.2 Data processing cycle

The data processing cycle inherent in accounting information systems is now presented in main points to gain a better understanding on how the cycle of information presents itself in this age of information technology. The data processing cycle consists of four phases: 1) data input, 2) data storage, 3) data processing and 4) information output phase (FIGURE 3). According to Romney and Steinbart (2012, 46), there exist several questions that need to be answered in terms of data processing cycle:

- What data should be entered and stored by the organization?
- Who should have access to this data?
- How should data be organized, updated, stored, accessed, and retrieved?
- How can scheduled and unanticipated information needs be met?

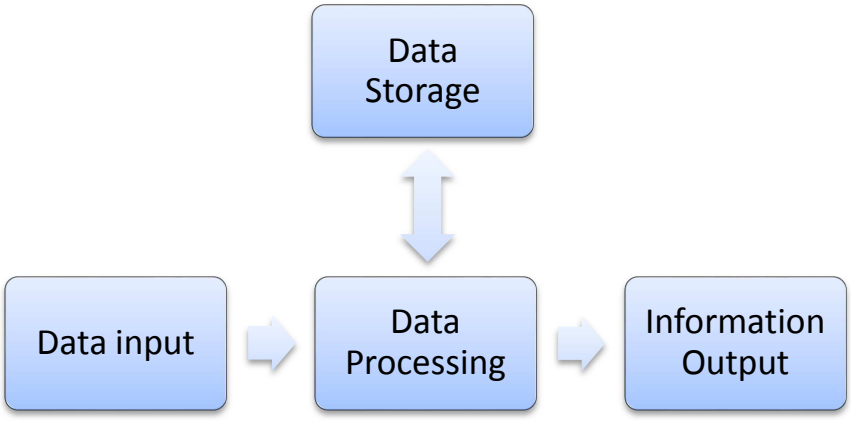


FIGURE 3: The data processing cycle (Romney & Steinbart 2012, 46)

In *data input phase* the data generated by the business activity needs to be a) captured, b) assured that it is accurate and complete, and c) confirmed that it follows the company policies, e.g. approving or verifying transactions (Romney & Steinbart 2012, 46–48). This can be seen as the most important phase of the cycle in some terms, since if things go wrong in the data input phase, there is not a great deal that can be done in the following phases. To capture the data source documents are utilized. Before, these documents were mainly paper documents that were then typed into the system by people. One of the disadvantages with this, however, was the fact that it created too many places for an error to arise. Along with developments in IT today many of the source documents are electronic as it is. Furthermore, automation is used widely and the forms in which the data is typed into the systems, i.e. the data entry screens, are designed to resemble the paper version of the source document with improvements such as prompts, checkoff boxes, pull-down menus and prenumbering. To enlighten the subject, Romney and Steinbart provide a table (TABLE 2) that lists some common business activities and their equivalent source documents.

TABLE 2: Common business activities and source documents (Romney & Steinbart 2012, 47)

Business Activity	Source Document
Revenue Cycle	
Take customer order	Sales order
Deliver or ship order	Delivery ticket or bill of lading
Receive cash	Remittance advice or remittance list
Deposit cash receipts	Deposit slip
Adjust customer account	Credit memo

(continues)

Business Activity	Source Document
Request items	Purchase requisition
Order items	Purchase order
Receive items	Receiving report
Pay for items	Check or electronic funds transfer
Human resources Cycle	
Collect employee withholding data	W-4 form
Record time worked by employees	Time cards
Record time spent on specific jobs	Job time tickets or time sheet

TABLE 2 (continues)

Moving on to the next phase, the idea of *data storage phase* is that the data within the systems is not enough as itself. Companies need to have "ready and easy access to its data", and "understand how data are organized and stored in AIS" (Romney & Steinbart 2012, 48). Consequently, the data needs to be structured somehow. The basic concepts that deal with the data storage phase include ledgers, coding techniques, chart of accounts, journals, audit trail and computer-based storage concepts such as a master file. Going back to the concept of useful information, this phase relates substantially to the accessibility of information.

The *data processing phase* on the other hand consists of four different types of activities, referred to by Romney and Steinbart (2012, 53) as CRUD: creating, reading, updating, and deleting. Basically, there are three ways of doing this: batch processing, online real-time processing and a combination of the two. In batch processing the data is processed periodically. For example, every morning the ledger-keeper collects the data files from banks and transfers them into the company's system. All the moneys that have arrived to the company's bank account the day before are processed into the system. As a result, new data records are created, accounts receivables are updated and error reports are produced which inform which of the transactions did not have a right index number to match the index number of the invoice. These will have to be processed manually. Furthermore, in batch processing the data gives an accurate description of the situation only right after the processing: a transaction that has not arrived in time of the batch processing is processed the next day. In case of ledger-keeping this might not be a problem but in some other tasks it might impose one. This leads us to the online real-time processing. Here the data is updated continuously as the transactions occur. In relation to the situation before, the user has the ability to examine the state of the matters in real time and be informed by the errors in the data as the transactions come through. This allows the errors also to be fixed in real time, which again makes the data more accurate. (Romney & Steinbart 2012, 53–55.) Altogether, in terms of data processing cycle, the feature of useful information that especially rises to attention here is timeliness.

The last phase of the data processing cycle is *information output*. According to Romney and Steinbart (2012, 54) there are three forms in which the information is most often presented: a document, a report, or a query response. Invoices are an example of a document. Today companies are moving to electronic invoices to an increasing extent which means that some of the work phases related to invoicing are disappearing or at least transforming. In the case of traditional invoicing, when the invoice is ready to be sent, it is printed out and mailed to the recipient in an envelope. When the recipient receives the paper invoice a few days later it is then typed into the recipient company's accounting system to be further processed and paid. With the use of electronic invoices the information on the invoice is transferred directly to the recipient's accounting information system via a specified operator, and thus the data input phase in the recipient company is shifted from people to computers.

Reports are usually carefully planned to offer information to management, employees and external stakeholders of the company. The company may have specific matters it wants to direct its attention to, and therefore creating reports to serve this purpose is critical. The query reports on the other hand offer the users possibilities to acquire information outside the more carefully planned reports. If, for example, a management accountant feels it is necessary to monitor some key figures outside the reports available, he or she can make a query request and get the information needed displayed on a monitor. The key features of useful information specifically present in the phase of information output are comprehensibility and accessibility.

Altogether the data processing cycle of contemporary accounting information systems is highly connected to the features of useful information. The development of technology has transformed the cycle of data in a way that many of the work phases previously conducted by people are now shifted to computers in consequence of automation. The effects that this development has had on companies are next discussed by presenting information on enterprise resource planning systems.

2.3 Enterprise resource planning systems

In this chapter the focus is on ERP systems, the benefits and challenges that are connected to it, the links it has to performance and the special relationship between ERP and the service sector.

2.3.1 Overview

Enterprise resource planning (ERP) systems are enterprise systems where the key word is integration. As Romney and Steinbart (2012, 55) mention, "traditionally, the AIS has been referred to as a transaction processing system because its only concern was financial data and accounting transactions". These kinds of traditional systems enforced companies to set up other separate systems to capture, store, process and report the information needed for other purposes. An example presented by Romney and Steinbart goes as follows: when in the traditional AIS, information on sales include only the date of sales and a debit to either cash or accounts receivable and a credit to sales, in an ERP system, in the same data entry phase additional data such as the name of the salesperson is captured in addition. Consequently, the idea of ERP is that all of the company data is recorded in the same database (the single database concept) and the data is accessed via ERP modules (FIGURE 4).

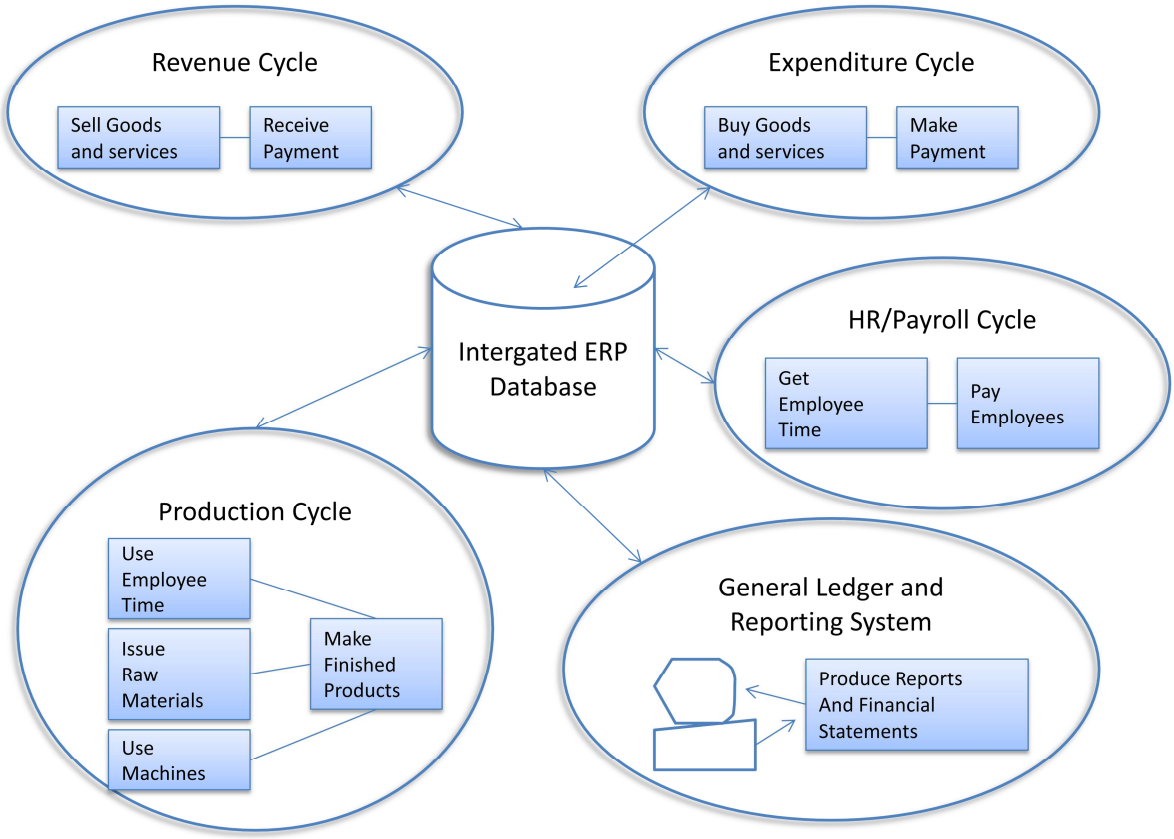


FIGURE 4: Integrated ERP system (Romney & Steinbart 2012, 56).

Another important element of ERP is that companies do not have to implement all the modules of the system. Instead, only the modules perceived as valuable can choose to be implemented. This can be beneficial also in the beginning of the implementation since companies can phase the implementation by first adopting just one module. The most common ERP modules are presented in TABLE 3.

TABLE 3: ERP modules (Romney & Steinbart 2012, 57)

Financial (general ledger and reporting system)	General ledger, accounts receivable, accounts payable, fixed assets, budgeting, cash management, and preparation of managerial reports and financial statements
Human resources and payroll	Human resources, payroll, employee benefits, training, time and attendance, benefits, and government reporting
Order to cash (revenue cycle)	Sales order entry, shipping, inventory, cash receipts, commission calculation
Purchase to pay (disbursement cycle)	Purchasing, receipt and inspection of inventory, inventory and warehouse management, and cash disbursement
Manufacturing (production cycle)	Engineering, production scheduling, bill of materials, work in process, workflow management, quality control, cost management, and manufacturing processes and projects
Project management	Costing, billing, time and expense, performance units, activity management
Customer relationship management	Sales and marketing, commissions, service, customer contact, and call center support
System tools	Tools for establishing master file data, specifying flow of information, access controls, and so on.

Furthermore, in ERP the focus is on the processes: the objective is that all the information concerning the process in question is captured at once (Järvinen 2011). This has several benefits compared to separate systems. For example:

- the data does not have to be typed in to the systems multiple times which in turn diminishes typing errors
- not having to deal with the difficulties concerning data transfers between the systems, such as timeliness and stiffness
- the ability to drill and draw up reports.

However on the other hand, this creates a substantial pressure on the data input phase, because if an error occurs, it will instantly appear in every module it affects.

In principle, the central database also enables the data to be readily available 24/7. In practice, however, the matter is slightly more complicated, because of the real life contingencies that challenge the use of AIS in companies. Some of the issues related to this are discussed in chapter 2.3.2.

Nowadays the systems can also utilize information produced by their external stakeholders which is integrated to the system, such as dealer prices and stock quantities. These extended ERP systems are primarily a consequence of the possibilities brought by the internet including functions such as e-commerce, electronic catalogues and customer relation management, CRM (Turban & Volonino 2010, 380).

2.3.2 Challenges and benefits of ERP systems

In this chapter the focus is on the challenges and benefits that the ERP system evokes. There exist several research articles on the topic. For example, Teittinen, et al. (2012) conducted a research on three different organizational levels: top management, middle management and shop floor. They were interested in the challenges and benefits that a company using an ERP system faces after the implementation. According to Teittinen et al. (2012), from the point of view of the top management the greatest benefits of ERP related to strategic management. ERP was seen as a tool that enables change in the organization. Their attitude towards ERP was quite positive. The challenges attached to ERP that the top management had to attend to were the misuse of the system, and especially difficulties encountered with the data entry. The top management felt that something had to be done to motivate the employees to make the data entries correctly and to make them see the essential nature of this work phase as it affected ultimately the whole system. The middle management on the other hand saw the benefits of ERP in the management of daily routines, the simplicity of having just one system, and in the centralized database. When asked about the challenges, the middle management also lifted to attention the mistakes made in the data entry and how difficult and time-consuming the correction of these mistakes was. They felt that this was partly a result of the lack of human resources addressed to the ERP implementation. Additionally, this lack of resources was seen as a reason why the system was not used to its full potential. The most negative attitude towards ERP was found to be on the shop floor level. Employees did not consider the data entry as a part of their job. They also felt that the system was hindering their work and that it did not fit to the changes and unexpected situations they encountered on a daily basis. Instead of doing what the system recommended them to do, they made the decisions based on experience. (Teittinen et al. 2012.)

One major challenge concerning ERP systems can also be lifted to attention. It is a claim that companies may not be using the systems to their full potential (Grandlund 2011, 4). Reasons for this could be the inadequate resources or the

suspicious attitudes people have towards new technologies (Grandlund 2011, 5), which also seemed to have a role in the research by Teittinen et al. (2012).

When it comes to the positive effects that ERP might have there seems to be a never ending list of various kinds of ERP benefits in the literature: inventory reduction, personnel reduction, productivity improvements, order management improvements, visibility, new improved processes, customer responsiveness etc. (O'Leary 2004, 68). In order to make any sense of these lists some categorization might be in order. One way to do the categorization is the division between tangible and intangible benefits (for example O'Leary (2004, 65). This however does not help the matter very much in terms of understanding how the benefits link to the different functions and parts of the organization. To get a better understanding on the subject the article by Shang and Seddon (2002) is lifted to attention. They divide benefits of enterprise systems into operational, managerial, strategic, IT infrastructure and organizational. They wanted to create a framework which would aid business managers in evaluating the benefits of enterprise systems and conducted a research using data on 233 case companies. According to them

- *operational benefits* arise from the basic activities of the company which are often repetitive in nature, and include things such as cost reduction, cycle time reduction, productivity improvement, quality improvement and improved customer service
- *managerial benefits* include better resource management, decision and planning benefits to management that generate from the centralized databases and built-in data analysis capabilities, and various performance improvements
- *strategic benefits* include business growth, alliance, innovation, cost, differentiation and external linkages
- *IT infrastructure benefits* offer business flexibility for future changes, reduced IT costs and marginal costs of business units, increased capability for prompt, economic implementation of new applications
- *organizational benefits* include things such as improved working patterns, greater organizational learning, empowered workers, a greater sense of common vision across the organization and, possibly, an improvement in organizational culture. (Shang & Seddon 2012, 279.)

Altogether, companies are engaging in ERP for various reasons. Benefits presented here make ERP a tempting solution as old legacy systems are updated to newer ones. At the same time difficulties encountered in the implementation phase and huge ERP projects gone wrong tell companies another story; story of resistance from the workforce and incapability of the system to adapt to changing

circumstances. Are companies then succeeding in their ERP projects and do the realized benefits and actions made to conquer the challenges demonstrate in the performance of the companies? This matter is explored in the following chapter.

2.3.3 ERP and performance

To begin with, there have been difficulties in determining the performance effects related to the use of ERP; hence prior research has produced results that show both positive and negative effects to performance or no effects at all (Kallunki et al. 2011, 23–24). In the early 1990s the term productivity paradox was brought to attention by Erik Brynjolfsson after researchers had not been able to find a significantly positive relationship between investments in IT and firm performance (Rom & Rohde 2007, 57). It was thought that costs outweighed the positive results related to these investments. Further, in the beginning of the 2000's research findings about the positive performance effects started to pick up, and Hunton et al. (2003 in Rom & Rohde 2007, 57), for example, found that while in firms that did not use ERP systems the financial performance was deteriorating the firms which had implemented ERP were able to maintain their level of financial performance. This, according to Rom & Rohde (2007, 57), led the interest towards resolving when and why these performance effects did occur.

To shed some light on the question of when, what seems to be a recurrent phenomenon is that it takes a few years before the performance effects of ERP materialize (for example Nicolaou 2004 in Kallunki et al. 2011, 24, and Shang & Seddon 2002, 290). In FIGURE 5: Paths of ES benefit development (Shang & Seddon 2002, 290).FIGURE 5 below, Shang and Seddon (2002, 290) depict the development of different dimensions of enterprise system benefits based on their case study findings. Although they did not measure the development of financial performance, the results may be seen as an indicator for that also (for example Kallunki et al. (2011) found a significant relationship between non-financial and financial performance).

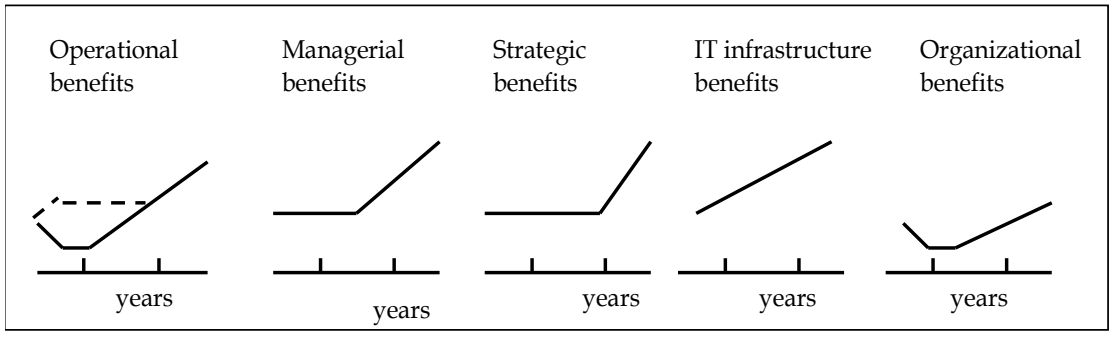


FIGURE 5: Paths of ES benefit development (Shang & Seddon 2002, 290).

The question of why is a bit more complicated. As pointed out by Rom and Rohde (2007, 57–58), the claim that investments in IT have a positive effect on firm performance, encloses an argument that it is the changes that occur in the company that affect the performance, not the IT per se. Consequently, other mediating factors need to be taken into account. Kallunki et al. (2011), for example, have taken upon this task and investigated the effects of ERP while monitoring the effect of formal and informal management control systems as a mediating variable. They found that "formal MCSs act as intervening variable, mediating the positive direct effect between ERPS and non-financial performance".

This thesis originates from a research article by Chapman and Kihn (2009). They applied the framework of enabling and coercive formalization by Adler and Borys (1996) and investigated the performance effects of ERP in terms of information system integration where enabling approach to management control acted as a mediating factor. The framework of enabling and coercive formalization will be presented in Chapter 3.3 but the basic idea behind it in the context of management control is that employees experience control in two ways: enabling approach to MC empowers employees to use their own intelligence and experience, whereas coercive approach takes employee's own thinking as a threat and tries to disarm it. In their article, Chapman and Kihn (2009) suggest that "the integrated information architecture underlying ISI will foster the four design characteristics underlying an enabling approach to control and that these will then positively affect performance". As a result, they found several significant positive relationships between the features of ISI, enabling approach to management control and firm performance. Moreover, they did not find a significant direct link between ISI and various performance items. This would suggest that enabling approach to management control would indeed function as a mediating factor between ERP and performance.

2.3.4 ERP in service sector

As mentioned before, ERP research has quite heavily been concentrating on manufacturing companies. This is understandable since majority of the companies using ERP systems are those of nature. However today, service companies are also implementing ERP systems to an increasing extent which has raised the interest of examining the special characteristics of these firms compared to the expected advantages of ERP. One research article undertaking this mission is the one by Botta-Genoulaz & Millet (2006). According to their research, there exist several special characteristics that separate service firms from manufacturing firms. Three of these are next presented.

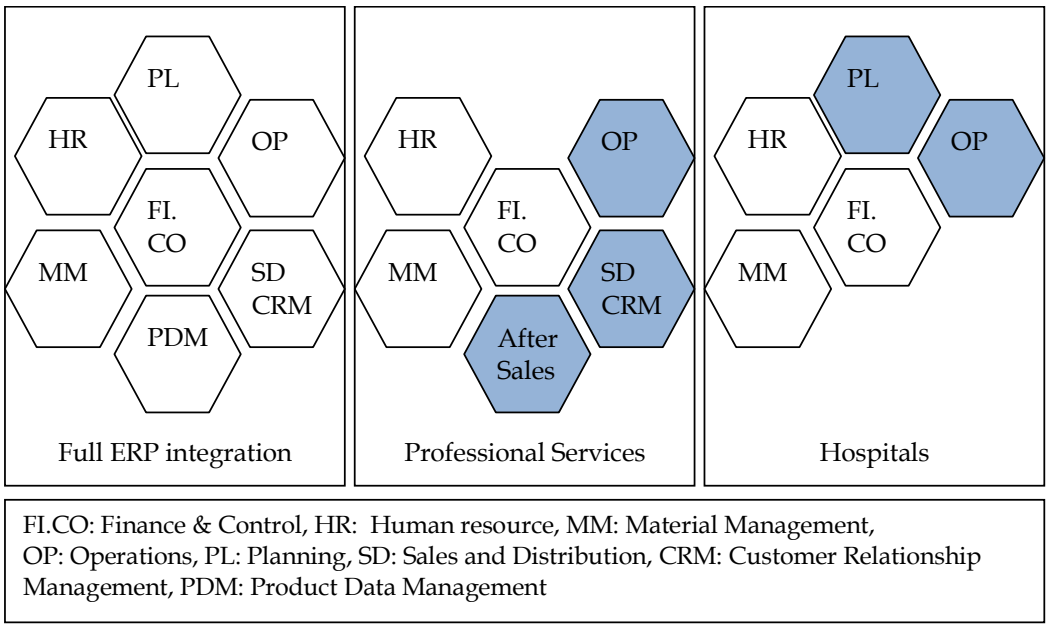
Firstly, as the product of the company operating in the service sector is partly or completely intangible, there is no way to stock it. On this account, while service companies have to keep stock in some extent related to the tangible materials used

in providing the service, the inventory function in a service company does not have as essential role as it has in manufacturing business. At the same time service businesses are more affected by the shifts in demand.

Secondly, service companies are constantly in contact with their customers in top of which the customer is often involved in the processing of the service. Consequently, there exist elements in the delivering of the service that can make it a much more complex process to manage than producing a tangible product.

And thirdly, the concept of productivity can be slightly difficult to decipher in the context of services, as it is the ratio of outputs to inputs. Here Botta-Genoulaz and Millet (2006, 207) refer to the work of Grönroos and Ojasalo (2002) in which the productivity of service originates from three main elements: inputs, outputs and service process. In short, the productivity of service is based on a) how efficiently the inputs of the service provider (i.e. personnel, technology, systems, information, time, etc.) and b) the inputs of the customers (i.e. own participation, participation of fellow customers) c) are managed to be driven through the service process into d) outputs of quantity and e) quality (i.e. outcome quality, process quality, customer perceived quality) by simultaneously f) minding the capacity efficiency (i.e. balancing between under capacity and over capacity related to difficulties that diffuse from changes in demand) of the service process (Grönroos & Ojasalo 2002, 417–418).

If we then look at the aspects denoted by Botta-Genoulaz and Millet (2006) concerning specifically the relationship between ERP and the characteristics of service businesses, the level of integration can be lifted to our attention. It seems to be that service companies have encountered more difficulties in reaching an enterprise-wide functional integration than companies operating in manufacturing industries. FIGURE 6 below demonstrates how companies in service sector, instead of implementing all modules of the ERP, resort to the best of breed solution where some of the functionalities are satisfied with the applications of other software providers. One of the topics connected to this is that ERP originates more from the direction of material resource planning than of human resource planning. Consequently, it seems to be that the kind of integration that the service sector needs from ERP is not still offered, although efforts have been made in this direction through modules of project management and after sales services. (Botta-Genoulaz & Millet 2006.)



FI.CO: Finance & Control, HR: Human resource, MM: Material Management, OP: Operations, PL: Planning, SD: Sales and Distribution, CRM: Customer Relationship Management, PDM: Product Data Management

FIGURE 6: Functional fulfilment and level of integration on service sector ERP (adopted from Botta-Genoulaz & Millet 2005, 216).

3 ORGANIZATIONAL AND PERFORMANCE EFFECTS OF MANAGEMENT CONTROL SYSTEMS

In this chapter the purpose is to link ERP and management control systems (MCS) together. A special interest is directed on finding out how ERP as a component of the organizational control system affects the system as a whole, and what kinds of organizational and performance consequences they have.

3.1 Defining the concept of management control systems

Organizational control system or management control system is a term which is quite difficult to put into words. According to Drury (2004, 643)

> there can be no control without objectives and plans, since these predetermine and specify the desirable behaviour and set out the procedures that should be followed by members of the organization to ensure that a firm is operated in a desired manner.

Another effort to define the concept of management control system is the one by Macintosh (1995, 2). He starts with the narrow definition of management accounting:

> It is the process of identification, measurement, accumulation, analysis, preparation, interpretation, and communication of information that assists executives in fulfilling organizational objectives... a formal mechanism for gathering and communicating data for the ends of *aiding* and *coordinating* collective decisions in light of the overall goals or objectives of an organization (Horngren & Sundem 1990 in Macintosh 1995, 2).

In the broad definition of management accounting Macintosh (1995, 2) further includes the concept of control, and lists a few control mechanisms, such as the standard operating rules and procedures, and some informal controls such as charismatic leadership and the fostering of a clan-like atmosphere. On the basis of these definitions, it can be said that MCS is a complex web of actions and procedures aimed to steer the organization into desired direction, and the starting point of control seems to be very tightly connected to organizational objectives. To offer a bit more thorough look on the subject, the framework of organizational control system by Eric Flamholtz (1996) is next presented.

According to Flamholtz (1996, 597–598), control has four *functions*:

- to induce decisions and actions which support objectives of the organization.

- to take into consideration activities taking place in different parts of the organization and accommodating them together.
- to provide information about the results of operations and people's performance.
- to facilitate the implementation of strategic plans

He continues by defining the organizational control systems as

> a set of mechanism - both processes and techniques - which are designed to increase the probability that people will behave in ways that lead to attainment of organizational objectives.

This is in accordance with the definitions presented before, and gives us a general idea on the subject. Let us now take a closer look at the different components that make up the MCS to clarify what the role of ERP is in this equation, and what connections it has inside the system.

According to Flamholtz (1996) organizational control system consists of three parts:

1) a core control system,
2) organizational structure, and
3) organizational culture.

He visualizes these three components as a three layered circle situated in the organizational environment (FIGURE 7). Furthest from the centre is the organizational culture. It affects the way people act, think and perceive matters in the organization. Values, norms, beliefs and habits; the components of organizational culture are the self-realizing controls of the organization. Although changes in the organizational culture tend to be very difficult to achieve and slow to realize, in the framework it is nevertheless seen as a variable which can be affected by management decision. An example which Flamholtz uses in his article is a situation concerning a company where the organizational culture was very sales oriented. According to the example, the organizational culture affected the branch manager's actions so that, instead of concentrating on the budgets and the bottom line for which he was supposed to be controlling, he was more concerned over the sales figure while undervaluing everything else. In this case organizational culture as a component of control overrode the formal control mechanisms of the company.

The middle layer, organizational structure, is described as a component of control in how it demonstrates where everything belongs in the organization. With the help of organization chart, for example, people are informed about their place in the organization, their areas of responsibility and people to whom they are subordinate and vice versa. There exist extensive literature on organizational

structure and how it affects the behaviour of people. The main concepts related to the design of organizational structure are

- work specialization
- departmentalization
- chain of command
- span of control
- centralization and decentralization
- formalization (Robbins 2000, 184).

In this work, the subject of formalization is taken under specific interest in chapter 3.3.

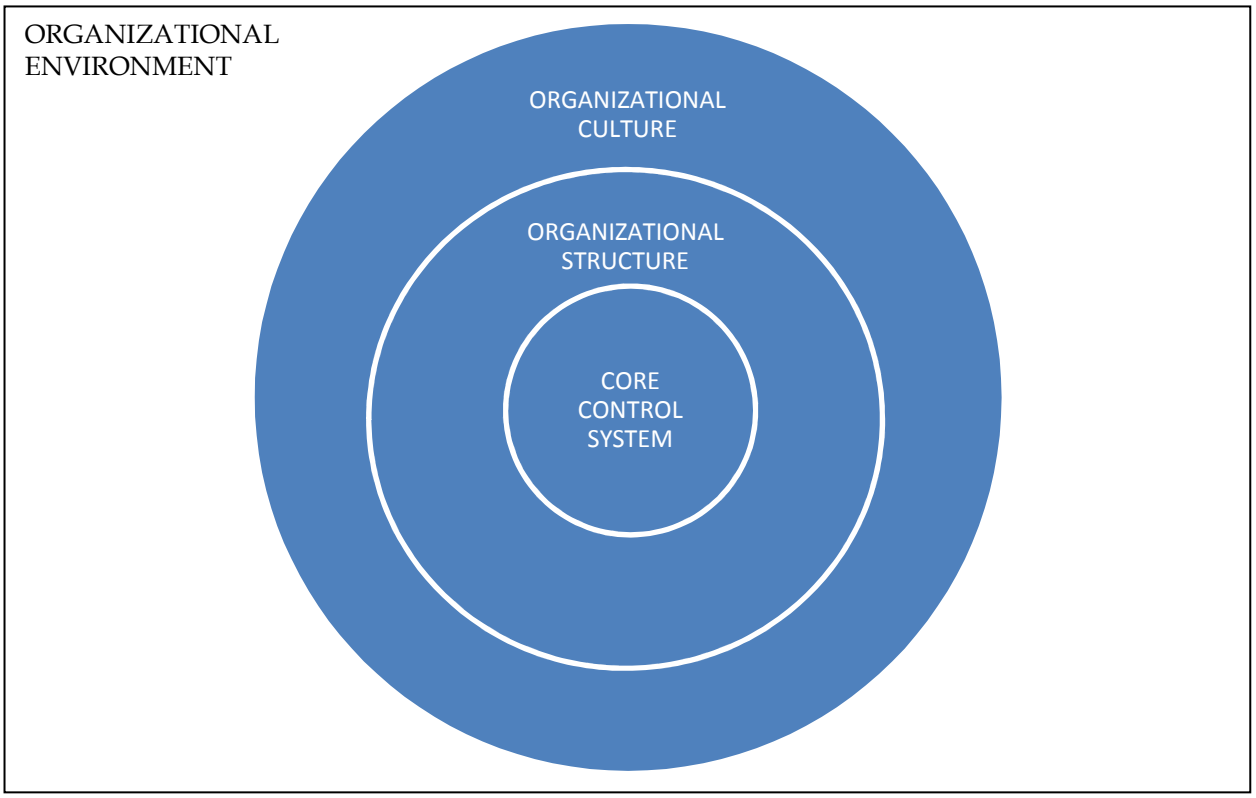


FIGURE 7: Organizational control system (Flamholtz 1996, 599)

Finally, the innermost circle in the framework is referred to as the core control system. It consists of five basic organizational processes: planning, operations, measurement, feedback and evaluation-reward (FIGURE 8). According to Flamholtz, each of these components can also be seen as a system by itself.

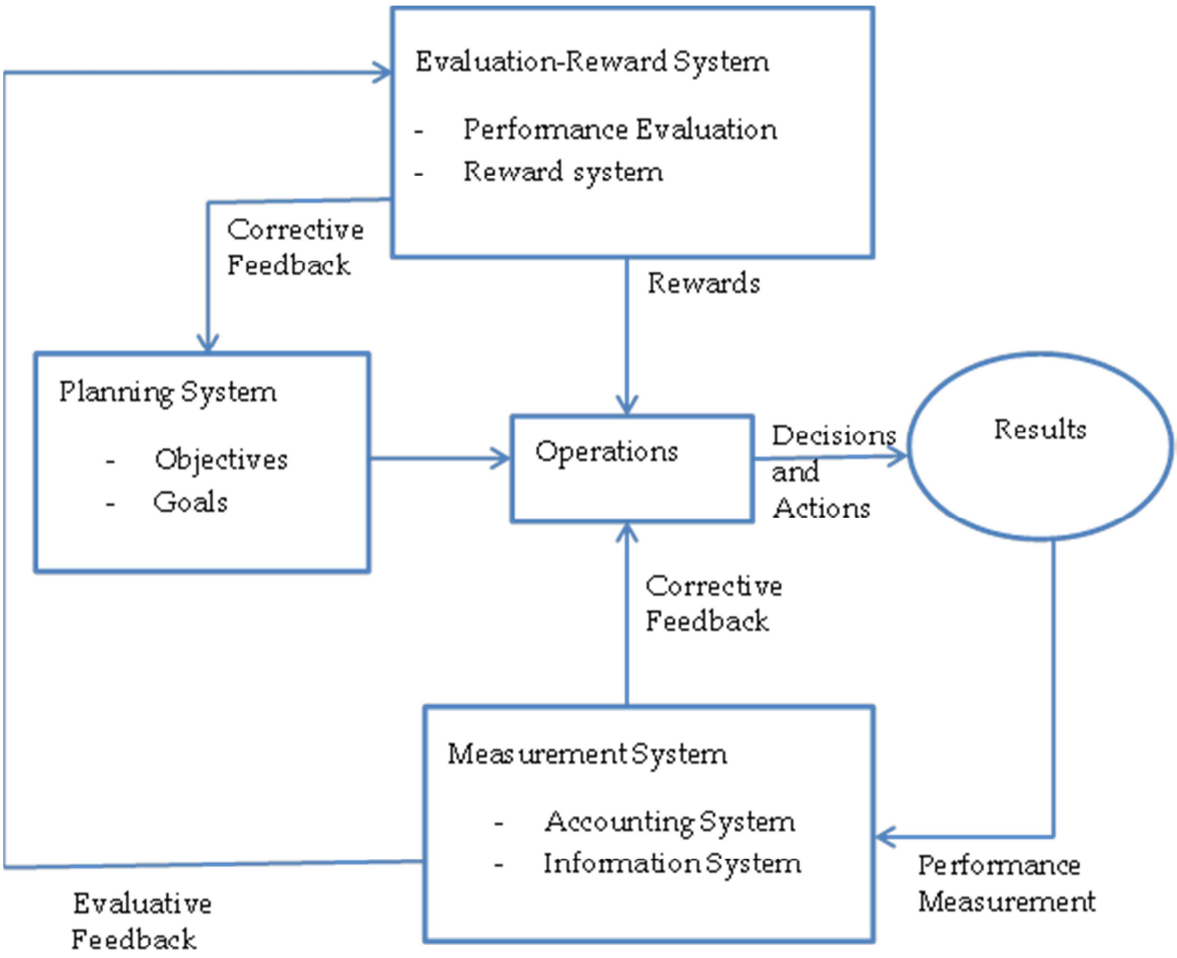


FIGURE 8: Schematic model of the core control system (Flamholtz 1996, 600).

Planning sub-system is everything about goals and objectives. If we take project planning and control as an example, it is about planning the operations involving the project, determining the financial targets and communicating them to the project members while simultaneously keeping in mind the overall goals of the organization. Operational subsystem in the framework is the component that describes the target of control. It can be, for example, a project, a department, an individual employee or even the whole organization.

When the plans have been made and the operations begin, in order to detect whether the goals are achieved, they have to be measured. In chapter 2, we have dealt with the issue of useful information and the data processing cycle that shed some light on the matter of how data is captured, stored and reported. It was also lifted to attention how the goals of the people determine the goals of the technology. In this framework the measurement has two functions. On the other hand, it generates information (both accounting and other) that helps the members of the organization to evaluate the operations of the chosen segment to the set

targets, and also to reward employees for achieving these predetermined goals. This is referred to as the 'output function' of measurement. However, another function of the measurement system has to do with the measurement per se, in that the sheer act of measurement creates control: merely by measuring something companies can make a statement that the target of the measurement is something they value. Following the same idea, it has been said that if something is not measured it does not exist.

Finally, the two remaining components of the core control system are the feedback system and the evaluation-reward system. According to the framework, there exist two kinds of feedback: feedback that is used to make adjustments to operations or to planning subsystem, i.e. corrective feedback, and evaluative feedback which is used for the purpose of performance evaluation and rewarding. This leads us to the two main functions of the evaluation-reward system. On the one hand, it has the function of comparing the measured results to the set targets, and this way evaluating the performance of the company, and on the other hand, based on this evaluation determine the appropriate rewards for employees taking part in the operations. What is emphasized by Flamholtz in this point is the importance of making the connections between the basis of the rewards and the actions that people have made in achieving the organizational goals visible. If this link is obscure, rewards do not necessarily succeed in inspiring people to work for the better of the company.

Altogether, core control system in its whole is described by Flamholtz as a cybernetic model which works like a thermostat: plans are made and standards are created, the operations taking place are measured and evaluated. Consequently, if the results (temperature) differ from the targets, the thermostat is adjusted. These actions then slowly change the temperature of the "room" and produce another result of measurement, and the cycle goes on. These kinds of cybernetic models have received some criticism for being outdated. Rikhardsson et al. (2005, 5) for example have argued that as the era of information society has arrived, the high position of organizational objectives underlying these models is contested. What has become beside these objectives is the role of business risk and the ways it affects the nature of control. Further, they suggest that the role of information and communication should be described in more depth in these models. Nevertheless, I feel that the framework of Flamholtz has provided us a solid outline of the organizational control system from where we can now move on to discuss the effects that the ERP system has in and to this ensemble.

3.2 Influence of ERP on management control

It seems that ERP systems have brought about a change that has various effects on the control environment of the company. One reason for this is that "ERP systems change the meaning of organizational visibility, as pointed out by Dechow and Mouritzen (2005, 728). Before, accounting has had an image of an ivory tower. Today however, a substantial part of the accountants' work has shifted to other parts of the company, e.g. to the people in the sales office or in the production phase, due to ERP system's process-based architecture which enforces the data to be typed into the system at once as presented in chapter 2. Another way by which this changed organizational visibility entails is how the information in these systems can be accessed by a wider group of people who themselves decide on how and when to use it. Rikhardsson et al. (2005) have discussed the subject of the effects ERP has on management control and are able to point out several key observations which are now discussed.

Based on prior research, Rikhardsson et al. (2005, 11) state that enterprise system is a contingent factor affecting management control, and that these changes are dependent on the organizational characteristics of the company as well as on the characteristics of the environment surrounding the company. Support for this statement can be sought from the framework presented before where organizational characteristics of culture and structure were perceived as components of the overall organizational control system situated in the organizational environment. Rikhardsson et al. (2005) present two main observations concerning this relationship. The first is that enterprise systems can simultaneously increase the empowerment as well as the control of employees. As mentioned before, ERP's system architecture supports organizational visibility. This increased visibility enables employees to make better decisions thus giving employees more power to master their work. Another matter they single out is the predominance associated with ERP systems. ERP projects are huge investments in which the functioning of the organization is mapped and processes are made visible. As a result, many of the processes are changed to match the logic of ERP. In this context Dillard et al. (2005) refer ERP as a physical manifestation of administrative evil. One aspect of this idea is that as ERP dictates what information is collected, stored, processed and presented, it affects the way people see themselves and their surroundings. This again creates situations where employees instead of trying to resolve the best possible way to do a certain task in terms of expediency and effectiveness, try to think of a best possible way to do a certain task within the ERP environment, i.e. ERP becomes a constraining element, that Dillard et al. (2005) claim, is not questioned. Another point put forward by Rikhardsson et al. is a claim that the changes in management control are also dependent on the way managers interpret and perceive them. If the manager

perceives the change as coercive, the consequence is different compared to a situation where the manager perceives it as enabling. The aspect of how, remains a bit vague.

The second issue that Rikhardsson et al. (2005) single out are the effects that enterprise systems may have on the role of accounting in management control. Leaning to prior research they suggest that the central role of the accounting department becomes contested due to decentralization occurring in the processing and reporting of accounting information. What was before solely the work of accountants, is now flown partly to the system through automation of controls and partly to other employees in other departments. This also has connections to the concept of administrative evil mentioned before: when the control becomes impersonal there is a danger of a moral decadence.

Based on these observations we can now turn our attention to how the ERP system's information system architecture is perceived to support the enabling approach to management control and why this might act as a link between ERP and performance.

3.3 Enabling approach to management control – a link between ERP and performance

As already acknowledged researchers have been interested in the performance effects of ERP and found various results. Chapman and Kihn (2009, 155) highlight that there is a consensus on which the technology itself does not automatically lead to enhanced performance because of its easy replicability. According to them, the relationship between information system integration, enabling approach to management control and firm performance is the kind of relationship that is more suitable for resulting in improved performance. This is because enabling approach to management control necessitates a certain kind of managerial competence which in turn is difficult to replicate. Subsequently, in this chapter the framework of enabling and coercive formalization by Adler and Borys (1996) is presented and discussed in the context of ERP.

3.3.1 Overview

Formalization means "the extent of written rules, procedures and instructions" in organizations (Adler & Borys 1996, 62). In prior research, low degree of formalization is typically suited with organizations that do business in unstable and complex environments and have high differentiation of tasks, i.e. organic organizations, whereas high degree of formalization is typically paired with organizations operating in stable environment and with low differentiation of

tasks, i.e. mechanistic organizations (Burns & Stalker 1966 in Donaldson 2001). This is because in environments with high uncertainty it is virtually impossible to create such rules that would work regardless of the situation. Furthermore, the examination of formalization can be made on the level of a work task. Some jobs are characterized by low task uncertainty and some by high task uncertainty; as a result, some work tasks are more formalized than others. Formalization also entails two quite opposite aspects related to the behaviour of people in organizations. The first is "administration based on discipline" (Adler & Borys 1996). This means that people follow the orders because they respect the authority of the person in charge or that there exists a power element of a certain kind that submits the person to behave in a certain way. Another aspect to the matter is offered with the following line of thinking: "an individual obeys because the rule of order is felt to be the best known method of realizing some goal" (Gouldner 1954 in Adler & Borys 1996, 62). Here the employee follows the rule because by doing that he or she simultaneously helps his or her own case.

In their article Adler and Borys (1996) present a second dimension to the typology of organizations (FIGURE 9) which they feel overcomes some of the problems of just looking at the *degree* of formalization. According to Adler and Borys (1996), there exist two *types* of formalization: "formalization designed to enable employees to master their tasks, and formalization designed to coerce effort and compliance from employees." The basis of their proposition resides on "good" and "bad" rules and on how employees distinguish them from each other. With the help of research on technology, they are able to convey a very hands-on kind of framework on the subject.

		TYPE OF FORMALIZATION	
		Enabling	Coercive
DEGREE OF FORMALIZATION	Low	Organic	Autocratic
	High	Enabling Bureaucracy	Mechanistic

FIGURE 9: A typology of organizations (Adler & Borys 1996, 78)

The framework begins with the idea of formalization as an organizational technology. By applying the knowledge from automation and system design research organizations can learn how to better accommodate their formal network to the dominant circumstances. Also by acknowledging the *impact* that certain formalization decisions have on employees' behaviour, already better decisions

can be made. Next the four generic features that distinguish deskilling from usability approaches are presented.

3.3.2 Features of enabling formalization

Repair is the first feature that distinguishes an enabling type of formalization from a coercive one. In short, it comes to play when something breaks down or the system malfunctions. In a deskilling option the user does not have the capabilities to fix it nor will he be provided them; instead, an expert has to be called to place, and for the time being everything halts. On the other hand, if it were a usability type of approach, the user himself would be equipped with the necessary information and instructions to fix the problem. A fine example which Adler and Borys use in their article is the one of a copying machine. Before, if a copying machine had a paper jam or some other malfunction, maintenance man had to be summoned. In today's copying machines on the other hand, the user is provided with illustrated instructions on how to clear the paper jam himself. In the context of organizational control, the managers have to evaluate how much they have to take into account the possibility of shirking and in what extent they could profit on the self-efficacy and resiliency of their employees in handling with the problems themselves. In the context of ERP, Chapman and Kihn (2009) see repair feature as the ability to draw up "what-if type of analysis rather than simply facilitating the production of routine reports". Assumption here is that in a same manner as a copying machine prompts the user of an error in the equipment and displays the proposal for actions, the level of integration in ERP enables the project manager to be prompted of the errors in the project and to retrieve the kind of information from the system that assists in dealing with these problems.

The second feature that distinguishes an enabling type of formalization from the coercive one is the *internal transparency*. It means that employees/users need to know how the system works and what leads to what. According to Adler and Borys (1996, 72), users need "understanding of the logic of the equipment's internal functioning and information on system status". This kind of knowledge enables employees to deal with the different situational factors themselves and to develop new kinds of ways to get the procedures done. Adler and Borys (1996, 72) present the example of an organization where instead of doing things as the ISO standard dictates, employees developed their own standards by comparing their work efforts to the work efforts of their historical projects. The idea is that by understanding the different factors that connect to the process in question, members of the organization are able to say 'this is what we did last time, how can we do it better the next time' or 'this is the best method to-date according to prior projects, we should make this a standard'. In coercive formalization employees are provided with the standards by which to do their work. As the focus is on complying with the rules, employees are not necessarily focusing on how to do

their job better – instead they are focusing on how to avoid any deviation from the standard in fear of punishment. In the context of ERP, the internal transparency feature goes directly alongside the process mapping efforts conducted in the companies in the implementation phase of the system (Chapman & Kihn 2009). Also the level of integration in ERP should provide users with opportunities to examine detailed and up-to-date data concerning the project which in turn helps the project manager to keep informed about the state of the project and to examine the inner connections related to the project.

The third feature of the framework is *global transparency*. Whereas in internal transparency, the visibility was clear on the immediate factors surrounding the task, in global transparency the visibility reaches to the wider organizational environment. According to Adler and Borys (1996, 73), "global transparency refers to the intelligibility for employees of the broader system within which they are working". By offering information on their place and purpose in the totality – in their global environment – employees are provided a seat with open outlook to observe both their immediate task environment and connections to other parts of the organization and the outside environment. This kind of knowledge is considered to be a valuable asset when it comes to optimizing the performance and detecting opportunities for improvement (Zuboff 1988 in Adler & Borys 1996, 73). In coercive logic there basically is no global transparency. Adler and Borys refer the situation to the functioning of Bentham's Panopticon:

> A prison in a wheel-like layout in which the warden is located on the wheel's rim; corridors connect the tower and the cells like so many spokes of a wheel, affording the warden full visibility into each cell but simultaneously shielding the warden from the prisoners' sight and isolating the prisoners from each other (Foucault 1977 in Adler & Borys 1996, 73.)

This means that the employees do not know how their actions affect the outside world and how they could accommodate their workings to the contingencies of the global environment. This is the job of the supervisor. In the context of ERP, global transparency feature depicts itself in two main aspects: 1) "the extensive process mapping efforts, and the exercises in standardizing general ledger accounting structures", and in the way 2) "ISI encourages interaction between previously distant individuals" (Chapman & Kihn 2009). What this means in project planning and control, in turn, is that the connections from the project to the overall goals of the company and vice versa become visible. By training the users of the system to understand the links their work phase has in the whole, the system works better. However, this is an ideal situation in the use of ERP, and companies have partially failed in this mission as was put forward in chapter 2.3.2.: there it was demonstrated that in some cases the global transparency offered by the system to the top management did not appear to be reaching the shop floor.

The fourth and final generic feature that determines the type of formalization according to the framework by Adler and Borys is *flexibility*. Flexibility in general terms means the opportunity to deviate from the general course of action for some reason or another. As we have come to learn, deviation is not something one desires in coercive formalization. According to the article, coercive logic is characterized by the assumption that "the manual prescribes, the employee implements, and only the supervisor can authorize a deviation" (Adler & Borys 1996). However, when the preference is on enabling type of formalization the assumption is that deviations are still risks but also learning opportunities. For example, in one organization they learned that, if in a hurry, certain steps in the procedure could be safely skipped. In the context of ERP, flexibility could be the ability to turn off control systems when not needed (Chapman & Kihn 2009).

Next we move on to the survey research part of this thesis where the link between information system integration, enabling approach to management control, perceived system success and firm performance is tested in the context of small service companies.

4 RESEARCH DATA AND METHODS

4.1 Methods

This is a quantitative research applying the survey method. There exist several frameworks for doing survey research. Here the legal framework (Diamond 2000, 2011) is used. This framework was applied by for example Van der Stede et al. (2007) when they analysed the quality of survey research in management accounting. Referring to Van der Stede et al. (2007), the five main categories of the Diamond's framework are presented below.

4.1.1 Purpose and design of the survey

Any survey should have a clearly stated purpose. According to Van der Stede et al. (2007, 447), there exist two alternatives: survey research is used either for description purposes or for explanation purposes (Groves 1989, Pinsonneaul & Kraemer 1993, Sudman & Blair 1999 in Vad der Stede et al. 2007). In this survey, the main purpose is to offer an explanation on whether enabling approach to management control acts as a mediating factor between information system integration and performance effects. Simultaneously, descriptive information is provided on the tendency of the companies to plan and control their projects, their financial and market performance, as well as on success of the systems. Replicating the research conducted by Chapman and Kihn (2009) the following hypothesis are intended to be tested in the context of small service companies:

H1: Information system integration is positively related to perceived system success.

H2: Information system integration is positively related to an enabling approach to management control as seen it its four design characteristics of (a) repair, (b) internal transparency, (c) global transparency, and (d) flexibility.

H3: An enabling approach to management control as seen it its four design characteristics of (a) repair, (b) internal transparency, (c) global transparency, and (d) flexibility, is positively related to perceived system success.

H4: An enabling approach to management control as seen it its four design characteristics of (a) repair, (b) internal transparency, (c) global transparency, and (d) flexibility, is positively related to business performance.

Design questions on the other hand include a choice between longitudinal designs and cross-sectional designs and the level of analysis. Longitudinal designs are more suitable for research aiming to make causal conclusions, albeit their use is quite rare because of difficulties and high costs related to them. In this research cross-sectional design is chosen, mainly for convenience reasons. Although a certain longitudinal aspect is pursued by disclosing the time that has occurred from the implementation of the ERP system. The survey is directed to top management because they are in a position to evaluate both the performance of the company as well as the processes concerning project planning and control.

4.1.2 Population definition and sampling

According to Diamond (2011) "the target population consists of all the individuals or units that the researcher would like to study". In this case the target population are the small service companies that have implemented ERP. To get information concerning this target population a survey population is chosen. Survey population is defined by Van der Stede et al. (2007, 461) as "the collection of respondents available to the researcher that is actually sampled". Here, the survey population consists of companies that are using a financial management system called Ecom. Ecom is a Finnish ERP system developed to serve the needs of the building technology industry, i.e. companies in the field of HPAC (heating, plumbing, air-conditioning) and electricity. There are approximately 2 500 companies that use Ecom. Companies can choose the version of the system they want to implement. The lightest version includes invoicing, dispatch, accounts receivables, client register, product register, purchase order, and a price catalogue service which incorporates information from the main wholesalers in Finland. The next version of the software includes in addition purchase invoices and accounts payable and the ability to integrate more external information from the industry operators. In addition to functionalities offered by the lighter versions, the third version of the software includes material offer, project control, offer calculation in the field of electricity and payroll. And the full software also includes the offer calculation, work and patent register and product nomenclature in the field of HPAC. It is noticeable that while there are different kinds of managerial reports available in the system, there is no actual accounting function present in Ecom. This affects the level of integration available in the system.

Since the management control component in this research is project planning and control, only companies that are using the project control functionality of the software are included in the survey population. There are about 300 companies that go within this definition and the invitation to the survey was sent to all of these companies. The reason why project planning and control was chosen to be the target of examination is that projects can be seen to have a major role in the operations of building technology industry.

As the survey population consists of companies operating in the field of HPAC and electricity, some description is now provided on the industry in question. Building technology industry provides services related to air, water, heating, energy, lighting, information transfers, security and other services that have to do with the movement of matter, electrons and sound waves. Addition to services, the industry consists of technical systems and devices. (Yleistä talotekniikasta.) The majority of the companies in the industry are small businesses. The total turnover of companies categorized under industry code 43 specialized construction industry, in 2011, was 11 billion euros, and the share of SMEs from this figure was 8.7 billion euros. The average turnover of a company was 483 000 euros in 2011. Turnover of companies operating in specialized construction industry experienced a rise of 8 per cent between the years 2010 and 2011, and a preview on 2012 figures entails a 3.6 per cent rise between the years of 2011 and 2012. (Financial statement statistics on construction.)

4.1.3 Survey questions

Survey questions are mainly adopted from the research article by Chapman and Kihn (2009). Another article that was used in the drawing of the questions was a working paper by Hauwaert and Bruggeman (2012) which investigated the balanced scorecard as an enabling technology. The questionnaire can be found from the attachments (appendix 1).

Firstly, the information system integration is determined by asking the respondents which functionalities of the system they are using. There are eight options that can be chosen.

Secondly, the enabling approach to management control is measured by how the four features of enabling formalization are seen to be present in the company by the respondents. A Likert scale from 1 (strongly disagree) to 7 (strongly agree) was employed in the questions. This scale was also used in the research by Chapman and Kihn (2009), and it is popular in survey questionnaires in general. Repair was the first feature of enabling formalization presented in chapter 3.3. It is measured with five statements. Contrary to the survey conducted by Chapman and Kihn (2009), the first statement is divided into three forms: "It is easy for me to modify project information a) in the planning phase, b) while project is in progress, and c) after the project has ended". Internal transparency is also measured with five statements. The first statement is adopted from the article by Chapman and Kihn (2009), and the other four are formulated by combining the information in the articles by Adler and Borys (1996) and Chapman and Kihn (2009), and the interview quotes provided in the working paper by Hauwaert and Bruggeman (2012). Global transparency includes six statements of which the first five items are applied from Chapman and Kihn, and the last is self-developed based on the same

combination of information as in internal transparency. Flexibility is measured with two statements both applied from the questionnaire by Chapman and Kihn.

The perceived system success was measured by four question items also used in the article by Chapman and Kihn (2009). The respondents were asked to evaluate the success firstly from the point of view of costs compared to benefits, and secondly from the point of view of the usefulness of the system for management.

The performance of the company was measured in terms of market performance and financial performance. Chapman and Kihn (2009) also included the social responsibility of the company in their research, but here it was left out due to lower relevancy in small business context. The market performance of the company was measured with a Likert scale from 1 (clearly below average) to 7 (clearly above average) as it was done in the article by Chapman and Kihn (2009). The financial performance of the companies on the other hand was measured by growth in turnover, as a proxy for growth, and net profit margin, as a proxy for profitability. Growth, especially, is a measure that is typically used in the small business context (Wiklund & Shepherd 2005, 80). The growth in turnover and the net profit margin of the respondent company were then assigned a value between one (1) and four (4). These values were determined by calculating the lower quartile, median and upper quartile of the key ratios of the companies in the same industry with turnover and the number of employees equivalent to the respondent companies (TABLE 4). Voitto+ cd was the source of this information. Net profit margin was based on financial statements of the year 2011 and the growth in turnover was calculated based on financial statements 2010 and 2011.

TABLE 4: Threshold values for financial performance.

Value	**Change in turnover, %**	**Net profit, %**
1	- -10.50	- 0.35
2	-10.49 - 7.30	0.36 - 2.73
3	7.31 – 29.00	2.74 – 9.43
4	29.01 -	9.44 -

4.1.4 Methods of statistical analysis

The survey data was analysed using IBM SPSS Statistics Version 20. For descriptive purposes the following methods of statistical analysis were used:

- frequencies, diagrams
- percentages, mean, minimum, maximum

– standard deviation.

For explanation purposes the chosen method was Pearson's correlation analysis. Tests for normality were then also made since it is the basic assumption behind Pearson's correlation. For this purpose Shapiro-Wilk's test was first applied, since it is the recommended test for survey data with less than 50 data items (Nummenmaa 2009, 154). If this test did not point to normality, further analysis was made with scatter plot analysis and the figures describing skewness and kurtosis of the distributions.

4.1.5 Validity and reliability

In an effort to formulate a good survey, the questionnaire was tested in one company using Ecom and by the management at Ecom. As a result, some minor alterations were made to the wording of the question items. Efforts to get a good response rate were also made: cover letter of the survey (appendix 2) was designed so that it would entice the companies to respond, and a follow-up letter (appendix 3) was sent to respondents to get more responses.

According to Diamond (2000 in Van der Stede et al. 2007, 465) response rates lower than 50 per cent lead to a situation where caution should be used in making conclusions from the survey data. In this case, since the response rate remained lower than 50 per cent, matters such as non-response bias should be taken into consideration. It means that actions should be made to determine if there is some systematic difference between the respondents and the non-respondents. As there is no information available on the companies using Ecom, the focus is directed to companies operating in the same industry. According to the descriptive statistics presented in Chapter 4.2, the respondent companies seem to be representing companies in every stage of the organizational life-cycle. Also the profitability of the respondent companies (3.61 %) in terms of net profit margin is consistent with the industry average (3.3 % SMEs in 2012 according to Financial statement statistics on construction).

Estimation of reliability of the chosen measures in this thesis is done by testing the internal consistency of the question items under each feature of the enabling approach to management control with Cronbach's alpha. This was also done in the research by Chapman and Kihn (2009). According to the test, in the repair feature the inner consistency is quite high (α=.82), and the items correlate well [0.37, 0.77], in internal transparency feature the reliability is high (α=.95) and the items correlate well [0.81, 0.92], and in global transparency feature the reliability is also high (α=.95) and the items correlate well [0.80, 0.87] (TABLE 5). The statements that measured flexibility caused a problem. By looking at the results, it can be seen that there exists a negative correlation between the two items. The question item 1 of flexibility was a reverse coded question. Either the

respondents did not understand the question properly or there has been some sloppiness in giving the answers. Whatever the reason is, one of the two question items has to be dropped out because they do not seem to measure the same matter. As a result, question item 1, the reverse coded question, is dropped off from the analysis. Further statistic of the correlations of the items can be found in appendix 5.

TABLE 5: Inner consistency of question items in the survey.

	Cronbach's Alpha	N of Items
Repair	,819	5
Internal transparency	,947	5
Global transparency	,945	6
Flexibility	-6,280	2

4.2 Data and descriptive statistics

The newsletter enclosing the invitation to the survey was sent to a total of 1 000 people. Since majority of these people were not the target group of the survey, the responds remained quite low, i.e. only 67 people responded to the query. But since the 1 000 people who received the invitation were not all included in the survey population, it is more appropriate to use the number of the companies that were targeted as the reference figure. Thus, if the response rate is calculated by comparing the number of respondents to the number of the companies that were targeted, the response rate would be 22.3 per cent. After eliminating the ones that were not suitable 42 remained. Reasons for rejection were: did not use project management, one man companies, all answers typed in as 1. This means that the final response rate would be 14 per cent.

4.2.1 Company data

As can be seen from FIGURE 10, most of the respondent companies operate in the field of HPAC and electricity. The 19 per cent that are labelled as 'Other' are also service companies operating in the building trade.

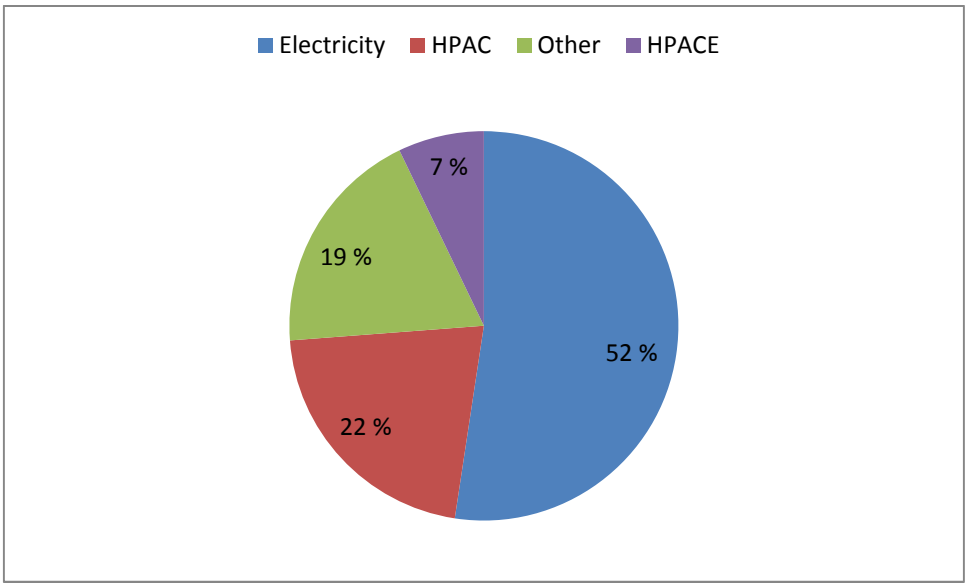


FIGURE 10: Respondent companies' branch of industry

Originally the query was directed to owner-entrepreneurs and CEOs but since the response rate remained so low, the responds of other employees was also included in the results. In TABLE 6 it can be seen that from the total of 42 respondents, 27 were owner-entrepreneurs, 4 CEOs and 11 others. Other respondents declared to be office clerks, employees and planning and administration personnel.

TABLE 6: Descriptive statistics on the respondents (n=42).

	Frequency	Percent	Valid Percent	Cumulative Percent
Owner-entrepreneur	27	64.3	64.3	64.3
CEO	4	9.5	9.5	73.8
Other*	11	26.2	26.2	100
Total	42	100	100	

*Other = office clerk, employee, planning&administration

In TABLE 7 descriptive statistics on the respondent companies are presented. As can be seen, the company ages vary from 0 to 71 while the mean is 21 years. All of the respondent companies can also be classified as SMEs since their annual turnover is less than 50 million euros. By looking at the number of staff in the companies, a further classification can be made saying 48 per cent of the respondent companies are micro businesses (less than 10 employees) and 52 per cent are small businesses (10–49 employees) (FIGURE 11).

TABLE 7: Descriptive statistics on respondent companies.

	N	Minimum	Maximum	Mean	Std. Deviation
Company age	42	0	71	20.67	16.72
Number of employees	42	2	45	13.55	10.48
Turnover, 1 000 €	39	225	7300	1836.79	1655.97
Change in turnover, %	37	-61.56	288,05	18.61	56.17
Net profit, 1 000 €	41	-186	500	51.46	108.61
Net profit margin, %	39	-26.67	20,00	3.61	7.96

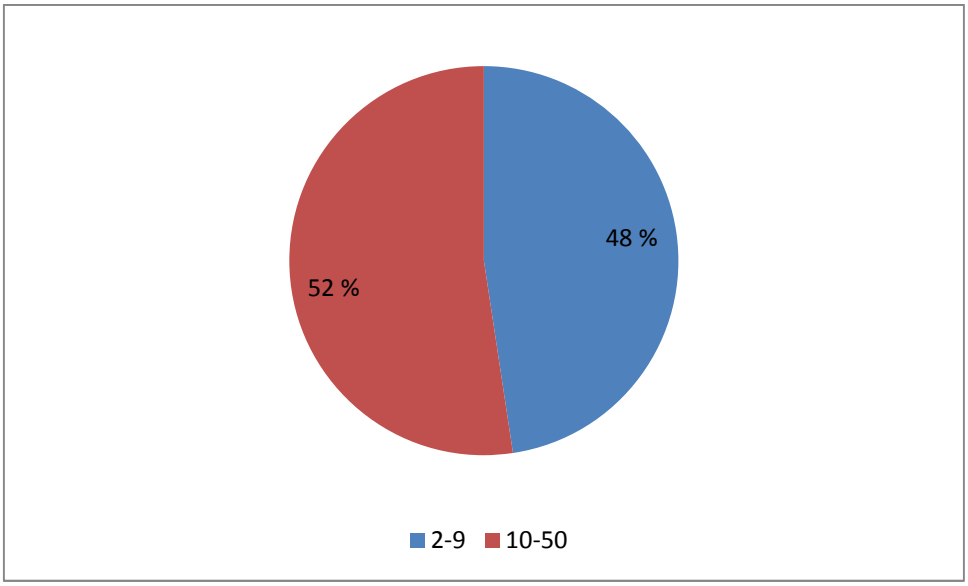


FIGURE 11: Respondent companies' division by the number of staff (n=42).

The respondents were also asked to choose the organizational life-cycle stage that they were in from five options: birth phase, growth phase, maturity phase, revival phase and decline phase. FIGURE 12 represents the distribution between these stages. Based on the comparison made between the stages they chose and company age and change in turnover, it seems that the responds hold true (TABLE 8): the average age of the company grows from 10 in the growth phase to 33 in revival phase, and the average change in turnover is highest in the growth phase (compare for example Kallunki & Silvola 2008, 69).

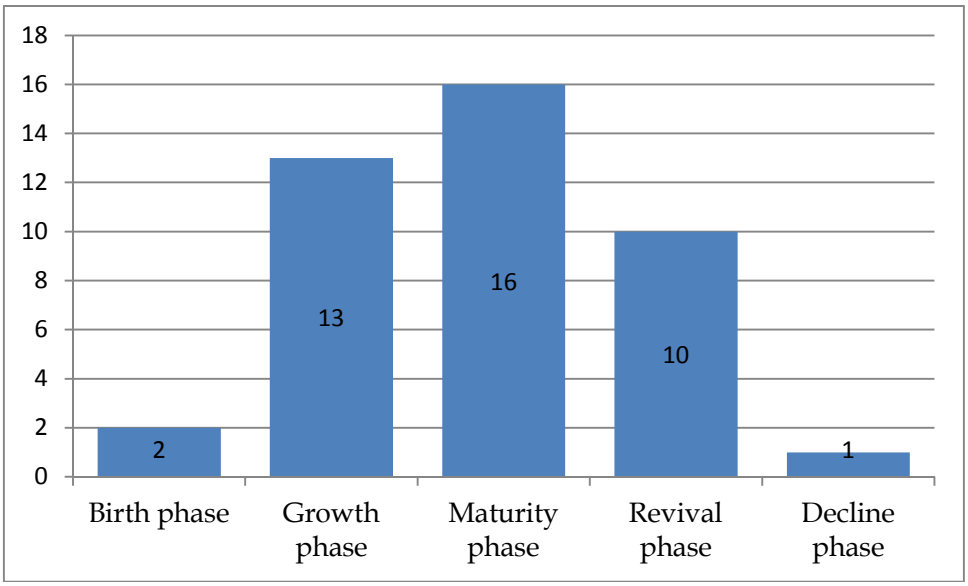


FIGURE 12: Organizational life-cycle stage of the respondent companies (n=42)

TABLE 8: Validation figures for organizational life-cycle stages.

	Organizational life-cycle stages				
	Birth	Growth	Maturity	Revival	Decline
	Mean	Mean	Mean	Mean	Mean
Company age	0	10	25	33	4
Change in turnover, %		45.50	12.21	5.91	-54.08

4.2.2 Respondent companies' use of the system

In FIGURE 13 the Ecom parts used in the respondent companies are presented. As can be seen all of the respondents are using the two most general functions of the software, the sales module and the purchase module. Thus, since the query was directed to companies using project control, the data was eliminated so that all of the respondents also had the project control in use. If we think of the level of integration in the system, the main functionalities after these three, which can be lifted to attention in increasing the level of integration, are the offer calculation and Ecom Webi.

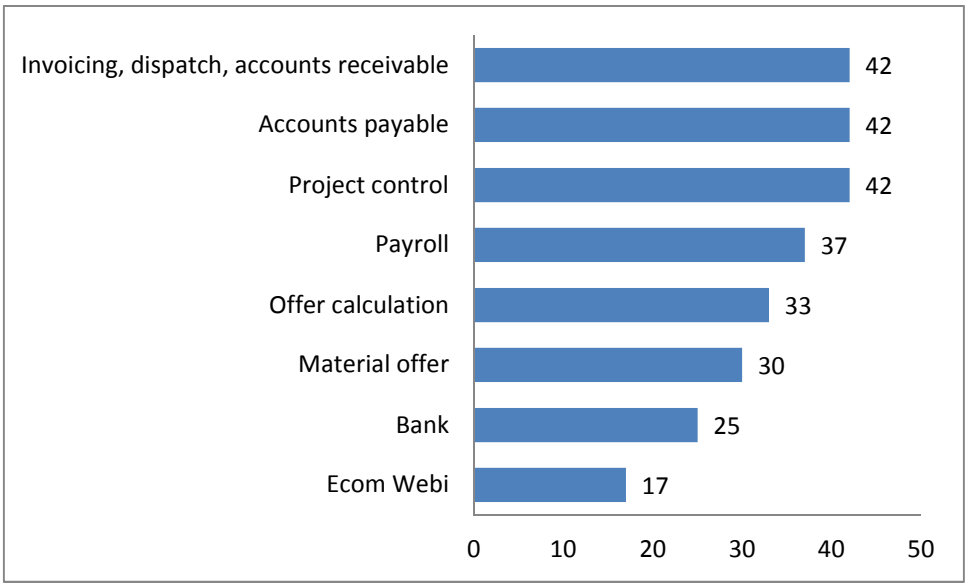


FIGURE 13: Ecom parts in use (n=42).

Another important factor affecting the use of the system is the time the companies have had the system in use. From FIGURE 14 it can be seen that four companies (9.5 %) have implemented the system less than one year ago, seven companies (16.7 %) between one year and three years, and 31 companies (73.8 %) have had the system in use for over three years. This is important because, as presented in chapter 2.3.3, it usually takes a few years before the performance benefits start to realize.

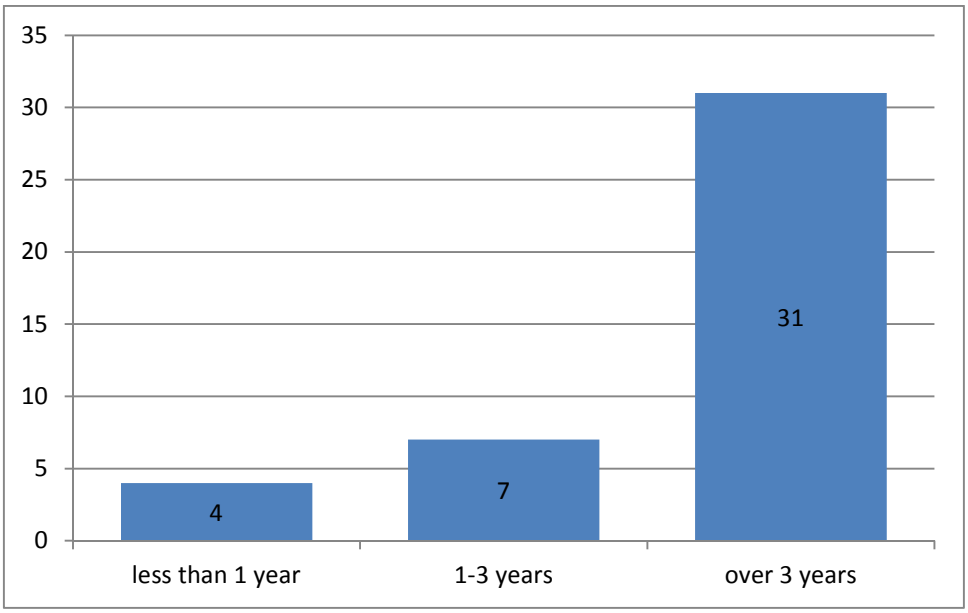


FIGURE 14: Years since implementation (n=42).

FIGURE 15 demonstrates the tendency of the respondent companies to plan and to control. It shows that during the project and after the project over 50 per cent of the respondents (23 out of 42) use the project control module always or nearly always. If we include the respondents that have chosen option 'often' the portion rises to 76 per cent (32 out of 42). The responds to the first statement differ from the other two as only 12 companies (29 %) state of drawing up a budget to a project always or nearly always, and 14 (33 %) inform that they never draw up a budget to a project.

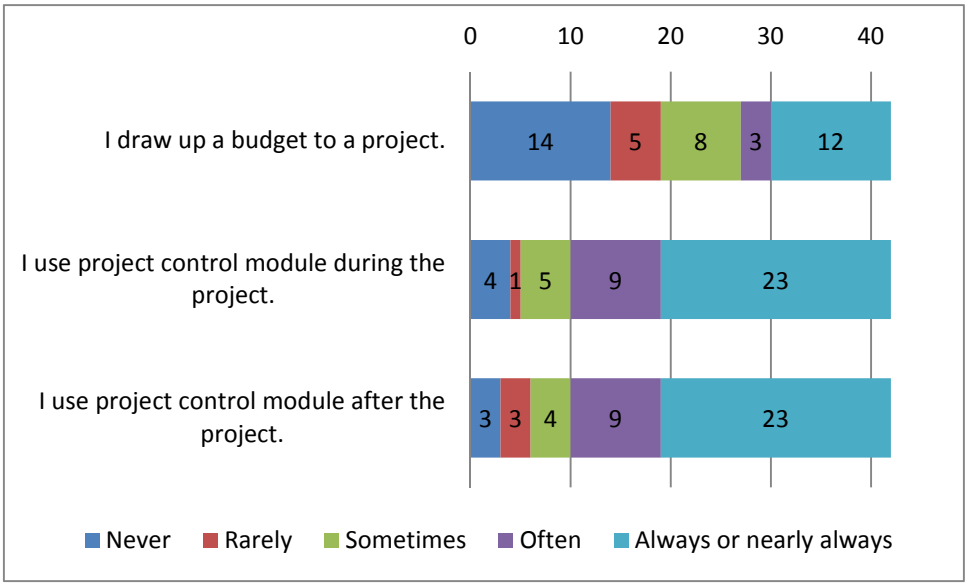


FIGURE 15: Tendency to plan and to control (n=42)

4.2.3 Performance indicators and the system success

The success concerning the project planning and control process as well as the information system was measured with four question items presented in TABLE 9. As can be seen, the responses ranged from one to seven in every question item. These four question items were then transformed into one by calculating a mean. This new variable, showing an average of 4.96 (compare 4.50 in the research by Chapman & Kihn 2009, 161), is used in further analysis (TABLE 10).

The market performance of the companies was then measured using a Likert scale of 1 = clearly below average to 7 = clearly above average. The results are presented in TABLE 9. Here, also a new variable was created by calculating a mean from the three question items. This new variable, showing an average of 4.33 (compare 4.53 in the research by Chapman & Kihn 2009, 161), is used in further analysis (TABLE 10).

The financial performance of the company was measured in terms of change in turnover and net profit margin. The descriptive statistics concerning these results are provided in TABLE 9. The results demonstrate that the respondent companies are spread around every quartile of the industry in terms of financial

performance since the range of the results is from one to four in both of the variables. In the research conducted by Chapman and Kihn (2009, 161) the financial performance of the companies was measured on a range of one to seven resulting an average of 4.65.

TABLE 9: Descriptive statistics for variables of success and performance.

	N	Min.	Max.	Mean	Std. Deviation
Success of project planning and control process and information system.					
Overall the benefits of our project control process outweigh the costs.	42	1.00	7.00	5.00	1.667
Overall the benefits of Ecom in project control process outweigh the costs.	42	1.00	7.00	5.14	1.475
I am convinced that our project control process is the right tool for managing this company.	42	1.00	7.00	4.88	1.501
I am convinced that Ecom system is the right tool for managing this company.	42	1.00	7.00	4.81	1.581
Market performance relative to competitors					
Development of new products	42	1.00	7.00	4.31	1.220
Sales volume	42	3.00	6.00	4.36	1.032
Market developments	42	1.00	6.00	4.33	1.028
Financial performance relative to industry					
Growth in turnover	37	1.00	4.00	2.59	.896
Net profit margin	39	1.00	4.00	2.49	1.073
Valid N (listwise)	37				

TABLE 10: Descriptive statistics for transformed variables.

Descriptive Statistics						
	N	Mean	Std. Deviation	Minimum	Maximum	Scale
1. Information system integration*	42	6.38	1.248	3.00	8.00	3.00 – 8.00
2. Repair	42	4.90	1.14	2.00	7.00	1.00 – 7.00
3. Internal transparency	42	5.05	1.32	1.80	7.00	1.00 – 7.00
4. Global transparency	42	4.43	1.40	1.00	7.00	1.00 – 7.00
5. Flexibility**	42	4.50	1.67	1.00	7.00	1.00 – 7.00

6. Success	42	4.96	1.33	2.00	7.00	1.00 – 7.00
7. Market performance	42	4.33	0.88	2.33	6.33	1.00 – 7.00
8. Financial performance*	39	2.58	0.82	1.00	4.00	1.00 – 4.00

* Notice that the scale is different from others. **=Flex2

4.3 Results

H1: Information system integration is positively related to perceived system success.

Based on bivariate correlation (appendix 6) and scatter plot analysis there is no significant link between information system integration and perceived system success. It seems that the information system integration could have been measured more thoroughly. Furthermore, it can be a case that there is simply not enough information system integration present in these companies to this relationship to show in statistical analysis.

H2: Information system integration is positively related to an enabling approach to management control as seen it its four design characteristics of (a) repair, (b) internal transparency, (c) global transparency, and (d) flexibility.

The situation is the same with the testing of hypothesis 2. Based on bivariate correlation (appendix 6) and scatter plot analysis there is no significant link between information system integration and the features of enabling approach to management control.

H3: An enabling approach to management control as seen it its four design characteristics of (a) repair, (b) internal transparency, (c) global transparency, and (d) flexibility, is positively related to perceived system success.

According to the results of Pearson's correlation analysis, there exists quite a strong positive correlation between all of the features of enabling control and perceived system success: repair 0.71, $p<0.01$; internal transparency 0.873, $p<0.01$; global transparency 0.794, $p<0.01$; flexibility 0.825, $p<0.01$ (appendix 6). Hence the results provided support for the third hypothesis.

H4: An enabling approach to management control as seen it its four design characteristics of (a) repair, (b) internal transparency, (c) global transparency, and (d) flexibility, is positively related to business performance.

By looking at the Pearson correlation coefficients presented in appendix 6, it can be seen that there is a positive statistically significant but weak correlation between the level of repair and market performance (0.419, $p<0.01$), and between the level of global transparency and market performance (0.347, $p<0.05$). There is no statistically significant link between any of the features of enabling control and financial performance. Hence, the results showed partial support for the fourth hypothesis.

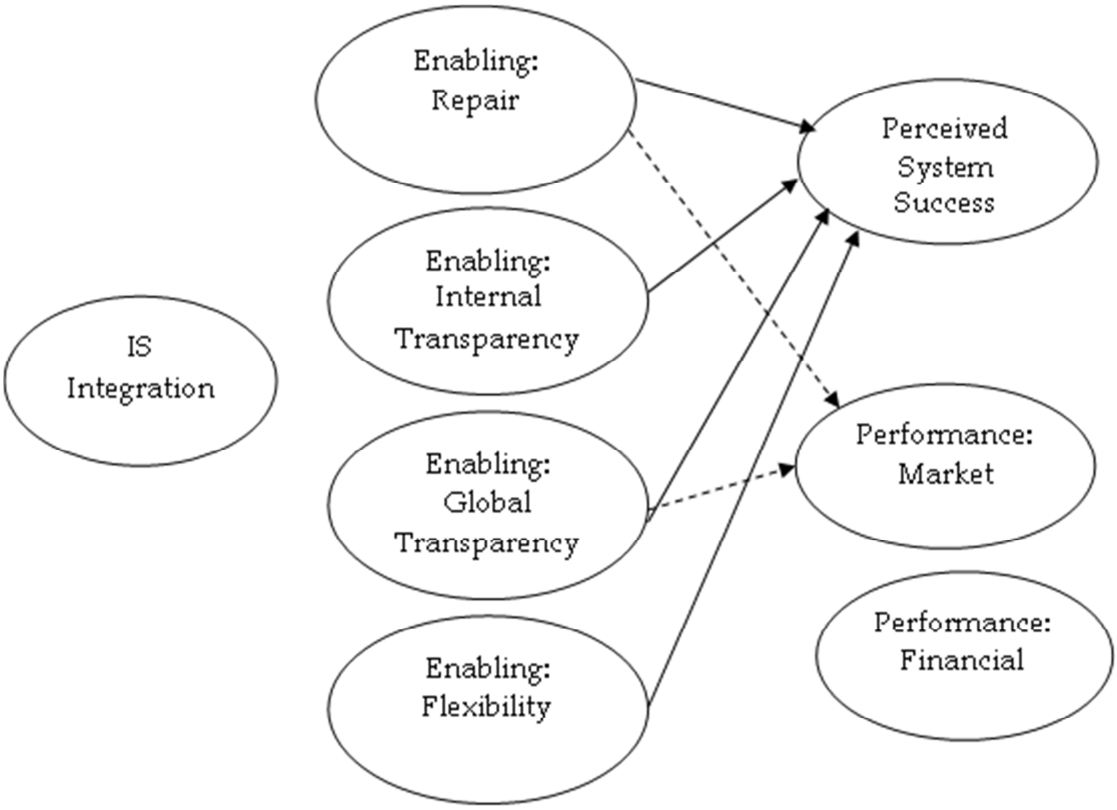


FIGURE 16: Results of the Pearson's correlation analysis.

5 CONCLUSION

The purpose of this thesis was to acquire knowledge on the organizational and performance consequences of management control systems in ERP context. The examination was made both by exploring prior research and by conducting a survey research. In the beginning, the notions of Granlund (2011) were addressed concerning the prior AIS research conducted in the intersection between information technology and management control. It was acknowledged that some further actions should be made to bind these two fields tighter together so that useful information could be produced and new kinds of research frames could be found. In an effort to adhere this notion, the following questions were aimed to be answered: 1) how enterprise resource planning systems and management control systems connect to each other and 2) how these integrated systems affect the overall control system of the organization. Additionally, the matter of benefits and challenges connected to these systems was aimed to be expounded. Answers to these research questions were sought from prior literature.

To visualize the place of ERP systems, in the context of MCS, a framework of organizational control system was presented. In this framework ERP system, as an accounting information system, was situated in the core of the organizational control system. The core control system was presented as a cybernetic model, which consisted of a planning system, a measurement system, an evaluation-reward system, operations, which was the target of the control, and several connections between these components. Although being clearly a component of the measurement system, ERP connects to the overall MCS by providing information which is used to plan, to control, to make decisions, to evaluate the performance and to reward employees. However, the direction of the effect goes two ways. On the one hand ERP enables certain objects to be measured making connections from goals to results and from results to rewards visible. On the other hand, it constrains the other components. ERP dictates what can be measured and what cannot. Furthermore, members of the organization can use the information concerning these connections, basically, in two ways. One is to regenerate this information into knowledge for the good of the company, and the other for the good of the employee him or herself. While the target of the company is to make these goals connect on a certain level at least (rewarding employees for reaching the goals), which of the situations actually realizes is depended on the employee's perceptions on the matter. This leads us to the typology of enabling and coercive formalization. As management control systems are these formalized sets of control actions and processes, according to the framework by Adler and Borys presented in chapter 3.3, they can be perceived either as enabling or coercive by the employees.

To get familiarized with the subject, the concept of formalization was addressed. Prior research has characterized organizations on the basis of the degree of formalization. If there exists a high degree of written instructions and procedure manuals that define the workings of the organization, it can be said that the organization is highly formalized. If, on the other hand, the existence of these kinds of rules is low and the operations inside the company are determined by other factors, the organization can be characterized as experiencing low formalization. The second dimension of formalization, suggested by Adler and Borys on the other hand, is the type of formalization. It has to do with how the formalization is perceived by employees and what assumptions it incorporates. In summary, the main difference lies in the way a member of the organization is perceived. By following the enabling logic, the objective of the rule is to equip the employee with the necessary information to master the task in hand regardless of the situation. In coercive logic, the employee is considered to be an asset if he or she masters the act of following the rule. In other words, the employee is disarmed from using his or her own thinking, because the task in hand and how it is supposed to be carried out is designed somewhere else and the employee is just left to act by the rule.

This new dimension has opened a great deal of doors to researchers in the field of management control. Basis for this thesis originated from the work of Chapman and Kihn (2009). They addressed the question of whether the information system integration embedded in ERP is boosting the enabling approach to management control and whether this again leads to perceived system success and improved organizational performance. This work was continued here by conducting a survey research similar to them, though in the context of small service companies. The basic idea behind this relationship is that the logic of the ERP system is more about making connections visible than closing them from the eyes of the employees. In other words, the better the employee understands the meaning of his work in the organization as a whole, for example, the better he or she is in using the system. And by better using the system companies are getting better chances of making the system a success.

The results of the survey offered some support for this relationship while in some parts they fell short of the expectations. Contrary to the findings of Chapman and Kihn, the survey results did not show a link between information system integration and any of the features of enabling control nor between information system integration and perceived system success. This might, however, be a result of either two things. The first is that the level of integration embedded in this system is not very high, on account of which the support it offers to enabling approach to management control is not sufficient to show in statistical analysis. By also considering the fact that the respondent companies were service companies in which more difficulties have been experienced in getting an enterprise-wide functional integration, this interpretation could be relevant. Another matter

possibly affecting these relationships is the way the level of integration was measured in this research. In the survey by Chapman and Kihn, the level of integration was measured with two statements: "Information in reports produced by our information systems is entirely based on common sources of data" and "We have fully-integrated information systems that contain both financial and non-financial information". Here the level of integration was measured by the number of functionalities the company had in use in time of the survey. In retrospect, though being an objective measure, this may not have been a sufficient measure because of the light nature of ERP in this research and the characteristics of service sector which influence the level of integration. Consequently, it would have been good to use self-reporting statements in the questionnaire.

Continuing to the next relationship, the four features in which the enabling approach to management control is manifested are repair, internal transparency, global transparency and flexibility. The results of the survey showed a statistically significant link between all the features describing the enabling approach to management control and perceived system success. In the survey by Chapman and Kihn similar results were found. However, they did not find a significant link between flexibility and perceived system success. As discussed before, the enabling type of formalization gives the member of the organization permission to think on his or her own: the focus is on understanding and mastering rather than on submission. Taking this to practice, one of the challenges connected to ERP systems was the suspicious attitudes towards new technology and the resistance to change. Consequently, the results of this survey suggest that by endorsing the enabling approach to management control contentment towards the system can be enhanced.

In addition, evidence was found that partially supported the interdependence between the features of enabling approach to management control and firm performance. Repair had statistically significant but weak link to market performance, as did global transparency. Statistically significant interdependencies neither between internal transparency and performance nor between flexibility and performance were found in this survey. If we look again at the results of Chapman and Kihn, similarities can be detected. They too found some weak associations between repair and market performance and between global transparency and market performance as results of their PLS-analysis. Why these two features then stand out from the others? By looking at these features a bit closer, some points can be lifted to attention. Repair had to do with the ability of the user, or employee, to deal with the problems him or herself as they come about. Global transparency on the other hand stands for the ability to see one's place and purpose in the totality. These matters seem to have a greater relevancy in terms of market performance.

In comparison to this survey, Chapman and Kihn also found positive associations between repair and financial performance, and flexibility and financial

performance, and negative association between internal transparency and financial performance. In their survey, however, the financial performance of the companies was measured different from here: they used a subjective self-reporting instrument that required the respondents to evaluate their company's financial performance relative to competitors on three aspects: return on investment, profit and cash flow from operations. In this survey the financial performance was measured by growth in turnover and net profit margin which were based on the financial figures that the respondents submitted on their companies. By also considering the fact that since the change in turnover represented a change of one year in time only, the accuracy of the measure can be contested. Another reason for the lack of correlation between the enabling approach to management control and financial performance could be the low tendency of the respondent companies to budget projects, which has to do with the context of small businesses.

This study has several limitations. First of all, the relatively low response rate and the small dataset of the survey overall cause problems. Consequently, discretion needs to be used in making causal conclusions from the results and generalizing them to the target population. Furthermore, some of the survey instruments could have been more thoroughly prepared, for example the measures of the level of integration, flexibility and financial performance. However, what on the other hand support the generalizability of the results are the points of resemblance to the work of Chapman and Kihn presented before. In future it would be interesting to make this kind of study both in the context of small businesses and in the context of services but not necessarily both of them together in a same research. It would also be interesting to know if the results would be any different if the data was gathered from different levels of the organization. Altogether, I feel that this research provided many interesting observations on the relationship of ERP systems and management control and on the organizational and performance consequences they entail.

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APPENDIX 1: Questionnaire

Vastaajan asema yrityksessä

- ○ Omistaja-yrittäjä
- ○ Toimitusjohtaja
- ○ Muu, mikä? [ ]

Mitkä Ecom-ohjelmiston osat yrityksellänne on käytössä?

- ☐ Laskutus, lähetteet, myyntireskontra
- ☐ Ostolaskut ja ostoreskontra
- ☐ Tarviketarjous
- ☐ Projektiseuranta
- ☐ Tarjouslaskenta
- ☐ Palkanlaskenta
- ☐ Monipankki
- ☐ Ecom Webi

Kuinka pitkään Ecom-ohjelmisto on ollut käytössä yrityksessänne?

- ○ alle puoli vuotta
- ○ 6 kk - 1 vuosi
- ○ 1 - 3 vuotta
- ○ yli 3 vuotta

Seuraava

Jos yrityksellänne ei ole käytössä Ecomin projektiseurantaa, onko käytössänne jokin muu sovellus projektiseurantaa varten?

- ○ Yrityksessämme on käytössä Ecomin projektiseuranta
- ○ Kyllä, mikä? [ ]
- ○ Ei

Edellinen | Seuraava

Laadin projektille budjetin Ecomin tarjouslaskentasovelluksen avulla.

- ○ En koskaan
- ○ Harvoin
- ○ Joskus
- ○ Usein
- ○ Aina tai lähes aina

Edellinen | Seuraava

Käytän projektiseurantasovellusta projektin aikaiseen seurantaan.

- ○ En koskaan
- ○ Harvoin
- ○ Joskus
- ○ Usein
- ○ Aina tai lähes aina

Edellinen | Seuraava

Käytän projektiseurantasovellusta projektin jälkiarviointiin.

- ○ En koskaan
- ○ Harvoin
- ○ Joskus
- ○ Usein
- ○ Aina tai lähes aina

Edellinen | Seuraava

Seuraavat kysymykset koskevat projektiseurantaa ja siihen liittyviä prosesseja.

Minun on helppo muokata projektin tietoja

1 = Täysin eri mieltä, 4 = Ei samaa eikä eri mieltä, 7 = Täysin samaa mieltä

	1	2	3	4	5	6	7
suunnitteluvaiheessa	○	○	○	○	○	○	○
projektin ollessa käynnissä	○	○	○	○	○	○	○
projektin päättymisen jälkeen	○	○	○	○	○	○	○

1 = Täysin eri mieltä, 4 = Ei samaa eikä eri mieltä, 7 = Täysin samaa mieltä

	1	2	3	4	5	6	7
Pääsen helposti käsiksi yksityiskohtaisempaan tietoon, jonka avulla voin tarkastella eroja projektin toteutuneissa kuluissa/tuloissa suhteessa suunniteltuihin kuluihin/tuloihin.	○	○	○	○	○	○	○
Keskustelemme yrityksessämme poikkeamista projektibudjetissa ja teemme toimenpiteitä niiden oikaisemiseksi.	○	○	○	○	○	○	○

Edellinen Seuraava

1 = Täysin eri mieltä, 4 = Ei samaa eikä eri mieltä, 7 = Täysin samaa mieltä

	1	2	3	4	5	6	7
Projektiseurannan myötä tietämykseni tulo- ja kulurakenteestamme on kasvanut.	○	○	○	○	○	○	○
Projektiseuranta tarjoaa tarpeeksi informaatiota toiminnan ohjaukseen.	○	○	○	○	○	○	○
Projektiseurannan avulla pystyn mittaamaan ja seuraamaan niitä asioita, jotka koen tärkeiksi.	○	○	○	○	○	○	○
Projektiseuranta auttaa selventämään projektin tavoitteet.	○	○	○	○	○	○	○
Projektiseurannan avulla voin helposti tarkistaa miten projektilla menee.	○	○	○	○	○	○	○

Edellinen Seuraava

1 = Täysin eri mieltä, 4 = Ei samaa eikä eri mieltä, 7 = Täysin samaa mieltä

	1	2	3	4	5	6	7
Projektiseuranta ja siihen liittyvät prosessit auttavat strategiamme viestinnässä.	○	○	○	○	○	○	○
Projektiseuranta ja siihen liittyvät prosessit osoittavat alueita, joissa meidän pitäisi mahdollisesti muuttaa strategiaamme.	○	○	○	○	○	○	○
Projektiseuranta auttaa henkilöstöäni ymmärtämään sen laajemman kokonaisuuden, missä he työskentelevät.	○	○	○	○	○	○	○
Analysoin projektiseurannasta saamaani informaatiota kehitelläkseni ideoita, joilla voisin parantaa hallinnassani olevia toimintoja.	○	○	○	○	○	○	○
Keksin usein uusia tapoja toimia projektiseurannan ja siihen liittyvien prosessien aikana.	○	○	○	○	○	○	○
Projektiseuranta ja siihen liittyvät prosessit luovat selvän kuvan yrityksestä ja linkittävät yrityksen osatavoitteet sen päätavoitteisiin.	○	○	○	○	○	○	○

Edellinen Seuraava

1 = Täysin eri mieltä, 4 = Ei samaa eikä eri mieltä, 7 = Täysin samaa mieltä

	1	2	3	4	5	6	7
Keskustelut projektiseurannan aikana keskittyvät varmistamaan, että alkuperäisiä oletuksia ja toimintasuunnitelmia noudatetaan tiukasti.	○	○	○	○	○	○	○
Projektiseuranta ja siihen liittyvät prosessit mukautuvat hyvin muuttuviin olosuhteisiin ja erilaisiin projekteihin.	○	○	○	○	○	○	○

Edellinen Seuraava

Seuraavat kysymykset koskevat projektiseurantaprosessin ja tietojärjestelmän onnistumista

1 = Täysin eri mieltä, 4 = Ei samaa eikä eri mieltä, 7 = Täysin samaa mieltä

	1	2	3	4	5	6	7
Projektiseurantaprosessimme hyödyt ovat suuremmat kuin siitä koituvat kustannukset.	○	○	○	○	○	○	○
Ecom-järjestelmän hyödyt projektiseurannassa ovat suuremmat kuin siitä koituvat kustannukset.	○	○	○	○	○	○	○
Mielestäni projektiseurantaprosessimme on oikea työkalu yrityksemme johtamiseen.	○	○	○	○	○	○	○
Mielestäni Ecom-järjestelmä on oikea työkalu yrityksemme johtamiseen.	○	○	○	○	○	○	○

Edellinen Seuraava

Yritystiedot

Perustamisvuosi

Liikevaihto t€ (viimeksi päättyneeltä tilikaudelta, esim. 2012)

Edellisen tilikauden liikevaihto t€ (esim. 2011)

Työntekijöiden lkm

Tilikauden tulos t€

Toimiala

Yrityksen elinkaaren vaihe

- ○ Aloittamisvaihe
- ○ Kasvuvaihe
- ○ Kypsyysvaihe
- ○ Uudelleen suuntautumisen vaihe
- ○ Taantumavaihe

Yrityksen suorituskyky suhteessa kilpailijoihin

1 = selvästi keskimääräistä alhaisempi, 7 = selvästi keskimääräistä korkeampi

	1	2	3	4	5	6	7
Uusien tuotteiden kehittäminen	○	○	○	○	○	○	○
Myyntivolyymi	○	○	○	○	○	○	○
Markkinakehitys	○	○	○	○	○	○	○

Edellinen Seuraava

Kommentteja, havaintoja, kehitysideoita, palautetta projektiseurantaan liittyen:

Kommentteja, havaintoja, kehitysideoita, palautetta yleisesti Ecom-ohjelmistoon liittyen:

Edellinen Seuraava

APPENDIX 2: Invitation to the survey.

Arvoisa yrittäjä/toimitusjohtaja,

Pyydän Teitä ystävällisesti osallistumaan tutkimukseen Ecom-järjestelmän käytöstä projektiseurannassa. Tutkimus on osa pro gradu-tutkielmaani Jyväskylän yliopiston kauppakorkeakoulussa.

Kyselyn tarkoituksena on selvittää Ecom-järjestelmän käyttöä pk-yrityksissä, käyttäjien tyytyväisyyttä järjestelmään ja järjestelmän vaikutusta yritysten suorituskykyyn. Tutkimuksen onnistumiseksi on tärkeää, että mahdollisimman moni vastaa kyselyyn. Kyselyn lopuksi Teillä on mahdollisuus antaa vapaamuotoista palautetta Ecomin porukalle.

Kyselyyn vastaamiseen menee aikaa noin 15 - 20 minuuttia. Kyselyaineisto käsitellään ehdottoman luottamuksellisena eikä tuloksia voida yhdistää yksittäiseen henkilöön tai yritykseen.

Kysely toteutetaan sähköisenä kyselynä, johon pyytäisin Teitä ystävällisesti vastaamaan **20.9.2013** mennessä. Lomake löytyy täältä:

http://MRINTERVIEW2.ad.jyu.fi/mrIWeb/mrIWeb.dll?I.Project=KYSELYECOMINKYTT

Vastaan mielelläni, jos Teillä on jotain kysyttävää tutkimuksesta tai kyselylomakkeen kanssa ilmenee jotain ongelmia.

Yhteistyöstä etukäteen kiittäen,
Leea Mäkelä

APPENDIX 3: Follow-up letter.

Arvoisa Ecomin käyttäjä

Saitte jokin aika sitten kutsun osallistua tutkimukseen Ecom-järjestelmän käytöstä projektiseurannassa. Tutkimus on osa pro gradu -tutkielmaani Jyväskylän yliopiston kauppakorkeakoulussa ja sen tarkoituksena on selvittää Ecom-järjestelmän käyttöä pk-yrityksissä, käyttäjien tyytyväisyyttä järjestelmään ja järjestelmän vaikutusta yritysten suorituskykyyn.

Vastauksia on tullut tähän mennessä vielä vähänlaisesti, joten kannustankin Teitä vastaamaan kyselyyn mahdollisimman pian (kuitenkin viimeistään 20.10.2013) ja näin jakamaan kokemuksianne ja vaikuttamaan osaltanne tutkimuksen onnistumiseen. Kiitos myös Teille, jotka olette jo vastanneet kyselyyn!

Kyselyyn vastaaminen vie aikaa noin 10-15 minuuttia. Kyselyaineisto käsitellään ehdottoman luottamuksellisena eikä tuloksia voida yhdistää yksittäiseen henkilöön tai yritykseen. Lomake löytyy täältä:

http://mrinterview2.ad.jyu.fi/mrIWeb/mrIWeb.dll?I.Project=KYSELYECOMINKYTT

Vastaan mielelläni, jos Teillä on jotain kysyttävää tutkimuksesta tai kyselylomakkeen kanssa ilmenee jotain ongelmia.

Yhteistyöstä etukäteen kiittäen,
Leea Mäkelä

APPENDIX 4: Descriptive statistics on the features of the enabling approach to management control.

	N	Min.	Max.	Mean	Std. Deviation
REPAIR					
It is easy for me to modify project information in the planning phase.	42	2	7	5.17	1.413
It is easy for me to modify project information while project is in progress.	42	2	7	5.17	1.324
It is easy for me to modify project information after the project has ended.	42	1	7	4.67	1.618
I easily get access to detailed information in order to investigate deviations between planned revenues/costs and realized revenues/costs.	42	1	7	4.69	1.554
We discuss the budget deviations and make actions to correct them.	42	1	7	4.79	1.539
INTERNAL TRANSPARENCY				5.05	
Project control process increases my understanding of what drives our revenue/cost levels.	42	1	7	4.98	1.569
Project control process offers enough information for management.	42	2	7	4.81	1.452
With project control I can measure and control things that I feel important.	42	2	7	5.07	1.386
Project control process helps to clarify the project target.	42	2	7	5.02	1.405
With project control it is easy for me to check how the project is doing.	42	1	7	5.38	1.447
GLOBAL TRANSPARENCY				4.43	
The project control process helps to communicate our strategy.	42	1	7	4.17	1.637
The project control process signals areas in which we may need to change our strategy.	42	1	7	4.76	1.478
The project control process helps personnel to understand the overall context in which they are working.	42	1	7	4.24	1.679
I analyse project control information in order to come up with ideas for improving operations under my control.	42	1	7	4.69	1.506
I often think of new ways of doing things during the project control process.	42	1	7	4.26	1.668
Project control process creates a clear image of the company and links the company's sub goals to its main goals.	42	1	7	4.48	1.486

FLEXIBILITY					
Discussion during the project control process focuses on ensuring strict adherence to original assumptions and action plans.*	42	1	7	4.36	1.428
Project control process accommodates well to changing circumstances and different projects.	42	1	7	4.50	1.671
Valid N (listwise)	42				

*reverse-coded question

APPENDIX 5: Internal consistency statistics.

Item-Total Statistics				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
REPAIR				
Repair1A	19.31	20.609	.756	.741
Repair1B	19.31	21.195	.768	.742
Repair1C	19.81	21.377	.555	.801
Repair2	19.79	20.563	.662	.767
Repair3	19.69	24.316	.370	.852
INTERNAL TRANSPARENCY				
Int_transp1	20.29	27.672	.810	.943
Int_transp2	20.45	28.303	.848	.935
Int_transp3	20.19	28.060	.921	.923
Int_transp4	20.24	28.966	.831	.938
Int_transp5	19.88	28.107	.867	.932
GLOBAL TRANSPARENCY				
Glob_transp1	22.43	49.080	.804	.938
Glob_transp2	21.83	51.069	.802	.938
Glob_transp3	22.36	47.260	.871	.929
Glob_transp4	21.90	50.137	.834	.934
Glob_transp5	22.33	47.935	.843	.933
Glob_transp6	22.12	50.254	.842	.933

APPENDIX 6: Results of the Pearson's correlation analysis.

Correlations									
		1.	2.	3.	4.	5.	6.	7.	8.
1. Information system integration	Pearson Correlation	1	-.081	-.078	.071	-.047	-.027	.037	-.206
	Sig. (2-tailed)		.609	.625	.654	.769	.865	.817	.209
	N	42	42	42	42	42	42	42	39
2. Repair	Pearson Correlation	-.081	1	.649**	.658**	.650**	.710**	.419**	.076
	Sig. (2-tailed)	.609		.000	.000	.000	.000	.006	.644
	N	42	42	42	42	42	42	42	39
3. Internal transparency	Pearson Correlation	-.078	.649**	1	.753**	.800**	.873**	.165	.152
	Sig. (2-tailed)	.625	.000		.000	.000	.000	.298	.357
	N	42	42	42	42	42	42	42	39
4. Global transparency	Pearson Correlation	.071	.658**	.753**	1	.844**	.794**	.347*	-.054
	Sig. (2-tailed)	.654	.000	.000		.000	.000	.024	.745
	N	42	42	42	42	42	42	42	39
5. Flexibility	Pearson Correlation	-.047	.650**	.800**	.844**	1	.825**	.242	.016
	Sig. (2-tailed)	.769	.000	.000	.000		.000	.122	.921
	N	42	42	42	42	42	42	42	39
6. Success	Pearson Correlation	-.027	.710**	.873**	.794**	.825**	1	.111	.046
	Sig. (2-tailed)	.865	.000	.000	.000	.000		.484	.781
	N	42	42	42	42	42	42	42	39
7. Market performance	Pearson Correlation	.037	.419**	.165	.347*	.242	.111	1	.122
	Sig. (2-tailed)	.817	.006	.298	.024	.122	.484		.460
	N	42	42	42	42	42	42	42	39
8. Financial performance	Pearson Correlation	-.206	.076	.152	-.054	.016	.046	.122	1
	Sig. (2-tailed)	.209	.644	.357	.745	.921	.781	.460	
	N	39	39	39	39	39	39	39	39
****. Correlation is significant at the 0.01 level (2-tailed).**									
***. Correlation is significant at the 0.05 level (2-tailed).**									