



TIMO HYVÖNEN

Exploring Management Accounting Change  
in ERP Context

Four perspectives



ACADEMIC DISSERTATION

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Timo Hyvönen



## ABSTRACT

The overall purpose of this dissertation is to study the role of ICT in the controlling process of organizations, and specifically how financial management as an active agency is able to mobilise resources, control decision-making and manage meanings within the ERP implementation process. Thus, the purpose here is to shed light from four different perspectives on management accounting change in the ERP systems context: (i) management accounting as a *technology*, (ii) management accounting as *knowledge*, (iii) management accounting as a *control structure*, and (iv) management accounting as a *profession*. However, unlike in earlier studies, the focus here is on the implementation phase, not on the impacts of ERP systems on management accounting. The dissertation consists of an introductory chapter and four published papers.

In this dissertation, the direction is from a preliminary and explorative survey to detailed and in-depth case studies. The survey used in the first paper not only indicated that the phenomenon is popular and interesting, but also showed how difficult, even impossible, it is, using the survey method, to capture a continuously changing target such as an information system, which is not only a stable system but also a dynamic and unstable process. Therefore, the last three papers were carried out as a case study in one company. In these papers, analyses on three levels were used: the institutional, organizational and individual levels. The institutional level means changes on the social and political level, i.e. EU integration and competition legislation. On the organizational level the focus is on the changes in organizational structures and processes, and on the individual level on single actors.

As a conclusion, the dissertation replies to the question of how it is possible, using a company-wide integrated information system (ERP), to mobilize local management accounting knowledge to dis-embed it from the local level to headquarters, and then globalize it by re-embedding the knowledge on all sites. Besides this, the dissertation also offers a rich description of the series of events in which the actor responsible for the project, is in a situation to establish different social networks, and, over and over again, to sell the whole idea of the project to different actors by using suitable metaphors for the situation. In contrast to some other management accounting studies, this dissertation suggests that instead of a panopticon, the centre of calculation created by ERP systems may be more like an oligopticon. The nature of the oligopticon, however, includes a propensity for errors, as its functioning depends on the existence of many accounting information system agencies and the connections between them. As a final contribution, this dissertation explains how technology by its definition and implementation can help an accountant in his/her personal career.

## TIIVISTELMÄ

Tässä väitöskirjassa tutkitaan modernin tietotekniikan roolia yrityksen taloudellisessa ohjauksessa, sekä sitä, kuinka yrityksen talousjohto aktiivisella toiminnallaan kykenee paitsi ohjailemaan taloudellisia resursseja, myös kontrolloimaan päätöksentekoa sekä määrittelemään uuden tietojärjestelmän käyttöönottoon liittyviä merkityksiä. Erityisesti tämän tutkimuksen tarkoitus on jäsentää johdon laskentatoimen mahdollista muuttumista otettaessa käyttöön yrityksen kaikki toiminnot integroiva ERP –järjestelmä. Tässä tutkimuksessa kysymystä lähestytään neljästä eri näkökulmasta: (i) johdon laskentatoimi teknologiana, (ii) johdon laskentatoimi tietämyksenä, (iii) johdon laskentatoimi ohjausrakenteena ja (iv) johdon laskentatoimi ammattina. Toisin kuin aikaisemmissa vastaavissa tutkimuksissa, tässä painopiste on uuden järjestelmän käyttöönottovaiheessa, ei sen myöhemmissä vaikutuksissa johdon laskentatoimeen. Rakenteellisesti väitöskirja koostuu johdantoluvusta, sekä neljästä aikaisemmin julkaistusta artikkelista.

Metodologisesti tutkimus etenee yleisestä kohti yksityiskohtaisempaa tapaus-tutkimusta. Ensimmäisessä artikkelissa käytetty survey-menetelmä osoittaa sen, että tutkittava ilmiö on mielenkiintoinen, mutta tutkimuksellisesti haastava. Kolme muuta atikkelia on toteutettu dynaamisempana reaaliaikaisena tapaustutkimuksena yhdessä yrityksessä.

Tutkimuksen tulokset osoittavat, miten suuri rooli yksittäisellä aktiivisella toimijalla voi olla uuden tietojärjestelmän käyttöönottoprojektissa. Koko yrityksen kattavan integroidun järjestelmän avulla voidaan siirtää paikallista kustannuslaskentatietämystä nopeasti ja tehokkaasti. Samalla aktiiviset määrätietoiset toimijat voivat piiloutua tietojärjestelmien ja laskentastandardien taakse pyrkiessään aikaansaamaan haluamiaan muutoksia. Tämän lisäksi tutkimus tarjoaa yksityiskohtaisen kuvauksen tapahtumasarjasta, jossa projektista vastaava henkilö joutuu rakentamaan erilaisia sosiaalisia verkostoja sekä aina uudelleen ja uudelleen myymään projektin eri osapuolille erilaisten kielikuvien avulla. Lopuksi tutkimus osoittaa sen, kuinka uudet laskenta- ja tietotekniikat hallitseva henkilö voi hyödyntää niitä omassa urakehityksessään.

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## Part II: Original papers

- [1] Management accounting and information systems: ERP versus BoB, *European Accounting Review*, 12 (1), pp. 155-174.
- [2] The role of standard software packages in mediating management accounting knowledge, *Qualitative Research in Accounting & Management*, 3(2), pp. 145-160, (with J. Järvinen. and J. Pellinen).
- [3] A virtual integration – The management control system in a multinational enterprise, *Management Accounting Research* 19(2), pp. 45-61, (with J. Järvinen. and J. Pellinen).
- [4] Struggling for a new role for the business controller (2008), *Tampere Economics and Accounting Net Series*, WP 1, (with J. Järvinen. and J. Pellinen).





# 1. Introduction

## 1.1 Background of the dissertation

This study addresses a topic which has profoundly affected management accounting research during the last decade; the links between modern information and communication technology (ICT) and management accounting. A starting point for that research tradition has been the two papers published in the *Harvard Business Review*, namely Davenport (1998) and Cooper and Kaplan (1998), in which the idea of the new kind of integrated information system was first presented to accounting academia more widely. Since then, more attention has been paid to the relationship between information systems and management accounting, such as the possible impacts of ICT on management accounting practices and the roles of management accountants (Scapens, Yazayeri & Scapens, 1998; Sutton, 1999; Bhimani, 2003; Chapman & Chua, 2003; Chapman, 2005; Dechow, Granlund & Mouritsen, 2006; 2007; Granlund, 2007, 2009).

The relationship between ICT and accounting has changed considerably during the last four decades (Sutton & Arnold, 2002). Even in the 1970s, only a small proportion of accounting functions was operated on computer-based information systems. These transaction processing systems typically covered payroll, inventory and record keeping. For instance, cost accounting, budgeting and all the other traditional management accounting tasks were often organized manually at that time. According to Kaplan and Cooper (1998) these systems can best be described as (external) financial reporting-driven systems. In the 1980s, the role of computer-based information systems in financial management increased with the introduction of personal computers (PCs) and easy-to-use spreadsheet, database and EIS<sup>1</sup>

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<sup>1</sup> An Executive Information System (EIS) is a type of management information system intended to facilitate and support the information and decision-making needs of senior executives by providing easy access to both internal and external information relevant to meeting the strategic goals of the organization. It is commonly considered as a specialized form of a Decision Support System (see e.g. Power, 2002).

applications. This change also broke down the previous hegemony of centralized mainframe computer-based ICT infrastructure, and, at the same time, decentralized financial management functions. However, still the conventional mode of action at that time was to develop separate stand-alone system for every function of the organizations. Thus, this kind of best-of-breed (BoB) architecture easily led to fragmented ICT infrastructure and to a situation where a company might easily have dozens of different software products from different vendors to maintain and update.

After the second half of the 1990s, virtually all large multinational organizations, and later on even many small and medium-sized organizations replaced their earlier homegrown (best-of-breed) legacy systems and implemented wide-ranging and multifunctional integrated information systems, enterprise resource planning (ERP<sup>2</sup>) systems (Cooper & Kaplan, 1998; Davenport, 1998). This kind of information system evolution also restored the power of centralized ICT infrastructure. The core of the ERP system is a central database that stores, standardises and streamlines the collection, analysis and dissemination of data throughout the organization. There is no universally shared definition of ERP systems, but from the management accounting perspective a well known and often cited one has been put forward by Granlund and Malmi (2002, p. 303), according to which ERPs are defined “as module-based integrated software packages that control all the personnel, material, monetary and information flows of a company”. Thus, in integrated ERP systems accounting and financial management are only one part of the large information system.

Typically, the motivation behind these investments has been the need, as well as the will to improve organizational efficiency, effectiveness and performance (Poston & Grabski, 2001; Hunton, Lippincott & Reck, 2003; Arnold, 2006). As the implementation of ERP systems often force companies to reengineer their business processes or organization structures (Davenport, 2000; O’Leary, 2000), Sutton

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<sup>2</sup> The roots of the ERPs can be found in the inventory management systems of the late 1960s. Material Requirement Planning (MRP), a part of which was the bill of material (BoM) was the very first attempt to control material resources by computer. The purpose of the MPR system was to make sure that enough parts would be found when needed. In the mid 1970s, the systems diversified when manufacturing resources came in, and thereafter the system was called Manufacturing Resource Planning (MRP II). This was a method for the effective planning of all resources of a manufacturing company. Finally, after the MRP II was extended to all the other organization functions, such as sales and distribution, human resource management, financial management, product design and plant maintenance, the current ERP system was born. (Vortman, 1999)

(2006, p. 1) has emphasized that modern integrated information systems “have fundamentally re-shaped the way the business data is collected, stored, disseminated and used”.

The purpose of this dissertation is to explore management accounting change in the ERP implementation context from four different perspectives. The study consists of the introduction part and four published papers. The next section incorporates the relevant literature review of the respective topics. Then, in the third section, the aim of the study, data and the methods used in this dissertation are presented. After that, the original papers of the study are summarized. Finally, the contribution of this study to our knowledge of management accounting change in ERP implementation is outlined, as well as the author’s own contribution to the co-authored papers.

## **1.2 Earlier Management Accounting Research in ERP Context**

The recent management accounting literature shows increasing research interest in the effect of ERP systems on management accounting practices. In their literature review Aernouds, van der Boon, van der Pijl and Vosselman (2005) classified existing empirical management accounting oriented literature into two main categories. According to them, the studies in the group with a “structural approach” focus on two main questions: how the implementation of ERP system will change the organization, and whether ERP implementation has an impact on organizational performance. The second empirical research category identified by Aernouds et al. (2005) is “processual studies”. These studies try to explain how the processes of change unfold and how their outcomes develop over time.

In their seminal study, Scapens and Jazayeri (2003) reported that although the introduction of ERP systems had not caused fundamental changes in the nature of the management accounting information used, there were indeed some changes in the role of management accountants - in particular: (i) the elimination of routine jobs; (ii) line managers with accounting knowledge; (iii) more forward-looking information; and (iv) a wider role for management accountants. Notably, they did not claim that ERP was the driver of these changes; rather it is argued that the characteristics of ERP (integration, standardization, routinization and centralization)

opened up certain opportunities and facilitated changes already taking place within the company.

The next question of these processual studies covers the issue of the impact of ERPs on management accountants' working routines and represents an idea of accounting hybridization (Granlund and Malmi, 2002; Caglio, 2003; Newman & Westrup, 2005; Burns & Baldvinsdottir, 2005; Hyvönen, Järvinen, Pellinen & Rahko, 2009). While Granlund and Malmi (2002) at the time their study was carried out found only modest changes, Caglio (2003) and Newman and Westrup (2005), however, reported on the adoption of a new ERP system challenging the definition of the expertise and roles of accountants within organizations, leading perhaps to new, hybrid positions. The remainder of these studies focus on either the links between ERPs and innovative accounting practices, or the effects of ERPs on management control (Granlund and Malmi, 2002; Quattrone and Hopper, 2005). Besides that, Quattrone and Hopper (2005) found that while the adoption of an ERP system did not influence management control in one of their cases, in their other case financial management expressed concern at the loss of control.

As an outcome of their literary review, Aernouds et al. (ibid.) observed that as a due of a variety of theoretical and methodological perspectives, the knowledge of the subject is rather fragmented, leading to the low degree of knowledge accumulated concerning the issue (see also Arnolds, 2006). One of their major concerns was that there is an important shortcoming of the extent the depth research addressed the question "how do accountability and control changes occur when ERP is adopted".

Dechow and Mouritsen (2005) in their literature review also adopted the same kind of methodological starting point as Aernould et al. (2005). However, in addition to structural/processual classification they also added the third dimension, namely the 'learning curve'. According to that research approach, firms implementing ERP systems have to go through a learning curve in order to benefit from the ERP investment. Dechow and Mouritsen (ibid.) argue that this approach is based on the 'stage—maturity model' used as a basis for consultants' advice on ERP implementation. The purpose of that research genre is to bring to light the potential of instrumental rationality acting within and through ERP systems. The next approach (structural) in Dechow and Mouritsen's typology in the ERP literature focuses on performance by asking whether ERP works. Common features of these,

usually survey-based studies are that they suggest only very moderate impacts of ERP systems on management accounting (Boot, Matolsky & Wieder, 2000; Granlund and Malmi, 2002; Spathis and Constatides, 2004).

In contrast to the two approaches mentioned, the third one emerging (processual) is concerned with 'how ERP technologies are made to work as 'systems'' (Dechow and Mouritsen, 2005, p. 692). The studies by Quattrone and Hopper (2001, 2005), Caglio (2003), Scapens and Yazayeri (2003), Lodh and Gaffikin (2003) and Newell et al. (2003) have in some cases identified actually remarkable effects of ERP systems both on the process of design, as well as on the process of use. In addition, these studies also explain why earlier surveys have been limited, and therefore unable to capture the essential features of the effects of the ERP systems on management control. In their own study Dechow and Mouritsen (2005) explored ERP as a promise of system integration, and as a result of their study they reported that fully integration never took place.

Besides that, the results of the study by Rom and Rohde (2006) indicated that ERP systems support the data collection and the organizational breadth of management accounting better than SEM (strategic enterprise management) systems. SEM systems, on the other hand, seemed to be better at supporting reporting and analysis. In addition, modern management accounting techniques involving the use of non-financial data are better supported by an SEM system. Moreover, the study by Quattrone and Hopper (2006) explores the ontology of IT systems. The paper argues that IT appears homogeneous as it attracts and generates heterogeneous uses. This paradox is labelled 'heterogeneous'. An IT system is theorised as an absence, which establishes a presence by mobilising and attracting other actors and technologies, in this instance accounting, seeking visibility in organizations. IT emerges from multiple and continuous translations involving customization of SAP<sup>3</sup>. Thus, the definition of IT is neither stable nor singular across time and space, which enables IT and SAP to travel across organizations.

The fourth approach coming to light just recently is a more critical perspective. The study by Caccio and Steccolini (2006) focused on accounting change in local

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<sup>3</sup> SAP is an acronym from the words 'Systemanalyse und Programmentwicklung'. SAP R/1 solution was launched in 1973, and SAP R/2 in 1979. With the change from R/2 to R/3 in 1992, SAP followed the trend from mainframe computing to client-server architectures. The development of SAP's Internet strategy with mySAP.com redesigned the concept of business processes (see <http://www.sap.com/about/company/history/index.epx>)

governments, and the active role of CFO in the project, a part of which was also ERP implementation. The study by Dillard, Ruchala and Yuthas (2006) was interested in ERP systems as an ‘administrative evil’ and Jack and Kholeif (2008) in the contest to limit the role of management accountants in developing countries through ERP implementations. Finally, Teittinen (2008) in his dissertation suggested that integration in ERP means not only integration between the software modules and organizations, but also integration between invisible realities. The common feature of these studies is that they all see ERPs as either a pure managerial fashion or a disgusting outcome of ever-increasing bureaucracy.

Summing up, the ERP oriented management accounting literature can be presented using the framework proposed by Lukka and Granlund (2002). In their article, they distinguished three genres of activity-based costing (ABC) research (consulting research, basic research and critical research). As an outcome of the study, they demonstrate how fragmented the field of ABC research seems to be. Using the same framework, it is also possible to describe the different research genres in management accounting oriented ERP research (see Figure 1).

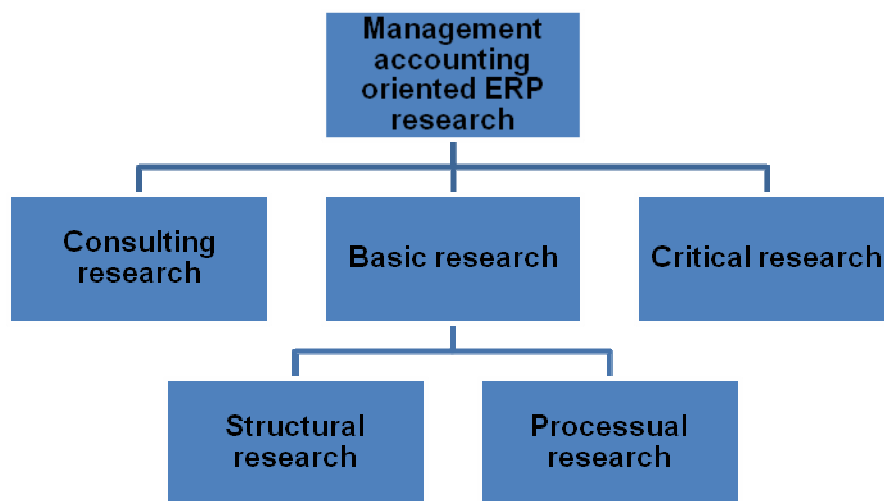


Figure 1. Research genres in management accounting oriented ERP research

In consulting research<sup>4</sup>, the focus is twofold: either the possibilities to develop organizations with ERPs are presented, or the interest is in critical success factors in ERP implementation phase often studied by statistical methods. In the basic studies,

<sup>4</sup> See e.g. KPMG Consulting, (1997), Deloitte Consulting (1998) and PA Consulting Group (1999).

however, the research questions concentrate more on the possible impacts of ERP implementations on management accounting, management control or the changing roles of management accountants. Structural studies have typically found only moderate impacts, while processual studies have also reported remarkable, albeit contradictory changes. Finally, critical studies as a basis will call into question the whole idea of ERP as integrated information systems. According to these, ERP systems will be seen either as a one form of managerial fashion or labour processing issue when these systems just offer a new device to forestall democracy by centralizing power on a small elite within the organization.

### **1.3 Purpose of the Study: Four Perspectives on Management Accounting Change in ERP context**

The overall purpose of this dissertation is to study the role of ICT in the controlling process of the organizations (e.g. Ribeiro & Scepens, 2006; Dechow et al. 2007), and specifically how financial management is able to mobilise resources, control decision-making and manage meanings (Burns, 2000; Caccio & Steccolini, 2006) within the ERP implementation process. Thus, the purpose here is to shed light from four different perspectives on management accounting change in the ERP systems context: (i) management accounting as a *technology*, (ii) management accounting as *knowledge*, (iii) management accounting as a *control structure*, and (iv) management accounting as a *profession*. However, unlike in earlier studies, the focus here is on the implementation phase, not on the impacts of ERP systems on management accounting.

The focus in the first article<sup>5</sup> is on the *technological role* of ERPs when new management accounting systems are implemented. The elementary questions in that paper are: why, and by whom was the new information system implemented in the industrial units studied. The second, albeit a secondary aim, in the paper is to explore what kind of impacts the ICT infrastructure (BoB versus ERP) has had on the management accounting functioning between these two different configurations. The paper by Granlund and Malmi (2002) suggests that in many cases modern

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<sup>5</sup> Hyvönen, T. (2003) Management accounting and information systems: ERP versus BoB, *European Accounting Review*, 12 (1), pp. 155-174.

management accounting systems in Finnish industrial units have been implemented outside the ERP system by using separate off-the-shelf solutions. Therefore, the latter three papers will take into more profound consideration why and how modern multidimensional profitability management systems have been created in a big industrial enterprise with different cost accounting and management control off-the-shelf software packages (Oros ABC/M<sup>6</sup>, Cognos PowerPlay) by using ERP system (SAP R/3) as a basic platform. The other important issue is what kind of reflections this has had on management control and the changing roles of controllers.

The second paper<sup>7</sup> approaches the issue from the perspective of *knowledge transfer*: how the standard software packages can help organizations to mobilize local management accounting knowledge (cf. Vaivio 2004 and his idea of mobilizing local knowledge with ‘provocative’ non-financial measures). In our case this means the roles of standards (Brunsson & Jacobsson, 2000; Giddens, 1990) when dis/re-embedding management accounting knowledge within a company.

In the third paper<sup>8</sup>, the focus is on how a company managed to create a new *management control system* (called virtual organization) by using the technology mentioned earlier, when the purpose is to increase headquarters’ control and visibility over the local business units (see also Blomfield & Vurdubakis, 1997; Quattrone & Hopper, 2005). The essential point in the paper is that when creating a new control structure the focus is on parallel processes and their social networks.

The last paper<sup>9</sup> concentrates on the management accounting *profession* and the role change of controllers. So far studies on the subject have concentrated either on the national or organizational level of change (the only exception being Baxter and Chua, 2008). In this study, the focus is on a single controller: how the aspiring controller (an active agency) managed to expand his role from ‘bean counter’ and to create a new kind of role model to the organization by using the ERP-linked management accounting development project as a stepping stone (cf. Järvenpää, 2007).

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<sup>6</sup> The software is correctly known as SAS<sup>®</sup> Business Intelligence.

<sup>7</sup> Hyvönen, T., Järvinen, J. and Pellinen, J. (2006) The role of standard software packages in mediating management accounting knowledge, *Qualitative Research in Accounting & Management*, 3(2), pp. 145-160

<sup>8</sup> Hyvönen, T., Järvinen, J. and Pellinen, J. (2008) A virtual integration – The management control system in a multinational enterprise, *Management Accounting Research* 19(2), pp. 45-61

<sup>9</sup> Hyvönen, T., Järvinen, J. and Pellinen, J. (2008) Struggling for a new role for the business controller (2008), *Tampere Economics and Accounting Net Series*, WP 1



As a conclusion to the papers we may suggest that the first paper explores what, if anything, is interesting in the current topic. The results of the paper clearly indicated that the impact of ERP systems on management accounting as such was not so interesting, but the important issues seem to be both the role of active agencies (Eisenstadt, 1980; DiMaggio, 1988; Garud, Hardy & Maguire, 2007; Hardy & Maguire, 2008) and the professional roles, i.e. accountants when implementing new information system. The first paper also revealed how a modest method a survey study is to explore an issue like this. Therefore, in order to fill in the gap in the management accounting research, it was decided to carry out the rest of the dissertation by an in-depth case study. This mode of action enabled us to study the phenomena, the role of ICT in the controlling process of the organizations from different perspectives<sup>10</sup>.

## 1.4 Data and Method

In empirical management accounting research, the relationship between survey and case study is heavily dependent not only on the personal background of the researcher, but also on the cultural traditions. In the USA, the case study has traditionally been seen as a pilot study, the purpose of which is merely to test some preliminary hypothesis for the study proper, usually survey (Arnold, 2006). In Europe, however, the situation is often the opposite and surveys are considered only a preliminary study where some new ideas are only tested in order to find out if the phenomenon is interesting to study at all. Between these two research lines there are field studies, the purpose of which is to achieve at a more general picture of the issue than a single case can do, but the purpose is not, however, statistical generalization in the spirit of survey studies. Just lately, there has also been an attempt for cross-sectional field studies in management accounting in order to close the gaps between surveys and case studies (Lillis & Mundy, 2005).

Summing up, in European management accounting research more diversity can be found than in the US tradition (Carmona, Gutierrez & Camara, 1999; Jones &

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<sup>10</sup>The purpose of this dissertation, however, is not to integrate different theoretical ideas (see e.g. Hopper & Hoque, 2006; Hopper & Major, 2007), but only to create various theoretically motivated views on the phenomenon.

Roberts, 2005; Tuttle & Dillard, 2007; Ahrens et al, 2008; Raffournier & Schatt, 2009), but as Lukka and Kasanen (1996) emphasized, accounting is still a rather local discipline by nature: both empirical evidence and authors are significantly clustered along country lines.

In this dissertation, the direction is from a preliminary and explorative survey to detailed and in-depth case studies. The survey used in the first paper not only indicated that the phenomenon is popular and interesting, but also showed how difficult, even impossible it is, using the survey method, to capture a continuously changing target such as an information system, which is not only a stable system but also a dynamic and unstable process (Dechow & Mouritsen, 2005; Quattrone & Hopper, 2006). Therefore, the last three papers are carried out as a case study in one company. In these papers, analysis on three levels are used: institutional, organizational and individual level. The institutional level means changes on the social and political level, i.e. EU integration and competition legislation. On the organizational level the focus is on the changes in organizational structures and processes, and on the individual level on single actors.

### *1.4.1 Survey*

The data for the survey were gathered through a postal questionnaire. All the recipient firms were industrial units and the firms in the survey were selected in a controlled manner from the list of the 500 biggest companies in Finland so that all industries were covered. The present study focuses on large and medium-sized units with over 50 employees, because it can be assumed that a systematic management accounting system is little used by smaller units (Lukka & Granlund, 1996). The sample size was 300 business units<sup>11</sup>. The questionnaire was addressed to the chief financial officer of the unit in November 1999 and a reminder was sent out in December 1999. By mid-January 2000, 99 usable responses were received. The response rate was 33%, which may be considered satisfactory for a postal survey.

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<sup>11</sup> Business units, not companies, were selected as the target group of the study, since more than one IS and management accounting system may be in use in a large company.

After removing from the data those units which had not updated their information systems during the 1990s, the final number of usable answers was 86. Overall, the data seem to offer a representative sample of Finnish manufacturing lines of business (Lukka & Granlund, 1996), including units of some world-class multinational companies such as Nokia (mobile telephones), Stora Enso (paper and pulp) and Sandvik Tamrock (drilling products for mining). As the target group consisted of manufacturing units, not firms, possible response biases could not be analysed, as the corresponding population data were not obtainable<sup>12</sup>. The statistical tests used in data analysis were the Pearson chi-square test and the Mann-Whitney non-parametric rank test.

The present author acknowledges the usual limitations of survey-based research. One is the researchers' lack of direct contact with either the phenomenon being researched or indeed the respondents. The validity of data obtained is therefore ultimately dependent on the reliability of the responses given by the individuals concerned. The second limitation is that surveys are not particularly suited to rich description, explanation of practical dynamics or contextual influence.

#### ***1.4.2 Case study***

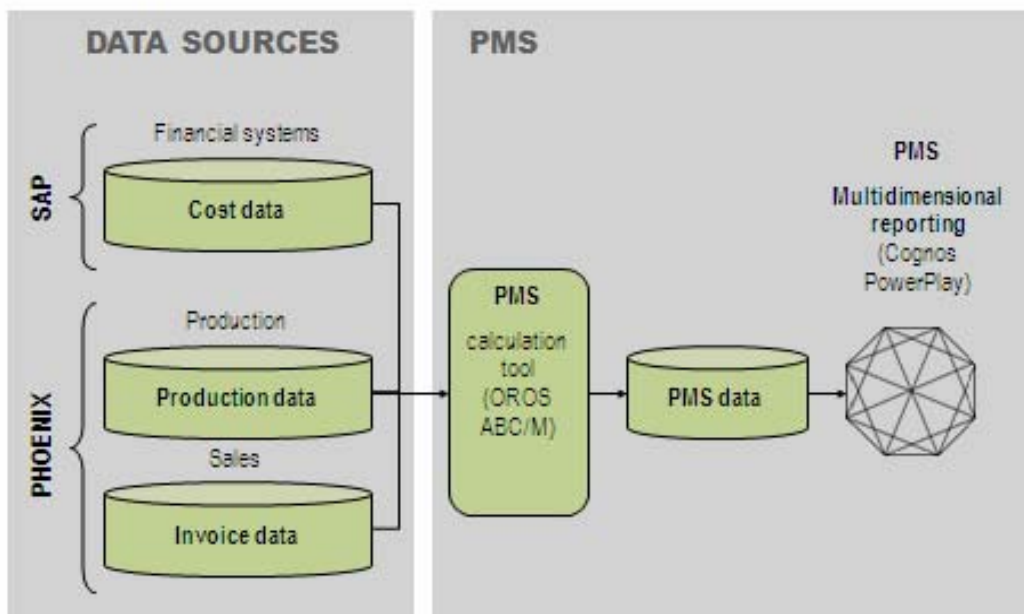
In the three case studies, the case group company, referred to hereafter as Paper Group, is an integrated (NYSE-listed) producer of paper, packaging and forestry goods. The case unit, hereafter Alpha, is one of the four divisions in the Paper Group. In 2001, annual sales of the Alpha division amounted to approx. €3.6 billion worth of graphic and office papers, which are produced at 12 locations and 20 manufacturing units. Alpha is the third largest fine paper producer in the world, and its largest profit centre, hereafter the Northern Mill, is in terms of output, the world's biggest integrated paper mill.

A milestone in the history of the case company was the merger of two paper companies, Beta and Gamma, forming the Paper Group in the late 1990s. Before the merger, both Beta and Gamma had acquired several smaller paper mills, all of

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<sup>12</sup> Lukka and Granlund (1996) in their cost accounting survey used the same kind of approach in the study.

which had customized mill-specific information systems. After the merger, the new corporation was in a position to decide which of the numerous existing information systems to retain or discard, or to install new ones. The Phoenix system for sales operations and production control, already installed in Beta, was to be expanded so as to cover the entire corporation, while SAP R/3<sup>13</sup> as the new software, was to be installed for all other functions throughout the rest of Europe. In spring 2002 the Alpha division started a project to develop an integrated profitability management system (PMS) throughout all its profit centres. The two ERP systems, Phoenix and SAP R/3, would function as the platform for the division's new management control system<sup>14</sup> (see Figure 2).



**Figure 2.** The structure of the new management control system

The opportunity to research the process of new management control system implementation emerged in autumn 2002, when we subsequently began to interview staff at the case unit's headquarters. At the headquarters, two business controllers, a

<sup>13</sup> Modules FI, CO, AA, HR, PM and partly SD

<sup>14</sup> The new management control system had several different names depending on the context, i.e. Virtual integration, Profitability management system (PMS) and Pipeline management system.

divisional controller and a management accountant responsible for the implementation of ERP-linked new management control system were interviewed. In their interviews, new names came up, some of which were included in the list of interviewees. After two interviews at the headquarters, we were granted access to the production site, which was the pilot unit of the project. The case unit was therefore selected for three reasons: first, the case company was one of the respondents to the original survey, second, the case unit had a recently implemented SAP system, and third, it was possible to study the management control system implementation in real-time. The strength of such a data collection process lies in the opportunity to access the information that the actors have at the particular moment in time before they had the chance to construct ex-post, linear and rationalized stories of the events that took place.

The first round of interview data was gathered soon after the management control system project was introduced (September to December 2002). The second round of interviews took place in reverse order after the new system was implemented in the pilot unit (November 2003). Final interviews were undertaken just one year after the project had come to an end (November 2004 to January 2005). A total of 13 interviews were carried out, and there was 24 hours of recorded interview data which was transcribed (see Appendix 1). In addition, there were numerous “off-the-record” informative discussions, and we were also provided with the project material in a form of PowerPoint slides.

The three case studies are interpretative, whereby a theoretical framework is used to draw out insights from empirical observations. A preliminary analysis of the interview data was done while data were being collected. At first, we tried not to bring up our own interests, but rather to listen and let the interviewees do the talking. Our aim was to create an authentic story of the ERP-induced organizational change process based on the interview data. After the first round of interviews, we introduced themes we considered interesting subjects for study. The process of analysing the data can best be described as three researchers independently reading transcribed interviews, and then gathering to form a collective opinion on what had taken place on the project. How had the interviewees acted and interacted, and what had resulted from the associations?

After that, we continued by searching for themes related to ERP systems and their influence on management control. As the views of a single interviewee are

often, from a theory-building viewpoint, quite limited, it is the task of the researchers to raise the level of abstraction by gradually posing more precise and more abstract questions. The characteristic feature of this type of research setting is an “emergent theory” according to which data used is not forced into any a priori theory, at least not during the data collection process (Glaser, 1992).

## **1.5 Summary of the original papers**

### ***1.5.1 Management accounting and information systems: ERP versus BoB***

The first article explores the differences between the adoption and use of modern enterprise resource planning (ERP) and traditional standalone best-of.-breed (BoB) systems in practice.

The survey study focuses on one grouping variable, the type of present information system, ERP or BoB. This comparison is relevant because companies or units which do not have an ERP system still have a variety of standalone BoB systems. The results indicate that 47% of the respondents were using traditional BoB, and 53% had implemented the ERP system at least to some extent. According to the respondents, 67% of the units had updated both of their main IT platforms (financial and production control systems), 19% had updated only their financial systems and 14% had updated only their production control systems. Sixty-three percent of the units that had updated both their main systems had selected ERP system as their IT infrastructure, while only 37% did so using BoB. When the unit had updated only its production control system there were no differences between the groups. Seventy-five percent of the units who had updated their financial system only, had done it with BoB and only 25% with ERP.

The first research question addressed the background factors of the IS implementation and consisted of three sub-questions: (1) initiators of the new IS, (2) motives behind IS investment and (3) the need for system modification versus business process re-engineering<sup>15</sup>. As the purpose of this research question was to

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<sup>15</sup> The third factor indicated no statistical significance.

analyse the differences between BoB and ERP adopters, the variable (1) was compressed into three groups. In group A the initiator was the financial department alone, in group B the initiators were the financial department and some other department together and in group C the initiators were other than the financial department. The results indicate that in 83% of the cases in group A the solution was BoB. In group B and group C the solution was more often ERP, 57% and 61% respectively. Thus the results support the assumption that because of the historical background of BoBs and the evolution of ERPs the members of financial departments were used to developing IT infrastructure more often with BoBs than with ERPs. This also emphasizes the role of active actors and different professions.

The articulated motives in the variable (2) were classified either as strategic or technological. In order to facilitate statistical analyses, the variables were therefore compressed into three groups. In group A the reasons for implementation were only strategic, in group B only technical and in group C both strategic and technical. The results proved that in group A and in group B, when the motives were either technical or strategic, the solutions were more often BoB than ERP, 56% and 69% respectively. However, in group C, where articulated motives were technical and strategic, the solution was more often ERP (62%) than BoB (38%). The results therefore support the role of ERP as an important strategic platform: ERP is more than a mere technical or strategic renewal of IS, it is a company (or unit) wide strategic IC.

The second research question addressed the changes in the problems of management accounting after new IS implementation. Some improvement had taken place in all issues studied, but the changes were quite moderate. The next step was to compare the issues between the two groups (ERP and BoB). The measurement device was a five-item Likert scale. As a result of the analysis, the Mann-Whitney non-parametric rank test indicated no statistically significant differences between the two groups of units. The only exception was budgeting: according to the analysis, ERP adopters have more problems with budget planning than units using only BoB systems.

The final research question focuses on the adoption of modern management accounting techniques (activity-based costing, target costing, life-cycle costing, activity-based management and balanced scorecard) and the relationship to ERP and BoB. The results indicate that exclusive of life-cycle costing, modern management

accounting applications are more adopted within companies which have implemented ERP than BoB. However, the Pearson chi-square test indicated no statistically significant differences between the groups.

### ***1.5.2 The role of standard software packages in mediating management accounting knowledge***

The second article aims to analyse how standard software packages provide divisionalised corporations with standards that can be used in achieving an efficient means of accounting knowledge transfer. In this case study the Oros ABC/M software package became an important “medium of interchange” (Giddens, 1990) for cost accounting-related knowledge. The generic features of the ABC system could be quickly implemented at other locations, anywhere in the world. Such mediating of generic cost accounting knowledge was also possible without regard to the specific characteristics of ICT infrastructure, cost accounting system features, accountants or the managerial needs of any single mill location.

A key argument emerging from this study is that off-the-shelf software packages can be efficient drivers for management accounting change (Granlund and Malmi, 2002), since they can be viewed as “best practice” standards that create trust in the new systems. In our case study, the ERP-linked ABC system had a key role in re-embedding the management accounting knowledge that was needed to unify the existing systems, whose heterogeneity was a result of recent company mergers and acquisitions. The new division level management accounting system can be considered as a “shock” originating from outside and typically involving resistance to change (Scapens and Roberts, 1993; Granlund, 2001). However, at the Northern Mill, reaction varied from eagerness to indifference, and division-wide implementation across 11 mills in Europe was accomplished with relative speed (in only eight months). Although users of the new PMS system at the mill sites were to blindly trust that PMS would eventually provide them with superior cost and profitability information, our observations suggest a high level of commitment towards this new system.

The findings of our study also suggest that success in increasing the internal uniformity of a management accounting system can be explained not only by following bureaucratic rules (Burns and Scapens, 2000), but importantly by



establishing internal accounting standards that leave room for voluntary choices (Brunsson and Jacobsson, 2000). The standards defining a uniform cost accounting model, together with the off-the-shelf software package, created a new expert system inside the case company (Giddens, 1990). This kind of system is flexible, and yet can be copied across all the mills. However, it is also a system that can easily become unquestioned and unchallenged.

Successful implementation of the new PMS system comprised three main elements:

- (1) a software package
- (2) a standardised ABC methodology
- (3) management accounting experts.

Different stages of the implementation project involved varying degrees of freedom to apply the standards. In the PMS design phase, ABC was chosen ahead of alternative cost accounting standards and, of the different cost accounting software solutions, SAP R/3 was abandoned and SAP-integrated Oros ABC/M was adopted. With respect to the ICT infrastructure choices, our case findings complement the results obtained by Granlund and Malmi (2002), who reported that the majority of companies in their study had decided to implement ABC outside of the SAP system. However, in our case study the main reason for this was not related to the technical complexity of SAP R/3 (Lodh and Gaffikin, 2003), but rather to the faster rollout options offered by the competing solution. This argument was supported by the case company's growth strategy and was successfully mobilized by the management accounting professionals to support the project and the ICT infrastructure solutions.

In terms of introducing software packages at mill level, the freedom to apply standards was related to the extent of tailoring the information systems, i.e. whether or not the systems should be implemented and/or whether the system should be at least partially tailored to "fit" existing organizational practices. A common argument (Scapens et al., 1998; Scapens and Jazayeri, 2003; Chapman and Chua, 2003) is that by customizing standard software packages, a company will lose many of the essential advantages of purchasing such a software package. Our findings suggest that tailoring accounting software may have hindered the implementation of a new ICT system the more that the expert knowledge embodied in PMS was exposed to discussion and criticism. However, as the necessary tailoring was left to

the division's ABC project-group, such tailoring did not include the organizational benefits of using off-the-shelf software.

Even though there was considerable freedom at mill level in terms of adhering to the standards, total compliance was generally accepted as being the sensible choice. The division's standards were broad enough to allow mill level personnel to introduce local information requirements in their reporting. Interestingly, at one stage the production site personnel expressed a wish for firmer divisional guidance. However, the introduction of very strict and detailed rules to varying situations has the potential to be a cumbersome solution. Moreover, it was also suggested that the creation of very detailed rules would have been too demanding for the experts, as this would imply that division level had detailed knowledge of the production site level cost accounting issues across all of the mills.

Earlier studies have indicated how important it is to trust both accountants and accounting information when evaluating corporate performance (Johansson and Baldvinsdottir, 2003). Our findings suggest further that voluntarism and "blind" trust in experts and software packages are essential features of both dis- and re-embedding processes (Giddens, 1990).

### ***1.5.3 A virtual integration – The management control system in a multinational enterprise***

Actor-Network-Theory based research on management accounting has to date illustrated how little we know about the messy and continuously changing accounting information systems (AIS) realities in large organizations, and how the information systems influence management control. In this study, we draw on the heuristic framework of Quattrone and Hopper (2001) and present the development of a management accounting system as a serendipitous process that illustrates the episodic nature of such processes. Actions are taken simultaneously in different geographical locations, with only a few key actors managing to hold the process together. For most of the time, the majority of actors are not connected, while new social actors emerge unobtrusively, in private or in small groups, enacting with ICT. Only in few instances is a larger association of actors formed, but although these associations can prove to be decisive, their outcome cannot be planned in advance.

Our findings suggest that ICT based accounting solutions seem to shape the organization's social reality in two ways. First, the ICT solutions virtually force accountants to study the logic of the solution, and second, they challenge them to invent ways of combining accounting and management rationalities. As actors, such as IT solutions, accountants and management are connected, this collection of actors begins to create its own agency and rationality that is not only accounting, ICT or management, but also a new emerging rationality. In our case, the actor that connected the local rationalities in different factories together was the accounting software solution and the action (the PMS project) that took place around it.

As in Quattrone and Hopper (2005), our case study evidences the imperialistic agenda of virtual integration to shrink the distance between geographically separated units by gathering detailed data on the factories and combining these into a virtual mill created by accounting reports. Our case findings illustrate various local collections of AIS and other agents. A seemingly small assignment by the CFO to investigate the possibilities of utilizing ABC methodology in SAP triggered a series of events that eventually challenged the existing management control system and which had the capacity to create new agencies. Taking on the assignment, the divisional controller started out to study and compare the opportunities provided by various off-the-shelf software solutions, which was the starting point for new a AIS agent that could create a local totality, i.e. an oligopticon (e.g. Latour, 2005). Then the agent, using the centralization theme as an incentive, persuaded top management to grant the right to compel factory accountants to associate and become part of the new agency. Central to this persuasion was the creation of representations of the management accounting software and the new visibilities that they enabled (see Bloomfield and Vurdubakis, 1997). Our case findings suggest that in addition to being visual images (e.g. PowerPoint slides), representations can also be lingual metaphors (Schulze and Orlikowski, 2001; Lodh and Gaffikin, 2003). For the division's top management, the representation was labelled 'virtual integration' while to factory accountants it was a 'profitability management system'. As the project was ongoing, these metaphors were visualized by PowerPoint presentations, including speculative calculations with hypothetical numbers (since the actual numbers were unavailable at the time). After the project ended, 'pipeline management' replaced the virtual integration metaphor.

This illustrates how framing activities become important in establishing ICT systems. Our case findings illustrate the dynamic interaction between the idea of reorganization (centralized management control) and the representations of the ICT system. Important political choices were made with respect to how to represent the system by visual images and metaphors, and to whom. In this political process it is extremely important to know the organization's history, e.g. what metaphors have been used previously and what concepts are tainted. These findings extend the studies by Quattrone and Hopper (2006) and Andon et al. (2006) by illustrating the nature of inter-company politics and management behaviour in ERP implementation.

Notably, our case organization made use of off-the-shelf accounting software packages. However, our findings prompt the question: how 'ready-to-use' and 'packaged' are these software packages? Even though a software package can offer readymade solutions, the organization's actors must construct its meaning through action, and this meaning must be continuously renewed in order to continue its existence socially. The process of framing then 'customizes' the ready-made off-the-shelf solutions as an organizational practice. In this sense, ready-made ICT systems can provide competitive advantages, even though other companies are likely to have them, too. What counts in creating competitive advantage is not technical functionality, but how the system can serve management purposes – for instance, how our case organization managed to reorganize its management control.

#### ***1.5.4 Struggling for a new role for the business controller***

So far studies on the subject, management accounting professions and the changing role of controllers, have concentrated either on the national or organizational level of change (the only exception being Baxter and Chua, 2008). In this paper, the focus is on a single controller. Drawing on earlier literature, we have identified the areas where management accountants must excel in order to survive in the organizational jungle: command of both emerging management accounting techniques and ICT, interest in developing business and social networking.

Järvenpää (2007) illustrated accountants' role change in a multinational conglomerate. One of his findings was that all accountants work on development

projects at some stage in their careers. Our study, however illustrates the importance of a successful development project as a means of role change. Being able to surf on the wave of new technology and to take full advantage of it made it possible to bypass many normal limits of role change. The importance of successful projects seems in our case to be at least partly explained by creating opportunities for social networking, as the project legitimates or even compels contacts with production location and marketing managers, ICT professionals and senior management. This social network can be put to use in multiple ways: we call our controller's ability to take advantage of his network a 'good tactical eye'. It involves three aspects; willingness to take risks, the ability to react quickly to new opportunities, and the ability to understand other actors' vital interests. Our controller's willingness to take risks has already been described; we only need to point out that it could be a characteristic that is held in high regard by top management. Regarding the ability to seize opportunities, we may point out that project included challenges that, if not taken on by the controller, would have been taken on by someone else.

In our case the mill controllers' job descriptions became more focused on financial reporting and data inputting, while the controller at divisional HQ was able to take control of strategic systems. The divisional controllers were able to utilize the centralized integrated information systems (ERP and the related PMS) while the mill accountants were left with the task of collecting and inputting the data. Even though some routine functions may have decreased at mill level as new information systems were implemented, more demanding analytical tasks, however, did not seem to emerge (see Granlund & Malmi, 2002; Scapens & Jazayeri, 2003).

The third aspect of the controller's good tactical eye seemed to be understanding the motivations of other organizational actors. This often requires some work history in the organization, which enables an ability to interpret information, a sort of personal multiplier (see Vaivio and Kokko, 2006). Role change can also be seen in connection with the ability to link up with organizational discourses (Alvesson and Willmott, 2002). The discussion around the profitability management project also benefited from strategic discourses. The new business controller seemed able to utilize strategic concepts and claim ownership of 'profitability management' in the organization while actively avoiding accounting concepts such as ABC. However, he did remain in control of the new profitability management system, and thus did

not lose touch with management accounting tasks. Instead, he was able to operate in both spheres.

Thus, the influence of ERP was to polarize management accounting tasks. Just as Scapens and Jazayeri (2003) predicted, ICT eliminated many of the routine tasks – for the new business controller. For the mill accountants, there was little or no effect while new systems did not replace and/or integrate old reporting systems entirely, and the amount of data inputting and data transfers increased. This finding is in contrast to Granlund and Malmi (2002), who predicted for ERPs a decentralizing effect on management accounting. Our findings suggest to us that for the mill accountants, the bean counter role may actually have strengthened. For the line managers, future-oriented management accounting information became more readily available, and they began including the new business controller, the information provider, in decision-making, thus increasing his business orientation. However, this new business controller role was by nature focused on the efficiency and profitability of existing operations, rather than the generation of new business opportunities.

## **1.6 The contribution of the dissertation**

The purpose of this dissertation was to shed light from four different perspectives on management accounting change in the ERP systems context: (i) management accounting as a technology, (ii) management accounting as knowledge, (iii) management accounting as a control structure, and (iv) management accounting as a profession. However, unlike in earlier studies, the focus here was on the implementation phase, not on the impacts of ERP systems on management accounting.

The contribution of the study to our knowledge of management accounting change in the ERP implementation context is, as earlier mentioned, subject both to the limitations of the applied methods (survey and case study) and to the constraints of the study's theoretical underpinnings. The shared contribution of the papers, however, is possible to condense into one entity: the role of ICT and especially ERP systems in management control change, and the importance of active individuals in this process.

The dissertation goes from general to particular. First, a big picture is presented, in which all the details are difficult to identify. The character of the first paper is indeed explorative and its contribution is connected to two issues. First is the novelty to study the reasons behind the ERP implementations. At the time this paper was published there were no published papers covering the area. Spathis (2005), however, later continued that kind of research tradition by studying the relationships between the motives behind ERP implementations and its benefits for accounting, but the results of his study remained quite modest. Second, the paper emphasizes the importance of active actors and different professions. Thus, this dissertation is connected to the fact that financial management, i.e. accountants as active agencies (Eisenstadt, 1980; DiMaggio, 1988; Garud, Hardy & Maguire, 2007; Hardy & Maguire, 2008), were able to prevent the ERP investment, and, if necessary, to retain their relative power by investing in conventional BoB systems. Therefore, accountants as change agents (Granlund & Malmi, 2002) are often in a position to control an organization's ICT investments.

The three other papers concentrate on how financial management as an active agency can exploit ERP implementation, which has already been accomplished in the organization. Drawing on Burns (2000), the papers elaborates how an active agency (a single controller) mobilizes resources, controls decision-making and manages meanings when implementing the new performance measurement system in ERP environment (see also Caccia and Steccolini (2006, pp. 171-172) and the active role of the CFO when implementing new management accounting system).

The first contribution of the dissertation relates to the question of how it is possible, using a company-wide integrated information system, to mobilize local management accounting knowledge to dis-embed it from local level to headquarters, and then globalize it by re-embedding the knowledge in all sites. According to the results obtained, it is easier to implement the new system when there is no need to open up the basics of the ICT system. Without opening up the system, the whole implementation is based on trust and the blind commitment of experts and technology. The study combines the idea of expert systems (Giddens, 1990) with the internal standards (Brunsson and Jacobsson, 2000) of the organizations, and shows how easy it is to hide away from the critics behind these standards.

Besides this, the dissertation also offers a rich description of the series of events in which the actor responsible for the project, is in a situation to establish different social networks (Latour, 2005), and, over and over again, to sell the whole idea of the project to different actors by using suitable metaphors for the situation (Schulze & Orlikowski, 2001). The selection of the metaphors is not only essential, but usually there are also some forbidden, tainted, words within organizations to be avoided. Thus, the study on the one hand shows that the company-wide information system created by using the standard software packages, is not only a stable system, but also a dynamic process (Dechow & Mouritsen, 2005; Quattrone & Hopper, 2006). On the other hand, the case findings illustrate the dynamic interaction between the idea of reorganization (centralized management control) and the representations of the ICT system. Important political choices were made with respect to how to represent the system by visual images and metaphors, and to whom. In this political process, it is extremely important to know the organization's history, e.g. what metaphors have been used previously and what concepts are tainted. These findings extend the studies by Quattrone and Hopper (2006) and Andon et al. (2006) by illustrating the nature of inter-company politics and management behaviour in ERP implementation.

The second contribution of the dissertation addressed the role of technology when increasing the centralized power over the mills. Earlier studies have suggested that the ERP systems may decrease the power of accountants by creating hybrid accountants (Newman & Westrup, 2005). In those cases other professions than accountants start working in traditional management accounting tasks. On the other hand, opposite suggestions have been made. In those cases, accountants may broaden their sphere of operations, and expand their control to other business areas beyond financial management, either by using ERP systems (Caglio, 2003; Scapens & Yazayeri, 2003), or even without them (Burns & Baldvinsdottir, 2006). In any case, without ERP integrated off-the-shelf system it might be difficult, or even impossible, to build a division-wide centre of calculation. The basic ERP system displays the views to everyone who has access to a certain part of the system. With off-the-shelf packages, it is easier to restrict the view offered to different professions on individual agencies by invoking the complicated technology as a reason (it is reasonable to limit the scope of the view because the system is so multidimensional and difficult to use).



In contrast to some other management accounting studies (e.g. Hopwood, 1987), this dissertation suggests that instead of the panopticon, this kind of the centre of calculation may be more like an oligopticon (Latour, 2005). The nature of the oligopticon, however, includes a propensity for errors (Latour, 2005) as its functioning depends on the existence of many accounting information system (AIS) agencies and the connections between them. For instance, a local and unexpected technical problem with (Excel) spreadsheets in one of the factories may cause the system to lose its rationality and visibility at the centre may become blurred, at least for a while. The same goes for version updates, or process changes that result in the inability of the system to produce interesting reports for top managers who then start to lose their AIS-based rationality.

The final contribution of this dissertation explains how technology by definition and its implementation can help an accountant in his/her personal career. Järvenpää (2007) suggests that traditionally almost all of the accountants have to work in some kind of accounting system development project during their careers. This study continues that discussion and illustrates the factors essential when creating something so valuable for the company that the person in charge of the project, will be rewarded as a promotion. In that case, the technology will simply serve as an enabler. Nevertheless, in order to normalize the change, as a part of daily action, the person in charge of the project, must have not only skills in management accounting and business processes, but also have a good tactical eye to help him/her to combine different issues in a creative way. By so doing, it is possible to create a completely new, permanent position for a business controller. In some cases this kind of role expansion has also led to internal conflict between different professions. In this case, however, no indication of any competition between the controlling function and the sales and materials management existed (cf. Armstrong, 1985; Ezzamel and Burns, 2005). In fact, the role of sales management may have been important in gaining approval for the PMS project. However, our paper found some evidence of competition between accountants and ICT professionals; the ICT professionals seemed reluctant to develop factory information systems according to the wishes of the accountants (cf. Newman & Westrup, 2005). The effects of this inter-professional struggle, however, are not necessarily negative for those management accountants willing to accept the challenge and ride the wave of new technology.

A limitation of the study is that it is not possible to combine the results of the survey and the case study. The survey was only the preliminary study, the purpose of which was not to theoretically triangulate later with the case study. Therefore it is possible to find several new directions for further studies. The first, of course, might be the opportunity to do a follow-up study of the survey. What has happened within the last ten years? Have some changes happened in the roles of professions, and to the conservatism of the financial professions? On the other hand, as the research subject of the survey was large and middle-sized organizations, it might be useful also to study smaller companies. In small companies, the roles of individual actors are probably even bigger than in larger companies. Finally, reason why the companies are supplementing their ERP systems with separate stand-alone systems (ABC, BSC, budgeting, financial reporting) instead of ERP's SEM systems, will also need further investigations.

## **1.7 Author's contribution to the joint papers**

Generally, the proportion of the contribution of each co-author in papers [2], [3] and [4] is difficult, or even impossible to estimate exactly, since the collaboration between the present author and co-authors may appear in many levels. Nevertheless something can still be said about the matter.

The present author was the principal author in all papers, and the whole joint paper project started because his previous interests in management accounting oriented ERP studies (Hyvönen, 1999; 2000; 2002; 2003a; 2003b). Therefore, as already agreed at the beginning of the project, the present author always wrote the first draft of the paper submitted to the journal. After receiving the review comments, we frequently revised the papers together.

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## Appendix 1. The interviews.

### Group interviews:

VP business controller #1	Group headquarters	13 September 2002	2 h
VP business controller #2			
Division controller			
Project manager			
VP business controller #1	Group headquarters	26 November 2003	1 h 30 min
VP business controller #2			
Division controller			

### One-person interviews:

Division controller	Group headquarters	26 September 2002	2 h
Division controller	Group headquarters	4 November 2002	2 h
Mill controller	Production site	11 November 2002	1 h 30 min
Cost accountant	Production site	12 November 2002	2 h
Sales manager	Production site	27 November 2002	2 h
Production manager	Production site	4 December 2002	2 h
Production manager	Production site	4 November 2003	1 h 30 min
Mill controller	Production site	14 November 2003	2 h
Cost accountant	Production site	17 November 2003	1 h 30 min
CFO/Business controller	Group headquarters	9 November 2004	2 h
Mill controller	Production site	24 January 2005	2 h

Total			24 h
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## Part II: Original papers

- [1] **Management accounting and information systems: ERP versus BoB, *European Accounting Review*, 12 (1), pp. 155-174. With permission from Taylor & Francis.**
- [2] **The role of standard software packages in mediating management accounting knowledge, *Qualitative Research in Accounting & Management*, 3(2), pp. 145-160, (with J. Järvinen. and J. Pellinen). With permission from Emerald.**
- [3] **A virtual integration – The management control system in a multinational enterprise, *Management Accounting Research* 19(2), pp. 45-61, (with J. Järvinen. and J. Pellinen). With permission from Elsevier.**
- [4] **Struggling for a new role for the business controller (2008), *Tampere Economics and Accounting Net Series*, WP 1, (with J. Järvinen. and J. Pellinen).**