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Johanna Hyvönen

LINKING MANAGEMENT ACCOUNTING AND CONTROL SYSTEMS, STRATEGY, INFORMATION TECHNOLOGY, MANUFACTURING TECHNOLOGY AND ORGANIZATIONAL PERFORMANCE OF THE FIRM IN CONTINGENCY FRAMEWORK

FACULTY OF ECONOMICS AND BUSINESS ADMINISTRATION,
DEPARTMENT OF ACCOUNTING AND FINANCE,
UNIVERSITY OF OULU

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Abstract

This dissertation aims to provide an extensive picture of management accounting systems and explore the relationships between management accounting systems, strategy, information technology, manufacturing technology and organizational performance. The dissertation consists of four essays. The first essay focuses on the adoption and benefits of management accounting practices, whereas the second essay studies the relations between customer-focused strategy, performance measurement techniques, information technology and their link to customer performance. The third essay studies the relations between manufacturing technology, information technology, strategy and organizational performance. The fourth essay, in turn, studies the management accounting systems and their relations to strategy and information technology. The first three essays employ the survey method while the last essay employs the case method. The framework used in this dissertation is the contingency theory.

The results indicate that financial performance measures will be important in the future and that greater emphasis will be placed on contemporary management accounting practices such as customer satisfaction surveys and employee attitudes. Also, the relative benefits from the previous three years and the future emphasis in the next three years are generally greater when the size of the firm increases. The results show that there is a significant association between customer performance and the three-way interaction involving customer-focused strategy, contemporary performance measures and advanced information technology. The proposed three-way interaction between financial performance measures, customer-focused strategy and advanced information technology is not supported at conventional levels of statistical significance indicating that financial measures are not important in the model. The results also indicate that contemporary performance measures do not help highly customer-focused firms to achieve customer performance. For firms with a low customer-focus, emphasizing contemporary performance measures and advanced information technology assists in enhancing customer performance. The results also suggest that manufacturing technology and information technology together help firms to improve their organizational performance regardless of their emphasis on differentiation strategy.

Keywords: contingency-theory, information technology, management accounting, manufacturing technology, performance measures, strategy

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Oulu, 2nd January 2008 Johanna Hyvönen

Essays

The thesis is based on the introductory chapter and the following essays:

I Hyvönen Johanna (2005) Adoption and Benefits of Management Accounting Systems: Evidence from Technology-Intensive Environment. Advances in International Accounting 18: 97–120.

II Hyvönen Johanna (2007) Strategy, performance measurement techniques and information technology of the firm and their links to organizational performance. Management Accounting Research 18: 343–366.

III Hyvönen Johanna (2007) Strategy, manufacturing technology and information technology of the firm and their links to organizational performance.

IV Hyvönen Johanna (2007) Strategy, Management Accounting Systems and Information Technology of the Firm – Case Analysis of Six Finnish companies.

Contents

1 Introduction

Increased global competition has led firms to seek competitive advantage through clearly articulated strategies, advanced management accounting systems, advanced manufacturing systems and advanced information technology, among other things (e.g. Chenhall & Langfield-Smith 1998a, Baines & Langfield-Smith 2003, Mabert *et al*. 2003a). In order to achieve competitiveness there should be an optimal fit between the strategy, management accounting systems and information technology used by the firm (e.g. Kaplan & Norton 1996, Ittner & Larcker 1997, Bouwens & Abernethy 2000, Palmer & Markus 2000, Ittner & Larcker 2001, Davis *et al*. 2002, Chenhall 2003) as well as between the strategy, manufacturing technology and information technology of the firm (e.g. Mahmood & Mann 1993, Kathuria *et al*. 1999, Samson & Terziovski 1999, Goh 2000, Mia 2000, Chan *et al*. 2006). It is argued that the effectiveness of strategy is enhanced by advanced management accounting systems. Advanced information technology is needed to provide proper information to enable management accounting systems to relate to support the formulation, implementation and control of strategy. According to the contingency theory, this fit should lead to enhanced organizational performance (e.g. Nanni *et al*. 1992, Atkinson *et al*. 1997, Chenhall & Langfield-Smith 1998a, Baines & Langfield-Smith 2003, Gerdin 2005). If the management accounting systems are found to be useful, then they are likely to be used and be beneficial to individuals, who then presumably can approach their tasks with enhanced information. These individuals then make improved decisions. It is also argued that the effectiveness of the strategy is enhanced by advanced manufacturing technologies and advanced information technology. This fit ensures the successful deployment of a company's technological capabilities in pursuit of its business strategy goals.

In management accounting literature there has been an increased emphasis on both traditional and non-traditional performance measures (e.g. Chenhall 1998b, Hyvönen 2005, Ittner & Larcker 1998). Contemporary performance measures such as Balanced Scorecards or customer satisfaction surveys are proposed as ways of linking operations to the company's strategies thereby enhancing organizational performance. The growing emphasis on non-financial measures arises from the critiques that financial measures have received. They have been criticized for excessive internal orientation or being historical and not being able to provide the information managers need in a highly competitive environment (e.g. Ittner & Larcker 1998).

Firms are increasingly taking advantage of a variety of packaged information technology systems. Global distribution channels, numerous international plant sites and closely integrated sourcing arrangements change the way companies do business (Mabert *et al*. 2003b). Information technology is a key component in managing organizations and provides the means to integrate processes, enforce data integrity and better manage resources (Mabert *et al*. 2003a). The developments and availability of information technology have changed the way management information is produced and presented to managers. Recently, it has been recognized that firms are faced with the challenge of integrating information technology into accounting practices (Olsen & Cooney 2000). Accounting and information technology are connected because information technology concerns the firm's financial ledgers and reporting systems (Granlund & Mouritsen 2003). Mabert *et al*. (2000) report that 75% of U.S. manufacturing firms are pursuing enterprise resource planning systems and that 44% have already implemented them. It has also been estimated that at least 30 000 firms worldwide have implemented enterprise resource planning systems (Mabert *et al*. 2003b). These systems help firms to integrate all corporate information into one shared database allowing the same information to be retrieved from different organizational positions (e.g. Quattrone & Hopper 2005). Information technology has also become a powerful tool for strategy. It has been claimed that information technology choices are strategic to the extent that they support or enable the firm's business strategy (e.g. Porter & Millar 1985). Because of recent substantial investments in information technology, it is important to know under what circumstances they are most effective in enhancing organizational performance.

The constructs investigated in this dissertation are strategy, management accounting systems, manufacturing technology and information technology. In addition, we investigate their links to organizational performance. The first essay focuses on the adoption and benefits of management accounting practices, whereas the next essay studies the relations between customer-focused strategy, performance measurement techniques, information technology and their link to customer performance. By customer performance we mean a construct that measures market share, sales volume, market developments and development of new products. The third essay, in turn, studies the relations between manufacturing technology, information technology, strategy and organizational performance. The first three essays use a survey method. The fourth essay studies management accounting systems and their relations to strategy and information technology by using the multiple case method.

The first part of the dissertation which introduces and summarizes the essays is organized as follows. Theory, literature review and contribution are presented in section two. Sections three to six summarize the essays. Conclusions are presented in section seven. Finally, the original essays are presented in the second part of the dissertation.

2 Literature review, theoretical framework and contribution of the thesis

2.1 Structure and theoretical framework

This study is based on a contingency theory that links different organizational characteristics. The contingency-based research can be described as follows:

> *"Researchers have attempted to explain the effectiveness of management control systems by examining designs that best suit the nature of the environment, technology, structure, strategy and national culture. In recent years, contingency-based research has maintained its popularity with studies including these variables but refining them in contemporary terms. The identification of contextual variables potentially implicated in the design of effective management control systems can be traced to the original structural contingency frameworks developed within organizational theory".* (Chenhall 2003)

The fit between different organizational constructs is assumed to be associated with organizational performance. The matching of these constructs leads to better organizational performance. The appropriateness of different control systems depends on the business setting. Earlier studies have linked management control systems to environment, technology, structure and size (Chenhall 2003). Environment has received attention since 1970s. The most widely studied element of environment is uncertainty. There are studies linking environmental uncertainty for example to the type of information, strategic planning or type of performance evaluation (e.g. Brownell 1985, 1987, Chenhall & Morris 1986, Govindarajan 1986). It is proposed, for example, that the more uncertain the external environment, the more open and externally focused the management control system is (e.g. Govindarajan 1984, Mia 1993, Gul & Chia 1994, Chong & Chong 1997, Baines & Langfield-Smith 2003), or that the more hostile and turbulent the external environment, the greater the reliance on formal control and an emphasis on traditional budgets (e.g. Khandwalla 1972, Otley 1978, Imoisili 1989). Given the continuing changes in the environment, the research in this area will be an important area of study also in the future (Tymon *et al*. 1998)

Key generic dimensions of technology that have been studied are technological complexity (e.g. Woodward 1965, Khandwalla 1977, Merchant 1984, Dunk 1992), task uncertainty (Perrow 1967, Ouchi 1979, Brownell &

Merchant 1990, Brownell & Dunk 1991, Mia & Chenhall 1994, Lau *et al*. 1995, Abernethy & Brownell 1997) and interdependence between work units (Thompson 1967, Chenhall & Morris 1986, Macintosh & Daft 1987, Williams, Macintosh & Moore 1990, Bouwens & Abernethy 2000). Examples of the propositions are that the more technologies are characterized by standardized and automated processes, the more formal the controls, or that the more technologies are characterized by high levels of task uncertainty, the more informal the controls, the less reliance on standard operating procedures, programs and plans, accounting performance measures, and the higher the participation in budgeting and broad scope management control systems. Structure can be defined as organic or mechanistic (Burns & Stalker 1961). For example large, decentralized, diverse firms with sophisticated technology have been linked to administrative controls including a strong emphasis on formal management accounting systems (Bruns & Waterhouse 1975). Centralized and formalized organizations have been linked to activity based costing (Gosselin 1997). Broad scope management accounting systems have been linked to marketing department (Mia & Chenhall 1994), decentralization is linked to broad scope, aggregation, integration and timeliness (Chia 1995) and organic structures are linked to activity analysis and activity cost analysis (Gosselin 1997). Management accounting literature also shows links between size and management control systems (Dixon 1998, Hoque & James 2000, Laitinen 2002, Davila 2005). Khandwalla (1972, 1977) reports that large diversified firms employing mass production with divisional structures use sophisticated controls and information gathering. Large firms that employ sophisticated technologies use administrative controls like formalized operating procedures, specialists and work rules (Bruns & Waterhouse 1981). The same study shows that small firms have interpersonal controls like centralized decision making, more interaction with budgeting but not accepted methods of reaching their budgets or having to explain budget variances. Hoque and James (2000) confirm in the study that large companies have more sophisticated systems than smaller companies. Large firms that are more diverse and decentralized use sophisticated budgets in a participative way and employ more formal methods of communication (Merchant 1984).

Recent studies draw from the original organizational theorists (e.g. Burns & Stalker 1961, Lawrence & Lorsch 1967, Thompson 1967, Perrow 1970, Galbraith 1973) to develop arguments that explain how the effectiveness of management control systems depends on the nature of contemporary settings. Issues concerning the role of management control systems within advanced manufacturing settings

have been explored (Chenhall 2003). Total Quality Management, Just-in-Time and Flexible Manufacturing are examples of these advanced manufacturing technologies. It has now been suggested that additional constructs may affect the design and use of the control systems (Nixon & Burns 2005). As Chenhall (2003) points out, perhaps the most important new stream of literature has been that related to the role of strategy. The theory suggests that there are important links within the traditional organizational model between strategy, environment, technology, organizational structure and management control systems (see Langfield-Smith 1997 or Simons 2000 for a review of strategy). New structural arrangements, such as teams, provide new perceptions about the role of management control systems. These new structural arrangements draw from the human resource management literature which investigates the dynamics of teams including issues concerning performance evaluation (Katzenbach & Smith 1993, Chenhall 2003). The research into the relationship between the design of management control systems and national culture extends the contingency-based research from its organizational foundations into more sociological concerns (Granovetter 1985, Whittington 2001). There have also been suggestions in the contingency literature that much can be gained from reflecting on the work of original organizational theorists and more recent thinking in the areas such as organizational and cultural change and information technology (Chenhall 2003).

Contingency theory has also been criticized for many reasons. As Fisher (1995) points out, contingency theory lacks clarity and specificity (e.g. variables are ill-defined). The relationships and causality among contingent variables are unknown. Although the most obvious contingent variables have been studied, others have yet to be identified (Fisher 1995). There are no robust measures for the variables (Chenhall 2003). As Perera (1997) points out, contingency research only shows associations among the variables at issue. Another criticism of contingency-based research is that it has relied on traditional, functional theories and has not applied more interpretive and critical views (Chenhall 1993). The weaknesses of survey instruments also cause problems. Researchers have used different operational definitions for the same variable, there are only limited number of variables in the questionnaire, the implications of the range and depth of variables are highly dependent on the exact nature of the questions being asked and the methods being used to determine an answer, the measurement of performance is problematic etc. (Fisher 1995, Chapman 1997).

Despite the criticism on contingency theory it provides the framework needed in this study. There are other possibilities but contingency theory was chosen

because: 1) Contingency theory has become one of the dominant paradigms for research on management control design. 2) The basic framework and potential strength of the method provide a basis to uncover generalizable findings that can enhance desired organizational outcomes (Chenhall 2003). 3) There are theoretical and empirical support for the theory. Several classes of contingency variables have been shown to be relevant to firm control systems. 4) The basic premise of contingency theory appears sound; a contingency-based approach attempts to map variables and demonstrate potential relationships between these variables and indicate potential links with outcomes.

Table 1 lists and describes the most important definitions used in this dissertation.

Table 1. Specification of key definitions used in this dissertation.

management accounting systems (MAS) = a collection of practices such as budgeting or product costing
management control systems (MCS) = a broader term than MAS including other controls such as personal or clan controls
management accounting practices = MAS
performance measure (PM) = part of MCS including performance measures such as return on investment, different qualitative measures, budget variance analysis or divisional profit
contemporary performance measure (CPM) = currently developed performance methods such as activity-based cost accounting methods, balanced performance measures or employee-based performance measures
financial performance measure (FPM) = such as return on investment, budget variance analysis or profit measures
non-financial performance measure = such as customer satisfaction measures or employee satisfaction
traditional performance measure = performance measures that have been used for years, e.g. return on investment, profit or cash flow
non-traditional performance measure = contemporary performance measure
information technology (IT) = different information system applications, e.g. customer relationship management systems, supply chain management or electronic data interchange
enterprise resource planning (ERP) = planning and resource management software systems
manufacturing technology (MANU) =both manufacturing technology practices and philosophies such as total quality management or just-in-time management
strategy= business strategy relating to each business unit of the organization and focusing on how individual strategic business unit positions itself in relation to competitors
customer-focused strategy = strategy where customer focus is a central element
differentiation strategy = differentiation strategy focuses on providing products that are highly valued by its customers
organizational performance (PERF) = combination of different measures that measure organizational performance, e.g. market share, sales volume, cash flow or return on investment

Table 2 shows the research questions related to the thesis. First, we focus on management accounting systems. How do managers in large manufacturing firms use management accounting systems? The essay provides evidence on the adoption of the management accounting systems, received benefits from the adoption and intentions to emphasize the management accounting systems in the future. Second and third essay investigate whether IT has a role in explaining organizational performance of the firm. The second essay investigates IT in relation with strategy and management accounting systems whereas the third essay investigates IT in relation with strategy and manufacturing technology. The fourth

essay investigates performance measures and IT of the firms. It describes and explains the use of performance measures and enterprise resource planning systems.

Table 2. Summary of research questions.

Essay	Research questions	Research method
1st Essay	How do managers in large manufacturing firms use management accounting systems? Adoption of MAS Emphasis placed on MAS Future emphasis on MAS	Survey
2nd Essay	Does IT have a role in explaining organizational performance of the firm? IT-strategy IT-MAS IT-MAS-strategy	Survey
3rd Essay	Does IT have a role in explaining organizational performance of the firm? IT-strategy IT-MANU IT-MANU-strategy	Survey
4th Essay	How do managers use management accounting and IT systems? Use of management accounting systems Use of ERP systems	Case study

Figure 1 shows the framework used in this dissertation for studying strategy, management accounting systems, manufacturing technology, information technology and organizational performance of the firm. It shows that strategy is linked to organizational performance. We assume that when the right type of management accounting systems, manufacturing technology or information technology is added to this relationship organizational performance will improve. Strategy, information technology and organizational performance are examined in the second, third and fourth essay of the dissertation. By strategy we mean business strategy determining how a firm is operating and competing in markets. The role of strategy is to convey the long-term goals and objectives of the firm in such a way that the strategy will help managers to achieve the ultimate goals of the firm. It is widely accepted in business literature that the ultimate goal of business is to maximize shareholders' wealth, i.e. striving for better long-term profitability of the business. Management accounting systems are of interest in the first, second and fourth essay of the study. The third essay also involves manufacturing technology construct.

The first essay focuses on management accounting systems. It includes performance measures, both financial and contemporary measures, long term planning, budgeting systems, product costing and decision support systems. Second essay investigates the relationships between performance measures, both financial and contemporary performance measures, customer-focused strategy, information technology and customer performance of the firm. It is argued that performance measures, customer-focused strategy and information technology together affect organizational performance. Third essay, in turn, investigates the relationships between differentiation strategy, manufacturing technology, information technology and organizational performance of the firm. Again, it is argued that strategy, manufacturing technology and information technology together affect organizational performance. The strategy variable is the same in the second and third essay. In the second essay, it is called customer-focused strategy and in the third essay differentiation strategy. The customer-focused strategy is consistent with differentiation strategy. The definitions are different as they need to match the constructs used in the theory. The independent variable in the second essay is labeled customer performance and in the third essay organizational performance. Customer performance includes four measures (development of new products, sales volume, market share and market development) whereas organizational performance is a broader concept also including financial measures etc. The term information technology in essays two and three refer to customer relationship management, supply chain management, data warehousing, e-commerce and electronic data interchange. In the fourth essay it refers to enterprise resource planning systems as seen in Figure 1.

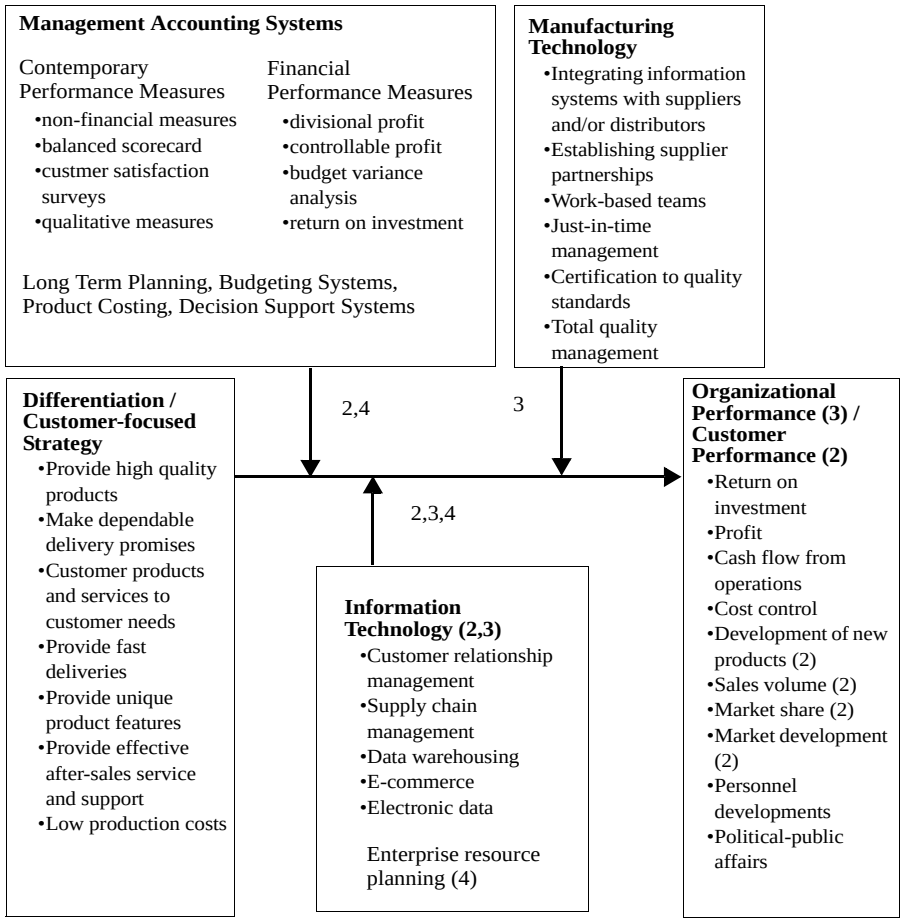

Fig. 1. Framework for studying strategy, management accounting systems, manufacturing technology, information technology and organizational performance of the firm. Numbers refer to essays in the dissertation.

In what follows, we briefly discuss the theoretical underpinnings of the each element shown in Figure 1.

2.1.1 Management Accounting Systems

The first essay aims to advance knowledge of adoption, benefits and future emphasis of management accounting systems. Recent management accounting literature has introduced different non-financial measures and combinations of

financial and non-financial measures to complement traditional financial measures (e.g. Bhimani 1994, Roberts 1995, Banerjee & Kane 1996, Groot 1996, Lebas 1996). Traditional management accounting systems have been criticized for having short-term focus and being internally oriented (e.g. Kaplan & Norton 1996, Chenhall & Langfield-Smith 1998a, Ittner & Larcker 1998). There has especially been interest in the adoption of different management accounting systems used in different countries.

The Finnish evidence on management accounting systems focuses on cost accounting practices. Lukka and Granlund (1996) and Virtanen *et al*. (1996) analyze the cost accounting practices by using a sample of industrial manufacturing firms. Variable costing is the dominant cost accounting practice in Finland (Lukka & Granlund 1996). There has also been interest in the adoption of contemporary management accounting systems. Malmi (1996) studies the diffusion of activity-based costing (ABC) in metal and engineering industries. The results show that ABC is used in 13.7% of the units. Laitinen (1995) found that in three different business categories 39%, 26.7% and 39.3% of the firms have considered or have applied ABC system. Lukka and Granlund (1996) show that none of the units in their sample were actually using ABC and that only 5% were implementing it. Malmi (2001) investigates 17 Finnish firms that are known to use Balanced Scorecard (BSC). For some firms BSC is just a new information system, but for others BSC includes defining measures, setting targets for those measures, holding someone responsible for achieving these targets and even making rewards based on achievements. Certain management accounting systems have been of interest in Finland but there is less evidence on the management accounting systems on the whole. Granlund and Taipaleenmäki (2005) study differences in management and control practices used by new economy firms (i.e. firms targeting at fast growth or already fast-growing firms that operate in the information and communication technology business) and by traditional firms. They report that it is very typical of new economy companies that very little resources are focused to their financial control activities. In new economy companies you have to invest in research and development in the early stages of operation and later in marketing, there being no interest in accounting systems (Granlund & Taipaleenmäki 2005).

While financial measures continue to be useful, the importance of non-financial measures is reported in many surveys. Chenhall and Langfield-Smith (1998a) provide Australian evidence of the adoption and benefits of both traditional and contemporary management accounting practices. The findings show that traditional management accounting systems are more widely adopted

than contemporary management accounting systems. However, contemporary accounting systems are recently more widely adopted than was found in prior surveys. In addition, the benefits obtained from traditional management accounting systems are higher than those of contemporary systems. A survey by the Institute of Management Accountants and Ernst & Young in the U.S. in 2003 revealed that traditional management accounting systems are still widely used and that adopting new cost management systems is not a priority in the current economic environment, among other things (Garg *et al*. 2003). Similar results were obtained for example by Clarke *et al*. (1996) or Guilding *et al*. (2000).

European economic integration, decreasing national barriers, the internationalization of firms, increasing harmonization of financial accounting practices and advances in information technology have created an interest in the extent to which there is a common ground in management accounting practices in Europe (Brierley *et al*. 2001). Also, there is an interest in the more general issue of whether management accounting practices in Europe are becoming part of global management accounting practices and whether the same management accounting practices are being used in a variety of countries (Granlund & Lukka 1998, Shields 1998, Brierley *et al*. 2001). Several studies investigate differences and similarities between countries. Wijewardena and De Zoysa (1999) provide a comparative analysis of management accounting practices in Australia and Japan. The results of the survey reveal a number of differences between these two countries. As Wijewardena and De Zoysa (1999) point out, a most striking difference is that while the management accounting practices of the Australian companies place an emphasis on cost control tools such as budgeting, standard costing and variance analysis at the manufacturing stage, those of the Japanese companies devote much greater attention to cost planning and cost reduction tools based on target costing at the product planning and design stage. Roberts (1995) compares management accounting in the UK with that in France. As Roberts (1995) points out, there is no necessary integration between financial and cost accounting in France. This is in stark contrast to the tradition in the UK, where cost and financial accounts are integrated and the published profit and loss statements are functionally presented. Guilding *et al*. (2000) comprising of large companies in New Zealand, the United Kingdom and the United States reports the incidence and perceived merit of twelve strategic management accounting practices. Most of the strategic management accounting practices are not widely used. Strategic pricing and competitor accounting appear to be the most popular practices. The comparison

between countries shows fairly similar levels of strategic management accounting usage (Guilding *et al*. 2000).

2.1.2 Management accounting systems and strategy

We assume that management accounting systems moderate the link between strategy and organizational performance as presented in Figure 1. Management accounting systems should be tailored to support business strategy to lead to competitive advantage and superior performance (e.g. Dent 1990, Simons 1987 & 1990). If management accounting systems are found to be useful, then managers use this enhanced information to make better decisions. There have been research linking performance measures and generic strategies. In general, more open, flexible, organic performance measures appear to better suit product differentiation and build types of strategies (Langfield-Smith 1997). Some studies have investigated the relationship between contemporary management accounting systems and strategy (Simons 2000, Miles 2003). Guilding (1999) provides evidence that, relative to other firms, prospector firms make greater use of and perceive greater helpfulness in competitor-focused accounting. The results also show that build firms exhibit greater reliance on long-run performance than harvest firms. Guilding and McManus (2002) show a positive relationship between customer accounting and market orientation.

Miles and Snow (1978) describe the planning and control systems of defender firms as likely to be very detailed, focusing on reducing uncertainty and emphasizing problem solving. These systems don't help in new product development or in locating market opportunities. Control systems are also likely to be centralized. Miller and Friesen (1982) characterize conservative firms (defenders) as needing a control system that signals the need for innovation by indicating significant drops in market share, reductions in the sales of old products and declining profitability. Porter (1980) argues that highly structured (i.e. simple sequential relationships between subunits, the absence of non-routine decisions, stable environment and repetitive operations) organizations support a cost leadership focus. As noted by Langfield-Smith (1997), there is some agreement among researchers that cost control is more important in firms following a defender or cost leadership strategy. The literature also shows that contemporary management accounting systems seem to be used in connection with differentiator, prospector or build types of strategies. However, the empirical evidence of the

relationship between strategy and management accounting systems is not clear and the performance links of these interactions are not strong.

Govindarajan (1988) shows that low emphasis on meeting budgets is associated with high performance in organizations employing differentiation strategy. Merchant (1985) reports that the control systems used in organizations following a growth strategy are not noticeably different from the control systems used in organizations under a maintain cash flow or selective growth strategy. Chenhall and Morris (1995) provide evidence that the association between enhanced performance and the interaction of organic processes with the use of management accounting systems is stronger in entrepreneurial than in conservative firms. Abernethy and Guthrie (1994) show that the effectiveness of the business unit is dependent on a match between the design of the information system and the firm's strategic postures. Management systems that have the characteristics of broad scope systems are found to be more effective in firms employing a prospector strategy than a defender type of strategy. Van der Stede (2000) suggests that differentiation business units generally undergo less rigid budgetary controls, which are associated with more budgetary slack, and presumably allow a higher degree of flexibility to respond to changes in the environment.

Simons (1987) reports that high performing prospectors place importance on controls such as forecasting data, tight budget goals and the careful monitoring of outputs but give little attention to cost control. In addition, he finds that large highly performing prospectors emphasize frequent reporting and the use of uniform control systems, which are modified when necessary. Control systems are used less intensively by defender firms compared to prospector firms. High financial performance is negatively correlated with tight budget goals and the use of output monitoring. Tight budget goals are positively correlated with high performance in small defender firms. However, the control systems introduced in Simons' study are focused on financial control practices. Simons (1990) also finds, contrary to accepted theory, that top managers of low-cost, high-volume businesses do not pay a great deal of attention to efficiency-related controls such as cost accounting systems. One possible explanation is that Simons explicitly focuses on formal control systems.

Many companies are nowadays emphasizing customer-focused strategies. Customer-focused ideology is embedded in many management philosophies, e.g. in Total Quality Management, Just-In-Time or Flexible Manufacturing. There is little empirical research concerned with customer profitability/satisfaction (Shields

1997, Foster & Young 1997, Guilding & McManus 2002). Ittner and Larcker (2001) show that customer-related performance is perceived to be more important to long-term success when the firm follows an innovative strategy. Perera et al. (1997) find support for the hypothesized association between customer-focused strategy and the use of non-financial performance measures but not for the link to organizational performance. A case study by McAdam *et al*. (2002) shows that performance measures that have a strong strategic link are perceived as more successful. Their results indicate that an appropriate mixture of different measures gives the best alignment with business strategy.

2.1.3 Information technology and strategy

We assume that information technology also moderates the relationship between strategy and organizational performance as depicted in Figure 1. In this study information technology refers to advanced information system applications like customer relationship management, supply change management, electronic data interchange etc. Massive investments in information technology have led firms to estimate its contribution to the organization (McKeen & Smith 1993). This has encouraged researchers to investigate situations within which extensive investments in information technology are likely to be most effective. One important situational characteristic is the strategy of the firm (e.g. Mahmood & Mann 1993, Kettinger *et al*. 1995, Palvia 1997, Li & Ye 1999, Prahalad & Krishnan 2002). As pointed out by Porter (2001), information technology has become a powerful tool for strategy. Information technology choices are strategic to the extent that they support or enable the firm's business strategy (Porter & Millar 1985). Information technology links one activity with other and makes real time data widely available through such tools as customer relationship management, enterprise resource planning, electronic data interchange or the internet. The existence of a link between strategy and information technology has been proposed by Benjamin *et al*. (1984), Bakos and Treacy (1986), Tan (1996), Palmer and Markus (2000) and Davis *et al*. (2002), among others. Many authors (e.g. Mahmood & Mann 1993, Kaplan & Norton 1996, Palvia 1997, Kathuria *et al*. 1999, Li & Ye 1999) have argued that the relationship between information technology and firm performance should be studied within a strategic management framework. Rai *et al*. (1997) also suggest in their analysis that while information technology is likely to improve organizational efficiency, its effect on business performance might depend on other factors such as information technology-

strategy links. As yet there is not much empirical evidence to support these claims. Chan *et al*. (1997) studied American financial services and manufacturing firms. They find, among other things, that the strategic orientation of the business, the strategic alignment of information systems and information systems effectiveness have positive impacts on business performance. Palmer and Markus (2000) find support for a match between information technology and business strategy but not for strategy and performance.

Davis *et al*. (2002) examined manufacturing and service businesses in the US. Their results indicate a positive, significant relationship between market differentiation strategies and strategic information technology. Li and Ye (1999) suggest in their study that firms need to make greater investments in information technology if they are in more dynamic environments and are pursuing more externally oriented strategies. They also provide evidence that a firm's external environment, its strategic orientation, and its integration of information technology into the overall strategy of the firm will influence the business value of information technology investment. As Tan (1996) points out, some individual information technologies are perceived to have a different degree of impact intensity on the different sources of competitive advantage. Tavakolian (1989) investigates information technology with different types of strategy. He reports that organizations with conservative competitive strategies possess more centralized information systems functions than organizations with aggressive competitive strategies.

2.1.4 Management accounting systems, information technology and strategy

The next assumption as depicted in Figure 1 is that both management accounting systems and information technology together affect the relationship between strategy and organizational performance. Information technology provides a necessary platform for firms to develop their management accounting systems and strategy. Olsen and Cooney (2000) argue that firms are faced with the challenge of integrating information technology into accounting practices. Often information technology is about the firm's financial ledgers and reporting systems (Granlund and Mouritsen 2003). The notion that there are important links between management accounting systems and information technology has been widely suggested (Chapman & Chua 2000, Ittner & Larcker 2001, Chenhall 2003). Advances in information technology have driven innovation and change in the

collection, measurement, analysis and communication of information within and between organizations (Burns & Vaivio 2001). Information technology innovations such as enterprise resource planning systems, e-commerce, the internet, electronic data interchange, supply chain management and customer relationship management have been implemented and provide a rich source of information for management accounting systems (Burns & Vaivio 2001). As yet there is not much empirical evidence of the link between management accounting systems and information technology. Dechow and Mouritsen (2005) investigate Danish firms and conclude that a primary lesson from the cases is that control cannot be studied apart from technology. Olsen and Cooney (2000) suggest that Data Warehousing has influenced the practice of accounting but the relationships are not tested empirically. Data Warehouses are valuable for making market projections and investigating potential new markets, as well as performing dysfunction analysis regarding sales of particular items and the work of individual salespeople. Granlund and Malmi (2002) examine the effects of integrated, enterprise-wide information systems on management accounting. They conclude that enterprise resource planning projects have led to relatively small changes in management accounting and control procedures.

2.1.5 Manufacturing technology and strategy

Manufacturing technology also moderates the relationship between strategy and organizational performance as presented in Figure 1. Manufacturing technologies need to be consistent with business strategy. This fit enables the successful deployment of technological resources in accordance with strategy. Successful deployment of technology helps to build a competitive advantage thereby enhancing organizational performance. The study of technologies, especially advanced technologies, and its relationship with strategy is currently receiving much attention (Zahra & Covin 1993, Kotha & Swamidass 2000, Parker 2000, Chang *et al*. 2002).

The empirical results show that a fit between certain strategy and technology dimensions will be associated with enhanced organizational performance. Parker (2000) provides evidence that the fit between strategy and technology is a significant predictor of superior performance. Zahra and Covin (1993) study the relationships among selected business strategy dimensions, technology policy dimensions and firm performance. The results show that technology policy choices vary widely across firms with different business strategies, and that

business strategy affects the strength of the relationship between firm performance and particular technology policies. Tracey *et al*. (1999) show that the relationships between manufacturing technology and strategy formulation are statistically significant and positive, and that high levels of these competitive capabilities lead to high levels of performance. Small and Chen (1999) studied various advanced manufacturing technologies using data from U.S. manufacturers. They investigate usage of various investment justification approaches and examine the impact of such practices on the ultimate performance of advanced manufacturing technology projects. Firms have reported benefits from adopting these modern technologies, i.e. improvements in product quality, the ability to respond more quickly to changing customer needs, and improved flexibility, among other things.

The study of Just-In-Time (JIT) and Total Quality Management (TQM) has received a lot of attention. Mia (2000) shows a positive relationship between JIT implementation and firm profitability. Both Kim and Takeda (1996) and Nakamura *et al*. (1998) report an improvement in several production performance measures subsequent to JIT adoption. Similar positive effects from using TQM have been reported by Samson and Terziovski (1999), Anderson and Sohal (1999) and Fullerton and McWatters (2001), among others. However, Sim and Killough (1998) conclude that while some firms improve their performance because of their emphasis on TQM or JIT, some firms that have implemented these techniques do not appear to have improved their performance. Other writers that have provided evidence of the relationship between quality and performance are, for example, Easton and Jarrell (1998), and Calantone and Knight (2000). Although TQM is only one of many new manufacturing initiatives, the practices associated with TQM provide the foundation for other advanced manufacturing techniques (Ittner and Larcker 1995). While a number of studies have suggested that TQM has failed to enhance performance (Ghobadian & Gallear 2001), the main body of the literature has concluded that there is a cause and effect relationship between TQM practices and improved organizational performance.

The literature suggests that advanced manufacturing technologies used together with a differentiation type of strategy will lead to enhanced organizational performance. Chan *et al*. (1997) find evidence that more proactive business strategies combined with more advanced information systems have positive impacts on business performance. In particular, the results show that the use of advanced technology is associated with differentiation strategy in firms showing superior growth. Dean and Snell (1996) studied manufacturing organizations in the U.S. They find, among other things, that the performance effects of advanced

manufacturing technologies tend to be augmented when used in connection with a quality strategy but diminished when used as a part of a cost strategy. Chang *et al*. (2002) point out that firms using a differentiation strategy should concentrate on achieving unique quality features and delivery speed. The matching of advanced manufacturing technology with strategies other than those focused on costs has been noted by many researchers, i.e. Boyer *et al*. (1996), and Lewis and Boyer (2002). The capabilities of advanced manufacturing technologies are best suited to strategies that emphasize flexibility and will not be used to their potential when implemented as part of a low cost strategy (Parthasarthy & Sethi 1992). On the other hand, cost reduction is often the principle reason for adoption of advanced manufacturing technology, so a low cost strategy should also be appropriate in connection with advanced manufacturing technology. Nevertheless, the main body of evidence suggests that a fit between advanced manufacturing technologies and differentiation strategies will enhance performance.

2.1.6 Manufacturing technology, information technology and strategy

Next we assume that manufacturing technology and information technology together affect the relationship between strategy and organizational performance as presented in Figure 1. Information technology is needed to provide different kinds of information to enable manufacturing technology to relate to business strategy. As yet there is not much empirical evidence of the links between information technology and manufacturing technology. Kathuria *et al*. (1999) proposes that it is the misalignment between manufacturing priorities and information technology that is the reason why all users do not derive the potential benefits of information technology applications. It is also noted by Boyer *et al*. (1997) that investments in information technology applications are more likely to yield better performance if they are consistent with improvements in the manufacturing infrastructure.

2.2 Contribution of the thesis

This dissertation contributes to management accounting literature in three main respects: First, we explore the role of information technology in connection with strategy and management accounting systems, and strategy and manufacturing technology. It has been suggested in the contingency literature that information technology might have a role in explaining these relationships, but there is no

empirical evidence of these relationships, to our knowledge. By providing empirical evidence of information technology and its relationships to other constructs, this dissertation contributes to management accounting literature extending our knowledge of information technology as a part of a contingency research. Second, we extend the contingency literature by using the case method instead of the much more frequently used postal survey method. Tillema (2005) study is one of the published studies using a case method in contingency framework. By using another method than the postal survey method, it is possible to get a more in-depth view of the variables and their relations. The aim is to learn more about the relationships between the constructs than would have been possible when using the postal method. Also, it would not have been possible to have this kind of wide description of management accounting practices by using the survey method. Third, this dissertation provides evidence of a large number of accounting practices, their adoption, benefits and future emphasis used in large manufacturing organizations. We give examples of a large number of non-financial measures that firms use in their performance measurement. Despite the recent interest in the management accounting systems, there is only limited evidence of Finnish accounting practices. Additionally, the need to know the extent to which management accounting practices are used in practice should be interesting because it gives firms an opportunity for benchmarking their accounting systems. Also, there is an interest in the more general issue of whether management accounting practices in Europe are becoming part of global management accounting practices and whether the same management accounting practices are being used in a variety of countries (Brierley *et al*. 2001, Granlund & Lukka 1998, Shields 1998). Therefore this study also provides evidence of the differences and similarities between two countries, Finland and Australia. Management accounting systems are investigated using the postal survey method and by using the case method.

3 Adoption and benefits of management accounting systems: evidence from Finland and Australia

The first essay in this dissertation provides evidence on the adoption of the management accounting systems, received benefits from the adoption and intensions to emphasize the management accounting systems in the future. It gives a wide description of both traditional and contemporary management accounting systems. The results are also analyzed by different industries and by number of employees. The findings of the survey are compared to the results reported by Chenhall and Langfield-Smith (1998a) whose study focuses on large manufacturing units in Australia.

The data used in this essay were collected by sending a survey to 132 Finnish firms in 2001 (see Appendix for the questionnaire). 51 responses were received, the response rate being 39%. The survey was pilot tested by a group of managers from eight different companies before sending the questionnaire. The sample consists mainly of large firms operating in the forest, metal and electronics industries. The majority of the organizations participating in this survey also are on some level involved in manufacturing because one part of the survey focuses on manufacturing technologies. The survey was sent at the business unit level because different business units may use different management accounting systems and because these companies were assumed to be using advanced management tools. The demographic data are shown in Table 2.

The management accounting practices in the survey are adopted from a survey used by Innes and Mitchell (1995), Chenhall and Langfield-Smith (1998a) and Joye and Blayney (1990).

Table 3. Demographic data.

	Number	%
Position at work		
Senior management	33	64,7
Middle management	14	25,5
Specialist	4	7,8
Educational background		
Academic	37	72,5
Polytechnic or college	14	27,5
Annual sales in million Euros		
2–10	2	3,9
11–40	6	11,8
41–80	8	15,7
81–160	12	23,5
>160	23	45,1
Function		
Production	7	13,7
HR	1	2
Finance	38	74,5
R&D	4	7,8
Number of employees		
20–100	8	15,7
101–200	6	11,8
201–500	14	27,5
501–1000	10	19,6
>1000	13	25,5
Industry classification		
Forest industry	18	35,3
Metal industry	18	35,3
Electronics industry	8	15,7
Other	7	13,7

The results show that all the management accounting variables in the survey have been adopted by the majority of the respondents. The management accounting variables are divided to five different categories: long-term planning, budgeting systems, product costing, performance evaluation and decision support systems. A common feature for all the categories is an even greater future emphasis on the highest ranked practices. Also, the relative benefits from the previous three years and the future emphasis on the next three years are generally greater when the size of the firm increases.

The three most beneficial management accounting systems are all traditional financial measures including divisional profit in performance evaluation, budgeting for controlling costs and variable costing. Future emphasis is on product profitability analysis, budgeting for controlling costs and qualitative measures in performance evaluation. Financial measures continue to be important in the future but it is also seen that greater emphasis will be placed on contemporary practices.

The comparison between this survey and the Chenhall and Langfield-Smith (1998a) survey shows similar results. One noticeable difference between these surveys is that Finnish firms intend to put greater emphasis on contemporary non-financial measures in the future than Australian firms. When the results are compared to other studies done in Europe, the differences in management accounting systems are not distinct.

The results analyzed by industry show that some of the measures are seen as beneficial by all three industries, i.e. variable costing, budgeting for controlling costs, qualitative measures and product profitability analysis. In the forest industry and metal industry the most beneficial management accounting systems have been traditional financial measures. In the metal industry the future emphasis will be on financial measures, but the results from the forest industry show that the firms intend to put future emphasis on non-financial measures such as customer satisfaction surveys and qualitative measures. The results from the electronics industry are rather different. Financial measures such as return on investment, capital budgeting measures such as return on investment and payback or budget variance analysis are not among the most beneficial measures in either the past or the future. The respondents from the electronics industry find non-financial measures such as employee attitudes or strategic plans developed together with budgets to be beneficial. These measures are not seen as beneficial by the forest or metal industry.

The results are also analyzed by the size of the firm. In general, the larger the firm, the more relative benefits are derived from the practices. Also, the emphasis on future management accounting practices is higher in larger firms. Some management accounting systems will be emphasized by all size categories, e.g. product profitability analysis, budgeting for controlling costs, qualitative measures and customer satisfaction surveys. Divisional profit will lose its status by all respondent groups.

4 Strategy, performance measurement techniques and information technology of the firm and their links to organizational performance

The second essay concentrates on the relationships between strategy, management accounting systems, information technology and their link to organizational performance. As described earlier, the link between strategy and management control systems is extensively investigated. This essay suggests that information technology also moderates the relationship between strategy and organizational performance. Information technology provides a platform for firms to develop their strategy and management accounting systems. It is suggested here that it is the interaction between customer-focused strategy, performance measures (contemporary and financial) and advanced information technology that affects customer performance.

A mail questionnaire (see Appendix 1) was employed in the empirical data collection (described in detail in Section 3.). The measures related to strategy are derived from broader studies designed by Miller *et al*. (1998) and used by Chenhall and Langfield-Smith (1998b). The measures for information technology are selected after a literature review. Organizational performance is measured following Govindarajan (1988), De Meyer *et al*. (1989), Govindarajan and Fisher (1990), Joye and Blayney (1990), Miller *et al*. (1992) and Innes and Mitchell (1995). Performance measures are measured by asking the respondents to assess the benefits obtained from each of the measures. The performance measures are derived from earlier surveys described in section three. Each variable, i.e. strategy, performance measures, information technology and organizational performance, is measured using multiple indicators. These multiple-item measurements are based on theoretical constructs, the validity of which is verified by factor analysis. Moderated regression analysis is used to test the hypothesis. This form of fit can be described as a Cartesian approach which argues that the fit between context and structure is a continuum that allows for frequent, small movements by organizations from one state of fit to another and that a limited number of factors offer general explanations of organizational structure (Gerdin & Greve 2004, Donaldson 1996). Under the Cartesian approach, this study can also be described as a contingency approach where fit is understood as a positive impact on performance due to certain combinations of context and structure. Further, it can be classified into a moderation approach where the third variable moderates the

effects that the independent variable has on the dependent variable (Gerdin & Greve 2004).

There are two main findings in this article. First, there is a significant negative association between customer performance and the three-way interaction involving customer-focused strategy, contemporary performance measures and advanced information technology. The findings related to the role of contemporary performance measures add to the growing body of literature that questions the extent to which these measures enhance performance. Earlier studies have also found negative associations with organizational performance or no links to organizational performance. Perera *et al*. (1997) found a significant association between customer-focused strategy and the use of non-financial performance measures, but they could not find support for the link to organizational performance. Ittner and Larcker (1997) report negative association between several strategic control practices (e.g. greater use of detailed action plans and targets, strategic audits, and greater use of customer and competitor comparison measures for monitoring strategic position) and performance. It has been argued in the literature that formal strategic control systems can actually hinder performance in some circumstances (Perera *et al*. 1997, Ittner & Larcker 1997). Ittner and Larcker (1997) identify four primary limitations in formal strategic quality control systems: 1) unfocused strategic action plans 2) limitations in performance measures 3) increased bureaucrazy and 4) inflexibility in strategic control systems.

Second, contemporary performance measures do not help highly customer-focused strategies achieve customer performance. The sample in this essay was divided into two groups according to their strategy; one group (High Strategy) is comprised of companies that are emphasizing a customer-focused strategy and the other group (Low Strategy) are not. The results show that if the company is in a Low Strategy group and emphasizing contemporary management accounting systems and advanced information technology, its customer performance will improve. This study indicates that contemporary performance measures do not help customer-focused companies. This is an interesting finding because it is contrary to the view that contemporary management accounting may best suit firms with customer-focused strategies (Bouwens & Abernethy 2000). The results reported in this essay are consistent with recent findings that managers in more complex settings find it difficult to use contemporary performance measures. Lillis (2000) argues in her study that there appears to be more problems measuring performance when strategic emphasis is on customer responsiveness rather than quality. It can be claimed that performance measures are hard to use when they are

involved with customization strategies. In spite of the difficulties connected with using contemporary measures, there is potential for them. When strategies become customized, these measures are hard to use and do not add to performance. For firms with a low customer focus, emphasizing contemporary performance measures and information technology assists in enhancing customer performance. This supports the idea that investment in performance measures and information technology are best suited to less complex situations.

5 Strategy, manufacturing technology and information technology of the firm and their links to organizational performance

The third essay in the dissertation investigates the links between strategy, manufacturing technology, information technology and organizational performance. Firms need to develop manufacturing technologies that are consistent with their business strategy. This effective utilization of technological resources helps to build a sustainable competitive advantage that enhances a firm's performance. As stated in the second essay, the effectiveness of a firm's strategy is also enhanced by information technology. It is argued here that advanced information technology is needed to provide different kinds of information to enable advanced manufacturing technology to relate to the differentiation strategy. It is the interaction of strategy, manufacturing technology and information technology that affects organizational performance. This statement is congruent with Milgrom and Roberts (1990).

Questions related to manufacturing technology are derived from previously used studies by Miller *et al*. (1992) and Chenhall and Langfield-Smith (1998b). The measurement of strategy, information technology and organizational performance is as described in sections three and four. It is of interest whether the level of information technology of the firm is reflected in the relationship between manufacturing technology and business strategy. This study proposes that a deeper understanding can be achieved by examining how manufacturing technology, information technology and strategy together influence firm performance.

The data were collected as described earlier in section 3. Each variable (strategy, manufacturing technology, information technology, organizational performance) is measured using multiple indicators as in the second study. The validity of the measures is verified by using a principle factor analysis. The hypotheses are tested using regression analysis. The form of fit can be described as a Cartesian, contingency and moderation approach in the same way as the second study (Gerdin & Greve 2004).

The results indicate that advanced manufacturing technology and advanced information technology together help firms to improve their organizational performance. The data were split into two subgroups with respect to differentiation strategy. It is both the firms that are emphasizing differentiation strategy and those that are not that gain benefits from high levels of manufacturing and information technology. This relationship is stronger in a Low Strategy group indicating that

when companies are not emphasizing the differentiation strategy, they will benefit more from the use of advanced manufacturing and information technology than companies that belong to the High Strategy group. There is not much previous evidence of the fit between advanced manufacturing technology and advanced information technology. The firms emphasizing differentiation strategy were expected to benefit from advanced manufacturing technology and advanced information technology. Interestingly, those firms that were not emphasizing differentiation strategy also benefited from advanced manufacturing technology and advanced information technology. It may be that as long as the firm has a clear strategic context, regardless of the strategy type, it benefits from the right manufacturing and information technology fit.

6 Strategy, management accounting systems and information technology of the firm – case analysis of six Finnish companies

The fourth essay investigates strategy, management accounting systems and information technology of the firm using case analyses. We aim to get a more in-depth view of the constructs and their relations. The case method has been seen as particularly strong in providing new insights into new phenomenon of which very little is known (Eisenhardt 1989). Comparisons between cases provide opportunities for discovering patterns between the cases and often emphasize complementary aspects of the phenomena. It is based on the same theory as the second essay in this dissertation. The second essay uses the survey method, whereas this study uses multiple case analyses. In the second study, information technology refers to multiple-item measures, whereas in this study information technology refers to enterprise resource planning systems. The chosen method lies somewhere between in-depth cases and surveys adopting a positivist epistemology.

The data were mainly collected by interviewing accounting/financial managers and directors. The interviews took place in November 2004. Six Finnish case companies were chosen for this study. It was desired to have subgroups of cases on different strategies, industries and their stages of implementing enterprise resource planning systems. Two of the companies represent the electronics industry, two represent the metal industry and two the paper industry. The research material also included notes, company documentation and firm web sites. The interviews were semi-structured. This study can be defined as a descriptive case study (Yin, 2003) or theory specification study (Keating 1995).

The results indicate that the firms that are emphasizing differentiation strategy also emphasize contemporary performance measures, and those firms that are competing with cost effectiveness strategy emphasize financial performance measures. These findings are similar to earlier findings in the contingency literature. Enterprise resource planning systems are used regardless of strategy. The results also indicate that enterprise resource planning systems change the way information is collected and communicated in the organization but they seem to have little effect on performance measurement. An increased emphasis on both contemporary non-financial and financial measures is found similarly to the first essay. The firms in the electronics industry place more emphasis on innovative

non-traditional performance measures than the firms operating in the forest or metal industry. Similar findings are also reported in the first essay.

7 Conclusion

The four essays together in this dissertation aim to provide an extensive picture of management accounting systems and explore the relationships between management accounting systems, strategy, information technology, manufacturing technology and organizational performance. Having four different studies enables the researcher to investigate the chosen variables in a selected, theory-driven context. It also makes it possible to use different methods in investigating the phenomenon and thereby having complementary information on the research phenomenon.

This dissertation provides comprehensive evidence of the management accounting practices in Finland. Adoption, benefits and future emphasis of 45 different management accounting practices are described. In addition, these practices are compared to the Australian practices. As described in the literature review above, prior to the 1990s there was very little evidence on management accounting practices. Despite the growing interest in management accounting practices, the evidence from Finland is limited. The main finding from the first study is that financial measures will continue to be important in the future, but it was also seen that greater emphasis will be placed on newer management accounting practices such as customer satisfaction surveys and employee attitudes. All 45 practices have been adopted by the majority of the respondents. A common feature is even greater future emphasis on the highest ranked practices. Also, the relative benefits from the previous three years and the future emphasis in the next three years are generally greater when the size of the firm increases.

This dissertation includes information technology as a construct to assist in understanding the relationship between performance measures and strategy. There has been interest in performance measures best suited to different strategies. Information technology provides an additional dimension to this relationship. While there have been studies on performance measures and strategy, and information technology and strategy, there has been no research on the combination of performance measures, strategy and information technology. This study also provides additional evidence of the relative importance of financial and non-financial performance measures in developing effective strategies. The results show that there is a significant association between customer performance and the three-way interaction involving customer-focused strategy, contemporary performance measures and advanced information technology. The proposed three-way interaction between financial performance measures, customer-focused

strategy and advanced information technology is not supported at conventional levels of statistical significance indicating that financial measures are not important in the model. The results also show that contemporary performance measures do not help highly customer-focused firms to achieve customer performance. This finding is interesting as it is contrary to the view that contemporary management accounting may best suit firms with customer-focused strategies. (Bouwens & Abernethy 2000). For firms with a low customer focus, emphasizing contemporary performance measures and advanced information technology assists in enhancing customer performance. This supports the idea that investment in performance measures and information technology are better suited to simpler situations that customer orientation. The findings related to the role of contemporary performance measures add to the growing body of literature that questions the extent to which these measures enhance performance.

The results from this dissertation do not support the proposed three-way interaction between advanced manufacturing technology, advanced information technology and differentiation strategy. However, the results indicate that manufacturing technology and information technology together help firms to improve their organizational performance regardless of their emphasis on differentiation strategy. This relationship is even stronger for the firms that are not employing a differentiation strategy. Successful adoption of advanced technologies has been problematic for many organizations. There has been considerable interest in the literature on the relationship between technology and performance. The findings reported here increase our knowledge of the fit between advanced manufacturing technologies (e.g. Just-In-Time and Total Quality Management) and advanced information technologies (e.g. customer relationship management and supply change management) and their link to organizational performance. The findings related to enterprise resource planning systems in the fourth essay are interesting as there are not many studies investigating enterprise resource planning systems and specifically, there are no studies investigating enterprise resource planning systems as a part of a contingency framework.

This dissertation also uses a multiple case method in examining the relationships between selected constructs. Survey-based research tries to find significant statistical links using statistical methods whereas in the fourth study the aim is to learn more about the relationships between the constructs by interviewing managers and directors. As there is no agreement on the role of information technology in the contingency research this kind of multiple case analysis is especially suitable (Keating 1995).

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Essays

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III Hyvönen Johanna (2007) Strategy, manufacturing technology and information technology of the firm and their links to organizational performance.

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