"HOLDING ALL THE CARDS"
THE ASSOCIATIONS BETWEEN MANAGEMENT ACCOUNTING, STRATEGY AND STRATEGIC CHANGE

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ABSTRACT

The main purpose of this study is to theorise the associations between management accounting, strategy and strategic change. The study contributes to existing strategic management accounting (SMA) literature by using Latours' (2005) actor-network theory. The empirical background of this case study derives from two enterprises which operate in the metal processing industry (Metal Ltd) and in the pulp industry (Pulp Ltd). The first purpose is to analyse the roles of management accounting actors in strategic change. The case companies' strategic change derives mainly from the external environment; from the joint effect caused by economic recession, cyclical industries and structural transformation. Management accounting (MA) actors are divided into two main categories: management accounting technologies (such as MA information systems and MA inscriptions) and human actors. MA inscriptions are divided into five further categories: reporting, budgeting, forecasting, investment calculations and ad hoc calculations (raw-material and production related calculations). The study also analyses how controllers experience and understand their role during a turbulent economic period. The second purpose clarifies the abilities of management accounting actors to influence strategy and the external economic environment. Strategy is understood as a concept which includes such linking parts as partnership strategies and strategic partnerships.

According to the research results, such MA inscriptions, which are ad hoc-type calculations often calculated on a spreadsheet by a collection of staff from different departments, are the most powerful MA actors in strategic change. The research results imply that officially intended patterns of accountability and control have changed as the accounting function has spread beyond financial departments. The research results suggest that MA actors can play various roles both within a strategy and between its linking parts. In some cases, the management accounting calculations can even trigger a change of strategy. Management accounting calculations has more power in relation to strategy if it is framed within qualitative and supporting information which opens up numerical data. Furthermore, management accounting requires a background against which it is possible to compare figures. While making a focused contribution to the literature on strategic management accounting, this study also provides a basis for making general observations. In future, controllers are expected to produce new and innovative value-added calculations as well as forecasts and supporting information tailored to specific purposes. The increasing business orientation of management accountants will also set new demands for their education in universities. Educational institutes will have to offer diverse and wide-ranging diplomas that give students the ability to analyse the businesses of companies from a variety of perspectives.

Keywords: management accounting, actor-network theory, strategy, strategic change, strategic management accounting

TIIVISTELMÄ

Tutkimus tarkastelee johdon laskentatoimen, strategian ja strategisen muutoksen välisiä yhteyksiä. Teoreettisena viitekehyksenä tutkimuksessa käytetään Latourin (2005) toimijaverkkoteoriaa. Tutkimuksella kontribuoidaan strategisen johdon laskentatoimen kirjallisuuteen. Empiirinen aineisto on kerätty kahdesta case-yrityksestä, jotka toimivat metallinjalostus- (Metal Ltd) ja sellu- (Pulp Ltd) toimialoilla. Tutkimuksessa analysoidaan ja kuvataan johdon laskentatoimen roolia yritysten strategisessa muutostilanteessa. Strateginen muutos yrityksille aiheutui pääasiassa ulkoisen toimintaympäristön muutostekijöiden kuten taloustaantuman, syklisten toimialojen ja rakennemuutoksen seurauksena. Johdon laskentatoimen toimijat on työssä jaettu kahteen pääkategoriaan: johdon laskentatoimen teknologioihin (laskentatoimen tietojärjestelmät ja laskelmat) ja ihmistoimijoihin (controllerin roolin tarkasteluun). Johdon laskentatoimen laskelmat on edelleen jaettu viiteen luokkaan: raportteihin, budjetteihin, ennusteisiin, investointi- ja ad hoc laskelmiin (raaka-aine ja tuotantolaskelmat). Tutkimuksen myös analysoi ja kuvaa johdon laskentatoimen ja strategian sekä ulkoisen toimintaympäristön välisiä suhteita.

Tutkimuksessa havaittiin, että ad hoc -tyyppiset laskelmat (kuten investointi-, raaka-aine-, ja tuotantolaskelmat), jotka usein lasketaan taulukkolaskentaohjelmien avulla ovat vahvimpia vaikuttamaan strategisiin päätöksiin muutostilanteessa. Usein näitä laskelmia lasketaan ainakin osittain talousosaston ulkopuolella eri osastoilta tulevien henkilöiden yhteistyönä. Tutkimustulokset myös osoittavat, että johdon laskentatoimi ja strategia ovat monipuolisessa vuorovaikutussuhteessa keskenään. Johdon laskentatoimen laskelmat voivat joissain tapauksina toimia myös strategisen muutoksen alulle saattajina. Laskelmilla on enemmän vaikutusmahdollisuuksia yrityksen strategiaan, jos ne ovat yhdistettynä niitä tukevaan laadulliseen ja täydentävään informaatioon, joka avaa numeerisessa muodossa esitettyjä merkityksiä. Lisäksi numeroita taustoittavat vertailukohdat lisäävät laskelmien vaikutusmahdollisuuksia suhteessa yritysten strategiaan.

Paitsi että tutkimus kontribuoi strategiseen johdon laskentatoimen kirjallisuuteen, se tarjoaa myös yleisempiä havaintoja. Tulevaisuudessa laskentahenkilöstöltä (erityisesti controllereilta) tullaan edellyttämään uusien ja innovatiivisten laskelmien ja ennusteiden tuottamista, mutta myös kykyä tuottaa erityisesti tiettyä päätöksentekotilannetta tukevaa informaatiota yrityksen johdolle. Controllereilta vaadittava syvempi liiketoiminnan tuntemus asettaa uusia haasteita myös laskentatoimen koulutukselle korkeakouluissa. Korkeakoulujen tulee tarjota monipuolisia ja laaja-alaisia tutkintoja, jotka antavat valmistuville opiskelijoille kyvyn analysoida yritysten liiketoimintaa monelta eri näkökannalta.

Avainsanat: johdon laskentatoimi, toimijaverkostoteoria, strategia, strateginen muutos, strateginen johdon laskentatoimi

FOREWORD

Bruno Latour's and Steven Woolgar's book Laboratory Life (1979) revolutionized science over 30 years ago when it questioned several established views on how science should be practiced. According to Latour & Woolgar (1979), the most significant point about conducting research concerned the transferring of the three-dimensional world onto two-dimensional paper. This dissertation can also be shared and moved from place to place, even if the results remain unchangeable. Latour (1987) qualified scientific knowledge and objects as "immutable mobile" in his *Science in Action*. A scientific paper is a good example of an immutable mobile. It is easily transported between people, but has some permanence to it. The written format enables the materialization of knowledge into readable, mobile and immutable formats. What makes the immutable mobile powerful is that it allows a coalition to build around an idea. Scientific papers can undergo transformations but, in the end, are almost always read in the written format. Thus, it remains to be seen how this dissertation will become immutable mobile – how it will help to create new scientific papers or new research ideas and thus also undergo some kind of transformation.

This doctoral dissertation is not solely the product of my own intellectual activity. It is, to a large extent, the product of interaction with numerous individuals who have generously given me guidance and support during this long, but most enjoyable endeavor. So it is naturally impossible to individually mention all those people from whom I have received guidance and support during this process. However, I will seek to express my gratitude to those individuals to whom I am most indebted.

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During my PhD studies I met many great people in conferences and at doctoral seminars, in Finland and abroad. I am very grateful for all the discussions, comments and reviews received. They have definitely influenced my thinking and taught me about research. I also wish to thank Professor Chris Chapman, Professor Jane Broadbent and Professor James Guthrie your advice during the Sixth Asia Pacific Interdisciplinary Research in the Accounting Emerging Scholars Colloquim held in Sydney, Australia during July, 2010. I also wish to thank the people I interviewed for this study and who gen-

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I have been working for the University Consortium of Pori during my studies. I warmly thank the former director Martti Sinisalmi for your encouragement at the beginning of my research process and the current director Harri Peltoniemi for your endless support and understanding during the long process. In addition, I warmly thank my colleagues and friends throughout the University Consortium of Pori for these years.

Finally, I want to express my deepest gratitude to those closest to me. First, I want to thank my parents Pirjo and Seppo for your support and encouragement both in this research and in life in general. Last, but not least, I want to thank all my closest friends for your unfaltering support and patience during this long and demanding process. You know who you are.

Pori, April 15, 2014

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1 INTRODUCTION

1.1 Background

> *It seems that accounting is the simplest and easiest thing within this business. What is causing trouble is finding new business opportunities. We need ideas from the markets on how we can offer new products to them. Management accounting serves as a tool within this process. It offers information about opportunities and threats. The actual challenge derives from the situation in which we need to find new business opportunities which will offer revenue streams in the future (Development Manager, Metal Ltd, Factory 1, 03/11/2009).*

This statement from the development manager (Metal Ltd, Factory 1) represents a traditional relationship between strategy and management accounting in which management accounting plays the subordinate role in relation to strategy. In other words, strategy determines what should be calculated in a particular situation. The relationship between management accounting and strategy is a widely studied issue and is the key issue in the literature (see, for example, Skaerbaek & Tryggestad 2010; Boedker 2010; Kreiner & Mouritsen 2003). This study continues the research conducted within the management accounting and strategy field by adding a dynamic dimension to it.

Next, attention is directed to those writers who have studied the relationship between management accounting and strategy. "The father" of the stream is Anthony Hopwood (1983, 1987, 1990), who has studied accounting in action and investigated its roles as a symbolic mediator. Hopwood's (1983) classic study is "On Trying to Study Accounting in the Contexts in which it Operates," in which the writer analyses the roles that have been claimed on behalf of accounting with the ways in which accounting functions in practice. According to Hopwood (1983, 301), accounting reflects many parameters of organisational life (the reflective role of accounting) but it has also played a more active role in constructing the organisational world (the constitutive role of accounting) in which it is embedded. There is a complex interplay between the reflective and the constitutive roles of accounting. The reflective role shows accounting's dependency on the organisations in which it is embedded and how the constitutive role often constrains organisations in the name of the possibilities and potentialities of the accounting craft. Generally, the constitutive role shapes views of both the constraints on organised action and the ends which it seeks to serve (Hopwood 1983, 301). Hopwood (1987, 228) emphasises the constitutive roles of accounting and the means by which they can shift the

perceptions of organisational functioning, while also infusing the patterns of language, meaning and significance within organisations. Generally, it seems evident that the reflective and constitutive role are present at the same time in different places in a company or at a different time within the same place, e.g. in the financial department.

Hopwood (1987, 214) points out that the roles of accounting are still defined externally to the practice of the craft. Quite many studies have concentrated on analysing the role which accounting is seen as playing in the enhancement of organisational performance. The progressive roles which accounting plays in an organisation's functioning also tend to be defined prior to and independently of the specific organisational practices by which they are implemented. In such cases, accounting is compared with abstract conceptualisations of what it essentially should be about. Accounting is seen as being able to be mobilised and changed in the name of an abstract image of its real potential (Hopwood 1987, 210). However, different accounting methods are seen as reflecting different circumstances rather than being implicated in a more positive process in which accounting becomes what it was not (Hopwood 1987, 212). Accounting is thus shown as a craft that is embedded in the functioning of an organisation, co-existing and interdependent with other aspects of the organisation, such as its strategy, structure, approaches to the segmentation of work and other organisational technologies and practices (Hopwood 1987, 212).

Accounting practice needs to be seen as playing a more active and progressive role in creating rather than merely enabling organised endeavour (Hopwood 1987, 211). Thus, rather than seeing organisational accounts as a technical reflection of the pre-given economic imperatives facing organisational administration, they are seen to be actively constructed in order to create a particular economic visibility within the organisation and a powerful means for progressively enabling the governance and control of the organisation along economic lines. So, accounting is considered one of the important means by which an organisation is incorporated into the social domain (Hopwood 1987, 213) Hopwood (1990) assumes that there is a need, not only for a new accounting understanding but also, for more subtle and advanced insight into the organisational dynamics which mediate and shape accounting changes in particular contexts. To understand accounting and the construction of an organisational order, accounting needs to be appreciated in its organisational context and more than a technical view of accounting is required. Hopwood (1990) claims that the possible range of the consequences of accounting stem from current developments in manufacturing technology, rather than any singular effect. This recognises that the very ambiguity of the concept of change is not helpful when reflecting on how accounting is embedded in wider processes of transformation. Accounting, to some at least, is too rigid a discipline, protected and buffered from the pressures of the world by professional conservatism and an inadequate knowledge base (Hopwood 1990, 8).

Hopwood (1990) analyses the ways in which accounting is caught up in the wider processes of organisational change. He does that by studying the general roles which

accounting plays in processes of organisational change. He places emphasis on three particular roles. In the first role accounting brings visibility to certain aspects of an organisation, making things visible that otherwise would not be. It influences perceptions, changes language and affects dialogue, thereby permeating the ways in which priorities, concerns and worries, and new possibilities for action are expressed. Accounting can also play a role in strategically moving managerial awareness away from the problems of just internal interdependences towards a view of the external positioning of an organisation or a particular segment of the organisation. In the second role accounting functions as a calculative practice. It is implicated in the objectification of phenomena and, in the process, makes those factors appear real and seemingly precise – these factors would otherwise reside in the realm of the abstract. The power of calculation is potentially great in the second role of accounting. When something comes into the calculative sphere, it very often enables new organisational interdependences to be created. The final role of accounting is the active part it plays in creating a domain of economic action. The abstractions and objectifications of accounting enable economic knowledge and understandings to be operationalised and thereby they can more readily permeate and shape organisational agendas, concerns and choices. Hopwood (1990, 10) argues that these alternative ways of viewing accounting provide a basis for studying how the role of accounting – in its actual organisational and social functioning – differs in comparison to the more conventional view of its decision and control functions. Accounting provides an influential means for inducing change in organisational affairs. Through the activities of planning, budgeting, costing and scheduling, accounting enables an assembling of complex physical processes and their abstraction within organisations. So it provides a basis for radically changing and disrupting the physical processes in the name of criteria and concerns which are not directly implicated in the physical processes themselves, such as the economic and the financial (Hopwood, 1990, 13).

In addition to Hopwood, various writers such as Dent (1990; 1991); Langfield-Smith (1997); Chenhall (2003); Baxter & Chua (2003); Skaerbaek & Tryggestad (2010) and Boedker (2010) have dealt with the issue of MA and strategy or strategic change from different perspectives. The studies that have examined the relationship between management control systems (MCS) and strategy in organisations undergoing change (e.g. Archer & Otley 1991; Roberts 1990) have concentrated on describing the controls utilised at the time of change but they have not provided insights into the interrelationship between MCS and strategy (Kober et al. 2007). Chapman (2005) connects work in accounting with research into corporate strategy. He aims to demonstrate the diverse manner in which one might study the connections that management control systems have with strategy and how management control systems may actively build and sustain valuable strategic roles. Dent's classic (1991) study of a railway organisation during the 1980s documents the power of accounting in creating organisational change. He discusses the shift from the dominant "railway culture" where the railway was a public service and its purpose was "to run trains," to a "new business culture" in which the

railway becomes a business and its purpose is to make a profit (see Conrad 2005). Dent (1990) thought that sometimes MCS might take a proactive role in influencing strategy (see Kober et al. 2007) as sometimes it seems that strategic change and reorientation is a normal, recurring facet of an organisation's behaviour. However, strategic reorientations appear only rarely. To a considerable extent, the strategic decision-making process constitutes an elaboration or refinement of existing strategies. As with strategic decisions, change can, at most, only be partially managed (Dent 1990, 16-17). Quattrone & Hopper (2005, 745) point out that understanding the role of management accounting, such as accounting technologies, requires a fluid, adaptive mode of investigation that follows paths laid out by previous research. The studies above turn the assumed unidirectional relationships of contingency theory around. Hansen & Mouritsen (2005) demonstrate that accounting devices can have an active role in enacting strategy and they ask whether or not such devices can be actors. They also question the subordinate and neutral role of accounting.

To conclude, many studies have analysed the relationship between strategy and management accounting. Nevertheless, the research concerning the role of management accounting (MA) in dynamic surroundings is scarce, which is why Hopwood (1990) points out the need for a new way to analyse accounting and for advanced insight into the organisational dynamics which mediate and shape accounting changes. He points out that current developments in manufacturing technology explain the observed trends in accounting. Hopwood (1990) initiated the research stream which analyses the roles which accounting plays in processes of organisational change. The aim of this study is to continue the research conducted in this stream by focusing on analysing the ways in which accounting creates visibility in organisations. In particular, this study emphasises those means which are influential for inducing change in organisational affairs.

1.1.1 Strategic management accounting (SMA)

Next the study compares two different research streams with each other. Contemporary management accounting and strategy research is divided into two categories which both rely on assumptions and research traditions of their own. Baxter and Chua (2003) label the dominant research relying on sociological functionalism as mainstream and all the other approaches as alternative. A significant amount of research (for example, (Chenhall 2003, 2005; Dent 1990; Simons 1995, 2000) has taken a mainstream approach. Mainstream research is based on two related research streams which are contingency theory and the economics-based research. The conventional economics-based approach regards management accounting as the provision of information that is designed to enable rational decision makers to make optimal decisions (see Scapens & Arnord 1986). Such an approach, which is embodied in research, adopts agency theory (see e.g. Baiman 1990) or transaction costs economics (see e.g. Walker 1998) and focuses on

equilibrium and optimal solutions. Such an approach does not assist the understanding of how various techniques come to be used in organisations. Generally, mainstream research assumes that accounting takes a subordinate role and its main aim is to ensure the correct implementation of predefined intents (Boedker 2010, 595). Baxter & Chua (2003) suggest that alternative management accounting includes seven streams of research including a non-rational design school, naturalistic research, radical alternative, institutional theory, structuration theory, a Foucauldian approach and a Latourian perspective.[1]

The researcher decided to select a Latourian perspective as the theoretical background for the study, even though there are other theories which focus on change, such as institutional theory, structuration theory and radical alternatives. Institutional theory, as developed by Scapens (1994); Burns & Scapens (2000), describes the nature of organisational rules, routines and institutions. MA practices can both shape and be shaped by the institutions which govern organisational activity. Institutions produce and reproduce settled habits of thought and action. Institutional perspective is a suitable theory when the focus is on organisational rules and routines, and when institutional character is recognised. However, in this paper the concern is not on intra-organisational processes of change or the implementation of any MA practice, which is why institutional perspective was not adopted. In structuration theory, Giddens (1984) used the notion of modalities to link the knowledgeable capacities of human actors to the structural properties of institutions. Giddens identified three inter-related dimensions: signification, domination and legitimation, each with its own modality, which is drawn upon in the reproduction of the systems of interaction, thereby reconstituting the structural properties. However, even if structuration theory is important for understanding the nature of management accounting, it is not particularly helpful for exploring processes of change (Burns & Scapens 2000, 8). The radical alternative draws on the ideas of Marx (see Atkinson 1972), the Frankfurt school (Habermas 1968) and labour process literature (Braverman 1974) to highlight how the practice of management accounting is implicated in the creation and perpetuation of an unequal society. Management accounting practice is inexorably intertwined with managerialist systems of ideology. In short, this radical alternative mobilises research to provide a platform for critique, change and improvement within organisations in particular, and in society in general (Baxter & Chua 2003, 100). However, the focus of the research was not to analyse conflict or the non-benign nature of management accounting in general, which is why the researcher decided not to adopt radical alternative.

The main reason for the selection of the Latourian view is the fact that it focuses on analysing the processes of change and movement (Latour 2005). In this research change is largely driven by external environment trends. The Latourian view is also particularly

[1] Baxter & Chua (2003) point out that the seven alternative perspectives adopted are illustrative and different papers may draw more broadly from the literature than their initial categorisation suggests.

interesting due to its focus on human interaction with technologies in the social context. The research is conducted in an environment where technologies have a determining role concerning daily operations.

The contingency theory approach (see Simons 1987; Chenhall & Langfield-Smith 1998; Guilding et al. 2000) has used questionnaires and interviews to test the relationship between accounting control systems and business strategy. Within a contingency framework, the accounting system becomes an effect of the environment and technology a largely passive adaptation to external factors (Justesen & Mouritsen 2011, 180). Contingency-based research is just one example of research in which accounting is seen as a technical practice. That view dominated the academic discussion until the late 1970s. Accounting was mainly regarded as a derivative practice, a neutral device that documents and reports the facts of economic activity using numerical computations for revenues, costs, profits, losses and returns. The simplest form of contingency theory suggests that organisations are contingent upon various contextual factors. Contingency-based research examines management accounting and management control system designs that best suit the nature of their environment, technology, size, structure, strategy and national culture – which are the main contextual variables (Chenhall 2003). In its more provocative form, contingency theory suggests that organisations should achieve a fit (selection or interactive) between their structures and their context so that they would be more effective (Dent 1990, 9). A variety of contingency theories may be utilised to explain this relationship. Contingency-based research predicts that certain categories of management control systems (MCS) will be more suited to particular strategies (Chenhall 2003, 150). The contingency theory assumes MCS are adopted to assist managers achieve desired organisational outcomes or organisational goals under specific conditions. Langfield-Smith (1997; 2005) provides a summary of research into MCS and strategy using the concepts of the positioning school from the late 1980s. As his review demonstrates, most research has been based on mainstream contingency theory, which has a long tradition in the study of MCS. The research methods used by contingency research are quantitative and usually surveys. This means the samples are large and the analyses are statistical and assume mainly unidirectional relationships between the context and the control systems of a firm (Chenhall 2003).

Recent contingency-based research has considered the relevance of strategy-related issues to the design of management control systems (Chenhall 2003, 127). A common feature of contingency studies is that MCS is viewed as playing a supportive role within the rational strategy implementation process (Langfield-Smith 1997, 221; Govindarajan 1988; Govindarajan & Gupta 1985). Strategies characterised by conservatism, defender orientations and cost leadership are associated with formal, traditional MCS focused on cost control, specific operating goals and budgets and rigid budget controls. Strategies characterised by defender and harvest orientations and which are based on cost leadership are associated with formal performance measurement systems including objective budget performance targets. However, the role of strategy is dynamic because managers

continually assess combinations of various contingency factors (Chenhall 2003, 151). During the 1990s the concept of strategic management accounting (SMA) and contingency studies emerged, presupposing the existence of SMA as a set of management accounting techniques for strategic purposes. According to Roslender & Hart (2003) SMA is best understood as a generic approach to accounting for strategic positioning. It is defined by an attempt to integrate insights from management accounting and marketing management within a strategic management framework. SMA can broadly be defined as being the use of management accounting systems to support strategic decision-making. Much of the prior research in SMA has concentrated on which accounting techniques are used and in what circumstances (Tillman & Goddard 2008, 80-81). Puolamäki (2004) defined SMA as the provision of explicit and quantitative information for strategic purposes. Later Puolamäki (2007) defines the role of SMA as being that of supporting management team decision-making concerning the implementation of strategic change and challenging the predominant way of carrying out activities in an organisation. A number of surveys of SMA practice have been conducted (Carr et al. 1994; Carr & Tomkins 1998; Guilding 2000). For example, Guilding et al. (2000) identified 12 strategic management accounting practices: attribute costing, brand value budgeting and monitoring, competitor cost assessment, competitive position monitoring, competitor appraisal based on published financial statements, lifecycle costing, quality costing, strategic costing, strategic pricing, target costing, and value chain costing. These surveys have found that competitor accounting and strategic pricing are the most widely used techniques, but some also suggest that the term SMA is not widely used in companies, and its meaning is not always clear to managers (Tillman & Goddard 2008, 81). Hansen & Mouritsen (2005) claim that SMA is actively involved in "mobilizing objects and logic that seek to encapsulate what strategy is". Their work raises the option that accounting devices can have an active role in enacting strategy (Hansen & Mouritsen 2005, 125). A quick search will reveal that several universities have added the term strategic management accounting to their teaching schedule. The common aim of these courses is to provide an advanced overview of current research and issues in the area of strategic management accounting.

The current study contributes to domestic SMA literature where such writers as Järvenpää (2002; 2007), Vaivio (2001), Virtanen (2006), Kolehmainen (2012), Granlund (1998) and Puolamäki (2007, 2004) have analysed the issue from different viewpoints. Vaivio (2001) analysed non-financial measurement in an organisational context from three perspectives. He stated that non-financial measures shift the remaining functional and professional boundaries within organisations. Non-financial measures deepen the financial managers' area of influence over other organisational actor's areas of expertise. Virtanen (2006) analyses the need for change in strategies and management control systems in changing business environments and also investigates the interplay between management control systems and strategies, both corporate and competitive, as companies attempt to adapt to their changing business environment. Her study yields results

on how management control systems can be used to affect strategic change in the endeavour to adapt organisations to new conditions in a continuously changing environment. Kolehmainen (2012) focuses on four management practices (management practices related to strategic investment decisions, the use of management control systems and the use of strategic performance measurement systems) that lie on the interface between strategy and management accounting. She argues that the inclusion of qualitative and subjective elements in management accounting could strengthen its strategic role. Puolamäki (2004) analysed the development application and implementation of SME constructs in the strategy process setting. His aim was to describe and analyse the social consequences of managerial actions during and after the construction process. Granlund (1998, 14) examined the challenges of management accounting change by examining the interplay between management accounting, change, and stability. He suggests that the relationship between accounting, change and stability is a complex web of multiple connections and mutual influences evolving over time.

Dent (1990, 21) identifies areas where further enquiry would contribute to our knowledge. The areas are the relationship between organisations' control systems and their strategies, accounting systems and the process of strategic decision-making, and connections between control systems and the emergence of strategic change. This study particularly contributes to the third category as its aim is to analyse the role of management accounting (MA) in a strategic change situation in two case companies. The aim is to understand the context by analysing the social phenomena which surround organisations and how they affect the relationship between accounting and strategy.

Chenhall (2003) presents the findings from an extensive selection of contingency-based management accounting research. According to contingency theory, there are some general findings concerning the main contextual variables which are environment, technology, organisational structure, size, strategy and culture. Firstly, environmental uncertainty is associated with a need for more open, externally focused, non-financial styles of MCS. However, hostile and turbulent economic conditions are associated with a reliance on formal controls and an emphasis on budgets. Secondly, technologies characterised by more standardised and automated processes are have more traditional formal management control systems with highly developed process controls, high budget use and high budgetary controls. Thirdly, large decentralised firms are associated with a strong emphasis on formal management control systems. Large firms also tend to adopt more formal management control systems. Contingency research has provided mixed findings as to whether culture does have effects across aspects of MCS. A general proposition that relates culture to MCS is that national culture is associated with the design of MCS.

The second mainstream research stream, the economics-based research (see Ittner & Larcker 1997; Ittner, Larcker, & Meyer, 2003; Lipe & Salterio 2000, 2002) focuses on the role of management accounting technologies, such as the Balanced Scorecard, in controlling strategy. These positivist theorists assume that the role of accounting is

largely to control and monitor the effective implementation of strategy (Boedker 2010, 596). Ittner & Larcker (1997) suggest that strategic control systems should be adapted to an organisation's competitive environment and claim that formal strategic control systems can hinder performance in some circumstances. Their finding indicates that organisations that place a greater emphasis on quality in their strategic plans do tend to make greater employment of quality-related strategic control practices. However, perhaps the most important point of Ittner & Larcker's (1997) study is an understanding of the roles of formal versus informal controls in implementing and monitoring strategic plans. They suggest that formal control practices can actually be counter-productive in some situations and in contrast, informal strategic control practices are more suitable for organisations that function in rapidly changing environments (Ittner & Larcker 1997, 311).

However, the mainstream approach has advantages. Contingency theory decreases the complexity and messiness of research sites and, via its quantitative focus, allows the aggregation and analysis of many data points to form a coherent picture of how the world operates (Boedker 2010, 596). The mainstream approach is defined by a stable ontology; the centralisation of power to only a few agents or universal ideals, and attempts at knowledge discovery through deductive reasoning and predefined building blocks (Boedker 2010, 596-597). All of which suggest an approach best suited to analysing a situation where change is not present.

However, the mainstream approach has received much criticism as well because one of its major shortcomings is that it assumes that stability, orderliness and predictability characterise social life. It offers insights into an organisation's fit with its environment but it does not emphasise the dynamic relations of organisations and the role of accounting within its context. Contingency research has contributed to our understanding of SMA but does suffer from the usual drawbacks in that the selection of variables and specifications has been eclectic, furthermore, the sample selected has not always comprehensive and some conflicting results have been produced. More importantly these studies throw little light on how SMA practices are implemented and used in practice and provide no theoretical explanation of such practices (Tillman & Goddard 2008, 81). In addition, the contingency approach paints too narrow a picture of the relationship between accounting and strategy and fails to grant full visibility with regard to how accounting shapes strategy and transforms the world in sometimes unanticipated ways (see Boedker & Chua 2009; Mouritsen et al. 2010; Skaerbaek & Tryggestad 2010).

Boedker (2010, 597) believes mainstream approaches, such as a contingency approach, can limit the categories of the problems studied, thus restricting the insights provided by the research into how the world works and the research methods employed. This is because contingency-based research has limited its focus to specific elements of accounting controls and looked at them in isolation from other organisational controls. From the interpretative perspective contingency theory ignores learning, dynamic relationships, culture and organisational politics and it tends to make organisations and their

members dependent upon forces operating in an external world, rather than recognising that they are active agents operating with others in the construction of that world.

Chenhall (2003, 161) is also aware of the limitations and problems in contingency research and points out that, in order to maintain the relevance of MCS contingency-based research, scholars will need to focus their attention on contemporary dimensions of MCS, context and organisational and social outcomes. In summary, the definition of MCS has evolved over the years to move from focusing on the provision of formal and financially quantifiable information for assisting managerial decision-making to a definition embracing a much broader range of information. MCS is not a passive tool but a dynamic concept which is difficult to evaluate using static contingency theory. Insights drawn from alternate theories can assist in elaborating the traditional contingency based model, so there is a need for greater diversity in its definitions and investigative approaches.

Boedker (2010) suggests that much can be gained by using an alternative lens to study the relationship between accounting and strategy. Alternative perspectives (see Baxter & Chua 2003) have their trademark theories, studies and interpretations concerning management accounting practice. Alternative research takes a non-positivist stand but it does not deny the derivative role of accounting as one important way of understanding it. Alternative management accounting research has augmented our understanding of accounting change. It attests to the improbability of purposeful and predictable change. There is little empirical evidence that a self-enlightened, well-engineered and progressive path characterises the development of management accounting technologies (Baxter & Chua 2003, 105). Some alternative researchers go so far as to suggest that accounting and change are not very close friends in practice. Changing networks of socio- cultural, political and economic conditions have been related to a variety of changes in management accounting practice in the twentieth century (Baxter & Chua 2003, 106). MA research has become aligned with a broader concern within the social sciences for closely examining the mutual accommodation of the body and technology. For example, Latourian researchers pay close attention to the interaction between networks of individuals and non-human artefacts, such as computers (Baxter & Chua 2003, 111). The theoretical background of this study belongs to alternative management accounting: it derives from the work of Latour and his collaborators Callon & Law in the early 1980s. Later in this study a Latourian approach called actor-network theory (ANT) is used. Ahrens & Chapman (2007) categorise ANT under the umbrella of practice theory, although both theories approach social practices from different assumptions. Despite that, the basic ideas of practice theory are described in brief below.

The concept of practice theory evolved during the 1970s, originating as a way to overcome the divisions between structurally oriented collectivistic studies and more processual- and individual-oriented studies. The father of practice theory is the French theorist and sociologist Pierre Bourdieu. Bourdieu's concept of habitus represents an important formulation of the principles of practice theory and he portrays habitus as the

habitual way of behaving that agents have when they enter into a relationship with the social world. So, habitus provides a feasible way of behaving in various circumstances (Bourdieu 1977, 18). Baxter & Chua (2008, 214) point out that the habitus of management accountants predisposes them to engage in the calculation of costs or the provision of financial support and advice in a certain kind of way. Habitus is seen as being quite stable over time, but nevertheless there are variations and changes in practice within Bourdieu's frame. Bourdieu acknowledges that different agents occupying a particular position may have different personal styles. Habitus and the logic of practice may also change as a result of alterations in context or because of a conscious desire on the part of agents (Bourdieu 2000, 160). Bourdieu contends that practices have a logic that is enacted and sustained in particular sites referred to as fields. Bourdieu describes fields as having their own contextualised pattern of practices (Boerdieu 2000, 115). The patterning of practices in a field is argued to be mediated by the ways in which agents mobilise various forms of capital in a bid to impose their definitions on a situation. Four different forms of capital are implicated in the constitution of a field and the practices that inform it, which are economic, social, cultural, and symbolic forms of capital (Bourdieu 1998, 41). Baxter & Chua (2008) utilised Bourdieu's practice theory to investigate the practical accomplishments connected to the position of a chief financial officer (CFO). Their exploratory experiment indicated that a practice theory lens requires the revisiting and reconsideration of some very fundamental aspects of research into accounting. They conclude that practice theory provides not only questions for contemporary management accounting research, but also new and valuable insights (Baxter & Chua 2008, 228).

Practice theory has been well-received in recent strategy research as well, in which the notion of "strategizing" has become the emblem for a concern with the details of how strategy is being practised in the everyday operations of an organisation (Jørgensen & Messner 2010). Strategizing means the same as mobilising different strategic objectives to which practices are expected to contribute (Jørgensen & Messner 2010, 186). A central understanding of practice theory is that accounting cannot be understood simply with reference to its presumed functional properties because it is implicated in the shaping of its own context (Ahrens & Chapman 2007, 100). Schatzki (2005, 465), a practice theorist, points out that social life is tied to a context that it is inherently a part of. Practice theorists also share concerns over the neglect of action in social theory (Schatzki et. al, 2001). Within practice theory, the concept of volition makes it of immediate interest to strategy theorists. For practice theorists, volition is conditioned by aspects of the system as well as by extant action, in particular routines. Practice theory introduces a concern with the moment of action in which the actor demonstrates a certain knack, an immediate familiarity with the situation and the possibilities that it presents (Ahrens & Chapman 2005, 108). Theorising management accounting practice is about understanding how people in organisations make specific uses of widely available accounting solutions, how such solutions come to be at their disposal and how their use might change

existing accounting methods and give rise to new accounting solutions that others can utilise as well. Nevertheless, management accounting literature has neglected Bourdieu's practice theory despite its seeming relevance for understanding management accounting in the field (Baxter & Chua 2008).

Ahrens & Chapman (2007) group studies draw on actor network theory as one cluster of studies of management accounting practices. They (2007, 104) point out that ANT has made an important contribution to the theorising of practice in management accounting. It has shown the significance of actors, action and inscriptions in the fabrication of social order. ANT studies have highlighted the constructed nature of accounting as an administrative technology as well as its potential to be just as easily deconstructed and forgotten (Ahrens & Chapman 2007, 108). The inclusion of ANT as a part of practice theory is questioned but they have common features, for example, they both focus on operations and actions in the field. ANT has shown that social order is much more complex than the simple reproduction of action or values. Instead, social order arises from actors' ongoing efforts at developing their actions with reference to a broader understanding of their working environment, rules and engagements (Ahrens & Chapman 2007, 109). Practice theory also served as the background theory for ANT in the 1980s when research recognised the social role of accounting. Such studies perceive MA as a means of intervening and as a means of acting upon individuals, entities and processes to transform them in order to achieve specific ends, thus they are seen as constitutive of social relations. ANT has several concepts which are central to understanding its theory and the meaning of these concepts (network, actors and translation) is described below.

The metaphor of heterogeneous network lies at the heart of theory, and is a way of suggesting that society, organisations, agents and machines are all effects generated in patterned networks of diverse, but not simply, human materials. ANT networks are neither solely the structures of traditional sociology nor networks of information technology (Latour 1987). An "actor" in actor-network theory is a semiotic definition – an actant – that is, something that acts or to which activity is granted by others. An actant can literally be anything – human or non-human – provided it can be defined as the source of an action (Latour 2005). Translation is closely associated with the movements because constant change is an integrated element within ANT (Latour 2005). Actor-network theory argues that order is an effect generated by heterogeneous means and there is no reason to assume, a priori, that either objects or people in general determine the character of social change or stability. In particular cases, social relations may shape machines, or machine relations shape their social counterparts (Law 1991). Some writers (such as Boedker 2010) refer to mainstream research as an ostensive research, and refer to alternative research as a performative research. Such a distinction comes, for example, from Latour (2005), who distinguishes a division between the sociology of the social (ostensive approach) and the sociology of association (performative approach). The sociology of the social defines, a priori, the elements which constitute social life and also their shapes and essences. The sociology of association assumes that the identi-

ty and form of social concepts evolve through processes of translation in actor-networks. Actor-network theory is chosen as the theoretical lens of this study for a number of reasons. Firstly, because of the shortcomings associated with contingency theories, such as stability, orderliness and predictability, which worsen the theory's ability to analyse dynamic relationships. Secondly, because ANT focuses on movement, which is an integral part of ANT theory, it has particular relevance when analysing a empirical context of continuous change. Lastly, ANT bears issues, such as boundedness and flexibility, which appear especially suited to the investigation of key developments in organisational thinking and practice.

To conclude, the traditional view emphasises the subordinate role of management accounting in relation to strategy. That research, often called mainstream, typically adopts contingency frameworks with qualitative research methods, such as surveys, large samples and statistical analyses. The research results, which have predicted that certain categories of MCS are more suited to particular strategies, have fully ignored the dynamic relations of the organisations and the fact that organisations operate today in turbulent environments where change is constant. In order to cope with the current situation, the study adopts an alternative view where the focus is on the contemporary dimensions of MCS when analysing associations between management accounting and strategy. This view allows the study of a much broader scope of information in which MCS is not a passive tool but a dynamic and constantly changing concept – as this study will demonstrate. In particular, the aim is to analyse the strategizing of organisations and emphasise the way strategy is being practiced in the everyday operations of organisations. Due to the fact that organisations have different strategic objectives to which everyday practices contribute, the aim is to analyse the strategizing of organizations and emphasise the way strategy is being practiced in the everyday operations of organizations. The alternative (the Latourian) view is used in this research in order to facilitate a fluid and adaptive mode of investigation in which an unpredictable mode of change, such as a sudden environmental change, can be taken into account.

1.2 Conceptual considerations

This chapter describes the main conceptual considerations, such as management accounting, strategy and strategic change, in order to clarify their meaning and content within the current research.

1.2.1 Management accounting

According to a traditional management accounting textbook "Cost accounting" management accounting measures and reports financial and non-financial information that

helps managers make decisions to fulfil the goals of an organisation. Managers utilise management accounting information to choose, communicate, and implement strategy. They also employ management accounting information to coordinate product design, production, and marketing decisions. Management accounting focuses on internal reporting (Horngren, Foster & Datar 2007, 2-3). According to the Chartered Institute of Management Accountants (CIMA), management accounting requires the identification, generation, presentation, interpretation and utilisation of information relevant to formulating business strategy, planning and controlling activities, decision-making, efficient resource usage, performance improvement and value enhancement, safeguarding tangible and intangible assets, and corporate governance and internal control (Abernethy & Brownell 1999). Both definitions represent the mainstream view in which management accounting is divided into financial and non-financial information and the focus is on internal reporting. However, this view is relatively stable and it does not recognise the dynamic role of management accounting. Hopwood (1990) suggests that managerial awareness should be shifted from the problems of looking at just internal interdependences towards a view of the external positioning of the organisation, which is why an alternative perspective is needed.

Alternative contributions have emphasised the more complex dynamic role of accounting devices as they become a means for learning more about possible alternatives. Inside the alternative view in actor-network studies, management accounting is presented in a way which differs from the mainstream research. In relation to the contingency approach, ANT adopts a more dynamic view by stating that accounting devices can have an active role in enacting strategy – and in doing so they become actors (Skaerbaek & Tryggestad 2010, 109). Preston, Cooper & Coombs (1992) point out that a management accounting system is never a ready-made package to be implemented, but a loosely coupled set of ideas and technologies that are constantly shaped and reshaped when they travel from one setting to the next. Latour (1987) has provided a detailed and illuminating analysis of the production of technology. However, he is relatively unconcerned about what the term “technology” includes. Technology can be an artefact, for example, a budget document; the processes or employment of technology, for example, the production of a budget; and the knowledge of people in designing or operating the technology, for example, the know-how that specifies the relationship between predicted costs and specific activities).

To sum up, the definition of management accounting has evolved from the mainstream view where the focus was on internal reporting with various measurements and reporting intentions. However, the dynamic role of MA recognises the fact that managers should also consider how their organisations can be influenced by factors previously thought to be external to their decision-making processes. In this study, management accounting is viewed as operating in a more active role compared with the traditional views, such as contingency frameworks. The view adopted in current study demonstrates that accounting devices can have an active role in enacting strategy. Management

accounting consists of actors that can be human and non-human. The non-human actors are various accounting technologies, such as those involved in the financial or non-financial production of information. Human actors are primarily understood as controllers. Accounting technologies are further divided into management accounting information systems and the different accounting calculations, which are called accounting inscriptions.

1.2.2 Strategy

There is no single, universally accepted definition of strategy. The origins of the term strategy go back to ancient Greece where strategos signified the role of a general in command of an army (Horngren et al. 2007). Various writers classify strategy under different typologies. Miles & Snow (1978) present a typology that is based on the rate at which enterprises change their markets or market offerings as a means of identifying generic strategies. Miller & Friesen (1982) categorise firms as conservative or entrepreneurial by examining the extent of their product innovation. Gupta & Govindarajan (1984) focus on variations in strategic missions by presenting the classification of build, hold, harvest and divest. The choice of strategic mission signifies an organisation's intended trade-off between market share growth and the maximising of short-term earnings (Langfield-Smith 1997). However, each of these typologies presented belongs to mainstream theory and the positioning school. The typologies presented are static, which is why they are not viewed strategy as the dynamic concept which is capable to change. The second challenge comes from the view according to which organisations should achieve a fit between their structures and their context, so that they would be more effective. The result is that certain categories of MCS are seen as more suited to particular strategies. These kinds of suggestions derive from contingency frameworks and are not suitable for analysing strategy within a dynamic environment where, for example, a company's boundaries are not well-defined.

Some management theorists view strategy in terms of the prescriptive or normative approach, while others prefer to explore how strategies arise in organisations – the descriptive approach. The prescriptive approach has tended to dominate writing on the design of strategic management accounting systems and techniques and it has been pertinent in explaining the process by which such techniques emerge and are operationalised. Chenhall (2005) differentiates between content and process approaches to studying strategy and management control systems. Content studies seek to identify effective strategic practices and manage strategic change and they have spurred accounting researchers to investigate which types of accounting controls best fit particular strategic archetypes. A good example of the content approach and classification within that is Minzberg, Ahlstrand & Lampel's (1998) study where they draw together diverse strands of strategic thought into ten distinct schools which are the design school, the planning

school, the positioning school, the entrepreneurial school; the cognitive school; the learning school, the power school, the cultural school, the environmental school and the configuration school. The first three schools are prescriptive in nature – they are more concerned with how strategies should be formulated than with how they do form. The other schools consider specific aspects of the process of strategy formation. They are concerned less with prescribing ideal strategic behaviour than with describing how strategies work (Minzberg et al. 1998, 6). Process studies investigate the steps or processes of making and implementing strategy (Chenhall 2005).

In this study, the theory of the positioning school was adopted because both case companies describe their operations by using terms, such as cost competitiveness and economies of scale that belong within the realm of the positioning school. This derives from the nature of their production processes – continuous process production, which stresses the facts associated with a selected strategic archetype. The positioning school emphasises the importance of strategies themselves, not just the process by which they are be formulated. It argues that only a few key strategies – as positions in the economic marketplace – are desirable in any given industry. The positioning school has some basic premises which are presented below (see Minzberg et al. 1998, 85):

1. Strategies are generic, specifically common, identifiable positions in the marketplace.
2. The marketplace (the context) is economic and competitive.
3. The strategy formation process is therefore one of the selection of these generic positions based on analytical calculation.
4. Analysts play a major role in this process, feeding the results of their calculations to managers who officially control the choices.
5. Strategies thus come out from this process fully formed and are then articulated and implemented.

The most well-known writer within the positioning school is Porter (1980, 1985). he describes three generic strategies: cost leadership, differentiation and focus. Even though the content of strategy and the shifts that occur in strategy have been described by using the strategic archetypes, which belong to the positioning school, it should be noted that strategy making is a far richer and more confused and more dynamic process than the fairly orderly and static positioning school (Minzberg et al. 1998, 121). As Minzberg (1998,121) argues, the role of the positioning school is to support the strategy making process, not to be it. Even though the position school view is adopted, the strategy of a company is not considered to be the static position in the market. Instead, it offers vital information concerning the content of the case companies' strategies and the shifts occurring within the market. Furthermore, the purpose is to develop a synthesis that encompasses a broader and more dynamic perspective and, more importantly, to

find ways to combine the thoughts of the positioning school with views such as the practice theory and actor-network theory views.

Whittington (2006) proposes a more integrated framework capable of building an understanding of strategy practice. Actors or practitioners of strategy are those who do the work of making, shaping and executing strategies (Whittington 2006, 614). The number of researchers is reflected is the distinctly local (practice based) understanding of ANT in organisational research settings (see Briers & Chua 2001; Lowe 2000, 2001). According to Whittington (2011, 184) practice theory is attractive and awkward. The theory responds well to the realities reported back from the field, but it also offers rich theoretical and methodological resources emerging from the turn to practice. That is the reason why the rise of practice theory is not a surprise. But there are also some dangers because practice theory is loosely coupled and so it is too diverse for more than light-touch policing (Whittington 2011, 184). Rouse (2007) identifies common themes of importance on which practice theorists agree. First, practice theory is a committed to shared practices, rules and norms. Secondly, it recognises individual agency and the struggles of everyday life, which require improvisation. Thirdly, it is the material, particularly the bodily and the artefactual. The fourth theme of practice theory problematizes language or discursive practice. Rouse's final theme emphasises the autonomous effects of the social by rejecting the reductionism of the micro analysis. To summarise, high quality practice-orientated research does not necessarily mean that a researcher deals with all themes at once (Whittington 2011, 185).

Often the concept of practice motivates no more than close attention to individual activity, for example, strategizing, leaving the collective nature of practice to melt away. In such cases, practice approaches are in danger of being just micro versions of the traditional process research (Whittington 2011, 184). When studying activity, a researcher should understand how being an accountant or being a strategist is not only a matter of individual accomplishment, but involves drawing on both the organisational and the societal practices of accounting or strategy. When studying societal practices such as accounting or strategy, a researcher should remember that societal practices are the negotiated products of agency. Thus in a world of close relationships, practice research involves a constant parsing out of the individual, the local and the societal. For accounting, strategy and similar societal practices, practice-theoretic research can never be purely "micro or macro" as the other is always present, even if temporarily not centre-stage (Whittington 2011, 185). The practice perspective on strategy is adopted because it represents a dynamic view in which strategy is viewed as a situated activity which is influenced by the interactions and negotiations of multiple actors.

Authors such as Whittington (2003; 2006); Jørgensen & Messner (2010); Chua (2007); Jarzabkowski, et. al (2007) have adopted the notion of "strategizing" instead of discussing "strategy". Whittington was the writer who (2003) introduced the practice perspective on strategizing, distinguishing it from the process tradition. This approach challenges the linear assumptions of "best fit" and suggests that the world is often a

confused place where prediction and linear pathways are not always possible. The practice notion conceptualises strategy as a situated, socially accomplished activity (Whittington 2003, 8) and sees strategizing as comprising the actions, interactions and negotiations of multiple actors and the situated practices that they draw upon in accomplishing an activity (Jarzabkowski, Bagolun & Seidl 2007, 7-8). Jørgensen & Messner (2010) illustrate how practice theory offers a valuable vocabulary to illuminate the processes of strategizing and the way it relates to the use of accounting information. Ahrens & Chapman (2005) study the notion of strategy as organisational practice, which is highlighted in the dynamics between formal power and the resistance of those who have to be co-opted into an organisational strategy (Ahrens & Chapman 2005, 108). The practice perspective on the crafting of strategy through MCS can begin to address the ways in which the efforts of local managers might be harnessed to pursue the agendas of the organisational centre. In this way, the practice view emphasises the potential innovations of skilful actors and their subsequent impact on organisational strategy (Ahrens & Chapman 2005, 107-109). To summarise, strategizing focuses the strategy discussion by analysing the shared practices, rules and norms associated with everyday life within organisations during their strategy processes. In this thesis, practice theory sets the background for understanding the shifts that occur in the strategic orientations of companies, particularly by demonstrating the power of local actors and by providing a more general understanding of what appears to be the focus in the case companies this study analyses.

The alternative approach posits that strategy ought to be studied as a social practice. This research (Baxter & Chua 2003) is perhaps best designated as the socio technological approach (mainly inspired by ANT). Alternative research (Baxter & Chua 2003) has come to emphasise the actively constitutive role of accounting in relation to strategy. Kober, Ng & Paul's (2007) analysis confirms this by demonstrating the existence of a two-way relationship between MCS and strategy. Some writers (such as Ahrens & Chapman 2005; Hansen & Mouritsen 2005; Miller & O'Leary 2005) adopt the new view where they begin to open up the concept of strategy.

Callon & Latour (1981, 286) present the concept of the macro-actor which includes many parts and which is a temporary achievement. Skaerbaek & Tryggestad (2010) argue that corporate strategy is not created by an outsider nor is strategy established and maintained solely by people, nor does accounting simply follow by adapting to strategy. According to them a stream of accounting devices, such as reports, accounting systems, and other physical arrangements, can play an active role in enacting and formulating strategy (Skaerbaek & Tryggestad 2010, 108).

To conclude, this thesis adopts a viewpoint that is a combination of the various research streams defined in this subchapter. Firstly, the empirical definition of strategy concept adopts the view and thoughts of the positioning school (see Minzberg et al. 1998). Secondly, practice theory emphasises the meaning of local understanding and strategy as situated activity. It also underlines the shared practices and values presented

in the strategy process. Lastly, the alternative views, the Latourian approach, emphasise the actively constitutive nature of the strategy process and accounting's role within it. Figure 1 summarises the theoretical perspectives utilised to analyse strategy in this research:

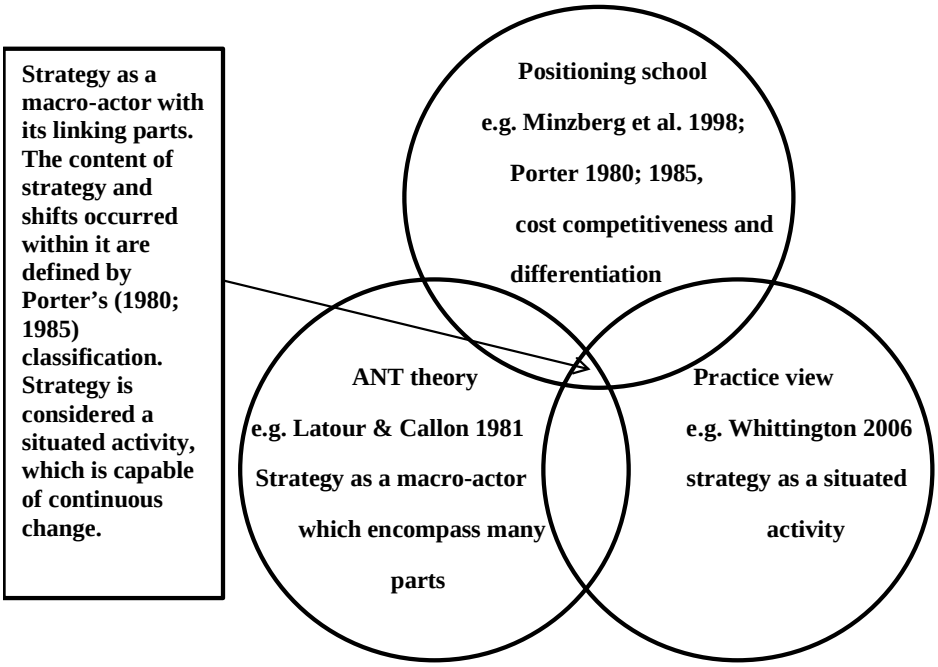

Figure 1 Theoretical perspectives applied in this study

To summarise, strategy is understood as a macro-actor with many linking parts: the linking parts are more or less connected to corporate strategy. Strategy is always a temporary response to particular moment, thus it is capable of continuous change. Constant movement between strategy and its linking parts implies a never ending information flow between strategy and its linking parts. Strategy and its linking parts enclose management accounting actors, whose role and influence varies largely depend on the context. A closer analysis of the analytical background of strategy is provided in Chapter 2. The next subchapter analyses the nature of strategic change in more detail.

1.2.3 Strategic change

Strategic change is a complex construct which incorporates multiple dimensions. It is thus difficult to operationalise (Abernethy & Brownell 1999, 194). The amount of stud-

ies in accounting literature that have attempted to measure strategic change is very limited (see Abernethy & Brownell 1999), but there have been attempts to capture strategic change in general management literature. Change is an integral part of ANT studies and against this background it is understandable that most accounting studies inspired by Latour's work focus on change. In the present research, as in alternative studies, change is not understood as being the result of linear, rational improvements or functional adaptations to new demands in a changing environment. Within ANT inspired accounting literature, Latour's notion of constant movement, which is called translation, is utilised (Justesen & Mouritsen 2011, 164). Translation is the point which differentiates sites from each other because sites no longer differ in shape or size but in the direction of their movements (Latour 2005, 97). Justesen & Mouritsen (2011,170) argue that the movement of the system is an ongoing process. Hence, ANT challenges the "diffusion model" of change. Change is not a linear process, instead it is adapted and translated (see for example Justesen & Mouritsen 2011, 176).

Skaerbaek & Tryggestad (2010) suggest that the question "What is strategy?" can be extended to include the components of strategic change. Then change is an integral part of corporate strategy. In this study, both case companies operate in capital intensive industries where investment in production facilities forms a considerable part of all investments. Major enlargement investments occur between certain time periods. The speed of strategic change is low in those industries, particularly when compared to other industries such as the mobile phone or consumer goods businesses. So, strategic change in this study does not imply the major shifts seen between Porter's (1985) strategic archetypes. Instead it shows minor changes which indicate a continuous structural transformation of the case companies' businesses.

Heterogeneous elements, such as different groups of people, different vocabularies and various technologies are temporarily linked together at a particular moment in time. Strategy and change are linked together in Jørgensen & Messner's (2010) study in which they adopt the term strategizing in order to point out that the world is a messy place where accurate prediction is seldom possible. The term strategizing implies that strategy as such is a temporary concept where constant movement (called translation) is always present.

As said, in this research the notion of strategy is extended to include the components of strategic change. Strategy is a temporary achievement (the snapshot of a particular moment) which is part of never ending change called translation. In this study, the prevailing economic environment created by the economic recession resulted in the companies requiring a strategic change in their operations in order to cope with the new economic climate. The economic downturn between 2008 and 2010 caused cutbacks in production and statutory labour negotiations, effects which were further heightened by the cyclical nature of the case companies' industries. Furthermore, it forced them to think about new ways of operating and structuring their business – "structural transformation". To conclude, strategic change is an integral part of strategy, which is constant-

ly active. Chapter 3 focuses on describing the nature and extent of strategic change in the context of the case companies as well as the main external economic trends (at the global and at the industry specific level) in more detail. Next, the focus is on describing and discussing the purpose of the study.

1.3 The purpose of the study

The key issue arising from the literature (see Skaerbaek & Tryggestad 2010; Kreiner & Mouritsen 2003) is whether or not accounting devices represent an active link between strategy and the external economic conditions of a firm. Skaerbaek & Tryggestad (2010, 110) presume that several accounting devices together can assume an active role in the formulation of strategy. Kreiner & Mouritsen (2003) indicate that accounting devices can play an active role in relation to the external environment. Both studies contribute to the area of this research by demonstrating the active strategic role of accounting devices in co-producing the firms' economic conditions and in enacting a strategy in cases of strategic change. Those studies which have predicted that certain categories of MCS are better suited to particular strategies, have fully ignored the dynamic relations of the organisations and the fact that organisations operate today in turbulent environments where change is continuous. There are a large amount of studies which have analysed the relationship between strategy and management accounting, but research concerning the role of MA in dynamic surroundings is nevertheless scarce. Hopwood (1990) pointed out the need for a new way to analyse accounting and for more advanced insight into the organisational dynamics which mediate and shape accounting changes. He points out that current developments in manufacturing technology explain the trends observed in accounting. Hopwood (1990) initiated the research stream which analyses the roles which accounting plays in processes of organisational change. The aim of this study is to continue the research conducted in this stream by focusing on analysing the ways in which accounting creates visibility in an organisation. Alternative studies stress the need for a much broader scope of information where MCS is not a passive tool but a dynamic and constantly changing concept. In particular, the aim is to analyse the strategizing of organisations so as to emphasise the way strategy is practiced in the everyday operations of an organisation. Organisations have different strategic objectives to which everyday practices contribute.

The main purpose of this study is to theorise the associations between management accounting, strategy and strategic change. This is carried out through an extensive literature review and the empirical analysis of two case companies. This study is conducted by following and refining the notions of the actor-network theory. The broad purpose is to study the actors and the associations between them, and the role of management accounting in strategic change situations. In order to answer to the main purpose the objective of the study is to address and answer the main research questions:

1. What roles do management accounting actors operate in during periods of strategic change?

The first purpose is to analyse the roles of management accounting actors in strategic change by using Latourian concepts such as intermediaries and mediators. Strategic change derives mainly from the external economic environment. Accounting actors are divided into two main categories which are management accounting technologies (non-human actors) and human actors. Management accounting technologies consist of two different groups of MA actors: management accounting information systems and management accounting inscriptions. MA information is generally an inscription of figures and words. The study also concerns the role of human agency by analysing how accountants – primarily controllers – experience and understand their role during a turbulent economic period. To summarise, the first research question aims at exploring the roles of MA actors during periods of strategic change.

Some authors (Skaerbaek & Tryggestad 2010; Kreiner & Mouritsen 2003) suggest that strategy and the economic environment do not exist independently of accounting devices, nor do the devices assume a subordinate role in implementing strategy. The aim of the second research question is to clarify the role of management accounting in relation to strategy and environment by using the framework provided by Preston et al. (1992) in which they claim that unspecified economic conditions enable a number of weak and hesitant technological possibilities to emerge. This type of unspecified economic condition is seen in the global economic recession during the research period. Weak, hesitant, technological possibilities are created by those management accounting actors (non-human or human) which operate as actors in strategic change – and which have the ability to influence strategy or the external economic environment. The second question continues the first objective by clarifying the abilities of management accounting actors to influence strategy (question 2a) and the external environment (question 2b).

2a) What is the nature of the associations between management accounting actors and the strategy?

2b) What is the nature of the associations between management accounting actors and the external environment?

The second research question analyses the opportunities available to accounting to co-construct a firm's strategy and external environment. This study does not simply observe and recite the environmental pressures that act upon organisations but also analyses how those pressures are constructed, perceived and drawn upon in action by actors inside their firms in ways that also change the fields of the case companies indus-

tries. Hence the study adopts the perspective labelled co-construction: technologies that actors develop are both a construction of the field in which the case companies operate and an intervention that constructs the field of the case companies in new ways (Robson, Humprey, Khalifa & Jones 2007). Latour suggests that facts (scientific or technical) such as instruments and machines, are the result of an elaborate process of movement which he calls translation (Latour 1987). Hence, explanations offered for the evolving roles of MA actors rely heavily upon a language of transformation: the keyword is change. Also many environmental processes analysed in this study are continually developing, usually at a more rapid pace or with greater frequency than previously (Robson et al. 2007, 413). ANT emphasises the possibility that various non-human actors such as reports, accounting systems and other physical arrangements can play an active role in enacting and (re)formulating strategy (Skaerbaek & Tryggestad 2010, 108). Strategy is understood as an actor which may consist of many linking parts. This kind of actor is termed a macro actor within ANT. Strategy is also assumed to be a temporary achievement which means that there is a constant movement between and inside these linking parts. The research adopts a perspective in which strategy is considered a black box. According to Latour (1987), the black box is a whole in which several elements co-operate with each other. Strategy is a kind of black box which aggregates the basic principles of an organisation. Both research questions shed light on different aspects of the research issue, the associations between management accounting actors, strategy and strategic change. Figure 2 summarises the research setting of the study.

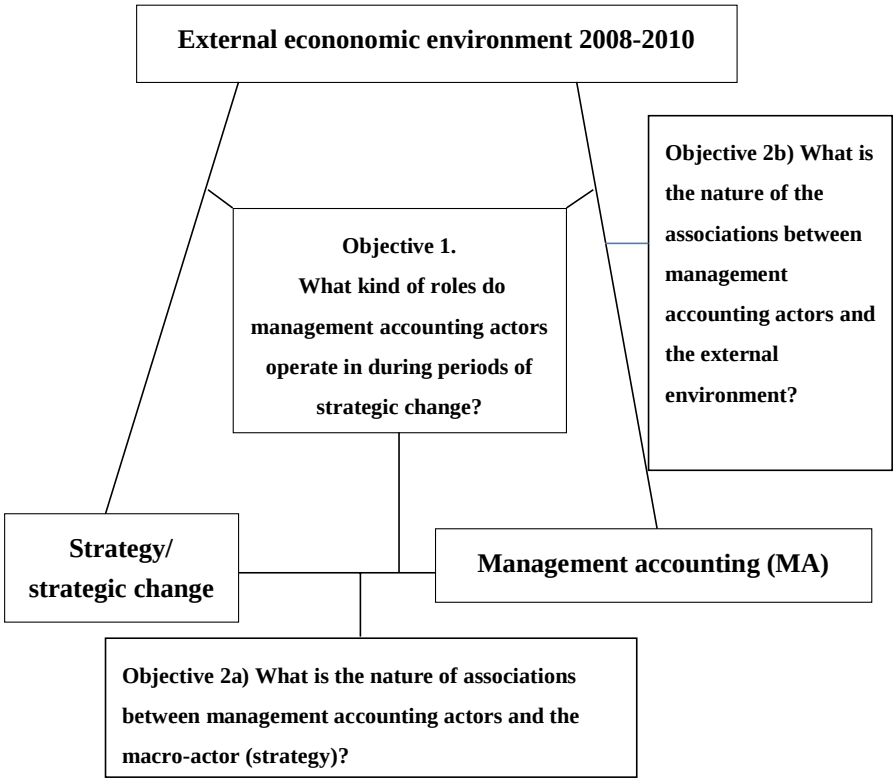

Figure 2 The research setting of the current thesis

Research objective 1 adopts a more static view and analyses the roles of various accounting devices within both case companies. The background of the empirical setting is described in more detail within Chapters 1.5.2 and 1.5.3. The aim of objective 2 is to analyse whether management accounting actors represent an active link between the strategy and external economic conditions of the firm and, to do that, it focuses on the associations between management accounting and strategy or the external environment. This study also demonstrates the active role of management accounting actors in co-constructing a firm's economic conditions and in enacting the strategies of both of the case companies. Generally, the questions share a concern for how management accounting emerges and works during periods of strategic change.

1.4 Methodological considerations

The adoption of a particular approach is linked with certain values and beliefs about the nature of the social sciences and society. According to Burrell & Morgan (1979) the

social science dimension consists of four distinct but related elements: assumptions about ontology, epistemology, human nature and methodology. Ontology concerns the nature of reality. Reality can be depicted as existing as a product of individual consciousness (nominalism); or the social world and its structures can be regarded as having an empirical, concrete existence that is external to any individual (realism). Epistemology is concerned with the nature of knowledge. One end of a continuum assumes that knowledge can be acquired through observation and built up piecemeal (positivism); and, at the other extremity, knowledge is said to have a more subjective and essentially personal nature (anti-positivism). Assumptions about human nature refer to the relationship between human beings and their environment. People's conduct can be regarded as being completely determined by their external environment (determinism) or, people can be viewed as being potentially autonomous and free-willed (voluntarism). These three sets of assumptions have direct methodological implications. If the social world is seen from an objectivistic view, then methods from the natural sciences tend to be utilised to locate, explain and predict social regularities and patterns (nomothetic) and statistical techniques are utilised to test hypotheses and to analyse data collected by standard research instruments, such as questionnaires and surveys. Alternatively, if the subjective experiences of individuals and the creation of a social world are stressed, then methods that allow insight into an individual's inner world are emphasised. The other dimension in Burrell & Morgan's (1979) framework defines two alternative and different approaches to society. One is concerned with regulation, order and stability and the other focuses on the fundamental divisions of interest, conflicts and the unequal distributions of power. These two dimensions are combined to form four mutually exclusive frames: functionalist, interpretive, radical humanist and radical structuralist (Burrell & Morgan 1979, 29-30).

In 1979, Burrell & Morgan's book, *Sociological Paradigms and Organisational Analysis*, had a huge impact on the understanding which European accounting academics have of their field (Burrell & Morgan 1979). The book largely persuaded accounting researchers that most of the existing accounting literature was functionalist and that there were new opportunities to be found in other paradigmatic possibilities (Justesen & Mouritsen 2011, 163). The Burrell & Morgan (1979) framework has been valuable for understanding the different approaches within accounting research, but as the research approaches in management accounting have evolved, the relevance of the subjective-objective dichotomy, as defined by Burrell & Morgan (1979), have become obscure. It is impossible to place Latour's work on the paradigms outlined by Burrell & Morgan in any meaningful way because Latour rejects the distinction between the subjective and the objective, which forms the basic axes in Burrell and Morgan's categorisation scheme. But Burrell & Morgan's (1979) book helped pave the way for the Latourian approach that was to be evolved a decade later (Justesen & Mouritsen 2011, 163). Some other writers such as Hopper & Powell (1985, 432) regard the subjective-objective dimension as continuous. There are other classifications of accounting studies as well.

Morgan & Smircich (1980) divide studies concerning the organisational and social aspects of accounting into three main categories: functional, interpretive, and radical. Hopper & Power (1985) label different accounting theories under these main categories. Chua (1986, 626) also criticises Burrell & Morgan's (1979) framework. She argues that the problem does not come from the utilisation of mutually exclusive dichotomies but instead from Burrell & Morgan's misreading of Kuhn as advocating irrational paradigm choice; the latent relativism of truth and reason which their framework encourages and the dubious nature of the differences between the radical structuralist and humanistic paradigms. Laughlin (1995) points out that the simple bipolar dualism introduced by Burrell & Morgan (1979) is too simplistic and it is quite probable that they have indeed isolated many, if not most, of the key domains of choice.

Chua (1986) distinguishes between the mainstream (functionalist) and alternative (interpretative and critical) world-views. The interpretative alternative is derived from Germanic philosophical interests that emphasise the role of language, interpretation, and understanding in social science (Chua 1986, 611-613). The aim of the interpretive studies is to enrich people's understanding of the meanings of their actions, thus increasing the possibility of mutual communication and influence (Chua 1986, 615). Chua (1986) differentiates an interpretive perspective from other perspectives (mainstream and critical) by referring to different assumptions made regarding beliefs about knowledge, beliefs about physical and social reality and the relationship between theory and practice. The assumptions are presented next.

a) Beliefs about knowledge

Scientific explanations of human intention sought. Their adequacy is assessed via the criteria of logical consistency, subjective interpretation, and agreement with actors' common-sense interpretations.

b) Beliefs about physical and social reality

Social reality is emergent, subjectively created, and objectified through human interaction.

All actions have meaning and intention that are retrospectively endowed and that are grounded in social and historical practices.

Social order assumed. Conflict is mediated through common schemes of social meanings.

c) Relationship between theory and practice

Theory seeks only to explain action and to understand how social order is produced and reproduced.

This study is interpretive in the context of the polyphonic debate. The basic assumptions of this study are thus tied to nominalism (ontology), anti-positivism (epistemology), voluntarism (human nature), and ideographic methodology. Ahrens et al (2008, 843) suggest that good interpretive research is much more than a theoretically informed

case study because the common concept of interpretive accounting research is about understanding the everyday practice of accounting, which involves the close contact analysis of human interaction. Ahrens et al (2008) point out that interpretive accounting research is good at studying process, which means it can be combined with notions of culture, history, values and change. The interpretive perspective is classified and placed on the subjective side within the Burrell & Morgan (1979) framework but it is demonstrated that interpretive studies, in addition to subjectivist elements, also encompass objectivist features. Hence interpretive research straddles the paradigms (Kakkuri-Knuuttila, Lukka, Kuorikoski, 2008, 267). The interpretive approach tends to favour the "emic" perspective, i.e. how the research subjects themselves develop their meanings, rather than the "etic" perspective, i.e. the issue is the interpretations of the researcher of the studied phenomena. Kakkuri-Knuuttila et al. (2008) point out that interpretive study, in order to be regarded as interpretive, has to include an emic element but an interpretive study limited to the emic mode would probably be viewed as a relatively uninteresting description only (Kakkuri-Knuuttila et al. 2008, 283). Discovered patterns in the actions and meaning ascriptions of the subjects, something which is often viewed as the outcome of interpretive studies, should be viewed as intermediate results, which demand explanation. So interpretive studies are inclined to include a certain element of realism, but they also tend to become inter-subjectively objectified in the interaction between the explicable and real in their tangible consequences (Kakkuri-Knuuttila et al. 2008, 288). It has been demonstrated that interpretive research is practice-based research, which is an understandable fact, if the aim of interpretive accounting research is considered when trying to understand the everyday practice of accounting (Ahrens et al. 2008, 846). Also, the practice theory approach was used for many of the insights gained from the tradition of interpretive accounting research (Jorgensen & Messner 2010, 187). In fact, Ahrens & Chapman (2007) refer to the categories of social research in general and define this category of research as practice theorising.

Baxter & Chua (2003) further evolve Chua's (1986) dichotomy. They label the dominant research relying on sociological functionalism as "mainstream" and all the other approaches as "alternative". The alternative MA research embraces various perspectives, but they all share the insight of management accounting as an interpretive and constitutive practice. This type of research has the capacity to change assumptions about the normative role of accountants. Baxter & Chua (2003) highlight seven different alternative management accounting research perspectives: the non-rational design school, naturalistic research, the radical alternative, institutional theory, structuration theory, a Foucauldian approach and a Latourian approach. Each of these perspectives has its trademark theories, studies and interpretations on management accounting practice. Most of these interpretative studies share a common theoretical concern regarding the specific uses of management accounting as a personal means of influence. Laughlin (1995, 82) points out that, from a theoretical perspective, the "medium" position is arguably a more realistic depiction of the social and technical nature of accounting sys-

tems design; he recognises that accounting practices are not a technical, context-free phenomenon.

Often management accounting research has been defined as action-oriented research (Granlund & Modell 2005, 167-170). Lukka (1991) distinguishes three groups of action-oriented studies. The first group includes inductive studies which emphasise the major role of empirical observations and aim often at concrete and directly applicable results. The second group consists of studies which develop frameworks and hypotheses, which are generally employed for evolving hypotheses for statistical tests. The third group comprises interpretive studies. This research utilises the case study method.

The case study is but one of several ways of doing social science research. Other methods include experiments, surveys, histories, and economic and epidemiologic research. In general, case studies are the preferred method when how or why questions are being posed because the investigator has little control over events and the focus is on a contemporary phenomenon within a real-life context. This situation distinguishes case study research from other categories of social science research. The advantage of a case study method is that it allows researchers to retain the holistic and meaningful characteristics of real-life events (Yin 2009, 2-4). The unique strength of case study is its ability to deal with a full variety of evidence such as documents, artefacts, interviews and observations (Yin 2009, 11).

A common concern of case studies is that they provide little basis for scientific generalisation. Nevertheless, case studies produce generalisable theoretical propositions that are not to be generalised to populations or universes (Yin 2009, 15). There are three main views in accounting literature that consider generalization in case studies. At one extreme there is the view which denies the option of generalization in case studies and at the other extreme, there is the view which denies the rationale of the aim to generalise. The view adopted in this research is compatible with a moderating view, which believes properly conducted case studies can produce generalisable findings (Lukka & Kasanen 1995, 76). According to Lukka & Kasanen (1995) a properly conducted case study can convince the reader of the validity of the case description and analysis. It is also fascinating to read and it offers new and fresh perspectives, observations and thorough interpretations of a single or a few research objects and so it expands the understanding of the studied field in the research community (Lukka & Kasanen 1995, 75). Various rhetorics of generalisation exist in accounting research. According to Lukka & Kasanen (1995), there are three basic categories of generalisation rhetorics in accounting: statistical generalisation rhetoric, contextual generalisation rhetoric and constructive generalisation rhetoric. The rhetoric in this study is contextual generalisation which means that the researcher has to attain a thorough understanding of the main case analysis and report it in a credible manner. The researcher has to understand the real business context and uncover general structural relationships. Thus the key point is a meaningful and convincing connection of the study with the real-world phenomena surrounding the case in question, such as history, institutions and markets (Lukka & Kasanen 1995, 83).

Case study research includes both single and multiple case studies (Yin 2009, 19). Single and multiple case studies reflect different design situations and, within these two variants, there can also be unitary or multiple units of analysis (Yin 2009, 46). The current research includes multiple case studies with multiple units of analysis. Metal Ltd has two main units of analysis: Factory 1 and the Head Office which is located outside Finland. Within Pulp Ltd there are three units of analysis but the analysis is mainly focused on the Head Office and on Mill 1. Two interviews were conducted at Mill 2. The number of cases influences the richness of case studies. Ahrens & Dent (1998) point out that there are three issues which the researcher needs to consider if they are to produce rich accounts. The first issue is the trade-off between a deep understanding of a particular organisational setting and the advantage of replication and comparative analysis. Two case companies were selected for this reason. The aim was to deepen the understanding of the research issue. Consequently, the researcher aims to describe the situation regarding the particular phenomenon of management accounting in as full detail as possible and does not try to make a comparative analysis. The second point addresses the process of theorising. Seeing patterns and developing theory is an emergent process in case research, in which the researcher iterates between insights and the field material. The theorising and the role of theory within the current study is analysed in more detail in the next subchapter. The researcher is always accountable to the reader for the integrity of his or her method. This demands that the researcher presents material in sufficient depth so that links from data to theory can be traced. The researcher has an obligation to convince the reader of the validity of the case description and analysis (Ahrens & Dent 1998, 9). A third issue relates to the extent that theoretical constructs can be used to filter contextual information in case research. Theoretical sensitivity is essential for good case research, but there is the danger of losing information by over-filtering rich field material through explicit theoretical concepts (Ahrens & Dent 1998, 11). The same authors also state that case research is an extraordinarily rigorous approach; the qualitative nature of the data and the absence of statistical methodology imposes the burden of inference on the researcher. The challenge to capture complexity in a coherent way falls entirely on the researcher. Table 1 describes the methodological considerations of the study.

Table 1 The methodological considerations of this research

Burrell & Morgan (1979) - a framework which consists of two independent dimensions based on assumptions regarding the nature of social science and the nature of society)	The basic assumptions of the study are: nominalism (ontology) anti-positivism (epistemology) voluntarism (human nature) ideographic methodology interpretive frame
Chua (1986) - distinguishes between alternative (interpretive and critical) and mainstream (functionalist) research	Alternative (interpretive study)
Laughlin (1995) - raises the point that undertaking any empirical study of accounting is adopting a perspective on theory, methodology and change.	Middle-range thinking
Baxter & Chua (2003) - label the dominant research relying on sociological functionalism as mainstream and all the other approaches as alternative research - - highlight seven different alternative MA research perspectives	Alternative (Latourian approach)
Ahrens & Chapman (2007) - the practice theory approach builds on the tradition of interpretive accounting research	Practice theory approach
Yin (2009) - case study types	Multiple case study/Multiple cases

A closer analysis of how the theoretical conclusions are drawn from the data is described next. The choice is not confined to debates between research traditions (qualita-

tive versus quantitative), but they are prevalent within paradigms and theoretical discourses as well (Ketokivi & Mantere 2010, 316). Reasoning is divided into two distinct categories: deduction and induction (e.g. Frigg & Hartmann 2006). In deduction one proceeds from a set of general premises to a more specific conclusion – with the strict condition that the conclusion must follow analytically from the premises. Inductive reasoning runs in the opposite direction; from particulars to generalisations (Ketokivi & Mantere 2010, 316). Inductive conclusions contain knowledge claims that are not analytically implied by the premises. Inductive reasoning is selected for the study for many reasons. The primary reason why inductive reasoning strategy was selected is because this study uses actor-network theory as its theoretical base. Using ANT as a research strategy puts a strong emphasis on empirical understanding, despite its strong relativist ontology (Lowe 2000, 344).

Ketokivi & Mantere (2010) examine two different reasoning strategies which can be utilised within inductive reasoning: idealisation and contextualisation. Idealisation involves the simplification of a complex phenomenon in an attempt to make it tractable (Ketokivi & Mantere 2010). Inference and explanation are separate activities where explanation follows after inference has been assessed. The strategy is supported by normative epistemology and methodology. The most appealing aspect of it is also its greatest weakness – abstraction. There is no general rule for selecting between alternative explanations. Contextualisation, in contrast, treats explanation and inference as inseparable, making inference, in a manner of speaking, contextualised, not abstracted or idealised. Contextualisation seeks to establish the contextual authenticity of reasoning. Specifically, reasoning is viewed as a context-dependent process, focused on arriving at what the researcher and the audience judge to be the best explanation (Ketokivi & Mantere 2010). The writers point out that context-dependent reasoning factors are involved and they have thus identified three distinct forms of it subjective contextualisation, empirical contextualisation and theoretical contextualisation. The theoretical contextualisation logic was selected, which seeks validity by establishing the relevance of claims with respect to a particular theory (Ketokivi & Mantere 2010). This study contributes to management control systems literature by using actor-network theory as a particular theoretical lens. Theory plays an integral role in the reasoning process that produces the claim. Theoretical concerns are used to justify a particular explanation over others. The conservation and consolidation of a particular theory drive the reasoning process.

1.4.1 The roles of theory in management accounting research

"Accounting theory will never be like a theory of gravity. Accounting is a social practice conducted by diverse social actors" (Laughlin 1995, 83).

Actor-network theory was chosen as the theoretical base for this study for many reasons. To begin with, Latour developed his theory in a similar business environment to this study; ANT evolved in a science and technology environment (see Latour 1996, Aramis or the Love of Technology) before being used in other fields. In Aramis or the Love of Technology, Latour (1996) uses longitudinal ethnography in which he describes the nature of an electro-magnetic inner city transportation system over a period of about 20 years from the 1960s through to the late 1980s.That book can be regarded as an exemplar of Latour's view of ANT research. The fact that ANT was developed in an industry where investing in infrastructure is significant, makes it worthwhile employing in case settings which have similar characteristics.

The second reason for selecting actor-network theory is its characteristic as a research strategy. ANT can be used to study issues such as expertise, boundedness and flexibility, which appear to be applicable to the investigation of key developments in organisational thinking and practice. The claim that ANT is ontologically relativist is founded on the fact that it typically embarks on research without a clear picture of what sort of entities it will reveal through interaction, it is also empirically realist in the sense, that it provides theory-laden descriptions of an organisation and so it can be utilised when producing descriptions of organisational processes. In particular, ANT's ontological relativism makes it flexible for dealing with organisational change processes (Lee & Hassard 1999, 392-394). ANT's flexibility makes it a suitable theoretical base for analysing dynamic change situations. Both case companies operate in a very cyclical industry where market conditions can change dramatically in a short time. The metal and metal processing industry is a so called front-cyclical business which means that demand decreases there before it does in other industries and demand increases at a very early stage in an economic upturn (Koskinen 2009, 44). A company's role is not only to adapt to the external environment and its development, companies influence, more or less directly, the development of their external environment. This occurs in many ways. The theoretical framework also makes it possible to analyse this two-way relationship. Flexibility also means that the researcher can choose particular concepts which are suitable for their research. Within this study the central concepts adopted were (management accounting) actors, intermediaries and mediators (to describe the role of management accounting), the fabrication process and translation.

Constant change (called translation in this study) always involves constant uncertainty about the shape and direction of change, which underlines the unstable nature of empirical surroundings. Thus responsiveness to market conditions is indispensable, and this is sought by maximising the flexibility of organisations' internal and external relationships. Translation operates inside the firm but also between various firms due to the fact that today's societies' economic conditions are such that strong organisational boundaries can no longer be treated as shorthand for success. So, the researcher needs an approach which is adequate enough to describe the removal of boundaries (Lee & Hassard 1999, 394). Both case companies have various partnership relationships with

their subcontractors which was one reason why ANT was selected as the theoretical lens for the study; ANT is a framework which is applicable to the analysis of the situation in which the boundaries of firms are mutable and diffuse, which is the situation in the case companies.

Latour (2005) theorises that society is built of heterogeneous elements consisting of people, but always in combination with technology and objects. The fact that basic principles, such as economies of scale, play an integral part on the case companies' operations implies that production, machines and other non-human objects have an impact on the accounting function. These non-human actors can be viewed as actors together with human actors and both have similar abilities to affect other actors when they work as mediators. Justesen & Mouritsen (2011, 177) point out that because the research questions, which the sociology of association processes often deals with are translation and change, it is more interesting than the more traditional sociology of the social (see Latour 2005). Translation is clearly present within the purpose of this study, which is to theorise the associations between management accounting, strategy and strategic change.

Within this research the ANT approach is derived from Latour's more recent work Reassembling the Social: An introduction to Actor-Network-Theory (2005) as well as Latour's book Science in Action (1987). ANT has had led to a number of diverse and very interesting studies as Justesen & Mouritsen (2011, 162) argue, but the previous emphasis on only one of Latour's writings indicates that there might be unexplored potential in Latour's more recent work, which could lead to further inspiration (Justesen & Mouritsen 2011).

There are many explanations of the role of theory in MA research (see Malmi & Granlund 2009; Quattrone 2009). There is the mainstream conception of the issue and the alternative view. The authors who support the mainstream conception in today's MA research community try to understand the causes, effects and functioning of MA (Malmi & Granlund 2009). Hopwood (2002) extends the scope from causes and effects to how MA is practiced. By doing so he responds to Zimmerman's (2001) criticism which claims that the empirical managerial literature has failed to produce a coherent body of knowledge. Hopwood (2002) argues that the notion of "the mainstream" refers not only to an evaluative dimension but also to a power dimension. Lukka & Mouritsen (2002, 805) argue that economics-based research (Zimmerman's view) can produce knowledge efficiently but it has its risks as well; it restricts our ability to construct and evaluate interesting propositions and evolve meaningful stories about management accounting in the social, organisational and behavioural contexts. That is the reason for it to remaining open for heterogeneity in management accounting research (Lukka & Mouritsen 2002, 805). So, although not all accounting researchers support Zimmerman's (2001) thoughts, this is the mainstream conception that prevails in today's management accounting research community. Vaivio (2008, 67) points out that with the mainstream view's roots in neoclassical economics and in particular the micro-

economic theory of the firm, the economics (mainstream) view offers a research perspective whose strength lies in its conceptual clarity, parsimony and elegance as well as in its universal character. However, the limits of the economics view need to be acknowledged.

The qualitative research has demonstrated that we need more than a general theory if we want to understand the management accounting phenomenon. The universalism of the economics view must be complemented with a fundamentally different philosophy of what counts as legitimate theory in MA research. In qualitative research, theory is primarily a local description and explanation as well as a temporal creation. This suggests a different ontology and a different epistemology. Theory emerges from a local context and is confined by the particular characteristics of this context. Theories are born, have a lifespan and die (Vaivio 2008, 69).

The alternative view is well presented in the articles by Baxter & Chua (2003) and Chua (1986). Chua (1986) discusses the consequences of conducting research within the interpretive and the critical research traditions and also some of the difficulties associated with these perspectives. She argues that the mainstream world-view has produced advantages for the conduct of accounting research with its insistence on public, intersubjective tests and reliable empirical evidence. Nevertheless, it has limited the subject matter of the problems studied, the use of research methods, and the possible research insights that could be obtained. Not only are these alternative world-views different, they can potentially enrich and extend our understanding of accounting in practice (Chua 1986, 602-603). Baxter & Chua (2003) review alternative management accounting research in the Accounting, Organisations and Society Journal from 1976 to 1999. They argue that different alternative research approaches have assumed an important role in raising a number of significant and interesting disciplinary insights. Alternative management accounting research has demonstrated the many different rationalities of management accounting practice, the variety of ways in which management accounting practice is enacted and offered meaning; the potency of management accounting technologies; the unpredictable, non-linear and socially embedded nature of management accounting change; and the ways in which management accounting practice is both constrained and enabled by the bodily habitudes of its exponents (Baxter & Chua 2003, 97).

Malmi & Granlund (2009, 599-600) also point out that accounting academics seem to have very different perceptions of what is regarded as theory. Part of this problem derives from the reluctance of management accounting researchers to define theory. Malmi & Granlund (2009) point out that research and practice in MA relies largely on two types of theories. Those theories that are considered theories by the research community and that are imported mainly from other social sciences, and then those that are currently not regarded as theories but attempt to explain how to apply MA to achieve superior performance. Lukka (2005) refers to these two types of theories by using the classification between domain and method theories. Domain theory refers to the body of knowledge concerning a certain substance field of discipline (Lukka 2005, 382). In this

study domain theory refers to the strategic management accounting literature in general, while method theory refers to ANT. In addition to its contribution to the substantive topic area, this study evaluates the ability of ANT as a theoretical lens for analysing the phenomenon under investigation in the area of the relationship between management accounting and strategy and strategic change.

Keating (1995) classifies the stages of theory development in case studies. The three stages are theory discovery, theory refinement, and theory refutation. The research belongs to the theory refinement category which seeks to establish the plausibility of the relationship between management accounting and strategy and control literature. Ahrens & Chapman (2007, 845) argue that theorising and theory building should proceed towards building accounting theories that can be easily communicated and turned into practice. Most management accounting and strategy studies derive from contingency theory literature, as pointed out earlier, but there are also numerous ANT studies in this research field as well. Granlund & Malmi (2009) demonstrate that there are two types of theories currently being utilised and developed. Theories that are utilised by the research community are borrowed from related fields. These theories are called method (or meta-theory). These social (meta) theories possess some challenges for researchers because it is difficult to falsify or test most of these. The other type of theories utilised are normative theories, which are not regarded as theories by the academic community. These theories aim to provide guidance for practice, but seldom address their potential shortcomings and inherent limitations. According to Lukka (2005), the application of method theories is not a novel phenomenon in management accounting research but their role in the storyline of studies is sometimes unclear and that is why the dichotomy between domain theory and method theory deserves far more attention than it has thus far been given. This study illustrates the suitability of ANT for theorising the associations between management accounting, strategy and strategic change. Theory refinement case studies can be divided into two categories. The first is theory illustration case study, the objective of which is to establish the plausibility of a specific theoretical perspective by demonstrating its capacity to illuminate some unappreciated aspects of management accounting practice. The second is theory specification case study, which seeks to refine a sparse, underspecified theory in order to make it amenable to broad scale statistical tests or critical case study tests. The starting point *in theory illustration* case studies is a certain existing theory, often from outside the domain of accounting. Its empirical findings are interpreted based on the selected theory frame. The conceptual system and vocabulary of the underlying theory are mobilised in the study and the same applies to the causality claims of the theory. Empirical work is not necessarily at the heart of the study, making it similar to theory discovery case research (Lukka 2005, 384). Granlund & Malmi (2009) argue that if a researcher utilises meta-theories, they should be careful in their application because there is a risk that the application of these theories will not make the world easier to comprehend.

Lukka (2005) offers an alternative way to map research in management accounting. His framework adds the degree of the researcher's empirical intervention into the picture, which divides studies into non-interventionist and interventionist categories. The first one attempts to eliminate the researcher's empirical intervention, which is called the non-interventionist position. The alternative, the interventionist, allows for the researcher's active participation and cooperation with other actors in the field. In this study the researcher takes the non-interventionist position since she does not participate actively but is an outsider observer.

1.4.2 A description of the acquisition and the analysis of the empirical data

The empirical background of the study comes from two case companies which operate in heavy industries. The researcher aimed to conduct a study in industrial companies for many reasons. The first reason was that some Finnish industries, such as the wood industry, are undergoing radical structural transformation, which means that a strategic change situation is occurring. The second reason was that actor-network theory was developed in a science and technology environment (Latour 1996; case Aramis) which possesses similar characteristics, e.g. huge capital investment, to the case study settings. The companies are two international enterprises which operate in the metal processing industry (Metal Ltd) and in the pulp industry (Pulp Ltd). Metal Ltd, is a metals company whose head office is located in Europe. It has approximately 4,000 employees and it its operations focus on the initial stages of the metal processing chain, in exploration, mining, smelting, and recycling. Its business concept is to extract minerals and produce metals. The pulp company, Pulp Ltd, manufactures bleached pulp grades. Pulp Ltd had six pulp mills but during the research period from 2008 to 2010 this was reduced to four because of the divestment of foreign operations (Pulp Mill 6) and the closure of Pulp Mill 5. Its sales portfolio includes between 10-15 pulp grades.

The research period was from 2008 to 2010 and the interviews in Metal Ltd began in August 2009 and ended in April 2010, and in Pulp Ltd from September 2009 to November 2010. The personnel – understood as actors – in different locations were interviewed and relevant documentation collected. Firstly, the key actors were identified, contacted and interviewed, and after that return visits and phone calls or e-mails were made in order to follow up new research avenues. During the research period the economic situation remained unstable.

The research period was unstable due to the strategic change situation which was mainly caused by the economic recession of the global economy. Traditional European industries, such as pulp and paper underwent structural transformation. Production has moved to countries such as China or India, where consumption is located nearer production. Many traditional production principles such as economies of scale have been replaced by customisation and differentiation. One reasons for that is Finland's location

far from the main markets and the transportation costs caused by that. By conducting research interviews and observations at the same time as the economic recession period, the researcher had the opportunity to consider processes as they were taking place, in real time.

The case companies possess many similar characteristics and they both have experienced major changes in their strategies and structures. In particular, the recent economic downturn affected both the companies and forced them to cut their production volume. They both operate in a process industry, which is characterised by such points as capital-intensive business and continuous processes. They employ a cost leadership strategy with an emphasis on the growth of the firm. China is the market which offers future growth potential for the companies. Both case companies are suffering from a lack of raw materials, which is a real threat to them. Metal Ltd is a leading European metal company. Its operations focus on the initial stages of the processing chain, in other words exploration, mining, smelting, refining and recycling. The case company's four mining areas and five smelters are located in northern Europe and the majority of the Group's finished zinc and copper metals are sold to customers in northern and central Europe. The important metals produced are zinc, copper, lead, gold and silver. In total, it has over 4,000 employees. The pulp industry company manufactures bleached pulp grades. Its four pulp mills are located in different parts of northern Europe. Pulp Ltd's main products are bleached softwood, birch, and aspen pulp. Its pulp grades have been developed for the manufacture of high quality printing papers, folding box boards, and tissue. Currently Pulp Ltd has approximately 800 employees (before the divestment of foreign operations there were 2,000 employees in the company).

Two case companies were selected because the analytic conclusions arising from two cases are more powerful than those coming from a single case alone (Yin, 2009, 61). The design of the case study's empirical part can be described by using Yin's (2009, 46) classification where case studies are divided into classes depending on the numbers of cases and unit of analysis. Figure 3 demonstrates the design of the current case study:

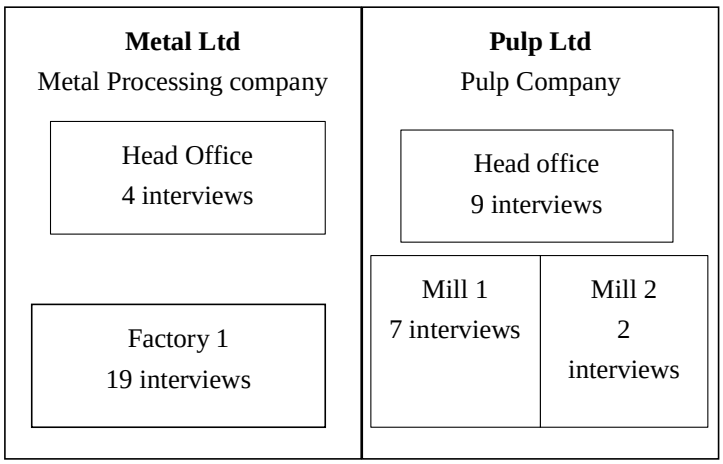

Figure 3 The design of the current case study

The data from the case companies was derived from four sources. The first source consisted of Annual Reports. The data covered the years from 2008 to 2010. The second source came from internal company reports and also confidential reports, such as information letters, quality documents, internal bulletins, strategy documents, investment proposals and other internal documents that were analysed. Thirdly, 41 interviews were conducted (23 in Metal Ltd and 18 in Pulp Ltd) between August 2009 and November 2010 in conjunction with shorter informal conversations (mainly with the interviewees) at lunch and during coffee breaks. A detailed list of persons interviewed and their positions within the organisations is presented in Appendix 1 and Appendix 2. The interviews were semi-structured in the first round and structured in the second round. All interviews were recorded on tape. The interviewees work in financial, production, marketing or other support functions. Key persons were re-interviewed when necessary. In both of the case companies, interviews were conducted in two places: in the head offices and in the companies' factories with the exception of two interviews in Mill 2 at Pulp Ltd. The persons to be interviewed came from the financial departments (such as financial managers, group controllers and controllers), personnel management (personnel manager), general management (administrative manager, managing director, factory managers), production (production managers) and R&D management (R&D managers, development managers). Three interviews were conducted in Metal Ltd's Head Office outside Finland. Fourthly, participatory observation was carried out during the interviews and meetings and on other occasions when the researcher was able to witness the observation of daily operations in the case companies. The researcher was allowed permission to take part in internal accounting training meetings during the research period in Factory 1 (Metal Ltd).

Field studies are frequently subject to common and global criticism of their inability to attend to such research criteria as validity and reliability. Many published case studies in accounting do not report how issues of validity and reliability are addressed (McKinnon 1988, 34). McKinnon (1988) discusses the general nature of validity and reliability and claims that issues concerning them cannot be avoided or compromised when conducting case study research. When defined broadly, validity is concerned with the question of whether the researcher is studying the phenomenon she purports to be studying. The validity of findings presented in this study is enhanced by the fact that evidence was collected from two rounds of interviews. Also the number of interviews is sufficient and the range of interviewees covers different actors from different staff functions. The number of interviewees was sufficient to gain empirical saturation, i.e. the range of interviewees covers different actors from the various organisational functions, which was necessary to gain a wide picture of the role of management accounting in the strategic change situation. The fact that both case firms provided the researcher with confidential material helped to build a picture of the operations and accounting functions of the case firms. Reliability, on the other hand, is concerned with the question of whether the researcher is obtaining data on which she or he can rely (McKinnon 1988, 36). The interviewer was unknown to the staff at the head offices, which was why it appeared to be difficult to gain opinions on quite confidential issues.

The researcher faced some limitations concerning access to certain information. Access to strategy meetings was denied (Metal Ltd), even though access was offered to many highly confidential documents in both case companies. Another limitation in this study relates to the question of general anonymity. Due to mutual agreements on secrecy and anonymity, it is not possible to report the names of persons or organisations. So it is not possible to utilise the name of the firms and their factories or mills.

In addition to Finland, the business sector of metal processing was studied to some extent outside Finland as well. Four interviews were conducted at the head office of the case company, which is located in Scandinavia. In Finland, studying the business of the case companies took place primarily through interviews and the studying of written documents and newspapers in the public domain. These written documents provided the researcher with a huge amount of information for understanding the economic situation of the case companies' industries.

1.5 The structure of the study

This thesis begins with an introductory chapter which presents the research field, conceptual considerations (management accounting, strategy and strategic change), the purpose of the study and methodological considerations. The purpose of this study is to theorise the associations between management accounting, strategy and strategic change. The chapter describes the key points of the actor-network theory which pro-

vides the tool for analysing the roles management accounting actors play during a period of strategic change (the first objective of study) and what kind of opportunities management accounting actors have to co-construct a firm's external environment and strategy (the second objective of study). The introduction also argues for the employment of the interpretive research approach as an appropriate means for acquiring empirical data for this type of research.

Chapter 2 explores the basic principles of the actor-network theory and introduces its central concepts, which are linked to the objectives of the study. These central concepts are actors and their roles – understood as intermediaries and mediators – the translation and fabrication process and networks. It also provides an overview of earlier management accounting studies that have used the actor-network theory.

Chapter 3 presents the empirical context of the study. First, the chapter examines the external economic conditions and describes the general development trends in Finnish industrial companies as well the specific trends in both case companies' industries. Second, it offers a brief introduction of the firms and their organisational structure. The chapter focuses on describing management accounting constructs and their importance within the companies' settings. The final part of the chapter provides a brief summary of the empirical findings.

Chapter 4 deepens the analysis of the roles of the management accounting actors and their opportunities to co-construct a firm's strategy and external environment. external environment and strategy. It does that by utilising the ANT framework. Further it refines the use of ANT in MA research and relates the current study to previous findings. Chapter 5 summarises the theoretical and empirical results.

2 THEORETICAL FRAMEWORK

This chapter defines the theoretical background of this research by presenting its basic principles and its analytical concepts. Such basic concepts as networks, actors, translation and fabrication operate as the basic tools for the theoretical analysis in the forthcoming chapters. Finally the chapter summarises earlier ANT studies in the management accounting field. In addition to the theoretical analysis conducted in this chapter, Chapter 3 deepens the analysis of specific subject substance areas. These substance areas are the accountants' (controllers') role, accounting information systems and accounting inscriptions.

This study contributes to existing management accounting and management control systems literature by using Latour's (2005) ANT. ANT is derived from the work of Latour and his collaborators Callon & Law in the early 1980s. Over the years, ANT has proved to be sufficiently flexible to move from its origins in science and technology studies into social science fields. From a methodological perspective it is difficult to classify Latour. Chua (1995) describes Latour's theory as social constructionism. Potter (1996) traces the origins of this theorising to the major stream of phenomenological constructionism attributed to Berger & Luckmann (1966). The other streams of theorising, which constitute the two other identifiable groups, are labelled "theories of interests" and "empirical relativism" (Potter 1996). Potter does note that the distinctions are not absolutely clear: "Modern sociology of scientific knowledge is characterised by a number of overlapping theoretical concerns, analytic methods and research focuses" (Potter 1996, 25). ANT was first used for science and technology and then for other issues by the notion of reverse causality. This is the view that the social dimension is to be explained, as opposed to providing the explanation (Latour 2005, 107).

The adjective "social" has a different meaning in actor-network theory than it has traditionally. It designates two entirely different phenomena because it is simultaneously a substance and also a movement between non-social elements (Latour 2005, 159). There are two different categories of methods for renewing the association between social connections: the sociology of the social and the sociology of associations. The sociology of the social tries to retain – as firmly as possible – elements which it claims are homogeneous. On the other hand, the sociology of associations tries to fathom controversies about the range of heterogeneous elements that may be associated together (Latour 2005, 160). In other words, in ANT, the task of defining and ordering the social should be left to the actors themselves, not taken up by the analyst (Latour 2005, 23). The social is further detected through surprising movements from one association to the next. Those movements can either be suspended or resumed. When movements are

prematurely suspended the social as normally construed is bound together with already accepted participants called social actors. When the movement toward collection is resumed, it traces the social as associations through many non-social entities, which might become participants later (Latour 2005, 247). The view adopted concerning the adjective "social" indicates that both a movement and non-social elements such as machines have a solid role in actor-network theory. ANT inspired research rejects other traditional sociological dichotomies, such as micro/macro, subject/object, structure/agency and technical/social because the theory posits that the world is neither purely social nor purely technical but always a mixture of both (Latour 1999b).

In addition to these sociological concepts, which have a different meaning in actor-network theory, there are concepts which are important and whose meaning is significantly different. On the one hand, there are contingency approaches and, on the other, the actor-network theory. Contingency theory centralises power to only a few agents (Skaerbaek & Tryggestad 2010, 110), but actor-network theory disperses power to many agents (some human, some not). According to Preston et al (1992, 577) power is a relation, not an attribute of an actor (Boedker 2010, 597). The reason for this distinction lies in the ethno-methodological roots of actor-network theory (Munro 1999, 434). In ANT, power is accomplished less through matters such as leadership and hierarchy than through a distribution of materials. It is also possible to determine the power of non-human actors (Callon & Latour 1992, 347).

Accounting possesses power as well, which enables action at a distance (see e.g. Miller 1990, 1991; Robson 1991, 1992). According to Lowe (2001, 95) the power of accounting systems rests upon their placement within networks of accountability. The later work of Latour (2005) makes it possible to understand the power of accounting figures. Accounting figures have power because they own multiple attachments that make up the accounting phenomenon. Power and powerfulness are explained by the multiplicity of objects providing a central role (Latour 2005, 83). However, the power of accounting figures is not the same everywhere. Power can be strong for one particular episode after which power can be lost. If researchers wish to study an accounting phenomenon from a perspective where a multiplicity of objects is provided with a central role, they must allow the accounting phenomenon to remain open for as long as possible and let it settle when the study runs out of time (Justesen & Mouritsen 2011, 184). This principle is highlighted in the following paragraph in greater detail. Through propositions about accounting power, identity, effects and influence it is possible to analyse the role of accounting in changing situations (Justesen & Mouritsen 2011, 184). To sum up, actor-network theory divides power between many agents by stating that power is a relation which is distributed through a movement of various materials, thus power can characterise non-human actors as well. Hence, accounting possesses power in actor-network theory.

In addition to the central principles of ANT, power is closely linked to the notion of "slowsociology" (Latour 2005, 190), which has a similar meaning to "go slow," "don't

jump" and the "keep everything flat". The aim of keeping the social world as flat as possible ensures that the establishment of any new link is clearly visible. Studies. (e.g. Quattrone & Hopper 2005, Dechow & Mouritsen 2005) that have focused on the role of technology provide examples of research that has taken the "keep everything flat" methodological advice seriously and, through empirical analysis, have come up with surprising candidates for explaining accounting change and practices. This point makes ANT research different from other notable approaches to accounting research. In order to understand ANT better, a closer look is taken at the basic principles of the theory which forms the background of this study. Those principles are science in action and the general symmetry principle.

2.1 The basic principles of the actor-network theory

Actor-network theory contains central principles which have a significant importance for understanding the theory. The first of them is the *science in action principle*. The main point of this principle is that the researcher should arrive at the research site before scientific statements become constituted as facts and the inner workings of technologies become taken-for-granted artefacts (Preston et al. 1992, 564). In brief, the principle means that the research should be conducted while the situation is still ongoing. Latour & Woolgar (1979) stresses that, in order to understand how science is created, it is necessary for the researcher to follow events as they unfold in the field (science in action), rather than to accept pre-packaged outcomes of that process (readymade science). By following scientists and others around in their work, Latour seeks to examine and explicate their actions (Lowe 2001, 329). The researcher should arrive before the complexity of the inner workings of facts is closed, i.e. while facts are still open, and before the commercial and academic networks, which support and hold them in place, have ceased to be subject to critical examination (Latour 1987). In Latour's recent texts, the concept of the "matter of fact view" is replaced by "the matter of concern view" and they are defined as the issues somebody cares about. The view is more realist than the matters of fact world view because the latter reduces things to mere mute objects (Latour 2004). Generally, a consideration of matters of concern implies an approach in which careful attention is paid to the rich and complex being of things. The main interest is now directed away from the fabrication process to the multiple being of fabricated things. This proposition is related to the well-known ANT premise that non-humans are also actors, but the matter of concern approach goes one step further (Justesen & Mouritsen 2011, 183).

The current research was conducted at the same time as the global economic recession period from 2008 to 2010. The turbulent economic situation was ongoing during 2009 and 2010 when the researcher worked in the field collecting data (interviews, documents and written reports) from both case companies. This is understood as the science

in action principle within the field of study. However, in the current research the principle is also applied to the accounting level. When it is applied to the accounting level, the principle is understood in such a way that the aim is to study management accounting actors (human or non-human) before they become an established practice in case companies. Thus the principle means that the researcher arrived at the case companies before the potential controversies involved in the management accounting actors' translation process had ended. Jones & Dugdale (2002) state that, to study accounting in action, a researcher has to travel back to when the change situation was still ongoing and open. Nevertheless, sometimes it is important to go back to a point in time before the change situation commenced and observe how it emerged, thus a brief history of the case companies is presented at the beginning of Chapter 3.

The second principle "general symmetry" offers a different view of the social reality. Latour (e.g. 1987; 1996) gives a central role to technologies and argues that technologies are so commonplace that people do not even think of them. They can shape the decisions people make, the effects people's actions have, and the way people move through the world. This view derives from his background; he developed his theory within the railway environment (Latour 1996. Aramis, or the Love of Technology). This particular work can be regarded as an exemplar of Latour's view of ANT research. According to the principle, contemporary society is constituted by collectivities of people and objects. The framework provided by Latour encourages the researcher to give emphasis to both humans and objects. Latour (1987; 2005) theorises society as being built of heterogeneous elements consisting of people, but always together with technology and objects. Interrelationships between human and non-human actors are viewed generally as the synonym for actor-network theory (Lowe 2000, 330), because the aim of ANT is to treat humans and nonhumans symmetrically rather than describing humans with certain attributes and objects with others (Lowe 2000, 344). ANT assumes that all the entities in a network are to be described in the same terms. Whichever word is utilised for humans, it can be utilised for non-humans as well (Callon & Latour 1992, 346). This is called the *general symmetry principle.* There is no social life without the participation of non-humans such as machines (Callon, Law & Rip 1986; Callon & Latour 1992, 348). According to ANT any action will rarely consist of human-to-human connections or object-to-object connections, but will probably move from one to the other (Latour 2005, 73). The principle has nothing to do with a reconciliation of the famous object/subject dichotomy. It does not mean that objective matters are offered privilege in relation to subjective entities, such as language, symbols, values or feelings (Latour 2005, 76). The central role of non-human actants (the term actant will be defined later in Subchapter 2.2.2) helps the researcher to appreciate that ANT sees power as resting in socio-technical relations. When technology affects individuals it has the potential to change the way in which people operate and move from one place to other.

To summarise, some points of ANT appear particularly interesting from the point of view of this study. Firstly, ANT as the theory guarantees machines a solid role due to

the special meaning given to the adjective social. This study was conducted within an environment in which machines and technological artefacts have a particular importance. The production process, which is called bulk production (continuous process production), determines the investments and products produced and largely determines the strategy choices available to the case company. This signifies that basically there is a need for investments between certain time periods. According to ANT, power lies in the socio-technical relations, which are the obvious consequence of human to object connections. The present research draws particularly on Latour's (2005) later work, which makes it possible to understand the power of accounting figures. In the following subchapters, attention is directed to the analytical concepts of ANT.

2.2 The analytical concepts

ANT as theory has been largely built upon the few central concepts that form the basic structure of the whole. These basics concepts are actors (and their roles), the metaphor of networks, the translation and the fabrication process. Next, more weight is given to analysing these basic concepts in detail.

2.2.1 The metaphor of networks

Actors such as the accounting technologies or human actors do not act alone but rather in networks. The metaphor of the heterogeneous network lies at the heart of actor-network theory and the theory suggests that society, organisations, agents and machines are effects generated in patterned networks. The networks of ANT are neither solely the structures of traditional sociology nor networks of information technology. According to ANT there is no reason to assume, a priori, that either objects or people in general determine the character of social change or stability. In particular cases, social relations may shape machines, or machine relations shape their social counterparts. What counts as a person is an effect generated by a network of heterogeneous, interacting, materials. The argument is that thinking, acting, writing – all the attributes that are normally ascribed to human beings, are generated in networks. Hence the term, actor-network – an actor is also always part of a network (Law 1992, 3-4). Network, therefore, is a tool to help describe something, rather than what is being described. The consequence is that somebody can provide an actor-network account of issues which have in no way the shape of a network (Law 1992, 3). Such central management accounting technologies as information systems and inscriptions always act in networks. For example according to Lowe (2001) the power of accounting systems derives from their placement within networks of accountability. It is worth repeating that network is a tool to describe something, not the end result as such. Justesen & Mouritsen (2011, 176) argue that the com-

pleteness of an accounting phenomenon is determined less by its relation to an underlying economic reality than to its role in the particular network that makes it important and translates it in a particular way. ANT emphasises that the history of a network matters because relationships are influenced by memories of past events, interpretations of the present, and the expectations of future behaviour (Chua & Mahama 2007, 55). According to this, a network's context, such as its industrial background, is more important than the economic reality outside the firm in determining the fate of a particular accounting technology.

Latour (1997) presents some advantages of thinking in terms of networks. The first issue is that elements which are close when disconnected may be infinitely remote if their connections are analysed and vice versa. The second advantage is that the notion of network allows the researcher to dissolve the micro-macro distinction, because the whole metaphor of scales is replaced by a metaphor of connections. The third point is that a network is itself a boundary (Latour 1997). The same author (1987, 258) argues that every time an inside/outside division is made, the researcher should study the two sides simultaneously and make a list, no matter how long and heterogeneous, of those who do the work. The only question one may ask is whether or not a connection is established between two elements. Instead of opposing the individual level to the mass, or the agency to the structure, the actor-network theory follows the process by which a given element becomes strategic through the number of connections it commands, and loses its importance when losing its connections (Latour 1997).

In addition to its advantages, the use of the term network also brings certain pitfalls[2]. There are misconceptions concerning the word. To begin with, network is not equivalent to technical networks, such as electricity or internet; rather it is an indicator of the quality of a text (the text's ability to indicate the network nature of the research target and whether two actors are connected or not). Network qualifies the objectivity which means the ability of each actor to make other actors do unexpected things. Some networks are more durable than others but their durability is a relational factor because the durability of materials can change when they are placed in different settings (Latour 2005, 128-129). In his later writings Latour (2005) suggests other metaphors, such as those of chains and trails, to replace the word network. The chain outlines a trail to be followed. However, the chain and trail metaphors are different from the network builder view presented in Science in Action (1987), in which a subject-like actor drives a process when someone (a person or group of people) is trying to mobilise actors in network (Jones & Dugdale 2002, 123).

Justesen & Mouritsen (2011) point out that the researcher can fail to fathom the network if he tries to follow the actors and list them because such a list can become long and heterogeneous (Justesen & Mouritsen 2011, 183). Possibly that is the reason why

[2] Latour (2005) is not satisfied with the term network, which is why he argues that he should have abandoned it long ago.

Latour (2005) suggested the new terms, chains and trails in order to replace the term network. Latour (2005, 136) suggests that a good text is part of an artificial experiment to replicate and emphasise the traces generated by trails. All activities such as writing or calculating are generated in networks of diverse actors. Networks are always in the background of any operation. The network is the tool or describing relations between actors – it is not the end result itself. The primary aim of the present research is not to build networks because a network built from a particular point in time is always incomplete and open to interpretations (Justesen & Mouritsen 2011, 183). Instead it is on all the actors described that always operate in networks when they are connected to others.

2.2.2 The central actors (management accounting and strategy) in the study

Actor is the central concept in this study describing management accounting and strategy. There are many definitions of actors provided (see Latour, Callon and Law,) and the definitions are somewhat contradictory. Depending on the writer, the meanings given to actors in this study are based on Latour's (1997; 2005) definition. According to Latour (1997), an actor is something that acts or to which activity is granted by others. An actor can be anything provided it is termed the source of an action. There exist many contrasting ways for actors to be offered an identity (Latour 2005, 23). Something that modifies a state of affairs by making a difference is an actor, and if it does not yet have figuration it is called an actant (Latour 2005, 71). The same actant can also be given different figurations (Latour 2005, 57). Actant and agency are simply different ways to make actors do things (Latour 2005, 55). ANT is not based on a stable theory of the actor, which means that the actor's size, its psychological make-up, and the motivations behind its actions are not predetermined (Callon 1999, 181-182). The questions to ask any agent are the following, does it make a difference to the course of some other agent's action or not? ANT does not suggest that objects do things instead of human actors (Latour 2005, 71-72). All the actors might be associated in such ways that they make others do something, for example, by means of generating transformations that are the result of many events and which will trigger further action in other actors (Latour 2005, 107).

A common view in management accounting studies (see for example Dechow & Mouritsen 2005; Quattrone & Hopper 2006) is that management accounting technology, such as information technology, is viewed as an actor, but an actor can also be human, e.g. a controller. The role of both in a strategic change situation is analysed later. The management accounting actors, for example, accounting information technologies, take part in the formulation and construction of organisational activities. They are salient examples which Latour refers to as non-human actors (Justesen & Mouritsen 2011, 176-177). However, Latour (1987) is relatively unconcerned about what the term technology includes. According to him (1987), technology can be an artefact, the processes or uses

of technology, for example, the production of the investment calculation, and the knowledge of people in designing or operating the technology such as the "know how" concerning how to calculate the cost of an investment. Accounting technologies, for example, information systems, enable particular kinds of action when they become part of a larger network, consisting of both humans and non-humans (Justesen & Mouritsen 2010, 184). Together with other devices, the use of accounting technologies may be seen as a central part of the process through which change is made acceptable within an organisation (Lowe 2000, 84). Quattrone & Hopper (2006) and Dechow & Mouritsen (2005) argue that accounting information systems operate as actors which make other actors in the network act in order to change the prevailing state of affairs. In the current study, management accounting technologies have been divided into two main groups: the management accounting information systems and the management accounting inscriptions, i.e. figures and words. Lowe (2004) claims that accounting information systems are actors which are able to influence the actions of human actors. Information technologies play a significant role inside the accounting activity in organisational settings (Lowe 2004, 616). Preston et al. (1992) and Chua (1995) take a similar view; accounting and other information systems are powerfully constitutive actors which are able to influence the actions and perceptions of human actors. They can be conceived of as black boxes (as well as strategies), which represent the whole formed by several actors (doing e.g. coding or doing work that requires similar expertise). In that whole, several elements operate together in order to reach common goal. In this research the focus is on accounting information systems.

The second subgroup to fall under the management accounting technologies is management accounting inscriptions. The view which assumes that management accounting calculations are inscriptions dominates ANT literature. Miller (1990) describes management accounting calculations using Latour's (1987) notion of inscriptions:

Written reports, books of accounts, pictures, charts all represent a domain and can be deployed in attempts to administer it. As technologies they do not have a neutral function of recording the relation, but literally represent in such a way as to make it susceptible to evaluation, calculation and intervention (Miller 1990, 318).

Latour (1986) suggests that various inscriptions, such as budgets, performance measures, periodic reports, and memos, are widely deployed in the enactment of what is accounted for in organisations. Inscriptions convert local events into textual forms which are mobile and can stay immutable through their displacements. Robson (1992, 690) also points out that accounting data are numerical inscriptions- metaphorical choices that rely on language and that various accounting representations emerge only after a process of movement (translation) involving mediations between various interests and the existing technologies that redefine them. Inscriptions are interesting not because of what they say, but because of the kind of action they enable by being materi-

al, mobile and combinable (Justesen & Mouritsen 2010, 177). The study of accounting may benefit from insights from Latour's later work because it assumes that actors are powerful not because they are copies of the world, but because they have been made strong by the multiple attachments (relations) that make up the accounting phenomenon (Justesen & Mouritsen 2011, 183), which makes it possible to understand the power of accounting figures and inscriptions.

As stated earlier, power according to ANT is dispersed between many different agents (some human, some not). Actions often criss-cross and consist of object to human connections (Latour 2005, 73). This means that accounting technologies work in close collaboration with human actors and the relationship is two-way (see Lowe, 2004; Justesen & Mouritsen 2011). Human actors construct facts as a consequence of their engagement with accounting technologies (Lowe 2004, 616). Writers such as Chua (1995), Briers & Chua (2001) emphasise the way in which human actors seek technological allies. According to Lowe (2004, 331), technological allies consist of accounting inscriptions and accounting information systems.

Latour's (1987) framework encourages the researcher to emphasise both non-human and human actors. In fact, power lies in the relations between actors such as machines and workers. In this research, management accounting technologies consist of two main classes: MA information systems and inscriptions (calculations). In order to analyse the role of accounting inscriptions (their identity, power and effects), Robson's (1992) classification of the characteristics of accounting inscriptions was adopted. In this research the technological objects (MA calculations) are viewed as artefacts (e.g. the budget document), instead of viewing them as the production of budget documentation or knowledge about how to calculate the budget (see Latour 1987). In addition to MA technologies the study involves human actors which mainly consist of controllers, but that category also includes others who have associations with controllers and who have the power to influence strategic decisions. These others can be sales manager, production managers, purchasing managers, administration managers, etc. Next, the focus of the study is directed towards analysing the conceptual background of the second central actor of the current study, which is the (corporate) strategy.

Callon & Latour (1981, 277) present the concept of the macro-actor, which includes several linking parts called black boxes. These linking parts are also the actors. The macro-actor includes different actors but all actors (linking parts) share common values which are compatible with, and which derive from, the main corporate strategy document. This fact indicates that the macro-actor (strategy) has successfully translated other actors' wills into a single will. This combining of other actors' wills allows them to act as one.

A corporate strategy (a macro actor), which can also called a black box, is a temporary achievement. A macro-actor is capable of defining what comes before and what comes after by building up balance sheets, by drawing up chronologies, and thus creating its own space and time (Callon & Latour 1981, 286). Corporate strategy is not the

outcome of an outside influence that imposes a strategy or a strategic centre; nor is it a strategy established and maintained solely by people, nor does accounting simply follow by adapting to strategy. Instead strategy is an emerging calculative collective and temporary achievement that transgresses such distinctions (Skaerbaek & Tryggestad 2010, 122). This indicates that conventional views regarding the roles of management accounting devices and the roles of management accountants are not only transgressed but also reversed. Experts in management accounting calculate the costs of their operations and benchmark their own cost structure against that of competitors but they do not treat the cost structures of competitors as a given outside constraint to be taken into account by adapting the internal corporate structure. On the other hand, accounting documents which traditionally serve as information devices for the benefit of external stakeholders, such as a balance sheet, can also be used as information internally in the next step when management plans and budgets for future action (Skaerbaek & Tryggestad 2010, 123). Callon & Latour (1981, 286) argue that the actor grows with the number of relations that can be placed in the black boxes. The black box contains such elements as modes of thought, habits, forces or objects. The more elements one can place in the black boxes, the broader the construction that can be created. Furthermore, a black box never remains fully closed (Callon & Latour 1981, 284-285). In this study, strategy as a macro-actor (also black-box) includes several linking parts (black boxes) which are entities with common ways of thinking and acting concerning a particular topic or object. A macro-actor offers an opportunity to reflexively analyse the contributions of calculations and to recognise that they are not only aimed at the internal or external purposes within organisations. Further, a macro-actor concept simultaneously considers the present and future (Skaerbaek & Tryggestad 2010, 123). The temporal nature of strategy offers opportunities to the spatial links between accounting devices and strategy, which is still partly the research area where further studies would offer meaningful contribution.

Linking parts (black boxes) are connected to corporate strategy and they also influence it. The constant movement between the linking parts (black boxes) and strategy demonstrates that there is a back and forth information flow between these entities, which are also termed leaking black boxes (Skaerbaek & Tryggestad 2010). In this research the focus is on two separate linking parts (black boxes): partnership strategies and strategic projects. The details of these two linking parts are opened and described in Chapter 3. A black box is never fully closed, indicating that the strategy is always, at least to some extent, a temporary achievement. The aim is to analyse the roles that accounting devices adopt vis-à-vis strategy. Figure 4 describes the strategy concept adopted in this research:

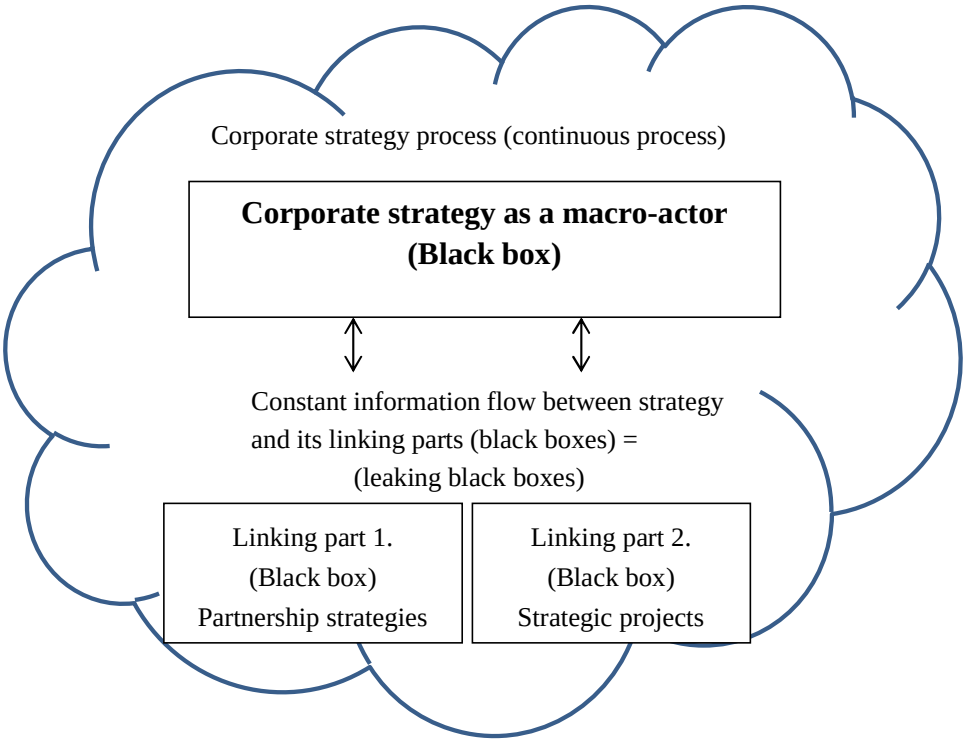

Figure 4 Strategy as a macro-actor and its linking black boxes

According to Skaerbaek & Tryggestad (2010, 109), the question of who is the strategic actor or the macro-actor can be extended to mean the possibility that accounting devices can play a complex part in enacting and formulating strategy. They state (2010, 122) that strategy is an emerging calculative, collective and temporary achievement which is neither the outcome of an outsider nor established and maintained solely by people. The accounting role is not simply to follow or adapt to strategy but rather to be actively involved as an independent outsider, in framing, formulating and imposing strategy.

There are only a few studies which have dealt with the management relationship between accounting and strategy by using ANT. Boedker (2010) created the alternative approach in order to inquire into the theoretical assumptions that underpin accounting-strategy research. She proposed that strategy and accounting are somewhat fragile, even unstable objects which change depending on the hands through which they travel and the network within which they are located. Furthermore, she pointed out that accounting is also a catalyst of expansion and transformation. Research objective 2a concentrates on producing a more detailed analysis of the associations between management ac-

counting and strategy. Next, attention is directed towards the concepts utilised in analysing the roles of management accounting actors.

2.2.3 The roles of management accounting actors: intermediaries and mediators

Latour (e.g. 2005) introduces the concepts of mediators and intermediaries which are the qualities of entities in actor-networks. Mediators and intermediaries form ways of classifying different (MA) actors in the current study. Latour (2005) argues that the concepts have a completely different meaning, thus the outcome of the actor's account will be deeply different. The major distinction will be to decide whether the actor – once provided with existence, figuration, and opponents – is treated as an intermediary or as a mediator. It is crucial to understand that difference cuts across all actors (human and non-human actors), no matter what their figuration is. What counts is not the category of figures but the range of mediators one is able to deploy (Latour 2005, 58). Next, attention is directed towards describing the attributes of intermediaries and mediators in greater detail.

Intermediaries transport meaning or force without transformation and they always count as one entity in spite of their multi-faceted configuration. As intermediaries, persons may not seem to be able to affect outcomes, because defining the input of intermediaries is adequate for defining their output. An intermediary always counts only as one entity, even if it is internally made up of many parts (Latour 2005, 106). For intermediaries, nothing will be present in the effect that has not been in the cause (Latour 2005, 97). If some factor is transported through intermediaries, then everything important is in the factor, not in the intermediaries (Latour 2005, 105). Law (1991) identifies four main categories of intermediaries which are texts (or other inscriptions), technical artefacts (such as machines or buildings), human beings and money. According to him these elements produce hybrid intermediaries when they join together (Law, 1991). The intermediaries add predictability to the setting, whereas the mediator makes it unpredictable (Latour 2005, 106). But it should be noted that being an intermediary is not a stable quality of any entity because actors can shift rapidly from being intermediaries to being mediators or vice versa (Latour 2005, 202).

As opposed to intermediaries, mediators cannot be counted as merely a unit, and a mediator may lead in multiple directions. Objects become mediators by accident, breakdown and strikes (Latour 2005, 39-40). Mediators are meaningful particularly from the first research objective point of view, the purpose of which is to find those MA actors which operate as mediators in the case companies during the turbulent economic recession period. This is because mediators have the power to influence other actors and to change the prevailing state of affairs. Mediators transform, translate, distort and modify the meaning or the elements they are expected to carry. Consequently, it is impossible to predict the end result of actions when two actors are taken as mediators (Latour 2005,

97). Causes do not allow effects to be deduced, since they simply offer circumstances and precedents (Latour 2005, 59). There are differences between actors in relation to the predictability of their actions. According to Latour (2005, 79), objects, by the very nature of their connections with humans, quickly shift from being mediators to being intermediaries, counting for one or nothing. The fact that some (non-human) actor shifts from the mediator role to an intermediary role does not mean that it stops acting, but that the mode of action is no longer visibly connected (Latour 2005, 65). But when humans become mediators it is impossible to stop them (Latour 2005, 202). This point indicates that when such non-human MA actors, such as budgeting or a budgeting process, change from being mediators to intermediaries, the process nevertheless continues but is no longer visible. Instead when a controller becomes a mediator she/he continues the operation during the relatively near future. Latour (2005, 58) claims that the reason for this derives from the point that individual human action is always intentional.

Mediators which exist through their attachments with other mediators actually form the core of actor-network theory; an actor-network is made to act by a large star-shaped web of mediators flowing in and out of it. It is made to exist by its many ties (Latour 2005, 220). Generally, what makes a good ANT study is a higher relative share of mediators in relation to intermediaries (Latour 2005, 61). Constant uncertainty determines the nature of entities in an actor-network, whether they are behaving as intermediaries or as mediators. From now on, when reference is made to an actor, one should always mentally add the large network of attachments which makes the actor act (Latour 2005, 220). To summarise, management accounting actors are divided into mediators and intermediaries depending on their roles in strategic change. MA actors which have the power to translate or modify the meaning of a strategic topic are considered to be mediators, whilst those who only transport meaning that relates to strategic issues without transforming it are understood to be intermediaries. The next subchapter introduces the translation process.

2.2.4 The translation process

The notion of constant movement is known as translation in ANT. According to Latour (2005, 106-108), the sociology of translation is a more accurate name for an actor-network theory. Translations may generate traceable associations which do not transport causality but deploy strings of mediators as networks (Latour 2005, 108). There is no consistent definition of the concept of translation. One, by Latour (1999a), states that translation means displacement, drift, invention, mediation, the creation of a link that did not previously exist. Generally, translation induces two mediators into a situation of coexistence (Callon et al. 1986, 27). In ANT, movements and displacements come first, places and shapes second. The reason for this is that sites no longer differ in shape or size, but in the direction of the movements to and from (Latour 2005, 204). Hence,

translation should be anchored in the movement of money or materials, such as written documents, which are sent out and then returned. Entities are converted into different kinds of inscriptions such as reports, documents, survey results, and scientific papers. Furthermore, materials and money move like inscriptions. Translation cannot be effective, i.e. it cannot lead to stable constructions if it is not anchored to such movements as physical and social displacements. The scope of translation is never ending (Latour 2005, 204). As described earlier, power is accomplished through the distribution of materials in an ANT. Effective translation is thus a synonym for the concept of power. The aim of translation is to lead to stable constructions. Translation is effective only when it is connected with the movement of some physical artefacts, such as accounting documents. There is a literature which analyses the power of accounting inscriptions and how they enable "action at distance" (see e.g. Qu & Cooper 2011; Miller 1990, 1991; Robson 1991, 1992). A more detailed description of that literature is provided in Subchapter 2.3.

In the current thesis, Latour's (2005) notion of translation is utilised to challenge rationalistic and functionalist approaches to change. Quattrone & Hopper (2001a) illustrate the problematic nature of the concept of change, which is one of the reasons why so little is known about it. Additionally the epistemological status of the concept is often left unexamined. Quattrone & Hopper (2001a) use the concept of a centred organisations and "drift" as a replacement for conventional definitions of change. Their model originates from Latour's (1999) work, where the translation process is presented as centred. Quattrone & Hopper's (2001a) view is that accounting is part of the process of fabricating knowledge (Latour 1999b). That process forms a part of broader attempt to construct organisations. Accounting is a practice that creates the calculations centre but also allows disorder (Quattrone & Hopper 2001a, 410). In the same work it is suggested that there is no assumption that people move from well-defined situations in a linear, predictable and ordered framework. Their framework incorporates multiple worlds, space and times and recognises that one perspective in space and time producing a single categorisation is unlikely to emerge in complex organisations. If the centred organisation view is adopted, this requires studying how and why accounting information is produced as well as its effects within the context of the dynamic and evolutionary fabrication of knowledge in organisations (Quattrone & Hopper 2001a, 430). This framework is very pertinent for the analysis of such rapidly changing industries as the mobile telephone business, but it does not offer a proper context for analysing the case companies. However, Quattrone & Hopper's (2001a) framework provides one background example for understanding Latour's thoughts in relation to management accounting literature.

In the MA literature Latour's concept of translation has been adopted in order to examine the modelling of accounting systems (see e.g. Justesen & Mouritsen 2011; Preston et al. 1992). The movement of the (accounting) system is an ongoing process, and this is the reason why ANT challenges the classical diffusion model of change (Justesen

& Mouritsen 2011,170). To conclude, the use of the concept of translation offers a novel perspective as it holds that accounting phenomena are never merely diffused, adopted or implemented but are instead adapted and translated, and, at the same time, they are enrolled in an actor-network (Justesen & Mouritsen 2011, 176). As such, the translation process offers a very different view of change compared to the contingency approach, which explains change with reference to a stable set of external variables. In the present research translation adds the dynamic dimension to the actors and to the traceable associations between them. Translation is considered the point which differentiates different sites or actors, such as companies, business areas or MA actors, from each other. However, the translation process is not a synonym for the causal relationship between two mediators which enables several mediators to operate in a network. The word translation is partly a synonym for fabrication, because accounting facts are fabricated (or reinforced) through the process of translation (see Latour 1987). The word fabrication was adopted (instead of translation) in research objective 2a because fabrication emphasises *the process* which reinforces selected management accounting actors (operating as mediators) in relation to strategy. Next, the study analyses the fabrication process more detail.

2.2.5 Fabrication process

Research objective 2a sheds light on the associations between management accounting and strategy. As argued in Subchapter 2.2.4, according to Latour (1987; 2005), scientific or technical facts are the result of an elaborate process of translation. Latour (1987) suggests that in order the better to understand the nature of a technology, a researcher should evaluate the processes involved in its fabrication. In fact, all technologies are social in some sense; they are fabricated by us (Bloomfield, Coombs, Cooper, Rea 1992, 200). Fabrication is a continuous process which mobilises and utilises resources both within and outside the particular project (or technology) (Preston et al. 1992, 566). Bloomfield et al. (1992) present the term "social technology" to emphasise the point that some technologies are aimed primarily at changing or reinforcing particular forms of social organisation. Research objective 2a develops objective 1, which ends with the classification of management accounting actors' roles in strategic change. The theoretical focus will now be directed towards describing the process of fabrication in further detail.

Preston et al (1992) explore the processes by which accounting and budgeting systems bring economic logic into hospital management. They (1992, 561) contribute to an understanding of how accounting and budget systems are produced through the study of emergent systems. In this research their framework is adopted to describe the associations between management accounting actors and corporate strategy. The purpose of research objective 2a is to describe the processes which bring economic logic into cor-

porate management, which is understood as corporate strategy. Bloomfield et al. (1992,201) point out that one should examine the processes of the fabrication of facts and artefacts in such a way that no a priori distinctions are drawn between what is technical and what is social. Such an approach contrasts with those typically adopted in theories of accounting systems which, as noted earlier, tend to evaluate existing systems by focusing on the properties of established structures and relationships and a set of boundaries pertaining to what is technical (e.g. hardware and software) and what is social (e.g. organisational rules). Preston et al. (1992, 565) offer the notion of fabrication as an attempt to examine the chains of reasoning and mechanisms of influence between structured forces in the determination of the direction of change, and between human agency in the determination of the pace of change. This point of fabrication conveys a number of images: the first concerns the building of the technology, the second concerns the fragility of the technological products and the third image concerns the machinations, promotion and selling of the technology. In the framework of the present research the first image is understood as how a (selected) management accounting actor is designed in order to meet the specifications (sometimes specified when the process begins). This indicates how a particular MA technology, such as an information system, is designed and/or modified in order to answer the demands made of it. The second image forces the researcher "to analyse whether sufficient resources have been committed to the process". These resources can be either human (personnel) or financial (money) as long as they have been allocated to the process, e.g. concerning the implementation of a new information system. The third calls for "the convincing stories concerning the purpose and effects of particular management accounting actors" (Preston et al. 1992, 565-566). This indicates the way a particular MA technology is "sold" to the organisation. Actor network theory allows the machinations underpinning the process of fabricating an information system to come to the fore; it does not give privilege to either social structures or actions, or to technology (Bloomfield et al. 1992, 217) Some of these background images can become matters of fact when the increasing of the mobilisation of resources is carried out both within and outside of the project (Preston et al. 1992, 565-566). In order to succeed within this fabrication process, the background images have to be realised at a sufficient level. In addition to these images there are also rules of method which influence the background of the fabrication process. Their meaning and relevance is described next.

Latour (1987, 258) offers seven rules of method for studying the fabrication of technical artefacts. These rules operate in the background of the fabrication process and they have been illustrated in the presentation of the present study as well as that of Preston et al. (1992). The investigation of the fabrication of accounting actors is informed by three guidelines derived from Latour's (1987) rules of method. Firstly, the researcher chose a management accounting actor, which operates in the mediator role in relation to corporate strategy. This indicates that selected accounting technology was able to influence and even (in some unusual cases) change corporate strategy. The second guideline re-

lates to the amount of resources committed to the process in order to guarantee against the danger of a weakly fabricated system collapsing easily at an early stage because there are insufficient resources and care committed to its maintenance. These resources operate in the network both historically and across conventional organisational boundaries. This rule of method emphasises the increasing mobilisation and utilisation of allies and resources from both within and outside technical projects. There is always a multiplicity of people involved in the fabrication process because human actors are usually controllers, in this study but they are also, e.g. production staff or purchasing staff. The third guideline relates to the science in action principle which suggests that the researcher should be present at the fabrication process before the black-box is closed and debates have died down. This study was conducted at exactly the time of a turbulent economic period. Preston et al. (1992, 567) conclude that it is naïve to assume that by simply assembling the components of a system, the desired outcome is achieved. The design of a system only represents part of the fabrication process because there are always individuals within, interpretations of, and responses to the proposed or implemented system. Next, a closer examination of the fabrication process as such is conducted.

In the present research the fabrication process is divided into three stages: the first includes the emergence of the possibility that management accounting actors influence strategic change. Chua (1995, 116-117) points out that to begin following accounting in the making, it is first necessary to identify core individuals or groups who are either directly or indirectly involved in the fact-building process and to ask why they are or why and how they become interested in the construction of accounting figures. In this first stage (a turbulent economic recession period), prevailing economic conditions enable a weak and hesitant technological possibility to emerge. These weak technological possibilities are those management accounting actors which operate as the mediators in strategic change. Latour (1987, 45) suggests that when new technological possibilities are created there is always uncertainty and dispute about their qualities and likely effects. In this research, selected management accounting actors become possibilities when they emerge as mediators – as they appear to have the potential to influence strategic change. An understanding of the fabrication of management accounting actors requires the consideration not only of past management and accounting initiatives in the case companies but also their organisational cultures (Preston et al. 1992, 570). The organisational background of both case companies is described in detail in Chapter 3.

The second stage in the fabrication process includes the convincing arguments made to support the nature of selected management accounting actors and their purpose. Organisations have different tensions between people, for example, from different departments, creating suspicions about each other's motives and intent (Preston et al. 1992, 573). As such it should be noted that resistances and contested practices are not suggested as a means of explaining the failure of fabrication processes. Instead, they demonstrate that the black-box concerning a particular management accounting actor is

not yet closed (Preston 1992, 578). The fabrication process may often begin in conversations between individuals, in working parties, in meetings of small groups, in consultation with outside experts and in a contained trial setting before they are made public within the organisation. Evidence of such "before the beginning" activities may be found in various documents (Preston et al. 1992, 573-574). In order to gain supporting resources or evidence against possible uncertainties, Latour (1987, 57) suggests that "before the beginning" texts need to be constructed "to withstand the assaults of a hostile environment". These persuasive strategies amount to common-sense efforts to marshal allies and defeat competitors in order to defend and extend a conceptual territory (Chua 1995, 138-139).

Latour introduces four different tactics for that purpose: fortification, stacking, staging/framing and captation. The first one, fortification, states that texts enter a discourse with a presumed objector and by doing so they fortify themselves (Latour 1987, 46). These texts do not rely on appeals to an external reality but rather fortify themselves by appeals to other, accepted technologies and to "given truths" (Preston et al. 1992, 574). The second tactic is referred to as stacking. It involves bringing in figures and numbers to convince the reader and to enable the text to go from details to generalisations (Latour 1987, 46). The third tactic is referred to as staging and framing. Staging means that a text explains how and to whom it should be read. The author of the text presents him/herself to the reader and enters into a series of trials to convince the reader. Framing statements provide an agenda for debate, an object for criticism, a framework for controversy, a benchmark for evaluating success or failure. A text is read between the lines in order to infer hidden meaning in it and to become a focus for dissent (Latour 1987, 457). Furthermore, texts also produce an engagement with the argument and the very resistance becomes more and more a matter of tactics and technical detail, and becomes less and concerned with the general strategy (Preston et al. 1992, 575). The final tactic suggested by Latour is captation. Captation as a tactic means the same as the control of an objector's moves. The classic way to achieve this control is by first offering general, unexceptionable statements before moving to lesser known and more contestable ones. Thus, the reader is induced to move far away from what he was ready to accept at first (Latour 1987, 47). A successful text will ultimately leave the sceptic appearing isolated and foolish in the face of a mass of supporting argument (Preston et al. 1992, 575). Overall, all kinds of general statements may be seen as examples of captation. In attempting to produce convincing arguments, networks of resources, allies and opponents have been created. Each network has different strengths (Preston et al. 1992, 577). A further discussion on tactics, with reference to case settings, is provided in Chapter 4.

Sometimes controllers may believe that they have produced definitive calculations, concerning for example strategic investment decisions, but the fate of the technology (investment calculations) depends on the behaviour of others, for example, the production manager (Robson & Cooper 1989). Thus despite enormous resources and strategic

intent, the controller is unable to determine the outcome of the investment calculation made. This point implies that the fate of technology depends on others. In brief; in order to understand the fabrication of a technology, it is first of all necessary to examine the response of those persons who use the technology as well as the technology being modified, strengthened and undermined in the process. The final product of the fabrication process arises as much out of a particular actor's implementation as out of its design. To summarise, fabrication occurs through the process of utilisation (Preston et al. 1992, 578). The intention of this research for objective 2a, is to analyse the adoption and implementation of particular management accounting actors in relation to corporate strategy. Figure 5 demonstrates the main steps of the fabrication process.

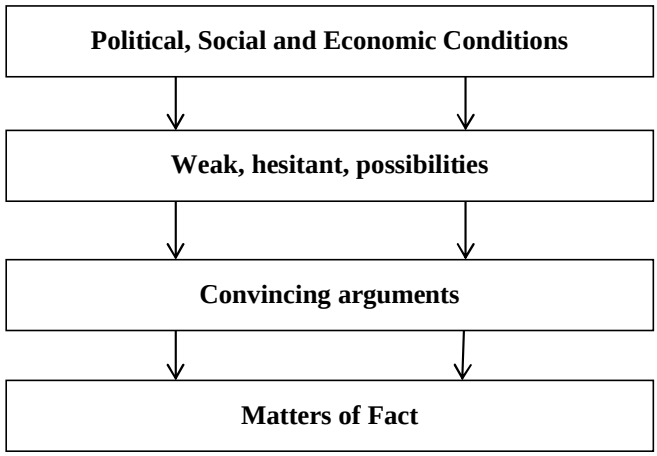

Figure 5 The process of fabrication (based on Latour 1987)

Social factors influence and are present in the fabrication process as the process includes the definitions, interpretations and meanings that emerge from the actions of individuals (Preston et al. 1992, 567). Account-fabrication is a decision-laden process rooted in faith and shot through with the social. Reality did not come first but arrived after the socialised processes of making and judging representations (Chua 1995, 138). People move technologies along, but in so doing they modify the technology (Preston et al. 1992, 578). The participants include the designers, users and those whose actions are subject to observation and evaluation by the system (Preston et al. 1992, 567). However, management accounting actors (such as budgeting) are also created and modified in each text which speaks of them and in each test or implementation which seeks to practice them (Preston et al. 1992, 578). Often individual interpretations and responses modify and change officially intended patterns of accountability, mechanisms of control and the manner in which the system was designed to operate (Preston et al. 1992, 574). The

emerging definitions, interpretations and meanings are seen to shape the way in which people both think and talk about the system and respond to its design, implementation and operation (Preston et al. (1992, 567). In conclusion, the individual expectations and definitions have considerable effects on the way in which a particular management accounting technology will operate.

According to Latour (1987) the end product of the fabrication process is a black-box, which forms the third stage in the fabrication process. The particular technology becomes fixed and the black-box has been closed when the technology is used, re-used and finally taken for granted (Preston et al. (1992, 578). Black-boxing occurs when facts and artefacts are accepted and taken for granted. When the statements come to be regarded as unproblematic, so that they do not need to be explicitly formulated and can be presupposed (Callon et al. 1986, 31; Lowe 2001, 82). Until the object concerning a particular management accounting actor is agreed as having been built or having collapsed, the final fate of the fabrication process is not known. Chua (1995,140) summarises this by stating that through the processes of quantification, visualisation, and normalisation a certain amnesia sets in when accounting information is used in organisations. Reports and tables, although titled "subject to errors and omissions" come to be seen as windows (albeit small) on a hidden reality. The purpose of research objective 2a is examine the associations between particular management accounting actors and strategy by using Latour's (1987) fabrication process model. In particular, his four tactics are utilised in order to analyse how the role of MA actors could be further strengthened in relation to corporate strategy.

In this study, the term fabrication was adopted in order to distinguish it from alternative terms such as production[3] and construction[4]. Even though fabrication as a term was separated out, there is considerable similarity in the content of those terms. Fabrication is intended to convey not only the building, but also the fragility and machination dimensions. Translation, which was described earlier, concentrates more on the machination dimension, whereas fabrication implies a combination of all these features (Preston et al. 1992, 566). The technological objects (MA calculations) are viewed as artefacts (e.g. the budget document), instead of viewing them as the production of budget documentation or knowledge concerning how to calculate the budget (see Latour 1987). Simplified, it can be stated that the term "translation" concentrates "selling" so that it means the same as building dynamic relationships, whereas fabrication includes also the characteristics of the entities (e.g. MA technology) and their supporting resources. Thus the term fabrication is the extended version of the term "translation". The term co-constructed was adopted for the second research objective because, rather than conceiving the case companies' strategies as being independent of the management accounting

[3] Production emphasises the building metaphor and the significance of routinised practices.
[4] Construction, emphasises the in which way accounting, together with other practices, serves to construct a particular field of visibility (Robson et al. 2007). Ogden (1997) illustrates how management accounting figures are constructed to accommodate and persuade diverse interests within organisations.

actors, it seemed that they are instead co-constructed. Using the term "co-construct", the purpose is to emphasise the co-presence of management accounting technologies and external environments (and possible other factors) which affect the process when analysing the relationship between management accounting and strategy (see Robson et al. 2007). To conclude, the fabrication model structures the analysis of the empirical study of the two case companies considering objective 2a. The second research question of study analyses those MA actors which operate as mediators in relation to corporate strategy. It utilises Latour's four tactics in order to analyse how selected management accounting actors gain more power which enables them to influence corporate strategic decisions. In the following sub-section a closer study is made of previous MA studies which have adopted the actor-network theory as their theoretical base.

2.3 Earlier MA studies using actor-network theory

Latour's theoretical constructs have had a considerable influence on the research literature in financial accounting and reporting, management accounting, and a variety of other fields including organisation theory, information systems and aspects of public sector reform (Lowe 2001, 332). According to a recent study by Chiabello & Baker (2011), Latour is the second most cited French social theorist in accounting literature after Foucault. Peter Miller[5] must be regarded as a key figure with respect to introducing both Foucault and Latour into the accounting research literature, along with his co-authors Nicholas Rose and Ted O'Leary. The conceptual toolbox developed by Latour has inspired a number of accounting researchers who have focused on a diverse set of issues. The authors include W.F. Chua, J. Mouritsen, Y. Gendron, A.Lowe, P. Quattrone, K. Robson, P. Miller, A.M. Preston, S. Llewellyn, T. Ahrens D.J., Cooper, H.T. Larsen, J. Baxter, M. Ezzamel, M. Power and I. Jeacle (Chiabello & Baker 2011, 151-152).

ANT-inspired accounting research consists primarily of single case studies and historical studies. Furthermore Latour's own work has changed over time (Justesen & Mouritsen 2011, 164). Even if Latour (1987) is extensively referenced in a number of accounting articles, it is notable that a socio-philosophical approach in which human and non-human, social and technical factors are combined into the same view remains rare in accounting literature. Moreover the number of studies which straightforwardly apply it is quite limited, even if most studies are inspired by ANT (Ahrens & Chapman 2007, 104). Most ANT studies have examined operative issues in public companies, such as in the health sector, rather than strategic issues in large manufacturing compa-

[5] During the 1970s and 1980s, Anthony Hopwood was actively searching for new paradigms for accounting research. Hopwood met Peter Miller and invited him to participate in a lecture on research methodology in certain doctoral seminars at the London Business School during the academic year 1982-1983.

nies. Accounting writers have adopted concepts from ANT in a variety of areas. The emergence of actor-network theory in management accounting research can be viewed as an attempt to reposition, or even rehabilitate, accounting technologies in the sociological explanation (Justesen & Mouritsen 2011, 164). To sum up, there is a relatively large number of accounting papers that apply ANT, but the current research reviews only a few of them. This study contributes to existing actor-network studies by applying theory to the manufacturing companies and using it to address strategic rather than operative issues. The research mainly applies ANT according to Latour's (1987; 2005) views and some of ANT's theoretical concepts, such as actors, translation and fabrication, play central roles. Justesen & Mouritsen (2011) present a literature survey, where they discuss how Bruno Latour's version of actor-network theory has influenced management accounting research. They provide a detailed analysis of the MA studies which have been based upon ANT – the majority of them on Latour's work. In the present study, earlier ANT studies have been divided into five different groups, using the same classification as that employed by Justesen & Mouritsen (2011). Their first category consists of studies which view accounting as inscription, forming the first wave of ANT studies in the MA literature. Miller (1990; 1991) found that accounting was an inscription, which enabled action at a distance. Robson (1991; 1992) draws attention to Latour's conceptual apparatus and in doing so aims to introduce a new research agenda into the accounting field. The accounting function represents and translates aspects of an organisation's environment into financial figures and it is this which provides the key to the widespread use of accounting information. A consequence of the ability of accounting to inscribe information in this manner is that it allows the controllers of a system to accumulate knowledge and, at the same time, to provide convincing representations of the environment. Generally, the power of these inscriptions is to enable action at distance (see Robson 1991, 1992, 1993, 1994). Miller (1990; 1991) and Robson (1991; 1992; 1993; 1994) introduced Latour's work to the accounting field. At the theoretical level, Miller's and Robson's ANT-inspired work challenged dominant positions in accounting literature (Justesen & Mouritsen 2011, 169). Since then, many studies (such as Joerges & Czarniawska 1998; Lowe & Koh, 2007; Mouritsen, Hansen & Hansen, 2009; Mouritsen, Hansen & Hansen, 2001; Mouritsen, Larsen & Bukh, 2001) have emphasised the centrality of inscriptions to organisations. If the notion of inscription is the central focus, it follows that a major function of management accounting is the representation of accounting facts for the purpose of organisational control (Lowe & Koh 2007, 953). Lowe (2004) argues that the production of facts is not merely to do with inscriptions, but rather that it relies on the conventions and culture of accounting as a profession and a professional practice (Lowe 2004, 617). Chua (2004) pointed out that actor-network theory enables researchers to study how accounting inscriptions, whether written or embedded in cyberspace, motivate actions, and how both the actions and the accounting are themselves connected with, and mediated by, other circulatory flows of actions. Latour (1987, 258) suggests that before attributing any special quality to the

mind or to the method of people, it is first important to pay attention to the ways in which inscriptions are gathered, combined, tied together and sent back. This is particularly important point in the accounting case studies, since many of them deal with the role of inscriptions.

The second category in the Justesen & Mouritsen (2011) classification includes those accounting studies which draw on actor-network theory to produce different accounts of implementation processes. In these studies, Latour's notion of translation is utilised in order to challenge rationalistic and functionalist approaches, while the concept of implementation as a linear process is rejected (Justesen & Mouritsen 2011, 170). Writers such as Preston et al. (1992) and Chua (1995) emphasise the processes that surround the establishment of facts or black boxes. The Preston et al. (1992) study is a particularly exemplary piece of writing which describes the fabrication process in detail. They underline the importance of arriving before the technology becomes settled in order to trace the creation of a closed "black box". Emsley (2008) employed the concept of translation to analyse the development of the cost of quality in two plants. His study shows that translating the cost of quality is neither a rational process in an organisational sense, nor a well-defined and sequential process (Emsley 2008, 378). Briers & Chua (2001) studied the implementation of activity-based costing in a manufacturing firm. They focused on the role of the boundary that stabilised and mediated diverse actor-worlds. Their field study illustrated how an organisation's accounting system can be changed by a heterogeneous actor-network of local and global actors and actants.

The third category consists of studies which take a different starting point, and which set out to re-open the constructed black boxes by tracing the processes by which accounting phenomena become taken for granted. Llewellynn & Northcott (2005) engage in opening the black box in their analysis of how a hospital of average cost was used in the UK to create a benchmark that enables comparison and control in the hospital sector. Jones & Dugdale (2002) focus on the ABC system and argue that the system itself is the outcome of a complex and non-linear construction process. They set out to re-open the ABC black box by tracing and following the central human and non-human actors in the construction process. The contribution of these studies consists in re-opening well-established accounting black boxes. The fourth group in the Justesen & Mouritsen classification includes accounting studies which use ANT to question whether technology stabilises or extends control and integration. Quattrone & Hopper (2005) examine how a particular management accounting technology, SAP, mediated organisational and managerial relations of distance, integration and control. Dechow & Mouritsen (2005) consider two firms pursuing the integration of management and control through enterprise resource planning (ERP) systems. They study the heterogeneity of networks of power, and seek to analyse how human actors and ERP systems come into existence and influence each other in the course of exploring integration. The last category of ANT studies comprises those which demonstrate that calculations have constitutive roles in forming boundaries between firms. Mouritsen (1999) claimed that compet-

ing accounting calculations dominate dialogues between managers on the realism of strategy. Miller & O'Leary's (2007) analysis of mediating instruments indicates how a road map may organise and coordinate a whole body of firms towards collective innovation. A list of these studies is presented in table 2.

Table 2 A list of earlier ANT studies in the MA field

The theme of study	**Writers**
Introduction of Latour's work to the accounting field	for example, Miller 1990; 1991, Robson 1991; 1992
Different accounts of implementation process	for example, Preston, Cooper & Coombs 1992, Chua 1995
Studies which focus on the reopening of existing black boxes.	for example, Llewellynn & Northcott 2005, Jones & Dugdale 2002
Whether technology stabilises or extends control and integration.	for example, Quattrone & Hopper 2005, Dechow & Mouritsen 2005
Calculations which have constitutive roles in forming the boundaries between firms.	for example, Miller & O'Leary 2007, Mouritsen 1999

In addition to these five categories there are studies which are particularly meaningful from the point of view of the current thesis. One of them is by Boedker (2010), who seeks to inquire into the theoretical assumptions that underpin accounting-strategy research generally. As a key contribution, the paper evolves an alternative approach drawing on Latour's theory. This view proposes that strategy and accounting are somewhat fragile, even unstable, objects, which change depending on the hands through which they travel and the network within which they are located. She argues that accounting is not merely designed to follow or implement predefined intents. It is also a catalyst of expansion, transformation and even surprise. A further notable study is that by Lowe (2001) who examines the aspects of the construction of socio-technical systems by placing an emphasis on understanding the traces which remain as networks are fabricated. By doing so, the main aim of his article is to emphasise the way in which actor-network theory (ANT) might contribute to case research in accounting. He explains some of the theoretical suppositions which are generally associated with ANT and which have made little impact within accounting literature. According to Lowe (2001), accounting literature has demonstrated particular reluctance to engage with the central concept of ANT: the desire to bring together the human and non-human and social and technical factors. Lowe (2001) provides insights into how accounting is practiced in organisations and the

manner in which human actors and objects of technology may combine to constitute networks in organisations.

To conclude, the typical ANT study analyses a situation where the research setting includes only one case company. Generally, ANT studies have described more operative issues, such as the implementation of a particular accounting system, rather than strategic issues in manufacturing companies. For this reason there is a call for strategy-oriented studies to use ANT to analyse the emerging change situation in manufacturing settings. The empirical surroundings of the current research are similar to those in which Latour (1996) first developed his concepts within the context of the French railway industry. The thrust of Latour's (1996) study, using actor-network theory, is towards a sociologically informed theory of accounting practice. Lowe (2004) discusses the impact and influences of the growth of post-social relations on accounting practice. He suggests a need to further evolve a research programme that seeks to investigate accounting practice in local settings. He also asserts that accountants form a distinctive knowledge culture, with their own unique rules of how knowledge is constituted. Actor-network theory will be utilised as a lens to make sense of how accountants, together with non-human objects, which are taken to be accounting technologies, form their own knowledge culture within particular case settings. The intention of the researcher is to outline an interpretation of the events using actor-network theory.

A major concern of this study is not to suggest that actor-network theory is superior compared to other theoretical frameworks. Indeed ANT has faced some criticism. ANT, as a term, is particularly associated with Latour and Callon. However, Latour (1999) has been rather reluctant to use the term. He has expressed strong doubts about its value as a phrase for describing the type of research it has come to refer to and the way in which the term has been employed by others. Latour points out that ANT as a theory has often been misunderstood and hence much abused (see Latour 1999a,1). ANT is, in itself, not a homogeneous term; different researchers have applied it a variety of ways. Scott (1991, 7) refers to that by stating that ANT seems to be merely a common orientation embracing a loose confederation of theorists, often with overlapping and conflicting terminologies and other inconsistencies. There have been criticisms of ANT – especially about the more general issues such as the macro/micro problem and the emphasis on empiricism (see for example Russell, 1986). Some writers (Barnes 1981; Scott 1991; Shapin 1988; Oldroyd 1987, 1988), from within the modern field of sociology of scientific knowledge, have disagreed with aspects of Latour's theories. Collins & Yearley (1992a; 1992b) criticise actor-network theory arguing that it produces empty empirical findings. Their criticism maybe derives from the empirically realist (providing theory laden descriptions of organisation) and ontologically relativist (in permitting the world to be organised differentially) nature of ANT (Lee & Hassard 1999). Lee & Hassard (1999) present arguments which can be viewed as either the criticism of ANT or the highlighting of the strengths ANT. Firstly, ANT overcomes its analytical limitations by removing conditions that exclude the "other". This is referred to as the notion of the

definitional sliding of ANT. Further, ANT focuses attention on the themes of boundedness and flexibility as they are operationalised in the practices of organisations. This is the era of organisational networks, strategic alliances, "factories within factories", outsourcing and business process reengineering. These kinds of developments, in particular, appear to be the strategic order of the day (Lee & Hassard 1999, 394).

Nevertheless, actor-network theory provides a comprehensive theoretical picture of the change situations within the case companies. In this study, economic conditions are such that strong organisational boundaries can no longer be treated as shorthand for success. Responsiveness to market conditions is the clarion call in the industries of both case companies. This responsiveness is sought by maximising the flexibility of an organisation's internal and external responsiveness. From this point of view, a research approach that is "blank" enough to trace the production and removal of boundaries is particularly suited to the analysis of the research topic.

2.4 Summary of the theoretical framework

Accounting academics have had different perceptions of what is regarded as theory. The present study adopts a view which is compatible with that of Lukka (2005) and Malmi & Granlund (2009), who argue that research and practice in MA relies largely on two types of theory: method theory and domain theory. The former is ANT, representing the theory which is imported from other social sciences, while domain theory, to which the present research contributes, is the strategic management accounting literature which analyses management's relationship between accounting and strategy. This research also contributes to the literature dealing with the role of MA in organisations.

Basically, the theoretical contribution to meta-theories is demanding because it is not possible to falsify them. The current research applies ANT as the theoretical lens for analysing the research issue: the role of management accounting in strategic change. The basic principles of ANT were presented in Chapter 2 and they are summarised in figure 6, which presents the background(s) of the concepts and the central tools utilised in the analysis (in chapter 4).

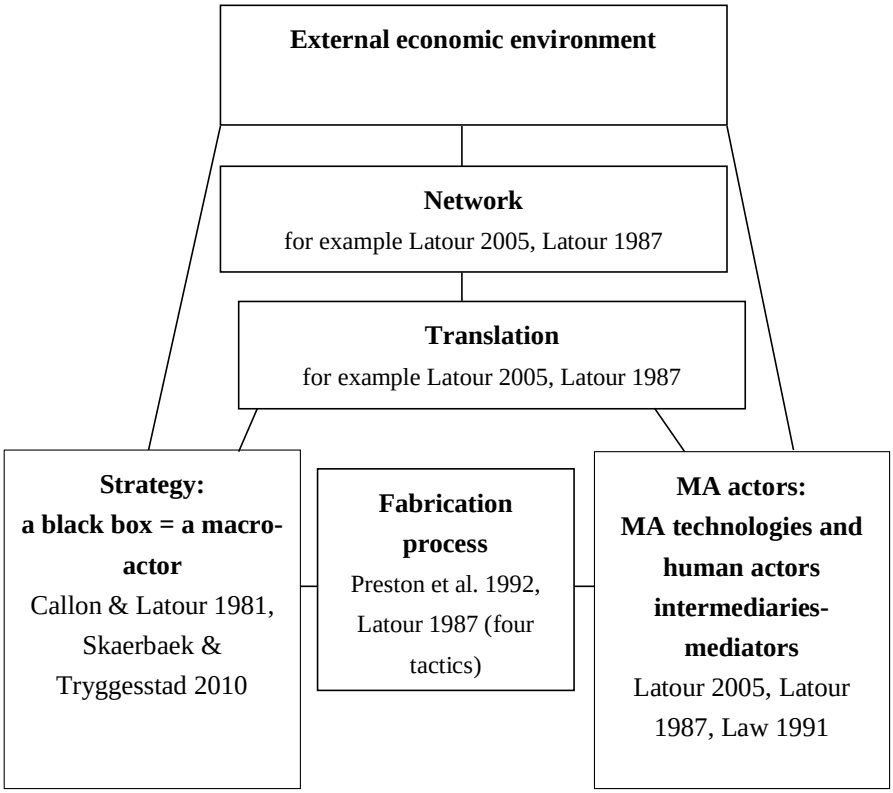

Figure 6 A summary of the theoretical framework (ANT) utilised in the research

Networks and translations are the core concepts of ANT which explains their positioning in the centre of Figure 6. Even though fabrication is placed between strategy and MA actors, it actually forms the broader base for the whole study. The fabrication process conveys a number of images but two of them are particularly relevant in the current research. The first of them is the fragility of technological products, which is examined in research objective 1. The fragility of technological products refers to the selected MA actors' role in strategic change as analysed by use of the terms intermediaries and mediators. The second image of the fabrication process concerns the machinations, promotion and selling of the technology. This point particularly relates to the second research objective where the purpose is to analyse MA opportunities to co-construct companies' strategies and external economic conditions. The image calls for convincing stories concerning the purpose and effects of a particular MA actor (Preston et al. 1992, 565-566). In the current research these convincing stories relate to the utilisation of Latour's (1987) four tactics in relation to the corporate strategies. Furthermore, Chapter 2 describes the basic principles and the analytical concepts of ANT. The basic principles of the theory were the science in action and the general symmetry principles, which under-

score the base of the whole theory. These principles operated in the background of the analysis for two reasons: because the researcher conducted the field research while a strategic change period was still ongoing and because the technologies were at the centre of operations Some writers (Barnes 1981; Scott 1991; Shapin 1988; Oldroyd 1987, 1988), from within the modern field of sociology of scientific knowledge, have disagreed with aspects of Latour's theories. The principles are derived from Latour's view (1987; 2005) that society is built of heterogeneous elements consisting of people, but always together with technology and other objects.

Chapter 3 describes the empirical background of the present study. It also deepens the theoretical analysis by adding additional concepts regarding the controller's role, management accounting information systems and management accounting inscriptions.

3 THE EMPIRICAL ANALYSIS OF THE CASE COMPANIES

The aim of this chapter is to describe the empirical background of this study by building a rich account of the phenomena in the field. The empirical material consists of two case companies, Metal Ltd and Pulp Ltd. The first subchapter analyses global and industry-specific trends and changes. The subchapter concentrates on analysing the roles of global megatrends such as globalisation and the growing importance of China's economy and the industries' growing service orientation. The research concentrates on trends which appear to be most significant for the case companies.

Secondly, a brief historical review of both case companies is provided in order to describe the context of the study. The reason for that derives from Latour's & Woolgar's (1979) science in action principle, which states that the researcher should go back to a time before the change situation began and observe how it gradually emerged. The chapter is structured so that information concerning a particular topic is presented from one or both case companies depending on the relevance of the topic to the case company.

The researcher aims to build a richer picture of the research issues than by merely focusing on mute objects, a method which ANT calls the matter of fact view. Latour (1987) points out that the researcher should arrive before the complexity of the inner workings of facts is closed. A case when the researcher works in the field at the same time as the actual change period is referred to as the matter of fact view in actor-network theory and that occurred in this study because the researcher conducted the field work in Metal Ltd (23 interviews) and in Pulp Ltd (18 interviews) between August 2009 and November 2010 during the change period.

In Metal Ltd the focus was more on a unit level analysis (19 interviews) in Factory 1 (sites are called factories in Metal Ltd). Most research interviews were conducted in Factory 1 and most of the staff interviewed worked in Factory 1 under the previous owner. So, their comments and opinions can mirror the thoughts they held during that time. The interviews were conducted in the Head Office (4 interviews) and reflect a Swedish corporate culture compared to the Finnish culture found in the interviews made in Factory 1. Compared to Sweden, Finnish management, negotiation and communication style tend to be clearly more authoritarian. In Sweden the operational style is very democratic and avoids conflict. With this style the Swedish managers tend to seek special commitment from organisational members: In the Finnish mode of operation, organisational commitment may remain weaker (Granlund & Lukka 1998, 193). During the interviews, the interviewees were told that Swedish culture differs from Finnish culture (for example in the Swedish willingness to negotiate longer compared to Finns).

But, no other differences concerning cultural factors came out. Factory 1 (Metal Ltd) is a smelter that produces metal – mainly copper and nickel) – from concentrate. Those interviewed in Factory 1 have different functions: administration (former and current CEO and HR Manager), business development and production, in addition to staff from the financial department. In the head office the interviewees were the Chief Financial Officer (CFO), President (smelting business area), Controller (smelting business area) and Manager (copper concentrate).

Pulp Ltd's sites are called mills due to the established position of the term in the industry. Compared to the interviews conducted in Metal Ltd, the researcher conducted more interviews in Pulp Ltd at the Head Office (9 interviews) than on the sites. The researcher conducted the rest of interviews in the mills: 7 interviews in Mill 1, and 2 interviews in Mill 2. The interviewees came from administration, the financial department and production. The researcher interviewed the Chief Executive Officer (CEO), Chief Financial Officer (CFO), Production Manager and Controllers in the Head Office and production staff and controllers in Mill 1. The interviews in Mill 2 concern wood procurement issues as well as the closure of Mill 5. The list of persons interviewed is presented in Appendices 1 (Metal Ltd) and 2 (Pulp Ltd). The researcher interviewed people from outside the financial departments in order to gain a comprehensive view about MA's role in strategic change. The time before the actual change period is explained in Subchapter 3.2 which describes the background of the companies.

3.1 The economic conditions

The objective of this subchapter is to discuss the external economic conditions by analysing global megatrends and trends in the case companies' industries. The research was conducted in a period which gradually transformed the operations of the Finnish industrial companies. The analysis and the discussion are based on two books. The first is "*Industrial Finland*" by Eloranta, Ranta, Salmi & Ylä-Anttila (2010) and published by SITRA (The Finnish Innovation Fund), which analyses the position of Finnish industrial companies after economic recession period. The second is "*After the transition – The future of the Finnish Forest Sector*," by Hetemäki, Niinistö, Seppälä & Uusivuori (2010) published by Metla, the Finnish Forest Research Institute, which analyses the structural transformation of the forest industry, which, according to that book, occurred by shifting the focus away from the supporting existing structures, and channelling change towards renewal and diversification, so as to allow the possibility of the pulp and paper and forestry sectors becoming a thriving combination of new and traditional activities.

The economic recession period ended "the golden age" of the Finnish forest industry, which has traditionally been the driver of the Finnish economy. It is unlikely that the order book of Finnish industrial companies will be the same as it was before the reces-

sion period (Eloranta et al. 2010, 52). Finland's distant location and growing logistics expenses have shifted production operations to factories which are located nearer the growing market areas and to countries whose cost level is lower (Eloranta et al. 2010, 56). Next, economic trends are divided into two categories, which are global and industry specific trends. The study analyses China's economic development together with globalisation because it has significant influences for both companies' industries. The second trend analysed is that of the growing service orientation, which will shape the operations of European industrial companies in the near future in many ways.

3.1.1 Globalisation and the growing importance of China

Globalisation **(**internationalisation) is a multi-dimensional term. Economists, political scientists, sociologists, anthropologists and lawyers debate its meaning in the context of their academic disciplines (Johnson & Turner 2003, 4). The IMF's World Economic Outlook defines globalisation as "the growing interdependence of countries world-wide through the increasing volume and variety of cross-border transactions in goods and services and of international capital flows, and also through the more rapid and widespread diffusion of technology". The definition highlights the interdependence, the increasing number and the range of cross-border transactions and the important role played by technology (Johnson & Turner 2003, 4). Roughly, globalisation means the social change which becomes visible in the increasing connections made between people all over the world. In other words, globalisation is worldwide networking between different actors. The term has many dimensions but frequently it is understood as a purely economic phenomenon. Depending on the context, globalisation is viewed as either convergence between people, convergence between markets or even global administration. On some occasions globalisation is connected with the blurring of the boundaries of nation states (Beck 2004, 135-136).

The issue of globalisation has come to dominate the industrial policy discussion in Finland. The present phase of globalisation differs from previous ones, due to the pervasiveness and speed of technological change, and the removal of barriers of trade and financial transactions. This presents challenges to such open economies as Finland when they compete as a location for industrial activities on a global level (Ylä-Anttila & Palmberg 2007, 183). Globalisation has had a considerable influence on both the pulp and metal processing industries. It is mentioned that the forest industry was the industry which tied Finland to (part of) the world economy. In the future, globalisation will change the structure of the Finnish forest industry even more (Hetemäki et al. 2011, 51). According to the CEO of Pulp Ltd, the global supply and demand balance determines the development of the market:

> *Overall, the market development is determined by the global supply-demand balance, which derives largely from the timing of greenfield investments and the growth of customers* (CEO, Pulp Ltd, 11/10/2010).

The global business environment is in unprecedented turmoil, which has several further influences on companies, including converging consumer tastes and escalating fixed costs (Ohmae 1989), the shortening of product lifecycles and the acceleration of the pace of technological change (Harrigan 1988), and a reduction in trade and investment barriers (Luo 1999). In particular, declining trade and investment barriers are factors which influence the case companies industries. The others, such as converging consumer tastes, shortened product lifecycles and a faster pace of technological change, are more significant factors for faster-moving businesses. The global business environment emphasises companies' ability to produce high quality products, use their innovation capabilities, adapt productivity, or provide added value products for customers. Globalisation sheds light on networking between companies, revealing that the scope of what a firm can do alone is declining. The networked environment means that that the mutual dependency between businesses, states and the economic field has increased. It also means that companies operate in network relationships with other companies, producing supporting services for them (Hetemäki et al. 2011, 53).

Declining trade and investment barriers have been one main factors accelerating the "China-trend". The trend implies that the significance of China and other emerging economies in the global market has steadily grown. Due to their lower cost levels, Chinese companies have a comparative advantage compared to traditional OECD countries. According to estimates, in the future, the aggregate gross domestic product (GDP) of the E7 countries – China, India, Brazil, Russia, Mexico, Indonesia and Turkey – will be slightly higher than that of the G7 countries – USA, Japan, Germany, Great Britain, France, Italy and Canada. The GDP of the G7 countries was double that of the E7 countries in the year 2000 (Hetemäki et al. 2011, 54). The current development of China implies that during the coming decades the world's economic power and foreign trade trends will continue and that the China trend will increase export opportunities for metal and pulp companies. For example, China's growing population will increase the need to build infrastructure, raising the consumption of metals:

> *Two particular trends, firstly the strong growth of China's population and secondly, the movement from rural areas to the urban areas will increase the need for investment in infrastructure. The trend calls for a lot of base metals such as copper and zinc (Chief Financial Officer, Metal Ltd, 03/11/2010).*

Even though China as a market area is huge and its purchasing power is increasing steadily it also faces considerable challenges, such as human rights, the increasing revenue differences between the rural and the urban areas and the environmental problems

(Eloranta et al. 2010, 52). The case companies also face challenges in relation to their operation in China. One remarkable challenge has been the lack of raw materials, which restricts opportunities to build factories in the country (CEO, Metal Ltd, 11/10/2010). China follows different operating principles, which place European companies in an unfavourable position compared to Chinese companies. The first disadvantage derives from the environmental legislation which does not allow compatibility between Chinese and European companies. There is a threat that the different rules followed in the environmental policies offer a competitive advantage to Chinese companies. The second issue arises from the different operating rules that are observable in the copper smelting business: Chinese copper smelters can buy raw materials at a loss. Both factors are highly significant in relation to the copper smelting business as about 95 percent of the increase in the copper smelting business comes from China. The other significant country is India, where the operating rules are similar to China (General Manager, until 05/04/2010, Factory 1, Metal Ltd). The factors discussed raise a bigger issue concerning China's economy growth: is it sustainable from the human and environmental point of view? (Eloranta et al. 2010, 52).

China already has and will continue to have a considerable role in the global economy. Already, growth in the case companies' products has shifted to E7 countries, which indicates that those companies with a presence in China, for example, a factory, increase their global presence and influence (Hetemäki et al. 2011, 56). On the other hand, Chinese companies, in the forest industry and the metal processing businesses, are increasing the export of their own products, which will intensify competition in the case companies' main export market areas. Chinese pulp companies have already started to look for new ways to operate by showing interest in buying old softwood mills in order to get to the softwood business because market entry to the softwood business has been relatively simple. The operations have been conducted by relatively small and fragmented suppliers (CEO, Metal Ltd, 11/10/2010). The second piece of evidence of Chinese companies growing power in the market comes from the quintupling of Chinese companies' printing and writing paper exports between the years 2004 and 2009.

The reasons for China's strong economic growth derive from their systematic economic development, which has had traditional competitive advantages over European companies. Chinese companies have also invested in education and knowledge in their operations (Hetemäki et al. 2011, 59). During the next three decades China's economic growth will be based on the connections between three variables: education, research and economic growth. If education influences productivity and the economy grows in a similar way to that of Europe and the USA, China will be the world's most important economy in 2040 (Eloranta et al. 2010, 49).

Finland is located at a considerable distance from emerging and enlarging market areas, which sets it at a disadvantage due to that fact, it is economic to manufacture only part of a product in Europe, which then goes, for example, to China or India (Eloranta et al. 2010, 19-20).For example, in the smelting business, logistic costs are taken at the

mines' risk, which puts those mines located near major markets in a favourable position compared to ones farther away. However, the reverse is also true. For example, in pulp production, eucalyptus plantations located in South-America result in high transportation costs and this explains why the amounts transported to Europe are relatively minor.

To sum up, globalisation has had considerable influence on both the pulp and metal processing industries because the global supply-demand balance determines market development. The discussion is focused on China because of its importance to both case companies is significant. China represents the customer side for both companies, which demonstrates that China's population and its economic growth will largely determine the export possibilities of Finnish companies. On the other hand, China has a significant role in the establishment of greenfield operations in China and throughout the world. In some instances, Chinese companies follow different operating rules, which puts European companies in a less competitive position compared their Chinese competitors. However, the level of costs is steadily increasing in China, which indicates that production will shift from China to other low cost countries, probably located near China.

In global environment, the limit of what one particular company can do alone has narrowed. In order to flourish, companies differentiate and outsource their support functions to companies they work in partnership with, which further develops service networks. Their role is now analysed in greater detail.

3.1.2 The global economy's and global industries' growing service orientation

Growing service orientation indicates that industrial companies value the shift from upstream to downstream and the importance of the role of the service networks built to support the core functions of companies. The trend has been noticeable in Finland where it has touched both case companies. China and other E7 countries' economic development have influenced the background to the development of the service orientation, especially in Europe (Hetemäki et al. 2011, 73). In mature markets the value has shifted from upstream (from products) to downstream (to services) and, in consequence, companies consider the enlargement of the services they provide to be a business opportunity (Eloranta et al. 2010, 132-133). Many Finnish industrial companies, which previously manufactured investment commodities, such as paper machines, have already created related service packages for the pulp and paper and related industries.

Such services as research, planning, consulting and maintenance will have a heightened significance in Finnish industrial companies' operations (Hetemäki et al. 2011, 72). Companies which operate in the front line of research and development (R&D) operations have a central role in finding new business potential (Eloranta et al. 2010, 56). A good indicator of the increasing significance of services as part of industrial companies' operations is the point that the proportion of production staff has diminished, while the proportion of R&D personnel has increased during the 21st century.

The amount of Finnish industrial company personnel who work outside production operations is over 50 percent (Eloranta et al. 2010, 153). A representative example of an industry which has recently invested strongly in R&D operations is the Finnish forest industry, which has been forced to find new revenue streams due to the decline in paper consumption. The growing service orientation suggests that new growth for such businesses has to be established either from old customers' new demands or from completely new customers. In the future, Finnish companies will have to construct their competitive advantage through such factors as reliability (trust) and the quality of the business relationship they offer.

The increasing significance assigned to service operations is not new. Chase & Garvin (1995) highlighted the service factory concept almost 20 years ago. They pointed out that the conception of service was narrower in many factories previous to that time; customers were seen merely as figures on a production schedule. Nowadays though, factories are a resource for helping customers with installation, maintenance, and troubleshooting (Chase & Garvin 1995, 37). They argue (1995, 43) that factories become "*service factories*" when managers and workers understand customer needs. Both case companies orient towards increasing their service orientation by widening their product portfolio and by adding service components to their products (Pulp Ltd) and by slightly modifying bulk products (copper metal) to meet the customer needs (Metal Ltd).

Recent years have witnessed fluidity and blurring with respect to organisational boundaries. Both public and private sector organisations have outsourced existing activities and have engaged in new forms of cooperation with others (Coad & Cullen 2006, 343). This places new demands on subcontractor networks, which perform a significant role in supporting the case companies' core businesses. Both companies have outsourced such service functions as maintenance to the external partners, which have strengthened their abilities to concentrate on their core business processes. The current operating environment sets new challenges for Finnish subcontractors, such as the demand to develop their operations while producing innovative components for new products. If Finnish subcontractors cannot answer this call it can mean even the loss of hundreds of thousands of jobs from Finland (Eloranta et al. 2010, 56). The growing service orientation of traditional industrial production can lead to the development of novel service networks, when the traditional boundaries between the firm and its subcontractors become unclear. The emergence of subcontractor-networks places the case companies in a new position as they have to accept that they are more dependent on other companies in the supply-chain network, which calls for new modes of business partnerships (Eloranta et al. 2010, 173). Chase & Garvin (1995, 43) claim that the service orientation of traditional industrial companies moves their operation towards the open system where connections have to be direct and accessible between the design, the marketing, and the strategic planning. The competitive forces which drive companies to differentiate their products with new services are simultaneously empowering factory organisations to deliver them (Chase & Garvin 1995, 44). An open system approach demands

that, for example, marketing data is made available to as many as possible inside the organisation. This is also important because people who make products are frequently more knowledgeable about their performance and repair than the people in the service field (Chase & Garvin 1995, 37).

When the focus of the industrial companies operations shifts from upstream to downstream the importance assigned to the customer increases. According to Chase & Garvin (1995, 35) the manufacturers that will thrive in the next generation will compete by combining services with products, anticipating and by responding to a truly comprehensive range of customer needs (Chase & Garvin 1995, 35). The development which has occurred from past to present is crystalised in the following statement: the competition is shifting away from how companies build their products to how well they serve customers before and after they build their products (Chase & Garvin 1995, 35-36). Customer service also becomes part of daily business operations in production, which demonstrates that the service tasks can no longer be separated from the work of the factory (Chase & Garvin 1995, 45). The increasing service orientation calls for new abilities from workers. Those who will work in the factories of the future are those who will know how to deal with complex machines, software interfaces, and design problems, and how to track quality and appreciate customers (Chase & Garvin 1995, 44). The factory will require workers with knowledge who will add value by thinking more like general managers, by contributing (as no computer can) by seeing the production system as a whole and by suggesting fresh ways to enhance products (Chase & Garvin 1995, 45).

To conclude, increasing the service orientation will occur in networks alongside globalisation which has also linked them together. Globalisation, together with the China effect, will speed up the emergence of service networks to support the companies' core businesses, particularly in Europe. The growing service orientation reflects that the focus of company operations is shifting from purchasing towards the customer interface, whilst the significance accorded different services such as R&D operations is increasing. On the other hand, the increasing service orientation reflects the heightened significance attributed to service networks. Service networks built to support companies' core businesses blur the traditional boundaries of companies and make them more dependent on other companies in the supply and demand chain. This presents new challenges for the business control function. The case companies' strategic re-directions derive from many factors which have occurred simultaneously: firstly from the global trends discussed, but also from industry-specific trends, which are discussed in the following subsection.

3.1.3 Specific trends in the case companies' industries

Industrial policy is one of the most controversial policy fields. Its scope, instruments and rationale vary across countries, changing over time; intentions and outcomes often differ. Problems and solutions differ between frontier countries such as Finland and the "catching-up" economies of the new EU member countries. The upcoming new approach to industrial policy hints not only at a more systemic industrial policy, forward looking and emphasising synergies with other policy areas, but also at fine-tuning to specific needs, comparative advantages and future technologies (Aiginger 2007).

The Finnish experience in the 1990s represents one of the few examples of how knowledge can become the driving force in economic growth and transformation. Ylä-Anttila & Palmberg (2007) discussed the role of industrial policies in the structural transformation and outstanding industrial performance that have characterised developments in Finland. They suggest some key issues; firstly, industrial policy must have a long-term strategic perspective. In other words, policies must be consistent over the long-term and not dictated by short-term cyclical or political considerations. Secondly, the knowledge-oriented and R&D-oriented strategy is coming under increasing competitive pressure from emerging countries. Thirdly, a systemic view and collaboration between different policy actors will remain the central feature of Finnish industrial policy. This will be important in encouraging entrepreneurship, alongside new measures such as tax incentives. This will call for more collaboration and coordination among industrial policy-makers which will become a high priority (without creating bureaucracy) in the future.

The situation of the case companies was made worse by the economic recession, which together with economic cycles and structural change caused a heightened negative effect on the industries. Thus, the strategic change in the case companies is not the result of any single trend but rather the joint effect of many factors, occurring simultaneously. Hence we must now look at those trends in those companies' industries.

The metal processing business

In order to understand the construction of smelters' revenue – its specific characteristics – attention must be paid to the point of view of copper smelters. The world's largest copper mines are located in Chile, the USA, Canada and Peru. The considerable distance of these mines results in challenges for smelters located in Northern Europe because the logistics expenses are at the mines' own risk. Companies which are located nearer the mines are in a more favourable position in relation to countries such as Finland or Sweden. The first thing which matters is metal content in the concentrate. The metal content determines the price of the concentrate. In addition, so called 'free metals' (metals that are not combined with other substances are called free metals such as gold, silver etc.) are significant for profitability because the trend for basic treatment-

refinement charges (TC-RC), received from the smelting process, has been downward. These free metals are metals which are free for Factory 1 and the revenue derived from them belongs to Factory 1, rather than to the raw material supplier. In addition to metal content, the way in which the production process is driven is important. Errors in the production process reduce the amount of profit gained from so called free metals or even create a loss, causing the company to pay for a higher metal amount than it receives from the production process, which is "a severe situation" (Production Manager, Factory 1, 05/11/2009).

> *A common trend in the metal processing business is that companies don't make money through their sales but through their purchases (Controller 2, Metal Ltd, 003/11/2010).*

The controller's argument demonstrates the importance of procurement operations for the case company because copper metal always has customers, whereas obtaining concentrates is a real challenge. In order to manage this, Metal Ltd has long had co-operation with mines. Its purpose has been to construct a picture of being a reliable partner for mines (Production manager, Factory 1, 05/11/2009). The situation is severe, particularly in the case of copper concentrate, which is the reason why the company does not see any increase in its copper business as viable in the next few years (General Manager, Factory 1 until 06/04/2010).

In the metal processing business (smelting and mining) the understanding of macro-economic trends is crucial. The end product (copper or zinc) is standardised according to prices set on the London Metal Exchange (LME) and overall the questions relate more to purchasing rather than selling issues. The business is not compatible with consumer-oriented businesses where the question deals with such issues as how to gain market-share (Chief Financial Officer, 03/11/2010). The demand for the case company's end products (zinc and copper) is mainly determined by investments in infrastructure. Copper is mainly used within the construction industry to transmit power but also by the manufacturers of electronic and electro technical engineering products. The second main user of copper is the automotive industry, which uses copper metal in generators and electrical motors (Annual Report 2008).

The availability of raw materials is the key success factor in the metal process industry. The fact that worldwide smelter capacity is larger than the capacity of the mines during the research period was the starting point for the strategic changes that have been observed, such as the use of renewable raw materials. That his resulted in mines feeling the pressure to operate near their full capacity level, but generally smelters operate at short capacity due to a lack of raw materials. The situation is further worsened by the long lead times of mines, which means that the time from the discovery of a new mine deposit to production is quite long – from five to ten years (Annual Report 2009), That

implies that the supply of raw material (concentrate) is less elastic than the cyclically sensitive demand for metals.

In order to cope with the fact that smelter capacity is larger than that of the mines, Metal Ltd has set up a team which actively searches for new investment targets, such as new mines. However, the world's mine resources are well known; it may be the possibility that no new mines will be excavated in the near future, which places pressure on the price of concentrate (Chief Financial Officer, 03/11/2010). During the research period, investments in new mines were postponed due to falling metal prices and the economic recession. Nevertheless, the position can change when the price of copper rises, raising the possibility that new mines will become profitable. The availability of concentrate was further restricted by falling metal grades in many mines, which is a common phenomenon when a mine comes closer to the end of its lifespan (Metal Ltd. Annual Report 2009). Forecasts imply that the prevailing situation can change within three to five years. However, prior to that, overall copper production capacity may decline temporarily until new mine projects come into production (President, Smelting Business Area, Metal Ltd, 04/03/2010). The prevailing situation puts mines in a powerful position in relation to the smelters, which have to compete in order to obtain concentrate (Chief Financial Officer, 03/11/2010).

To summarise, due to prevailing conditions, Metal Ltd does not have plans to enlarge its smelter side during the coming years. The expansion of mining would be done if there were any potential mines for sale. The second factor restricting expansion in the smelting business is the location of the company far from growing market areas such as China or India (President, Smelting Business Area, interview 04/03/2010).

The following subchapter analyses the situation in the pulp and paper business where the traditional production paradigm can no longer serve as a measure of the technical development of industry anymore. The Finnish pulp and paper and forest industry faced a profitability crisis from 2008 onwards and is finally being forced to consider new revenue possibilities (Hetemäki et al. 2011, 76).

The pulp and paper business

The Finnish forest industry has been "driftwood" since the beginning of the 21st century. The traditional and dominant production paradigm of the paper industry: more, wider and faster has served as the measure of technical development in the industry. The discussion in Finnish industrial companies has traditionally commenced from raw materials and technical details, rather than from the perspective of the customer or the end product. Recent discussions in the media have demonstrated that this way of thinking is changing in Finland as industrial production no longer has to be driven solely by the raw material side (Temmes & Pantzar 2009, 40-41). The representative example is the forest industry which has realised that the development of new innovative products and their commercialisation demands a different know-how and organisation structure than

that of the production or the sale of the standardised bulk products (Lamberg & Peltoniemi 2010, 8).

The profitability crisis was further deepened by Russian import duties, the high prices of wood and the location of Finnish mills far from the main markets. Deep knowledge and significant capital investment have offered the Finnish forest and pulp and paper industry companies a competitive advantage (Lamberg & Peltoniemi 2010, 8). However, the renewal of the Finnish forest industry companies depends on their overall profitability, which influences the company's ability to innovate and to invest in new products and services (Hetemäki et al. 2011, 76). An indicator of the new way of thinking is shown by Pulp Ltd: previously the customer was once viewed as being used for pulp storage, nowadays the customer is the end user of paper (Group Controller 21/09/2009). The following subchapters concentrate on the further discussion of industry-specific change trends. The trends discussed are the growth of processed production, based on rapidly growing plantations; the increasing significance of electronic communication; and the increasing significance of energy questions and so called "green energy".

The development of the pulp industry is tightly tied to four factors: the price of wood, the price of paper, the operating level of paper machines, and the level of the world's pulp inventories. The significant pulp manufacturers are the USA (even if the trend there is downward), Canada, Brazil, China, Russia as well as India which has increased its weight in the pulp business. Pulp Ltd belongs to the tenth biggest pulp manufacturer in the world (Senior Vice President, Finance, 05/03/2010). China and South America have been the main targets of greenfield investments for the Finnish forest and pulp industry companies during the last decade. The strategic directions and guidelines drawn by the Finnish forest and pulp industry companies particularly emphasise such market areas for the future. In addition, Russia can also be an investment location, although that is doubtful (RISI 2009; 2010). (RISI is one of the world's most recognised operators, producing systematic evaluations of the pulp and paper industries' market trends.)

The most cost effective competitors to Finnish companies come from Chile and Brazil, where the growth rate of a tree is approximately eight times faster than that of the Northern softwood zone. In South America, one hectare offers seven to 12 tons of pulp per year in comparison with one ton of pulp in Finland; this has a direct influence on production costs. Pulp mills which are located in South America are large and cost effective; the production capacity of one mill is equivalent to that of two Northern zone pulp mills. South America possesses similar problems to those of China as there is a lack of land, which raises its price and further influences production costs. This factor implies that the production costs will stabilise between South America and the Northern softwood forest zone (Hetemäki et al. 2011, 55). The Finnish pulp and paper industry companies have looked for growth from China and South America by investing in greenfield factories there. Finland is located far from those expanding market areas, a

fact which inevitably directs the production of Finnish pulp factories towards value-added products. Growth comes from countries where the cost level is lower and where the growth rate of trees is faster than in the Northern softwood zone.

The decline in the consumption of printing paper has also reduced the amount of paper produced, for example, in the USA. Compared to the USA, the situation in Europe has remained quite stable according to RISI (2009; 2010). The most significant single factor in the reduction of printing paper has been the increasing significance of electronic communication, which has reduced the pricing power of the paper industry (see Anderson, Clark, Eilertsen, Gjerstad, Gordon & Lange 2007). The other reasons for the decline in the amount of printing paper produced has been the movement to other paper qualities, the reduction of advertisements and smaller-sized tabloid papers.

Printing paper has held a central position in the paper industry and it is estimated that printing paper covers about three-quarters of the overall exported amount of the Finnish paper industry (in the year 2008). Printing paper is therefore the most significant product of Finnish forest industry. However, there are product categories, such as packing, board and tissue products, which electronic communication does not directly affect. On the contrary, electronic communication can even increase their consumption (Vice President, Mill Manager, 23/11/2009). Possibly, the production capacity of packing and board products will expand in Finland or other parts of world, but their amount still remains only a fifth of the whole paper industry's production capacity. The economic development of China and other upward economies will largely determine the future consumption of printing and packing papers (Hetemäki et al. 2011, 59-60; Hetemäki & Hänninen 2009).

Paper industry companies will have to find new revenue streams to compensate for the reduction in profit from their main business. Simultaneously with the downward development trends concerning paper consumption, the price trend for energy products has been upwards, which increases the paper industry companies' interest in it. The second reason why the significance of the energy questions has become evident is that the EU has set targets concerning the amount of renewable energy and, according to those targets, the percentage of renewable energy should be higher (Eloranta et al. 2010, 179). This fact explains why renewable energy issues have raised the question of potential new revenue, even if it brings uncertainty concerning profitability issues and its possible unfavourable effects on the markets. This partly explains why investments in biofuel factories have remained at low levels (Hetemäki et al. 2011, 65). Consequently, the Finnish state has supported the use of renewable energy options by offering investment funding to biofuel factories and by setting targets for the use of renewable energies (Hetemäki et al. 2011, 65). There has been much discussion concerning the right way to offer support to biofuel factories. Some parties have questioned the current investment funding by claiming that it is an ineffective method for factories and that support should be tied to the production output of factories.

The establishment of biofuel factories can begin the era not only of acquisitions and mergers but also of the establishment of cooperation with companies in the energy and forest industries. In fact, a few biofuel factories have begun production. Already many forest industry companies have increased the number of energy-related operations in their business operations, and this will have consequences throughout the whole sector (Hetemäki et al. 2011, 66). The future of the bioenergy business is dependent on many factors that are outside the control of operators, such as the development of global energy consumption, the availability of energy sources, domestic and foreign policies and technological developments (Hetemäki et al. 2011, 65).

To summarise, the Finnish pulp and paper industry has faced a structural transformation which has influenced the industry in various ways. This discussion has united the industry, partly because its companies are highly dependent upon each other for development. Possibly the specific dominator which ties the industry strongly to the structural transformation process was the fact that it operates as a key industry for connecting Finland to global development trends. The pulp and paper industry built its success on a paradigm which no longer acts as the measure of technical development. Thus, it is forced to find new competitive advantages and bioenergy is thought of as having particularly strong potential.

Finnish pulp and paper industry companies have invested in the growing business areas by establishing factories in China and South America. Europe as a market area is quite stable; the printing paper business is not expected to grow but there is growth potential for the board and the tissue paper business. In order to succeed, Finnish companies have tried to construct the image of a reliable partner and customised their products as much as possible to add value to their products. Finnish companies have to link their competitive success to factors other than the lowest price, and this demands new valued-added solutions. In order to compensate for losses due to the decline in paper consumption and the high price of wood, the Finnish pulp and paper industry companies have increased the amount of new products, such as energy products, in their business, which may begin an era of mergers and acquisitions in industry. However, the bioenergy business is marked by many uncertainties, one of the greatest being the overall profitability of business.

Closing discussion about trends in the external economic environment

In the future, the global supply and demand balance will largely be determined by such E7 countries as China. Finland's high costs and distant location from the growing market areas and will force it to compete with factors like high quality, productivity and customer value. China is an emerging consumer of metals and pulp; the consumption of paper is concentrated there and investment in the construction of infrastructure will continue to emerge in China. China as a market area possess advantages which create disadvantages for European operators, such as relative cost advantages, different operating

rules concerning purchase terms for raw material (copper) and fewer environmental regulations. However, the lack of available land area will limit the possibility to build new sites in China. Furthermore, China's future economic development largely depends upon how Chinese companies succeed in their investment in R&D operations. What is evident, nevertheless, is that China will have a significant global position due to the amount of greenfield investments being made there.

The second global level trend which has been analysed is the growing service orientation which is closely connected with both globalisation and the China trend. When bulk production (homogeneous standard production) moves to lower cost countries, service operations become a way to compete against low cost countries. The growth of service operations can be analysed from two different perspectives: either from operations, which are linked to their own business; or from the service network, which emphasises networks outside the company. Firstly, when the service function is connected to the company's own operation it includes the adding of service components to the product in order to customise it. Customisation is also possible in the bulk product business, even though the possibilities are more restricted compared to the standard goods industry. For example Metal Ltd has done some customisation of its copper products for particular customers. Secondly, the service network view emphasises those service networks which are the supporting services produced by outside subcontractors or so called partnership companies. These companies have an influential role to play in producing various supporting operations, such as maintenance or logistics. The role of these companies will be further discussed as the part of a company's strategy. The establishment of service networks forces companies to create a control mechanism so that they can control a network according to strategic guidelines. In these networks companies operate more or less in open systems where information flow and open communication become key success factors.

Those industries that produce durable goods (such as the forestry, engineering workshop, metal and the construction industries) are examples of cyclical industries. A cyclical industry is a type of industry which is sensitive to the business cycle, such that revenues are generally higher in periods of economic prosperity and expansion, but lower in periods of economic downturn and recession. Both case companies operate in cyclical industries and business fluctuations have a considerable effect on their operations.

Fluctuations (either upward or downward) typically occur between certain time periods, but the current research was done during a time when several factors collapsed simultaneously. Firstly, the downward cyclical trend – connected with the global economic recession – and the industry specific trends caused a heightened joint effect, which further worsened the economic environment of the companies. The structural transformation describes the wide variety of influences which resulted in permanent changes to the structures of the industries. Structural transformation does not mean that companies abandon their basic strategy, but rather that they add the elements from differentiation to offset possible losses to their main strategic orientation. These innovative

elements can be considered the service components which relate, for example, to customer service or to delivery terms. Today's industrial environment underlines such principles, which state that today's special product is tomorrow's bulk product (Eloranta et al. 2010, 84).

The aim of next subchapter is to describe the empirical background of the case companies. The empirical section provides the basis for the subsequent analysis in chapter 4.

3.2 The background of the case companies

Metal Ltd

Metal Ltd is a leading European metal company with its head office in Sweden. The company has a total of approximately 4,400 employees and about 400 employees in Factory 1. Factory 1 produces copper, and nickel as its main metals. The main metals of Metal Ltd are copper and zinc but because Factory 1 produces copper, the research focuses mainly on the copper business. Metal Ltd's operations focus on the initial stages of the metal processing chain in exploration, mining, smelting, and recycling. The business concept is to extract minerals and produce metals in a cost-effective and environmentally friendly way. The company's main metals are zinc and copper, but the extraction of lead, gold, silver and other products is also important in terms of its profitability (Annual Report 2009). Its operations are organised into two business areas which are mines and smelters. It has four mining areas and five smelters in Northern Europe (Annual Report 2009). The head office of Metal Ltd is located in Sweden. The case company's first ore was found in Sweden in 1924. After the merger of two companies in February 1931, Metal Ltd came into being. Few smelters internationally were able to process high arsenic content ore, so the company decided to build its own smelter to ensure the production of gold, silver and copper. By 1935, there were 2,500 people working for the company. The company continued to grow and prosper in the 1960s and continued exploration at new deposits. Between 1987 and 1992 the company acquired several manufacturing businesses producing brass and copper products. In 1994 and 1995 the company made substantial investments in both the mining and smelting divisions. In April 1998 the case company made a disastrous acquisition and almost went bankrupt. The acquisition and the consequences arising from it set Metal Ltd on its current development path. In 1999, Metal Ltd's reorganised at group company level and was listed on the Stockholm Stock Exchange (secondary listing). In 2001 the whole group moved back to Sweden and its shares began trading on the Stockholm Stock Exchange in a complete restart for the company.

> *There was a rescue operation by financial investors in 2001 and we moved Head Office to Sweden. A new Board of Directors was appointed too, which meant*

> *that we had totally new management in Stockholm. Yet, all our units operated as nothing had taken place, which built autonomy in the units. We had to build up a new corporate structure and control systems as well. When I came to the board in 2003, the situation was still quite confused. In the beginning we had to sit long days and nights in order to understand what was taking place. We were all quite new in the business so we didn't understand it fully (President, Smelting Business Area, interview 04/3/2010).*

The next considerable shift which significantly influenced the future of Metal Ltd occurred in 2003. At the end of 2003, Metal Ltd acquired the mining and smelting assets of a Finnish mining and smelting company. Two of the smelters were located in Finland, the third in Norway. The acquisition included a zinc mine in Ireland. In 2004, a new Metal Ltd was created. According to Business Area Manager, the advantages gained were huge and this was when Factory 1 was bought.

> *After the acquisition we were a fairly large company. The heritage and precious culture adopted from the Finnish company assisted us enormously. We believed that during the coming years we had higher ambitions because we had bought these two units from the Finnish mining and smelting company. We built a new culture for our company due to the Finnish directness, which helped us I would say. Then we felt that we could reduce our control. Now we have prestigious control and everything runs smoothly (President, Smelting Business Area, interview 04/03/2010).*

The Finnish metal company brought a lot of new knowledge and new corporate culture into the company. In 2006, Metal Ltd decided to invest in order to expand the operations at one of its mines. The new facilities were inaugurated in 2010. They doubled the mine's annual ore production and expanded copper production, hopefully by fifty percent by 2014. In 2010, the company decided to expand the electronic scrap recycling facility at one of its smelting plants. A decision to carry out a major expansion in one particular mine was taken in January 2011. The expansion will be carried out between 2011 and 2014, reaching full production capacity by the end of 2015. The case company is also starting the mine in order to extract gold and tellurium (Metal Ltd's webpages).

To conclude, Metal Ltd faced periods which shaped its future. The first of them was 2001 when the company was close to bankruptcy and which resulted in the appointment of new management. The second major restructuring period occurred in 2004 when the new Metal Ltd was created. The management of Metal Ltd recognises that the knowledge received from the Finnish mining and smelting company assisted it in building its own control systems and corporate culture. After that the focus has been on the mining business, either on the expansion of it or on the opening of new mines. The timeline for the main milestones in Metal Ltd is shown in Figure 6:

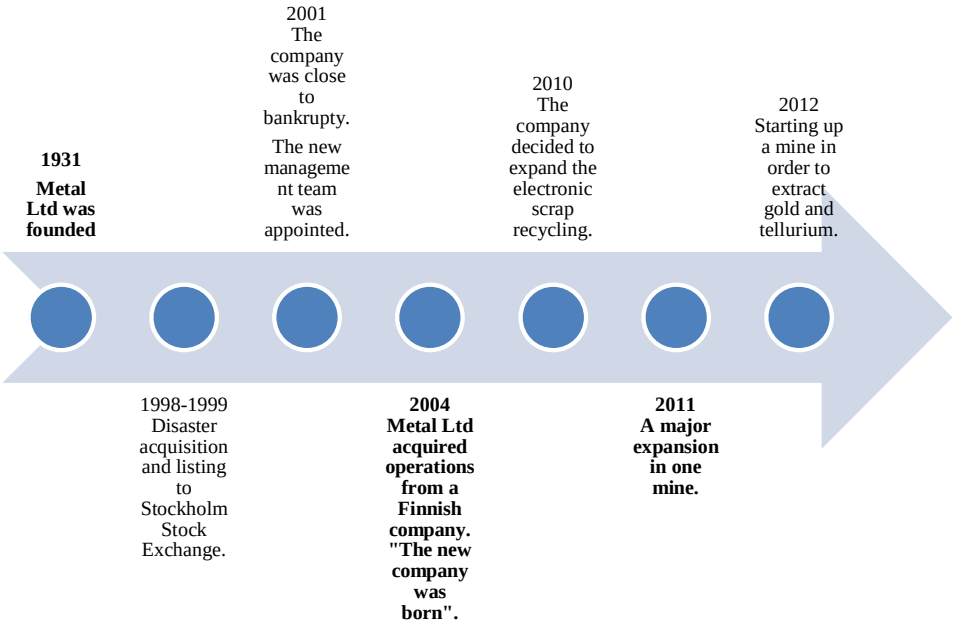

Figure 7 The timeline for the main events in Metal Ltd

Metal Ltd has a group organisation with two business areas (mines and smelters). The company has five units in the smelting business area (BA). Two zinc smelters and two copper smelters and one lead smelter. Nowadays the smelting BA also has a commercial department which supports all units by providing raw materials and taking care of the sales of finished products. The commercial department comprises operations, such as raw materials purchasing, metal sales, risk management operations and the accounting function (Controller 2, Head Office, Metal Ltd, 03/11/2010). The organisation chart of Metal Ltd is presented in Appendix 3.

Metal Ltd's Accounting and Financing Department includes IT operations, group control functions, treasury, and internal auditing and risk management operations. There are 13 personnel in the Accounting and Financial Department; three of them work in reporting/controlling, eight in the treasury and one in both internal auditing and investor relations (Chief Financial Officer, Head Office, Metal Ltd, 03/11/2010). The Group Controllers work under the CFO in order to analyse markets and factories. One controller works in the smelting BA and produces reports covering the business area (Financial Manager, Factory 1, Metal Ltd, 23/09/2009).

Factory 1 has a financial department that is managed by the Financial Manager with two controllers who deal with management accounting issues and Financial Assistant

who deals with other administrative duties such as invoicing and financing. The Financial Manager of Factory 1 is a member of the Management Board. Two controllers who work under the Financial Manager participate in the work of the board when needed but they are not board members. Both of the financial organisation charts (Metal Ltd and Factory 1) are presented in Appendix 4. Next, a short summary of of Pulp Ltd follows.

Pulp Ltd

Pulp Ltd was founded in 1973. It manufactures bleached pulp grades and its Head Office is located in Finland. In 2010, Pulp Ltd has approximately 800 employees. Earlier Pulp Ltd operated as a resource company, selling pulp primarily to its owners. Currently, Pulp Ltd is part of a larger group and, furthermore, one of the world's principal suppliers of market pulp for many companies. Nowadays, Pulp Ltd has approximately 2,000 employees. The company's pulps (softwood and hardwood) are for manufacturing printing and writing papers, boards, specialty and tissue papers.

In 1997 Pulp Ltd acquired Pulp Mill 1 which specialises in manufacturing pulp for wood-fibre printing papers and for coated printing and speciality papers. Pulp Mill 2 went into production 1985. It is specialised in manufacturing pulps for use in making printing papers and folding boxboard. Pulp Mill 3 manufactures pulp for magazine papers and tissue paper pulp. After the merger, Pulp Ltd became the owner of Mill 4 in 1991. Mill 4 is specialised in producing tissue and speciality papers.

Pulp Mill 5 was the company's first pulp mill and it began in 1977. It was closed down in 2009 because it reached the end of its technical lifecycle and its profitability had deteriorated in a highly competitive market situation. In this study the closure of Mill 5 is seen as a strategy-related project. In 2010, Pulp Ltd strengthened its position as a producer of softwood pulp and became a group company focusing on selling pulp to third party market customer. The company's position in the group was reinforced in 2011 when A, its main owner, expanded ownership in Pulp Ltd. Pulp Ltd redeemed its own shares from Owner B on the basis of the shareholders' agreement the parties had made in 2009. Due to the redemption, Owner A now owns around 57% of the company, Owner B 11% and Owner C 32%. Owner A was granted a call option for the rest of Pulp Ltd's shares. The call option is valid for two years. Pulp Mill 1 boosted its energy efficiency through pioneering work. The idea is that after the investment in bioenergy was completed in June 2012, the mill will use only green fuels and will become the first carbon neutral pulp mill in Finland. In addition, the whole group is participating in a feasibility study with two energy companies for constructing a bio refinery for biogas production in Mill 1. Gradually in 2012, Pulp Ltd became part of the group. It has adopted a new group corporate image which reflects a major strategic change. Pulp Ltd is now part of a single group and its strategy directs it towards a common goal. The CFO believes that co-operation inside the group will expand and the search for new synergy possibilities is ongoing (Senior Vice President, Finance, 31/05/2010).

Before 2009, the company had one mill outside Finland which it established in South America in November 2007. The mill manufactures pulp from Eucalyptus trees. and produced one million tons of pulp between May 2008 and April 2009. In December 2009, Pulp Mill 6 was divested to Owner B.

In addition to basic products, Pulp Ltd has additional revenue streams which support its traditional business. Today, close to 10% of its turnover comes from its by-products, such as electricity, heating, bark fuels, crude tall oil and turpentine. Pulp Ltd's sales portfolio includes 10-15 pulp grades and it is becoming a supplier of fibre to the expanding markets of the Far East. The company also provides technical customer service with fibre expertise and global support services, including logistics and warehousing through its long-term partners.

The timeline of the main events in Pulp Ltd's history is pictured in Figure 7. Today, Pulp Ltd is a major producer of softwood pulp for high-quality paper, board and tissue producers in Europe and the Far East.

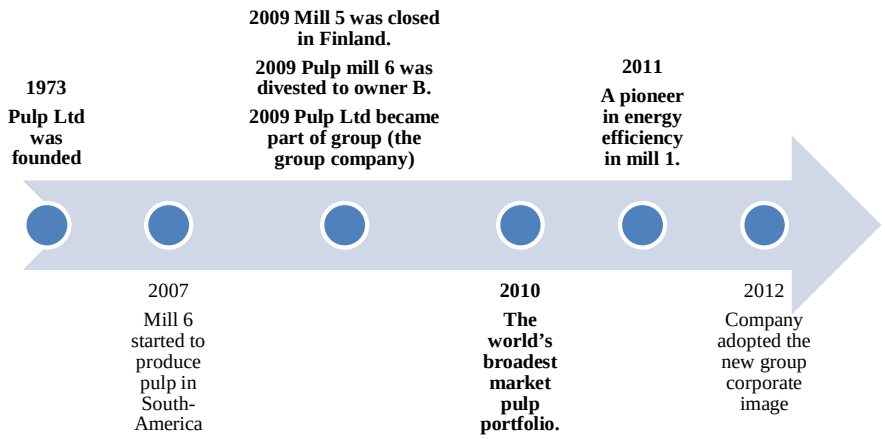

Figure 8 The timeline of the significant events in Pulp Ltd's history

Pulp Ltd describes its organisation as core processes which are management, customership and sourcing and operations. Personnel are organised into competition centres which are business development, business support and steering, production and sales and marketing. The managers of core processes and competition centres belong to the Management Group of the company (Internal report, 2010). The organisation chart is pictured in Appendix 5.

Before the outsourcing project, the financial administration of Pulp Ltd was divided into four departments which were Bookkeeping, Reporting and Group Controlling, Financing and ICT services. During the outsourcing process, bookkeeping and ICT were

outsourced to the respective departments of the group, financing activities were concentrated within the group's financing company (Senior Vice President, Finance, 05/03/2010). As a result of the changes, group controlling became the most significant part of the CFO's responsibility. In the Head Office there are three controllers in addition to the CFO. In each mill there is one (mill) controller and, moreover, some of the controllers operate as competence centre controllers. Pulp Ltd's personnel are located in the competence centres in the organizational chart. There is also one controller located in the Russian saw-mill (Controller 1, Head Office, 19/11/2009).

Different working groups form important channels for information exchange and the co-ordination of administrative tasks and assignments with the CFO. The CFO participates on the Board of Directors of the Group finance company, representing the case company. The Group has a separate financing company which acts as the central organisation for all financing-related issues. Its board consists of each company's CFO and its chairman is the CFO of the whole group. In addition there is also a CFO group which meets every month (each company's CFO represents their own company). Furthermore, the CFO regularly meets with the managers of the outsourced functions (bookkeeping and ICT) in order to coordinate the tasks and assignments (Senior Vice President, Finance, 31/05/2010). The Finance Department of Pulp Ltd is presented in Appendix 6.

Currently, the situation in the pulp industry is undergoing structural change due to developments in the industry. The trends which caused structural changes in the pulp industry are discussed in more detail at the beginning of Chapter 4. The pulp industry is considered part of paper industry, which has a long history in Finland and particularly during the research period when the industry seemed to be a "hot case". This became obvious due to the large number of articles in the press about the situation in the paper industry.

To summarise, Pulp Ltd faced several incidents which affected its future during the research period. The first of them was the closure of Mill 5 which is analysed in further detail in this study. The second was the decision to divest the Mill in South America in December 2009 when Pulp Ltd decided to concentrate on its operations in Finland. The third occurred in 2012 when Pulp Ltd became part of a larger group. Appendix 7 summarises the main facts of both companies.

3.3 Strategy as a macro-actor

The analytical definition of strategy is based on Callon and Latour's (1981) and Skaerbaek & Tryggestad's (2010) definitions which argue that strategy is a macro-actor which consists of several linking parts which are, to a remarkable extent, similar and can be placed together so that a broader construction can arise. These linking parts are partnership strategies and strategic projects which are connected to actual strategy. The subchapter also summarises the main points of the strategic change period. The first part

of the subchapter focuses on the preceding conditions (also called the economic environment) of the case companies' industries during the research period (from 2008 to 2010).

3.3.1 The prevailing economic background in the case companies' industries 2008-2010

The main focus in the present research is on those changes which arise from the external environment. The analysis begins in 2008 when the economic downturn and recession began and ends in 2010 when the economic situation became more stable. Focusing on this period offers the researcher an opportunity to consider change processes as they occurred in real time. Some of these change processes are significant for understanding the role of management accounting actors.

The research was conducted in the period when several change trends occurred simultaneously. The first trend was economic recession, the effects of which were described earlier in this Chapter. The second trend was economic fluctuation and has heightened meaning, particularly for so called cyclical industries. The economic fluctuations of this period were mostly downward trends and were tightly tied with the economic recession, thus the boundaries between them often blur. As such, the fluctuations directly affected the price of raw materials and the end-products by further influencing production costs and demand. The third trend which had a significant influence, especially on the pulp and paper industry was the structural transformation of markets, which was reflected in the reduction of paper consumption.

The above mentioned trends resulted in strategic change, which is analysed in more detail below. Next, the focus is directed on Metal Ltd and developments in its economic environment during the research period.

Metal Ltd

The situation was turbulent and tough for the global economy and above all the market for metal during 2008. Zinc and copper prices were halved and many of the world's mines and smelters operated at a loss. The mining industry was in trouble and finding concentrates was a real problem for smelters like Factory 1. Metal Ltd's performance was influenced by tough market conditions, by lower production levels and higher investment costs during the year. Also, a new CEO took over at the beginning of 2008. Factory 1 concentrated all its operations in the ongoing period, in order to make its operations profitable. The fact that the demand for sulphuric acid declined dramatically during 2008 caused severe problems for Factory 1. The demand for sulphuric acid became a bottleneck in the production process, even though the demand for copper remained high. In December 2008, the company decided to cut production at their zinc

smelters in response to falling demand (Annual Report 2008). To sum up, 2008 was a year of continuous struggle due to falling metal prices, lower production levels and the problems of finding concentrates.

The copper smelters remained at low levels of capacity utilisation throughout 2009. Competition between the smelters for mined concentrate, which was in short supply, was severe during 2009 – it is expected that this situation will continue for the coming years (Annual Report 2009). At the beginning of 2009, the demand for metals was weak due to the continued fall in investment in the mature economies' construction sectors and the levelling off of growth in emerging countries. In January 2009, a decision was taken to cut production in its copper smelters due to reduced demand for metal and sulphuric acid. Production cutting operations also occurred in Factory 1 as it was forced to lay off its staff temporarily for the first time in its history. Construction investments, nevertheless, expanded substantially in China in comparison to 2008. In addition to the reduced demand for copper and sulphuric acid, the treatment and refining charges remained in an unfavourable position in relation to the smelters as the treatment and refining charge is the compensation paid to smelters for their refining of the concentrate for metals. The price of copper remained at historically high levels until the fourth quarter of 2009, when it fell by fifty percent in just a few weeks. Signs of a slow economic recovery in North America and Europe became clear in the latter half of 2009, and expectations of continued strong demand in China and economic recovery in the mature economies resulted in a rise in the prices of zinc and copper. The sulphuric acid market did gradually improve during the year, but the shortage of copper concentrate continued (Annual Report 2009). To sum up, the first signs of a slow economic recovery in North America and Europe emerged during the year but the copper smelters were forced to cut production and the shortage of copper concentrate continued.

Signs of economic recovery emerged during 2010. The rapid rate of development in China showed no signs of levelling off and the demand for metal was vigorous and there was a worldwide shortage of mining capacity, which resulted in record price levels in several metals during the year. The outcome of this was different for mines and smelters. The high metal prices were passed on to the mines, but overcapacity in the global smelting industry pushed treatment and refining charges down and resulted in a fall in the smelters' profitability (Annual Report 2010). In consequence, 2010 was a period of high metal prices, but the global overcapacity of smelters resulted in a fall in profitability. Although the situation improved during 2010, Factory 1 faced new challenges due to a strike at the Finnish ports, which resulted in losses for Factory 1.

Pulp Ltd

The Finnish forest industry has been undergoing structural transformation, which is forecast to be long-lasting (Hetemäki, Niinistö, Seppälä, Uusivuori 2011, 14). Historically, the Finnish wood industry has developed based on a combination of domestic

timber and the importing of wood resources – primarily from Russia and the Baltics. In 2008 the domestic wood supply was limited and the volume of imported wood was in question as Russia increased wood export duties. This caused a rapid rise in the cost of wood over the year and deterioration in the profitability of the case company's mills (Annual Report 2008) The development of the pulp market is strongly tied to the price of paper. The price trend of paper is a factor which influences market trends in the pulp market and the level of paper inventories. This explains why the development of the pulp market is tied to trends in the paper market.

The year 2008 was demanding in the pulp industry for many reasons. Firstly, the global economic downturn cut demand for paper, which caused production cuts in the case company's mills. Secondly, the situation worsened due to a dramatic decrease in the price of pulp in autumn 2008, which increased pulp inventories. In November 2008, Pulp Ltd announced a decision to begin negotiations on the possible closure of Pulp Mill 5 in Finland. The background to the operation was the purpose of reducing Pulp Ltd's overall wood requirements, while assisting its operations in its most modern mills, which worked closer to their nominal capacity (Annual Report 2008). In addition, there were also internal changes during the year, a new CEO was appointed at beginning of September and the previous CEO retired on 31 August, 2008. So, 2008 was demanding because the domestic wood supply was limited, which caused a rise in the cost of wood, and because of the global economic downturn, which cut demand for paper. The third point was the dramatic decrease in the pulp price, which expanded pulp inventories.

In 2009, inventories normalised and Pulp Ltd began to produce at normal operating rates, which caused a rapid rise in the cost of wood. The Confederation of European Paper Industries (CEPI) reported the following decreases in demand from 2008 levels: printing paper -15%, magazine printing paper -25% and fine paper -20%. Nevertheless, the first half of year 2009 seemed quite weak due to the stagnation of Finnish wood trade. Pulp Ltd made the decision to close Pulp Mill 5 in January 2009 because of the shortage of wood raw materials, reducing the company's overall fibre requirements. The closure of Mill 5 is examined later because that strategic project had consequences for corporate strategy as well. Positive signs, such as the recovery of China's economy from mid-2009, meant Asian customers began buying pulp again (Annual Report 2009).

Pulp Ltd decided to focus more clearly on selected core functions and to strengthen its operation in them by signing a letter of intent regarding the divestment of its foreign-based function to Owner B. In October 2009, the mill was sold to Owner B of the company. The ownership structure before that operation was that Owner A owned 23%, Owner B 47% and Owner C 30% of Pulp Ltd and after the divestment Owner A owned 53%, Owner B owned 17% and Owner C owned 30% of Pulp Ltd. Also, with the arrangement, Owner A strengthened its position as a producer of long-fibre pulp and exited the production of short-fibre pulp. In December 2009, Pulp Ltd became a subsidiary of Owner A, which meant that the role of Pulp Ltd began to change inside the group: it became a group company, instead of a resource company for its owners. Pulp Ltd was

forced to begin statutory labour negotiations due to the closure of Mill 5, the divestment of foreign operations and the more efficient utilisation of Owner A synergies (Annual Report 2009). To summarise, the first half of 2009 seemed weak due to the stagnation of the Finnish wood trade but such positive signs as the recovery of China's economy from mid-2009 meant that Asian customers began buying pulp again. The management of the company decided to concentrate on its domestic operations, which meant that it sold its foreign-based operations to Owner B. The arrangement changed the role of Pulp Ltd from being a resource company to becoming a group company. The final decision concerning the closure of Mill 5 was taken. The decision also caused broad public debate and criticism, but the company's management believes that the decision was right.

Due to the better market situation, the profitability of Pulp Ltd improved at the end of 2009 and at the beginning of 2010, which was strong in the pulp business in general. Thus, the selling of pulp to the market was not a problem. One sign of this is the production level of Pulp Ltd's mills which remained high over the year (Annual Report 2010). Factors, such as high pulp prices, problems regarding pulp production in many market areas such as Chile, and a strong dollar, improved Pulp Ltd's position in the market (Senior Vice President, Finance, 31/05/2010). Nevertheless, the case company's market share is small due to fragmented markets, although the fragmentation has also had positive effects; it offers the company a competitive advantage by enabling it to build a good customer portfolio (CEO, 11/10/2010). The price of pulp went down towards the end of 2010 (Senior Vice President, Finance, 05/03/2010). To conclude, such factors as the closing of unprofitable small mills, the strong dollar and Chile's earthquake improved the case company's situation in the market. The view adopted by this study presumes that strategy and change are not two independent concepts but belong together – strategy includes the components of change. Appendix 8 summarises the main trends in the metal processing and the pulp industries from the start of 2008 to the end of 2010.

Basically, the companies utilised three different ways to adapt to and manage the turbulent economic situation. Firstly, they adjusted their operations. Secondly, they improved their internal efficiency. Thirdly, they developed new revenue streams. The first one, the adjustment of operations, means that a company changes the level at which it operates. The other way to change the level of operations is to use subcontractors. The main factor is that when companies change their activity level, they enlarge or reduce their operation level. The second way to respond to a difficult economic environment is to improve the input-output ratio. This can be attained, for example, by adopting an efficiency boosting project (as Metal Ltd did), by integrating the information systems or by introducing synergy benefits (as Pulp Ltd did). The main point is that the level of operation does not change but efficiency improves. The third way relates to the purpose of finding new revenue opportunities in order to compensate for factors of an uncertain business climate or challenges faced in the operation of traditional production. The new, although secondary, revenue streams can offer differentiation to previous action. When

a company adds elements which bring differentiation, it may face challenges if its traditional way to operate has been on price. The challenges deal with issues such as how to control a business in which revenues come from many small streams. Companies can look for these new revenue streams, for example, from completely new business areas where the business logic is different, such as in the biodiesel industry.

3.3.2 Corporate positioning strategy

The definition of strategy in an empirical setting is Porter's (1985) classic generic strategy categorisation. Porter (1980, 1985; 1996) described three generic strategies: cost leadership, differentiation and focus. Even though the content of strategy and shifts occurred in it have been described by using these strategic archetypes, it should be noted that strategy making is a far richer and more complex and more dynamic process than the relatively orderly and static positioning school (Minzberg et al. 1998, 121). The typologies are static and they do not view strategy as a dynamic concept capable of change. Nevertheless, the classification offers a background against which a shift in strategies comes clearly visible.

Both companies describe the content of their strategies by utilising terms which derive from Porter's categorisation such as cost competitiveness, economies of scale, etc. The positioning school describes strategies which are generic, identifiable positions in the marketplace. Porter's classification is used in companies which operate in industries where movements are relatively slow and company positions in the marketplace are identifiable. In particular, the evidence received from Factory 1 (Metal Ltd) demonstrates that the strategy formation process is based on analytical methods in which analysts play a major role and are aided by managers who officially control the choices. Next, closer attention is paid to the strategy concept of both case companies.

Metal Ltd

The company has annual strategy processes for group, business area and unit level. The group level contains elements that are valid for smelters and mines, while the business area level contains elements which are valid only for smelters or mines. Metal Ltd begins strategy work in spring and completes it in autumn. The strategy process model represents both the top down and bottom up models. Even if the group offers clear targets for the process, the units have a lot of freedom for formulating their strategies, although the units have to meet the return requirements of the group in the long-term. Metal Ltd's strategic mission is to produce metals through exploration, mining, smelting and recycling operations. According to the mission, it wants to be one of the industry leaders as regards value generation for its shareholders and accepting responsibility for people, the environment and society. Thus, Metal Ltd wants to be in a top position

among medium-sized base metal companies by creating strong mines, efficient smelters and being the first choice as a business partner. It has three strategic focus areas which are increasing operational efficiency, organic growth and the acquisition of productive mines and mining projects (Metal Ltd's webpages).

Metal Ltd's actions between 2010 and 2012 determined its strategic focus: to expand its mining operation. Metal Ltd is currently conducting a number of expansion projects at its mines. Such investments are based on known assets and processes, which often means lower risk levels, shorter lead times and lower costs than expanding in conjunction with growth through acquisitions. The company's ambition is to grow not only organically, but through the acquisition of mines and mine projects, which explains why it works continuously on the evaluation of potential acquisition projects. The prevailing situation is made problematic by the fact that the amount of mines in the world is fewer than the number of smelters, and this situation is expected to continue in the coming years. The acquisition of operating mines is preferable because it ensures long-term production capacity. In smelting, strategy also concerns other issues, such as how to improve productivity, processes or the ability to work with secondary materials (Metal Ltd's webpages). The focus of strategy has also shifted to smelters' strategic core area: improving efficiency, which deals with the strategic project – the efficiency boosting project will be described in more detail below.

One particular fact which has underlined Metal Ltd's strategy has been its production-oriented mode of operation. In brief, the core of their strategy deals more with production and raw material issues than marketing or selling issues – as the following quotation shows:

> *The challenge in Metal Ltd's operation is to sell everything as profitably as possible. Profitability comes from proximity to customer because we pay the transportation cost to the customer. Metal Ltd's purpose is to sell to industrial customers or to traders, but if this is not possible then it sells to warehouses. The issues often deal with revenues, prices and costs because the market price of any metal is very well known. A company can always sell everything it produces, so it should produce as much as possible (President, Smelting Business Area, 03/04/2010).*

From this point of view the business largely depends on production rather than on some other business. The customer does not drive the strategy of Metal Ltd to a large extent. The core elements of strategy, production and raw material acquisition play a more important role than sales and marketing because, for example, there is always a ready market for copper.

The development of strategy has included the long-term trend which implies that strategy has moved closer to practice, thus management accounting has been more connected to the strategy process. This demonstrates that the strategic targets presented

should also be realised in practice, which has brought accounting and strategy together as the following statement by the Financial Manager of Factory 1 suggests:

> *Before 2003 the profit and loss accounts were prepared for the next 10 to 20 years. In addition, the concepts presented were ambitious and not, to a considerable extent, practical ones. Now strategies are more practical. Companies have the ambition to realise them in practice. Thus accounting is bound more to the strategy process (Financial Manager, Factory 1, 31/08/2009).*

The role of local actors in formulating organisation strategy is important, particularly when head office does not necessarily know all the details concerning organisational technologies or other possibilities. In these circumstances it becomes crucial to offer ideas concerning a unit's operations and also to offer ideas concerning the coming years to Head Office (Financial Manager, Factory 1, 23/09/2009).

To conclude, the strategy of Metal Ltd deals with production and raw material issues instead of selling side issues because there is always a market for copper and zinc. The development trends of their strategy underline the fact that it has become more practical, which ties accounting more closely to the strategy process. The aim is to realise strategic targets in practice as well. There are two linking parts in the strategy concept. By describing those, this study aims to show the multi-faceted nature of strategy. Two broader constructions which emerged during the interviews are partnership strategies and strategic level projects. Strategic partnerships with most the important contractors are the first linking part, which is connected to corporate strategy. The second linking part contains the strategic projects. The focus is thus shifted onto such strategic projects which have evident strategic significance and, in some cases, they are made up of several projects sub-projects, each one of which has its own defined and separate strategic significance.

Partnership strategies

Partnership relationships represent hybrid forms of governance that enable organisations to gain access to technologies, competencies, economies of scale and the scope of trading partners in more efficient ways than through arm's length transactions or through vertical integration (Coad & Cullen 2006, 343). Companies do not anymore produce all service operations by themselves but instead they outsource such functions which do not relate to their core business. It illustrates the construction that has the purpose of realising in practice part of the following statement which crystalises the strategy of Factory 1: High-quality operation cost-effectively with a light balance sheet.

The purpose of the partnership network establishment was to adapt to fluctuating demand, to manage asset and liability relations and to transfer fixed assets to partners and to change fixed costs to variable costs. According to the manager who is responsi-

ble for partnership strategies, the dominant strategy with partners is often cost competitiveness. Nevertheless, Factory 1 has considered that, for some of its partners, it would be better to move towards differentiation. It has therefore entered into strategic partnerships with its most important subcontractors, such as maintenance or internal logistics operators. Together all subcontractors or partnership companies cover about forty percent of the annual costs of Factory 1 and so they have a significant impact on company profit (Administration and Technical Services Manager, Factory 1, 06/10/2009).

Only by considering that collaborating firms are intertwined in complex networks of differentiated tasks and individual relationships is it possible to develop a customised network of management accounting information flows to control inter-organisational interaction efficiently (Caglio & Ditillo 2012, 62). In Metal Ltd, its partners' performance is checked according to accepted standards in managers' quarterly meetings. Different measures are used in order to evaluate a partner's performance. Each partner has a measure of their own, which is changed when necessary. The purpose of the measures it is to make sure that the partner is committed to developing operations (Manager, Business Development, 22/01/2010). However, Factory 1 believes that it should update some of its measures due to its shift in strategy. In future, the aim is to develop measures from cost competitiveness to considering other factors as well, such as quality or customer satisfaction (Administration and Technical Services Manager, Factory 1, 16/03/2010).

Each partnership strategy contains its own measures and target which are used in order to evaluate a partner's performance. These measures are weighted to cost competitiveness, so, in the future, the company will evaluate them more from the point of view of differentiation.

Strategic project - Increasing operational efficiency project "the New Metal Ltd project"

Manufacturing firms have responded to the highly competitive market of the past two decades by implementing such practices as quality circles, statistical process control, the theory of constraints, just-in-time inventory management (JIT), total quality management (TQM), six sigma, and total preventive maintenance (TPM). More recently, these practices have been recognised as elements of a lean manufacturing strategy (Fullerton, Kennedy & Widener 2013, 50). The Increasing Operational Efficiency Project was general in nature and included a common toolbox containing different tools from which units could select those that seemed to be most workable. Continuous improvement was the cross-sectional theme of the project.

The project included points from the lean philosophy which is often regarded as the most important strategy for manufacturing firms (see Fullerton et al. 2013, 50), but the project itself was broader than mere lean philosophy (Manager, Business Excellence, Factory 1, 31/03/2010) The background reason for starting the project was the economic

situation. The project is a change project with the aim of ensuring the future possibilities of Metal Ltd (Manager, Business Excellence, Factory 1, 31/03/2010).

The smelting side of Metal Ltd's strategy concerns issues such as improving productivity and performance processes. The project especially supports these strategic focus areas. The project was implemented in the Head Office and on the unit level, but it was particularly significant for the smelting business area, due to the similarity of the project's purposes and the business area's purposes. The project's common purpose was to change how things are done – to change the culture in Metal Ltd. A more practical purpose of the project was to improve overall effectiveness, to make the processes more workable and to reduce waste in Metal Ltd as well as in its units. Efficient operations, high levels of capacity utilisation and low costs boost competitiveness and enhance a company's ability to cope with periods when metal prices are low. Fullerton et al (2013, 66) pointed out that as the implementation of a lean manufacturing strategy intensifies, the organisation simplifies its internal accounting reporting system, eliminates inventory tracking and overhead allocations, and increases its use of value stream costing. The case company's efficiency enhancement work is based on a group-wide organisation and production philosophy, "New Metal Ltd," ensuring projects are implemented in the fields of production efficiency, leadership and decision-making, quality and financial control (Metal Ltd's webpages)

In Head Office, the project consisted of four different sub-projects. The aim of the first sub-project was to change the IT system in order to improve the business processes. The second project concentrated on improving organisational effectiveness, the third focused on performance management and the fourth on the sales and operational planning (Controller 2. 03/11/2010). The group gave the units freedom to decide how to follow the project. Factory 1 considered the project a strategic one and it promoted the project in many ways inside the unit.

Pulp Ltd

Pulp Ltd is a world-leading producer of softwood pulp for high-quality paper, board and tissue producers in Europe and the Far East (Pulp Ltd webpages). Currently, Pulp Ltd is one subsidiary within a group which follows a certain corporate portfolio. The portfolio is a collection of businesses which make up the company. The best-known portfolio planning tool is perhaps the growth-share matrix, which is seen to be part of portfolio planning and comes from the Boston Consulting Group (Mintzberg 1998, 94-95). The group has five core businesses: tissue and cooking papers, board, pulp, wood products and wood trade and forestry services (CEO, 11/10/2010). The group's mission has been to competitively procure, market and upgrade Finnish wood at its own production units so as to enhance the value of its owner members' assets and Pulp Ltd's mission is to be the most competitive and efficient pulp producer for their customers in Europe and the Far East.

Pulp Ltd structures its operations via core processes, which define the targets and procedures implemented. The core processes of Pulp Ltd are sourcing and operations, customership and management (Senior Vice President, Finance, 05/03/2010). Each process has its own tasks. The management process creates and implements the strategy, customer process comprises a full range of activities for how the company interfaces with customers and how it supports their businesses. Lastly, the sourcing and operations process entails how the company internally operates when conducting its business. The sourcing and operations process contains operations from the sourcing of raw materials to how the company physically produces its products. In addition to core processes the company describes its operations using the term competence centre, which describes how the personnel are organised (Annual Report 2009). Pulp Ltd has described its core interest groups – to which it has tailored its messages – as customers, owners, employees and society. In addition, the three "cornerstones" – customer, competence and cost efficiency – determine points which are important in order to implement the strategy.

The role change from being a resource company to a market pulp agent has increased the importance of services and technical customer support solutions in the company's strategy. Pulp Ltd has to find customer groups for which the lowest price is not decision-making criteria number one – due to its location in a country with high production and transportation costs. Pulp Ltd's purpose is to offer know-how and services to its customers, which explains why it has invested in building close partnership relations with its main customers. This ambition is mentioned in its strategy in the following way, "The objective of Pulp Ltd is to develop high quality products and services in order to support the use of its products" (CEO, 11/10/2010). Pulp Ltd has only a few competitors aiming to evolve a similar customer-focused knowledge base into their businesses (CEO, 11/10/2010). The importance given to customer service before 2009 did not stand out so much, due to the fact that the main task of Pulp Ltd was to produce pulp for its owners (CEO, 11/10/2010).

To conclude, the shift from resource company to market pulp company has influenced the strategic focus areas in Pulp Ltd. Services and technical customer support solutions have gained in importance since Pulp Ltd became a subsidiary and the seller of market pulps. Even though the cost competitiveness has and will remain the core strategy, the new elements and new revenue opportunities offers it ways to differentiate itself from competitors. In the following sections attention is focused on the linking parts of strategy.

Partnership strategies

Pulp Ltd made the strategic choice that pulp production is its core business, which is why it decided to outsource its support functions to subcontractors. The company has named its most important partners as strategic partners, such as maintenance staff, who were once Pulp Ltd`s personnel but later outsourced from a new company. Currently,

Pulp Ltd owns this new company together with an outside partner that owns 49% of the maintenance company and provides know-how for the operation (Service Supplier Steering, 17/05/2010).

Pulp Ltd evaluates the performance of strategic partners using a bonus system which includes models tailored to each partner depending on the contract signed and the nature of operations (Vice President, Mill Manager, 06/05/2010). Pulp Ltd has named a contact person who is responsible for partnership relations in general. The contact person makes sure that partners are committed to further developing their operations with the company (Service supplier steering, 17/05/2010).

Both case companies have outsourced their support functions to partners, forming the service networks surrounding them. However, increasing concerns about outsourcing in general imply that the co-ordination and controlling of these service networks will be a key success factor for Finnish industrial companies in the future.

The following chapter will discuss the second linking part of strategy, which is a strategic project in Pulp Ltd.

Strategic project - The closure of Mill 5

The closure of Mill 5 is not a strategic project in the common sense. The original reason for the closure stemmed from Pulp Ltd.'s strategy. The project was chosen for analysis, because it consisted of a whole array of accounting tools, and also because the calculations shaped the strategic choices made during the project.

Mill 5 is located in Finland and it was the oldest and most unprofitable mill of Pulp Ltd, which was one of the reasons for its closure. Nevertheless, the most significant reason for its closure was the market situation during the research period and the lack of raw material (wood) at a cost effective price. The CFO of Pulp Ltd commented:

> *The shutdown of Mill 5 was a dull operation as such. But, there wasn't any reason to retain five mills running at under capacity in a situation where we lack cost competitive wood every year. Instead, it is wiser to run four mills at full capacity and retain all staff in them. From an overall profitability point of view this was the right decision. There was a lot of criticism due to the decision but personally I believe that the decision was right (Senior Vice President, Finance, 31/05/2010).*

The decision initiated a discussion in different media, but, in the prevailing conditions, no other choice was seen as viable. A project group was established to coordinate the closure project and it held meetings each month that consisted of persons such as the Project Manager, Production Manager, HR Manager, Controller and others – making 10 in total. The purpose of the project group, whose members came from different mills,

was to update the situation and to check the correctness of financial figures. The project group was a forum for transferring information and updating forecasts.

According to the Project Controller, his main job was to collect numerical data, put it together and to report responsibilities and costs (Controller, Pulp Mill 2, Pulp Ltd, 14/07/2010). Cost reporting and controlling caused the most work for the controller during the closure project. The principles according to which the costs were divided and reported were decided by the management of the company at the beginning of the project. Cost allocation between Pulp Ltd and the factory which was located near Pulp Ltd caused a huge amount of work for the controller at the beginning of the project. All costs were divided into three groups: costs during operating time, costs at non-operating time and costs after the closure of Mill 5 (Controller, Pulp Mill 2, 14/07/2010). A special contract was signed to allocate and charge costs correctly with the neighbouring factory. The Project Controller felt that cost forecasting was a demanding task due to the fact that some costs emerged unexpectedly during the project (Controller, Pulp Mill 2, 14/07/2010).

> *When production actions ended there were, nevertheless, some operations going on. For example the wood handling and the power plant for the needs of the neighbourhood factory called for cost coordination and reporting. Wood handling and power plant operations were conducted by Pulp Ltd's staff. The neighbourhood factory was charged for the operations, which sometimes caused disagreements and even the need to arrange a round of bids for the contracts (Controller, Pulp Mill 2, 14/07/2010).*

The quotation demonstrates the temporal nature of strategy, i.e. strategy is never fully closed. The second task of the controller was to determine various contractual obligations. The closure of a mill is always unique, which creates a need to re-negotiate contracts, in this case mostly with the neighbourhood factory. Every contract was unique compared to the normal situation in which contracts exist and continue, even when a particular operator changes. As well as the division of costs, the re-negotiation of contracts caused disagreements with the neighbourhood factory (Controller, Pulp Mill 2, 14/07/2010).

In the latter phases of the project, the duty of the Controller was to calculate capital asset values which frequently meant searching for information to sort out the correct selling prices. This phase of the project was named "the letter of intent stage". The Project Manager coordinated the phase by operating as a link to potential buyers. The stage involved the signing of contracts concerning the costs of particular construction work with the neighbourhood factory (Controller, Pulp Mill 2, 14/07/2010).

According to the Project Controller, the closure project was a valuable learning process. The personnel changes which took place during the project complicated the closure project, for example, the Project Controller was forced to begin the project at short

notice because the former controller had left the company. The Project Controller mentioned that taking part in meetings as often as possible is crucial as is documenting and saving documents of all action taken. Lastly, the goals of the project and how to achieve them should be kept clear. The controller underlined the fact that the beginning of the project is the most important part and that communication is vital in order to stay informed during the projects (Controller, Pulp Mill 2, 14/07/2010).

To summarise, the Project Group and the Project Manager were significant strategic actors. Even if the Project Controller performed strategic work, his role was not equivalent to that of the strategic actor. The Project Controller felt that his role was primarily to summarise things numerically i.e. he was in a subordinate position as he passed on information to the Project Manager and Project Group. Many factors were decided beforehand and those decisions formed the rules followed during the project, i.e. the closure phase (Controller, Pulp Mill 2, 14/07/2010).

The summary of the strategy discussion

Figure 9 summarises the strategy of Metal Ltd. The three different levels of strategy can be seen through the strategic focus areas: growth is centred on mining projects and efficiency improvements – mainly to smelters. Strategy deals primarily with issues concerning production and raw material-related factors, instead of the marketing side – because the company can sell everything it produces. The linking parts are mostly related to the unit level strategy, even though they are also included in factors which are related to the business area and the whole company level.

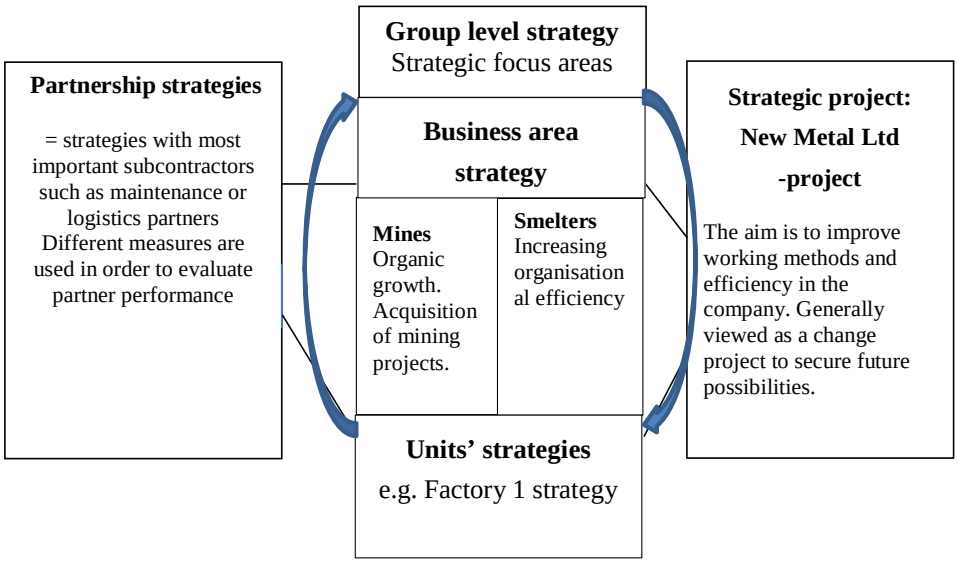

Figure 9 Metal Ltd's strategy with its linking parts

The evidence received from Metal Ltd demonstrates that it has tailored partnership strategies with its strategic subcontractors such as maintenance or (internal) logistics. Coordination within these relationships depends on various measurements for analysing the performance of partners, which, in many cases, are located outside the financial department and involve the responsibilities of the Administrative Manager. The second linking part includes another project which has strategic importance, particularly from the smelters' point of view in Metal Ltd.

The group to which Pulp Ltd belongs follows the portfolio strategy. The pulp business is one of the group's five businesses. Pulp Ltd describes its operations by using core processes, which are management, sourcing and operations and customership together with competence centres. The role change from a resource company to a market pulp company was the shift which influenced Pulp Ltd's strategy in many different ways. In brief, it increased the importance given to services and technical support and changed the corporate image. Becoming a market pulp operator further underlined the importance of such factors as knowledge of customer processes.

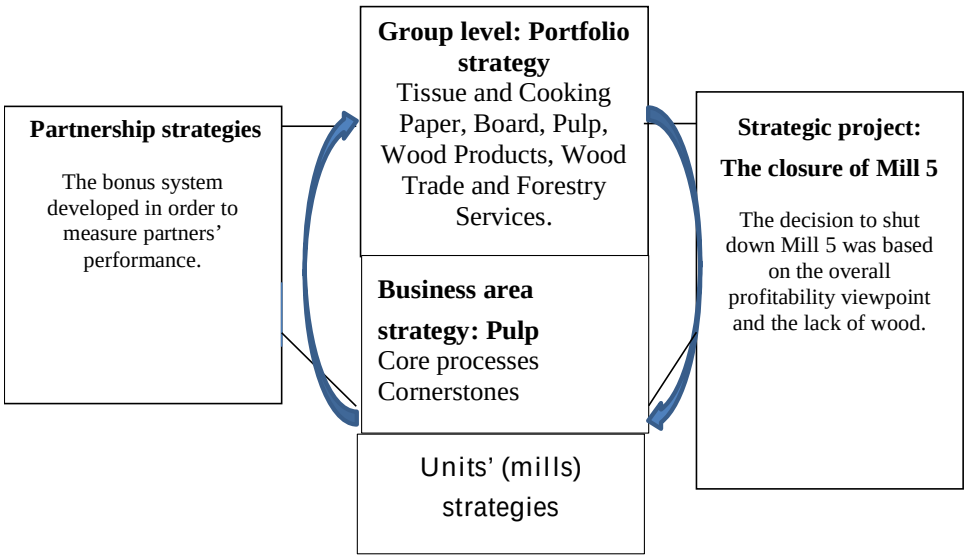

Figure 10 Pulp Ltd's strategy with its linking parts

According to the view adopted in the current thesis, strategy is defined as a multi-faceted whole which pervades many parts of an organisation. The MA role in relation to strategy depends on whether it is seen as actual strategy or one of the linking parts, such as the partnership strategies or the strategic projects. Further, the MA role depends on whether the level of analysis is the whole company, the business area or the unit level. However, MA surely has a role in the strategy process. A more detailed analysis of that is presented in Chapter 4.

3.3.3 Strategic changes

Strategy and change are not two independent concepts but are interlinked – strategy includes the components of change. The strategies were described by utilising the classification based on positioning school definitions (see Minzberg 1998). In particular, Porter's (1985) three generic strategic archetypes were adopted. Porter's classical division helps describe the shifts in the strategies of the case companies as they move from cost competitiveness towards differentiation. The objective of this subchapter is to analyse strategic changes associated with the strategy.

Metal Ltd

Particular turning points in the past assist companies in explaining and understanding their current situation and the strategic options adopted. The influence of industry-specific trends is reflected directly in the case companies' strategic decisions. The strategy shift towards differentiation in Metal Ltd is explained next:

New Way - Towards differentiation

Before the actual research period began, Metal Ltd's strategic objective was to focus equally on two metals: zinc and copper. The aim of Metal Ltd was that it would have as much mining capacity as it had smelting capacity in both metals. Achieving this objective was easier with zinc as the company gained even 70 to 80 percent of the concentrate it needed from its own mines, whereas the corresponding amount for copper was only 20 to 25 percent. This resulted in the desire to buy copper mines, which was challenging due to the lack of new mines. The investment needed in order to gain self-sufficiency in copper would have meant about two to three billion euros of investment.

After the management of the company realised the prevailing situation it began to think that it could be a significant player in zinc where it already had a good position – in 2010 Metal Ltd was the eight biggest zinc player in mining. In copper, the company was fairly important on a European scale but in the global business its role was not very significant. Metal Ltd decided to concentrate on zinc in the mining business, and in copper its purpose was to be as profitable as possible, particularly in the by-product business (President, Smelting Business Area, interview 04/3/2010). Metal Ltd's strategic decision to be self-sufficient in zinc meant that the company was forced to discover new revenue streams in order to fulfil the uncertainties associated with copper. The decision connected with the turbulent economic situation during 2008 and 2009 implied that Metal Ltd had to find revenues to compensate for the losses of the copper business.

The first new revenue option derives from the use of secondary raw materials. As such, secondary raw materials are a growing business and an environmentally friendly way to produce metals. The company had also invested a lot in electronic scrap recycling; an investment target has been to improve the production process in order to improve the handling of secondary raw materials (Chief Financial Officer, 03/11/2010). Secondly, the new income streams received from new metals can compensate for the shortage of copper concentrate. The challenge with the new metals is how to refine them to sell end products. Factory 1 noticed that metals, such as gold and silver, but also others, can improve the profitability of operations (President, Smelting Business Area, 03/04/2010). A third possible revenue stream comes from other by-products such as sulphuric acid or steam (President, Smelting Business Area, 03/04/2010). As such, the by-products and functionality of the production process is important in determining the actions of Metal Ltd.

The second main metal in Factory 1 is nickel. Factory 1 has moved its focus and investments to nickel due to a lack of copper concentrates. Furthermore, it has considered the option of expanding the production volume of nickel in the future (Financial manager, Factory 1, 23/09/2009). Nickel has been more controllable due to the fact that both revenues and costs are in the same currency compared with copper where revenues are in euros and costs in dollars. That leads to a monetary risk which can cause considerable earnings or losses in the copper business. Nevertheless, Metal Ltd's nickel production volume was smaller than that of copper in November 2009, but that can change because the recent focus of investment has been on nickel production (Development manager, Factory 1, 19/03/2010, and also General Manager until 06/04/2010).

Nickel possesses some challenges as well. Factory 1 only smelts the nickel concentrate, but it does not own the concentrate as such. The owner of nickel concentrate is an external company with its head office is in Russia. This implies that the decision-making comes from Russia, where such factors as customer service or delivery reliability are significant decision-making criteria. Factory 1 has to consider this factor in its future operations. Furthermore, the Russian method of calculating costs differs from the Finnish way which makes comparisons between operations more challenging. There are also other cultural differences between the countries which can cause difficulties in negotiations. Consequently, the timely progress of negotiations is crucial because if the negotiations are delayed harm can be caused to possible investments, for example, postponing investment in Factory 1 (Development Manager, Factory 1, 19/03/2010).

In the metal processing business the question does not largely depend on marketing and selling products but on purchasing or production related issues. In spite of that, the value-added solutions, such as intelligent logistics or tight relationships with customers provide added value and assist Metal Ltd in understanding what customers need and want. In order to meet customer demands and to get a small premium on the basic price of pure metal, Metal Ltd has slightly modified some of its products. The next example explains why traditional customer relationships might not be so important for Metal Ltd as they are for many other companies.

> *Copper's basic price is around the 8,000 dollars per ton offered by the London Metal Exchange, which offers a range of futures and options contracts for metals. Metal Ltd can get the premium from the customer by modifying the product and logistics according to the customer's need. The premium is about 100 dollar per copper ton but the price of copper can easily move from 200 to 400 dollars or vice-versa in a day. If the customer does not buy the copper ton for some reason, we have to find a new customer for the copper ton. In that case the company loses only the premium which is 100 dollars. It is sure that the company nevertheless gets the basic price which is 8,000 dollars (Chief Financial Officer, 03/11/2010).*

Because the possible price premium is so small compared with the possible change of the metal price per day, the question is not so much the marketing or selling. Around ten to 15 years ago, Factory 1 sold all the produced copper concentrates to the same firm's other unit. Now that figure only amounts to one third of its whole production, implying that Factory 1 has a new customer base setting new demands for product quality and delivery. The logistics and the selling side are the responsibilities of Head Office but Factory 1 has to be aware of the situation. To sum up, customers are closer to the business today and they also offer more feedback than before (Administration and Technical Services Manager, Factory 1, 16/03/2010).

Strategic change drivers (in Metal Ltd and Factory 1) were, for example, the lack of copper concentrate, the monetary risk associated with copper and the downward treatment-refinement charges. Metal Ltd was forced to find new revenue possibilities in order to compensate for the losses from its main production line. Significant new opportunities for Metal Ltd have been the secondary raw materials, new metals or other products, such as sulphuric acid or steam. Furthermore, Metal Ltd has done some minor tailoring of its copper for its customers, in addition to looking for potential new customers. These factors demonstrate the gradual transformation of the strategy of Metal Ltd, indicating that it differentiating.

Metal Ltd has no plans to enlarge its smelting business due to the prevailing overcapacity of smelters compared with the mine capacity in the world. Thus, Metal Ltd has compensated for its dominant circumstance by broaching new materials. However, the position of Metal Ltd is complicated by its location far from the largest copper mines. Metal Ltd's main strategy is, nevertheless, cost competitiveness, which is understandable from the point of view of its production process. Even though cost competitiveness is (and will remain) the main strategy, differentiation provides a vital additional revenue stream in order to compensate for the losses from a smaller overall production quantity. In a cyclical industry changes can occur quickly but, in general, change is relatively slow. A good example of quick change is Factory 1, which enlarged its production capacity only a few years ago, demonstrating that differentiation is quite a new way operate (Development Manager, Factory 1, 03/11/2009).

However, differentiation is not without its problems. For example, it offers new challenge to the main production line (Administration and Technical Services Manager, Factory 1, 16/03/2010). Also, ff the focus is directed too much onto additional revenue streams, the focus on the main business can be lost. Nevertheless, the importance of one additional revenue stream is quite minor, but when they are put together they are significant (Development manager, Factory 1, 19/03/2010). To conclude, the copper smelting business today is largely dependent on its by-product business. Next, attention is directed towards the strategic change drivers of Pulp Ltd. Those drivers moved Pulp Ltd from a resource company to a subsidiary and to a supplier of market pulp and technical expertise.

Pulp Ltd

When Pulp Ltd operated as a resource company, its primary task was to produce pulp for its owners. Nevertheless, the first sign of Pulp Ltd's future role came during its time as a resource company when its owners gave the message to the company that it could begin to learn more about what paper-making is. This provided a good starting point for the company to utilise knowledge gained from its owner's paper business within the pulp business (Senior Vice President, Finance, 05/03/2010). The decision to divest foreign operations to Owner B initiated a strategic change for Pulp Ltd. The consequence was that Pulp Ltd became a subsidiary of Owner A. The new role meant adopting a more open way to communicate:

> *Before 2009 we had two owners. We had to be very careful what we could tell them. The same information had to be offered to both owners. Now this situation doesn't exist anymore (Controller 1, Head Office, 19/11/2009).*

Nowadays there are more personal contacts than before – when the case company operated as the resource company. Generally, the common opinion is that collaboration is now closer and more open. The focus is now more on the advantage produced for the group (Group Controller 21/06/2010). So, the company moved from a production-oriented style towards a more customer-oriented way to operate. The basic company statements were updated at the same time with the role change and the organisation structure changed as well. Some functions were centralised in the group, which resulted in staff reductions (Senior Vice President, Finance, 05/03/2010). Later Pulp Ltd adopted the group's website format and work clothing (Mill Controller, Mill 1, 17/05/2010). In 2012, Pulp Ltd adopted the new group corporate image and name. The harmonisation of name and corporate image reflects a major strategic change. Pulp Ltd now feels that it is part of a single group and its strategy directs it towards the group's common goal.

Furthermore, the case company reinforced its position as a producer of Northern softwood pulp and became one of the world's principal suppliers of market pulp and a technical expert in 2010. Currently, Pulp Ltd sells pulps from three other manufacturers to a global market and its sales portfolio includes plenty of different pulp grades. According to the CFO, the purpose was to increase the amount of market pulp it produces from the level it was at in 2010. Becoming a supplier of market pulp created the need for Pulp Ltd to update its accounting systems and it began to build reporting systems that could better serve customers in the market pulp agent role (Senior Vice President, Finance, 31/05/2010). Nevertheless for Pulp Ltd it is relatively simple to calculate profitability:

> *If a company has 1,500 different products and 10,000 different customers it is much more difficult to conduct a profitability analysis for a particular customer.*

> *But when we have three different categories of pulp and a few customers, it is easier to see the most important points (Senior Vice President, Finance, 05/03/2010).*

Pulp Ltd had been a supplier of market pulp before but then the amount of pulp it produced was minor. In order to strengthen its position as a supplier of technical expertise, Pulp Ltd's long-term purpose has been to gain information about its customers' technologies and to understand customers' processes better. The following describes the development very well:

> *It used to be the view was Pulp's customer was the Mill's pulp storage. But now, little by little, opinion has changed and people have begun to understand that the reason for producing pulp is the customer downstream. So, it matters what kind of pulp is made (Vice President, Mill Manager, 23/11/2009).*

The purpose of the case company was to find customers who would be profitable in the long-term and would also be realistic to reach from a logistic point of view (CEO, 11/10/2010).

Towards differentiation – searching for new business opportunities

The case company constantly analyses new business opportunities from the point of view of factors such as synergy, raw material availability and overall profitability and compares them to the trends in the pulp industry. One new business opportunity is bioenergy, for example, biodiesel.

> *If we analyse the role, costs, location and synergy advantages of a biodiesel factory, accounting could serve the purpose by offering information in the form of business-analyses or investment calculations (Senior Vice President, Finance, 05/03/2010).*

The case company has made investments in order to make its production processes more energy effective and to refine energy commodities further. It is evident that the pulp industry will remain its main business and others such as biodiesel, are potential additional businesses, even though they can be important to the company's profitability (CEO, 11/10/2010). Forecasts estimate that companies will invest in the power plants which are interlinked with mills. This trend is expected to begin in two to three years (Hetemäki et al. 2011, 65-66). It is estimated that in spite of the increasing significance of biodiesel, the forest and pulp industry will maintain its position in Finland, although the Finnish forest industry will be smaller but more profitable than now (Hetemäki et al. 2011, 60).

To conclude, the journey which began when Pulp Ltd's purpose was internationalisation and growth has now ended at a time when Pulp Ltd is part of a group with a common name and corporate image. The structural transformation of the paper market was probably the most important reason for the strategic change in Pulp Ltd which was further heightened by the company's shift from resource company to subsidiary. That meant an increasing market orientation and focus on customer service. The fact that the production oriented method of operation was replaced by a customer-oriented way to produce pulp underlined the importance given to the customers' opinion. Pulp Ltd's purpose is to integrate with customer processes in order to better understand them. The case company wants to differentiate itself in the market by offering more value to its customers than its competitors. In order to compensate for the uncertainties associated with its main business, pulp industry companies have begun to search for additional business opportunities such as bioenergy. Thus, these new revenue opportunities and the modified old ones are significant factors in moving Pulp Ltd's strategy towards differentiation.

The distinction between external economic changes and strategic change is challenging due to complex cause and effect relationships. In brief, the main factors which pushed the case companies' strategies towards differentiation were new raw material options, customer and/or quality oriented operations and new business opportunities. During the research period, the economic recession operated as a kind of watershed which translated the case companies' strategies from cost competiveness towards differentiation.

Figure 11 pictures the strategic change, firstly at the group level and then in the smelting business area, particularly in Metal Ltd. Underlying the strategy at the group level was the decision to concentrate on zinc production in the mining business because no copper mines were for sale. The picture describes the change from the period before the economic recession to the time after the economic recession.

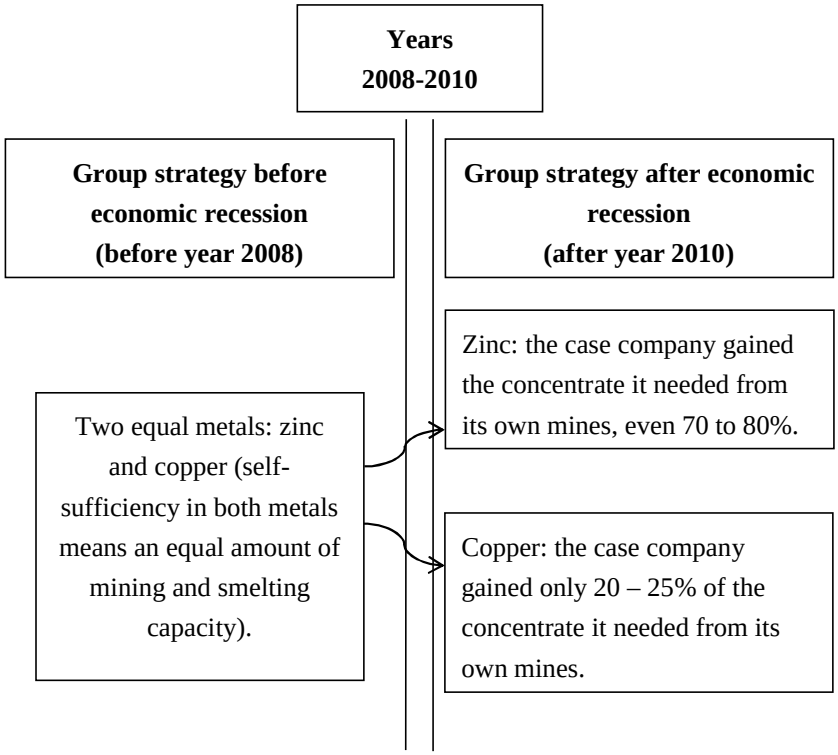

Figure 11 Strategic change in Metal Ltd (group level)

Due to the smelters' main production process being continuous process production, cost competitiveness has been the main strategy offering competitive advantage. However, things have begun to change and currently some of the smelting operations represent differentiation arising from the use of secondary raw materials and the search for new metals, such as gold or silver, from concentrate.

The strategic focus in the smelters was to improve the efficiency of productivity, processes and raw material usage. These focus areas are shown in Figure 12, which describes strategy at the business area level. The focus is clearly on new raw materials and quality/customer service-oriented operations as well as new business opportunities.

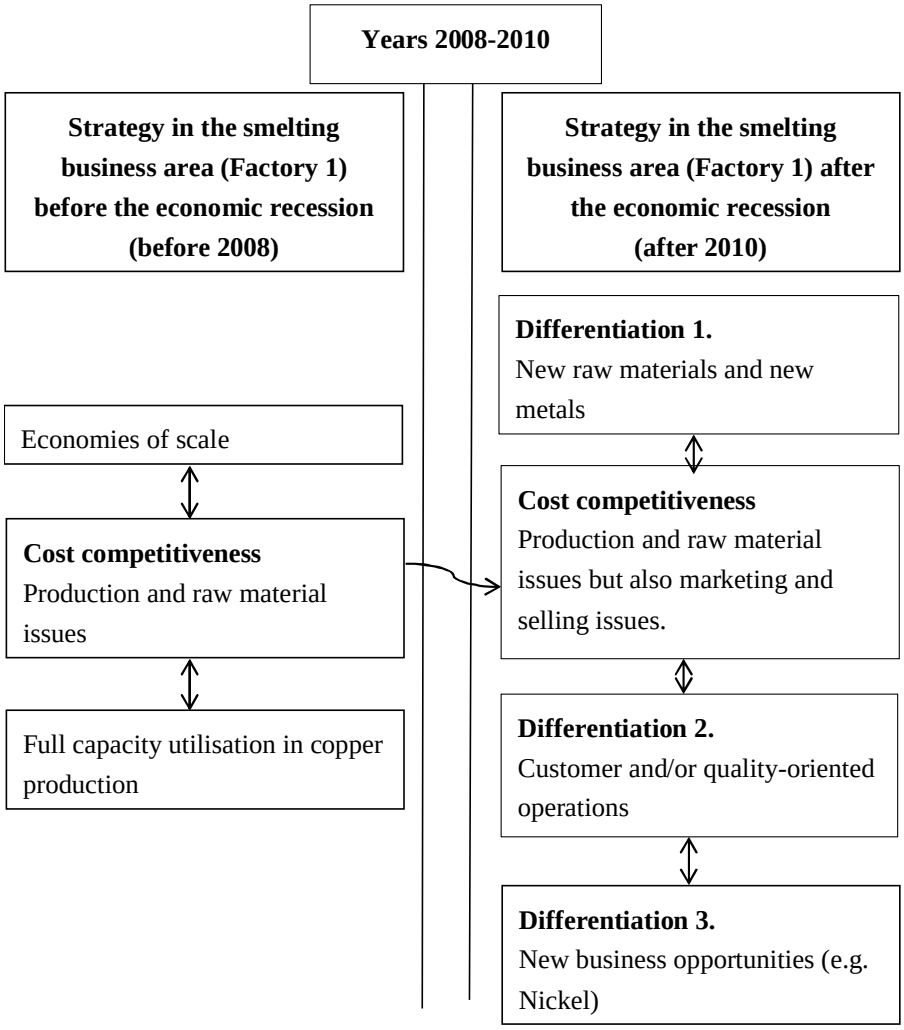

Figure 12 Strategic change in Metal Ltd (business area and unit level)

Figure 12 demonstrates a connection between Metal Ltd´s cost competitiveness strategy with factors which create differentiation. It also describes the strategic core of the company consisting of production (and raw material) related factors. Differentiation has provided vital additional revenue streams that compensate for the losses resulting from the smaller overall production quantity of the smelters. However, differentiation is not without its problems. It creates new challenges because the company has to manage many small revenue streams in addition to its main business, which clearly represents cost competitiveness.

Figure 13 illustrates the change in group strategy of Pulp Ltd. The main change was becoming a subsidiary of Owner A. Before the recession the company´s purpose was to produce pulp for its two owners, which meant careful consideration in communication.

After becoming part of the group, communication became more open and the focus was on creating advantages for the whole group. Moreover, the name and corporate image were standardised in the group. This was a major strategic shift according to Pulp Ltd.

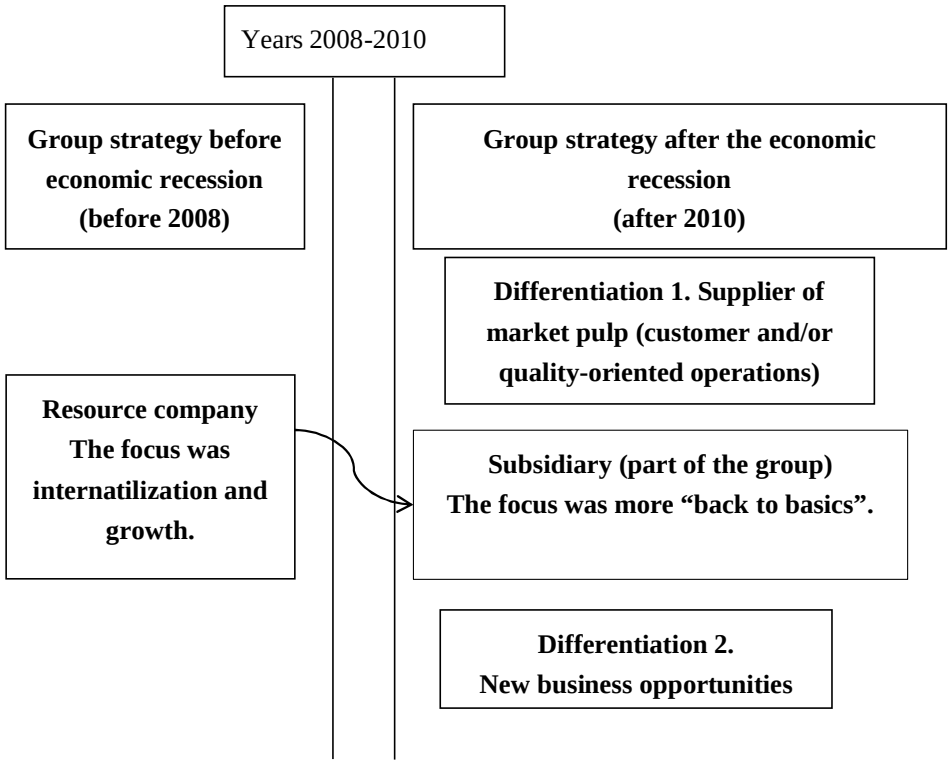

Figure 13 Strategic change in Pulp Ltd (group level)

The resource company period offered Pulp Ltd a good starting point for learning and thus made the later technical development work, such as integrating with customer processes, possible. Differentiation was derived from its operation as a seller of pulp on the market, indicating that Pulp Ltd's purpose was to strengthen its position in the northern softwood market.

Currently, the company offers technological know-how, which signifies the importance of knowledge concerning its customers' technologies and processes. In general, factors like customer service and knowledge will be crucial. In addition, the use of the products will be improved by the high quality services offered to customers. Accounting also serves new business opportunities by offering knowledge in the form of business analyses and investment calculations.

The change has also underlined the need for Pulp Ltd to renew its reporting systems. All these factors will underline the importance of the customers' opinion in all future strategies and operations. Moreover, the company continues to seek new business opportunities, which it estimates from the point of view of synergy, raw material availability and productivity. Additional revenue streams, such as bioenergy, can be significant in the future. The next chapter will continue by discussing accounting actors in more detail.

3.4 Management accounting actors

The analysis concerning a particular management accounting actor is described in one or both companies, depending on the results received. If the results were significantly identical, or if there was no sign of a particular research target then the results from only one case company are described. The analysis of the role of management accounting is restricted to the discussions, statements and specific initiatives in Metal Ltd and Pulp Ltd. The discussion will now focus on management accounting actors and their roles in both case companies.

3.4.1 Human actors

The (changing) role of management accountants has been a widely studied research issue during the last few years (see for example Granlund & Lukka 1998; Burns & Vaivio 2001; Järvenpää 2001). Burns & Vaivio (2001, 389-390) identify four particular roles in their summary of the literature on the changing role of management accountants. The roles were the provider of cost information, the controller, scorekeeper, the internal business consultant and members of the strategic management team. Granlund & Lukka (1998) point out that Finnish management accounting culture has been in a significant transition period. They suggest that a controller's role has changed from merely profit reporting and cost accounting to become a management consultant role (see e.g. Granlund & Lukka 1998). Hyvönen, Järvinen & Pellinen (2011) stated that when two developments, complexity, i.e. more complex jobs, such as those done by group accounts, and involvement, i.e. those involved in providing information for business decisions, coincide, then controllers become business partners. In the current study human actors are mainly seen as being people from financial departments but also others, such as production, purchasing and administration personnel, who conduct various calculations in organisations and take part in negotiations where strategic decisions are made.

There is a stream of literature (Caglio 2003; Newman & Westrup 2005; Burns & Vaivio 2001), which states that the role of management accountants has become in-

creasingly subject to hybridisation. Hybridisation occurs when the role of management accountants expands to encompass other business and information systems activities or when other actors expand their roles to encompass accounting activities. Burns & Vaivio (2001) identified this increasing hybridisation within their study, noting that interfaces between professions have disappeared and changed. For example, a considerable part of management accounting is transferred from being the responsibility of the controller to the managers' responsibility, which means that managers manage their own budgets. On the other hand, strategy formulating and the implementation of systems were once the responsibilities of managers, but today are more likely to be the responsibility of controllers (Burns & Vaivio 2001). One particular reason for the increase in hybridisation is the greater role given to accounting information systems. Newman & Westrup (2005, 269) observed that, in some organisations, groups other than accountants, such as ICT and senior management, had taken control of Enterprise Resource Planning (ERP) systems and that the roles of accountants had consequently been marginalised.

One particular reason for hybridisation is integrated accounting information systems such as ERP systems. Several writers (Jack & Kholeif 2008; Chapman 2005; Granlund & Malmi 2002; Quattrone & Hopper 2005; Scapens & Jazayeri 2003; Hyvönen, et al., 2011) have investigated the impact of ERP systems on management accounting and control. The implementation and use of these systems raise fundamental questions about the role of management accountants in an organisation (Jack & Kholeif 2008, 30). Chapman (2005, 685) argued that studies in this area should view ERP systems not as technological curiosities but as vehicles through which fundamental questions concerning the nature of management accounting and control may be both asked and answered. Granlund & Malmi (2002) found that ERP systems have influenced both management control and management accountants' roles, but at the time their study was conducted the changes had been quite moderate. Scapens & Jazayeri (2003) reported in their processual case study that although the introduction of ERP systems had not caused fundamental changes in the nature of the management accounting information used, there were changes in the role of management accountants towards a wider, forward looking role.

The controller's position inside an organisation influences the role as well because a controller can work in a centralised accounting department or in a unit. Lambert & Sponem (2012) found that the controllers' active role was not a universal one, but rather it was dependent on the roles of general management, especially at the middle level. Hyvönen et al (2011, 16) stated that in their case study, the mill controllers' job descriptions are more focused on financial reporting and data inputting, while the divisional controllers at division HQ were able to take control of the strategic systems. The study by Granlund & Lukka (1998) offers identical evidence by claiming that the mill's controllers often operate as quantifiers rather than as controllers.

In this research the classification employed in order to discuss the controller's job description is based on the classification made by Granlund & Lukka (1998). The clas-

sification describes the different roles of a controller and its development in the Finnish business and cultural environment in the following way:

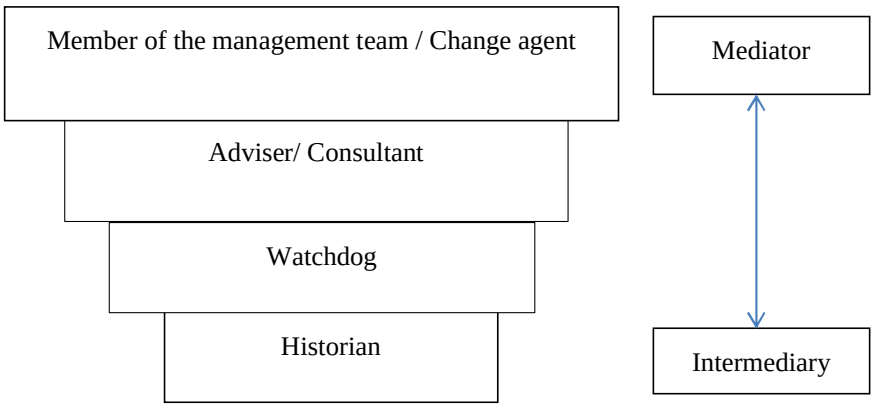

Figure 14 The expansion of the job description of a management accountant (based on Granlund & Lukka 1998, 187)

The classification describes the expansion of the controller's role from historian and watchdog positions to becoming a member of the management team and a change agent. The idea is that the lower levels are included in the upper levels in the model. Previously, controllers operated as historians by delivering information about the past and as watchdogs. The role of controller has since been enlarged to deal with the role of consultancy as a member of the management team and, when needed, in the change agent role (Granlund & Lukka 1998). When the controller operates in the role of a consultant he/she is a significant actor in translating management's concepts (Qu & Cooper 2011, 346). Next, attention is shifted to analysing the controllers' role in both case companies.

Metal Ltd

The Management Board of Factory 1 discuss the role of management accounting and controllers at the board's monthly meeting. A member of Factory 1's Management Board had read the Rolls Royce Annual Report. The following example describes the controller's role at Rolls Royce:

> *In that company the controller's role was to report the current trends of the company and its overall success. The evidence received from the Annual Report showed that the role of the controller proved to be significant (Financial Manager, Factory 1, 05/03/2010).*

The controller's role in Rolls Royce seems to be that of a management consultant or change agent where the controller is a member of the board as well. According to the Financial Manager (Factory 1), the culture in Factory 1 has been that MA solely calculates the needed calculations but does not take part in the decision-making in the unit. The reasons for this can derive from the production-oriented operations in Factory 1. In some situations the production somehow "overrides" accounting. This is due to the overall objective of the operation in the unit, which has been to fill Factory 1's capacity.

The opinion of the Financial Manager reveals that traditionally the role of a controller in Factory 1 has been more a watchdog than a consultant. However, pressures from the external environment have changed that role. The economic recession during the research period increased the communication between different departments. For example, communication between the Financial Department and Production Department has increased. This can be seen in the fact that the Production Department has begun to consider how the Financial Department can offer information in certain circumstances.

The prevailing economic situation, which has changed the focus from mere capacity fulfilment to one of many revenue streams, has made new demands of accounting. The increasing communication between the functions, but also between Head Office and the units has been visible proof of that. The Financial Manager mentions that the current trend is the right one (Financial Manager, Factory 1, 05/03/2010) The results from Factory 1 support the view that part of MA is transferred from the responsibility of the Controller to other managers' responsibility. During the interviews conducted on site, the researcher received facts which demonstrated that some measures, such as those relating to the partnership strategies or other calculation models relating to predictions of the company's finances, are the responsibility of the administration manager. Even if the Financial Department probably has access to these measures, the example demonstrates that the traditional interfaces between professions have disappeared and changed.

Pulp Ltd

In Pulp Ltd the role of controller seemed to be more like a management consultant as the next citation from the Group Controller shows:

> *A controller's role is to operate as the managers' backbone. He/she does not manage the business but operates as active support for the managers. If we outsource the role of controller, then next we have to outsource production managers. Then working becomes difficult because we don't have our hands anymore.*

> *A controller should add value to the business, which I believe is the most significant role change (Group controller 21/9/2009).*

The statement describes the role of controller in Pulp Ltd as a management consultant or a change agent. The Group Controller's opinion is compatible with writers such as Granlund & Lukka (1997; 1998) and Hyvönen et al. (2011). Nowadays, the common expectation is that controllers should describe observed problems and the future trends. In particular, controllers should offer perceptions of how to operate in a particular situation and also explain why.

The turbulent economic situation further underlines the importance given to the controller in an organisation. Currently, managers need more and more information about the future. Controllers are expected to offer this information to managers, but this sets new challenges for them. Nevertheless, a controller's role is not compatible with a manager's role. Even if the role of controllers is to offer valuable background information regarding decision-making situations, the managers make the final decisions (Group Controller 21/9/2009)

In addition to the conditions of the external environment, a company's organisational structure as well as controller's position inside an organisation clearly influences the role.

> *The role of a controller depends on the position of the company as well as the economic market conditions. However, in financial administration roles, management accounting is most closely connected with the business (Group Controller 21/9/2009).*

The fact that Pulp Ltd has a mill controller in each mill, although other financial operations, such as corporate financing and bookkeeping, are outsourced to the group's financial organisation (Senior Vice President, Finance, 05/03/2010), demonstrates that a controller operates in the local units, so that his or her operations can be harnessed to support the direction of the company's business.

> *The purpose of Pulp Ltd has been to evolve its accounting department into a strong, effective and dynamic team which operates as part of the company's backbone by making sure that others in the organisation can do their own work as effectively as possible (Senior Vice President, Finance, 05/03/2010).*

Generally, based on the interviews conducted in Pulp Ltd it seems that their controllers operate in two kinds of roles: in a watchdog position as well as quite clearly in the management consultant role. The role depends on the position the controller works in. According the evidence gained from field a mill controller on site operates in a position where he/she is responsible for various duties, such as monthly reporting, the auditing

of external companies, participating in various strategic projects but also in providing financial information to the competence centres' staff. This demonstrates that the position of site controller is not compatible with that of a bean counter but more closely resembles that of a consultant. From another point of view, temporary positions, such as Project Controller for the closure of Pulp Mill 5, the role can be more of a watchdog role. But, an unambiguous distinction between the roles is undetectable and neither is it appropriate.

The evidence received from outside the case companies (especially an article concerning the interview with the CFO of UPM, see Luotonen 2009, 37-39) offers the view that controllers operate more and more as change agents and management consultants in companies. This means that a controller's work has to be strengthened. Traditional reporting is left to new service centres and controllers focus more and more on measuring and improving profitability. The CFO of UPM describes the role change of controllers in the following way:

> *Nowadays controllers in companies have a new role as management consultants. Every reporting area and a few support functions now have their own controller, particularly a business controller, whose role is to follow their own business area development and to look forward. A controller's role is to support in this way and challenge business area managers. Their job includes more future forecasting than before (Luotonen 2009.*

In some instances the controller operates outside the actual decision-making situation in spite of the fact that the situation may include the final calculations concerning a particular issue. Then the controller's role is more compatible with the cost accounting and the profit reporting role. The evidence from the closure of Pulp Mill 5 supports the view of a controller operating in the watchdog position. However, the controller also performed the calculations and the cost analysis without taking part to the actual decision-making. Frequently, a controller provides needed information to the appropriate staff, who make the final calculations. The second evidence comes from Pulp Ltd where the controller's main duty is monthly reporting to the owners. She/he is responsible for the co-ordination of monthly plans and reports collected from sites around Finland and works closely with mill controllers by distributing schedules, guidelines and principles to them. After getting the information from mills she/he compiles the reports into one consolidated report for the whole company. The evidence from both cases indicates that within these cases the controller operates more as a quantifier of figures due to the fact they calculate and collect required information but do not participate much in actual decision-making.

According to the group controller, the amount of manual work will diminish during the next 10 years and the amount of employees required will be reduced. One reason for this is that advanced information systems will offer high-quality and timely information

in order to fulfil the needs of making reports. The argument from the group controller supports Granlund & Lukka's (1998) classification of the future role of controllers, which will probably consist of two kinds of roles: the control role, such as the financial controller, and support roles, such as the business controller, and these will differ from one another. The roles will vary depending on the company and the external economic situation.

To conclude, the roles of controllers varied between the companies. At Metal Ltd the Controller of Factory 1 operates more in a watchdog role. In Pulp Ltd a controller's position seemed to be closer to that of a consultant. In Pulp Ltd a controller's role resembles a gatekeeper who provides a signal when there is something that demands more attention. However, it should be noted that in Factory 1 of Metal Ltd, the economic recession of 2008 and 2009 shifted the role of controller more towards that of being a consultant.

3.4.2 Accounting information systems

There are studies (for example, Hyvönen, Järvinen & Pellinen 2008; Dechow & Mouritsen, 2005) which have described the role of integrated information systems in organisations by using actor-network theory. As such ERP systems are fundamentally bound up with the organisational processes of accounting. ERPs seek to systematise and coordinate record keeping, the design and implementation of the structures of categorisation and the aggregation of transactions. That ultimately allows for the generation and manipulation of comprehensive virtual perspectives on the nature and flow of operations and resources (Chapman 2005, 686). The value of accounting information systems derives from their associations with inscriptions, which offer actual value by, for example, providing a business support role. However, in the current research they have been separated and analysed in isolation from MA inscriptions and there are several reasons for this. The first reason is because the objective of the present research is not to analyse the implementation of accounting information system in detail. Secondly, the case companies clearly present the projects associated with information systems as separate projects – rather than connecting them with the accounting inscriptions. Thirdly, according to the evidence acquired from interviews, the information systems did not offer high value as such but instead operated as factors in the background. This demonstrates the fact that the value of IT systems is derived from their associations with inscriptions. IT systems alone have no value.

Hyvönen et. al (2008) suggest that the data collection process involves many tradeoffs and choices between various alternatives, with the result that only part of the information becomes management "facts" while the rest of the information remains unseen by the top management (Hyvönen et al. 2008, 46). The differences in the information requirements of people at local levels and at headquarters have the potential to

create “trading zones” and local-level customised information systems (Dechow & Mouritsen 2005; Quattrone & Hopper 2006; Hyvönen et al. 2008). Quattrone & Hopper (2001a) speculate on how coupling ERP technology with management controls may lead to the proliferation of centres and peripheries in a way which requires a focus on ongoing change as well as a theorisation of management control which recognises its multiple and changing nature. In practice, it seems that ERPs have to be supported with other information systems such as Excel or different software packages for management control purposes (Quattrone & Hopper 2006; Hyvönen et al. 2008; Granlund 2007).

Several writers have noticed that management control systems are quite complex because they are decentralised geographically and are abstract in nature. Therefore, the systems are always partially invisible to a single observer. That is why it is important to represent and visualise the systems (Hyvönen et al. 2008; Bloomfield & Vurdubakis 1997, Quattrone & Hopper 2001b). The visualisation of the case companies’ main accounting systems is presented in Appendix 9 and 10. The accounting systems have been presented at the unit level (Factory 1) in Metal Ltd (see Appendix 9) and whole company level (before and after the ongoing development work) in Pulp Ltd (see Appendix 10). Hyvönen et al. (2008, 46) argue that in practice management accounting controls systems can only achieve a partial visibility, and partial forms of control. Such control systems can be called the oligopticon (Latour 2005). Such oligoptica are susceptible to errors (a small disturbance can blur a vision entirely). Their findings suggest that IT accounting solutions seem to shape an organisation’s social reality in two ways. First, the IT solutions force accountants to study the logic of the solution, second, they challenge them to invent ways of combining accounting and management rationalities (Hyvönen et al. 2008).

The use of IT also affects the relationship between accounting and other functions (see Xiao, Dyson & Powell 1996). There are several studies on how the introduction of IT affects organisations. For example McCosh (1986) observed that IT enables people other than management accountants to keep top managers informed and so the use of ERP systems may reduce or eliminate the role of management accountants as information suppliers because line managers can directly access the information they require (see Scapens, Jazayeri & Scapens 1998). However, studies such as King et al (1991) found that IT developments increase the power of management accountants over systems and line managers. Granlund and Malmi (2002) expect that ERP systems will change the role of management accountants from a bean-counting to business process orientation. ERP systems are also expected to eliminate routines tasks, decentralise accounting knowledge, expand the role of management accountants and produce information that is more forward-looking (Scapens & Jazayeri 2003). Evidently, management accountants have lost their monopoly on access to accounting data since the implementation of ERP systems (see Rikhardsson & Kraemmergaard 2006).

According to Dechow & Mouritsen (2005), control cannot be studied apart from technology and context. The ERP’s infrastructure is the meeting point of many technol-

ogies and many categories of controls. They emphasise that understanding the impact of integrated accounting systems requires a heightened attention to control as practised across a firm. The consequence will be that clerical accounting work is shifted out of the accounting function. Dechow & Mouritsen (2005) suggest that ERP draws organisational attention to the question: what is integration and how is it to be achieved? Management control is a collective affair between separate commercial entities that have become mutually dependent when local systems are replaced by an ERP system. Even if ERP systems are frequently presented as technologies for management control, they do not automatically strengthen management accounting. Instead they make separate versions of control mutually dependent, and thus management control becomes a collective affair. Through the use of ERP, the corporate management control agenda becomes a varied one where most of the control mechanisms previously sustained in a firm suddenly become visible because they have to be put into a collective database. The consequence is that management control in the world of integrated information system is not a property of the accounting function (Dechow & Mouritsen 2005, 730). In this study, the tendency in both companies was towards more integrated information systems (even if not ERP) in some parts of their companies.

The control system becomes an immediate transitory which places the organisation in a trading zone where getting factors connected sometimes mediates what the best course of action is. So, it is not surprising that ERP systems measured by traditional accounting criteria do not produce radical improvements over previous practices. Dechow & Mouritsen (2005) sum up that an important avenue of exploration is not the widening field of possibilities that ERP systems present, but their potential to inhibit traditional and comfortable modes of management control. The statement from Dechow & Mouritsen (2005) demonstrates that it is not possible to study management accounting without technological information systems. Technological solutions such as ERP are a platform offering an official truth, which determines the general operating processes, for example, in reporting and budgeting.

Dechow & Mouritsen (2005, 730) argue that these technological effects will probably have significant consequences for future approaches to technology mediated accounting research. They show that control cannot be studied apart from technology and context because it is not possible to understand the meeting point of many technologies and the many categories of controls that are simultaneously pragmatic and yet sophisticated. Hence the effects cannot be accounted for with the current tools of research, where objects are said to be present either at the centre or at the periphery of a calculation. Quattrone & Hopper (2006) argue that accounting technologies mediate global and local needs. The case companies' accounting systems will now be focused on in more detail.

Metal Ltd

Management control is, in some instances, seen as grounded in ERP mediated routines for the collection, manipulation, reporting and discussion of corporate data (Chapman 2005, 686). Metal Ltd does not have integrated accounting systems but, instead, units in different countries employ their own information systems (Financial manager, Factory 1, 05/03/2010). The reasons for this can be found in the past:

> *We don't have standardised systems for SAP in all of our units. We merged the transactions of the particular Finnish units in 2004 and 2005 and then we inherited the earlier owners' SAP platforms. Otherwise SAP is not employed elsewhere in the company. This is a fragmented system but, at the moment, we don't have any plans to change that (Chief Financial Officer, 03/11/2010).*

The statement from the CFO emphasises the fact that ERP systems have come to be what they are through the decisions and resources of previous actors, subject to future decisions and resources that may transfigure them beyond recognition (Chapman 2005, 686). However, the group reporting system is common in Metal Ltd. Overall, accounting information system changes have been connected to the larger change situations as the next statement from the CFO clearly indicates:

> *Significant changes (such as the introduction of a new information system) took place when Metal Ltd was created in 2004 [some units, such as Factory 1, were merged into the company]. The whole reporting package was revised then as well. When a new CEO takes over, reporting practices frequently change due to the new CEO's requirements concerning reporting and his desire to do new things in his own way. Of course, the purpose is to improve accounting information systems every year (Chief Financial Officer, 03/11/2010).*

An important change took place in Metal Ltd when the new information system was introduced in 2005 and 2006. However, in 2008, a new CEO began at Metal Ltd and the case company made some changes in its information systems (Chief Financial Officer, 03/11/2010). Business processes rendered through ERP systems retain considerable possibilities for diversity and flexibility (Chapman & Chua 2003). Dechow & Mouritsen (2005) refer to that as a "techno-logic".

Even though the units had separate information systems, Metal Ltd's Head Office initiated a huge accounting information system development during the autumn and winter of 2010. The purpose of the project was to integrate five separate information systems into one coherent system:

> *Currently we have five systems: two systems for raw material purchasing, one system for selling metals, one general system and one for offset hedging. Our objective is to create an information system which integrates all five systems into one. Now we have to transfer information from one system to the other. An integrated system would reduce a lot of manual work and it would be coherent with our production process, the continuous process production. That is, what will be put on the raw material side will go through the process and finally comes out as finished metal (Controller 2, 03/11/2010).*

The new integrated information system will make different versions of control mutually dependent, although calculations of the differences between zinc and copper will include some minor differences. In the future, when the new reporting system is introduced, the calculation will follow the same model used in the zinc and copper smelter. For Metal Ltd there is no reason to do it differently because the pricing of metals follows the same principle. The case company wants to choose the best alternative from the two models and introduce it in all its smelters (Controller 2, 03/11/2010). The consequence of the project could be that various versions of control in the different departments of the Metal Ltd's Head Office become visible. The opinion of the staff who work in the project is that the new integrated information system will improve control, even if it is difficult to implement. The second aim of the project is to reduce spreadsheet use because staff at Metal Ltd's Head Office believe it is currently too high.

The SAP system forms the core of the information systems in Factory 1, to which other systems are either directly or indirectly connected. Factory 1 has improved its financial reporting as well by implementing a new application (Financial Manager, Factory 1, 31/08/2009). The aim of the application is to integrate different measures into one information system. Until now, Factory 1 has taken some of its information straight from the SAP system but some it has had to transfer manually. The aim of the new application reform is to create improved access to information for users in different places and to reduce the use of spreadsheets (Manager, Quality and Operations Development, Factory 1, 04/11/2009). The improved access to information means that persons in different parts of the organisation will have open access to information which may diminish the Accounting Department's power as a supplier of information. A presentation of Factory 1's information systems is found in Appendix 9.

Pulp Ltd

During the years 2009 and 2010 Pulp Ltd had ongoing development work due to organisational changes. The first effect was the new group reporting system, which was implemented in 2009. The second effect was that external and internal reporting were integrated into one system. Regular, monthly internal reporting was transferred from inter-

nal accounting to external accounting, which meant that it was outsourced to the group's common finance company (Controller 1, Head Office, 21/06/2010).

> *When we outsourced our bookkeeping and monthly internal reporting to an external organisation, it allowed us to concentrate more on the development of management accounting. Now management accounting can focus on business support, which is the role that management particularly expects from it. Particularly, it can now concentrate on encouraging managers in strategic decision-making situations by offering them different reports and value-added analyses (Group Controller 21/06/2010).*

The argument from the controller emphasises the fact that basic accounting work is shifting from the traditional accounting function because it does not necessarily demand special know-how which would need to be kept inside the company. The tendency in management accounting has moved from transaction analyses to value added-analyses, such as customer profitability analyses (Senior Vice President, Finance, 05/03/2010). According to the field evidence, the prevailing tendency seems to be that companies retain the core operations of the accounting function and outsource the others. The group controller believes that systems such as ERP will be more sophisticated after 10 years and management accountants will be required less than they are now. However, the job of controllers will remain, although more advanced information systems will allow better analyses concerning different reporting needs (Group controller 21/06/2010).

Even if the information systems often change during strategic shifts, such as internal changes due to a new CEO, change is not necessary. For example, such strategic projects as the divestment of foreign operations in 2009, did not cause notable changes to the reporting systems (Controller 2, Mill 1, 25/11/2009) Pulp Ltd has many different calculations for different purposes:

> *Profitability calculations can include separate monitoring concerning a specific period for the mill and then the information is available for the needs of possible further refinements, but this not is the official truth about the profitability of the whole company (Senior Vice President, Finance, 05/03/2010).*

Pulp Ltd will face new challenges for its accounting information systems and analysis in the future as it wants to be a notable pulp operator with more customers. One indicator of this is the fact that part of Pulp Ltd's information system had become unnecessary for the company due to organisational changes. The company thus initiated a project that was meant to reduce the amount of such systems and to check processes in order to improve its internal effectiveness (Group Controller 21/06/2010). The visualisation of Pulp Ltd's information systems (in Appendix 10) clearly demonstrates Pulp

Ltd's aim to rid itself of the situation where the same information goes from a system or place A through systems B and C to its final destination D. The aim is also to reduce the importance given to spreadsheet usage.

To conclude, the accounting information systems of both companies were presented in Appendices 9 and 10. The visualisations offered the researcher a way to analyse the role of various systems, even if they represent a particular person's view of the whole and may be partial. In both companies the tendency was towards reducing the number of information systems. The ultimate aim was to centralise operations within core information systems that offer the official truth to the whole company. Integrated information systems bring more transparency, in contrast to the separate systems which boost the importance of various documents in order to gain a collective image about management control.

Next, we analyse the roles of various MA actors that are labelled inscriptions. In this research, different categories of MA calculations are called inscriptions.

3.4.3 Management accounting inscriptions

Accounting inscriptions are closely connected to accounting technologies because they play a significant role in selling technologies (Norreklit 2003). Consequently, the analysis of information systems is connected with the analysis of particular MA inscriptions. In this study management accounting inscriptions are understood as actors that are divided into five categories according to the evidence gained from the case companies. These categories are reporting, budgeting, forecasting, investment calculations and ad hoc calculations (calculations associated with raw materials and production). In addition to these MA inscriptions, organisations have many other inscriptions which have an important role in organisational communication and in consulting work, more specifically inscriptions such as PowerPoint presentations (see e.g. Alvesson 1995).

Inscriptions are the devices to which translation is connected as they allow knowledge from distant locales to be mobilised and brought back to the centre of the calculation, which is seen as essential for the objectification of organisations and institutions as they mediate, regulate and authorise people's activities (Miller & Rose 1990). Although inscriptions have the potential to engage users and produce ideas and action (Quattrone 2009), their effects remain uncertain because they are subject to constant question, negotiation and reinterpretation (Qu & Cooper 2011, 345).

Management accounting inscriptions have an important role in the development of knowledge, in particular textual and graphical inscriptions are influential in articulating and constructing new forms of power knowledge (Ezzamel, Lilley & Willmott 2004). Inscriptions are an important, but not the only, reason for the power of accounting (Qu & Cooper 2011, 346). They also have weak and uncertain effects in convincing clients. Inscriptions may take many forms and have variable ability to produce, capture, secure

and refute claims about other places and times (Preston 2006). Robson (1992) emphasises three major qualities of inscriptions in explaining the power of accounting quantifications, which are presented in Table 3:

Table 3 Three major qualities of inscriptions (Robson 1992, 691-700)

Mobility	Inscriptions are required to move from the setting to the actor and back. Written records: the mobility of accounting reports remain strongly joined to the use of "writing".
Stability (of forms)	Inscriptions must be recognisable to their users who act upon organisation. This implies a stability of relation between the inscription and the context to which it refers (At a general level stability refers to the rules or conventions that relate a mobile inscription to its context e.g. the same calculation principle).
Combinability	Allows actors to accumulate inscriptions, aggregate, tabulate, recombine in order to establish new relationships and calculate "norms" through which to compare the settings to be influenced in accordance with his/her specific objectives or ideals.

Robson (1992) argues that the inscriptions have enabling effects – via their mobility, stability and combinability – because they make accounting concepts powerful and thus able to influence action. The first quality, mobility, follows directly from the problem of distance and the concept of translation, and it indicates that inscriptions must be mobile because the history of accounting has demonstrated the importance of mobility in the dissemination of its techniques and practices. The second, stability, implies the stability of relation between the inscription and the context to which it refers. Stability, as the quality of inscriptions, includes problems because the stability of accounting figures is challenged due to inflation which apparently corrupts the stability of accounting (Robson 1992, 697). In this research, the term "stability" refers particularly to the stability of the figures, even if it could be viewed as the stability of the calculation principle. Then stability would be higher than it is in the current study where it refers to the figures. The final characteristic, combinability allows the actor to accumulate inscriptions, aggregate them, tabulate them, and recombine them in order to establish new relationships. Combinability is the most obvious triumph of the numerical inscription (Robson 1992).

Firstly, attention is directed to reporting, understood as basic monthly reporting aimed at managers. Reporting is understood as an inscription which is quite stable and strongly associated with accounting information systems. Within ANT, associations can be described as a type of connection between things that are not themselves social. However, the organisation's social structures are redefined when actors form associations (Latour 2005, 5). It should be underlined that people in organisations are not just social actors, thus ANT covers all research where non-humans, such as management accounting inscriptions, are granted action (Latour 2005, 10-11), The social thus becomes visible as a local mix of people and technology (Hyvönen et al. 2008, 47). The first inscription category includes various subcategories of reporting, such as monthly reporting and other regular reporting. The category does not include ad hoc type reports but only reports which are prepared for a certain time period.

3.4.3.1 Reporting

Metal Ltd

Metal Ltd is listed on the Stockholm Stock Exchange, which sets particular needs concerning periodic reporting. As such, the reporting structure of Metal Ltd is very common and found in many listed companies. Each unit (of Metal Ltd) is a profit centre of its own. Reporting has a sub-layer where the nine units are divided into two business areas: mines and smelters. Overall, the financial reporting between the mines and smelters is the same. The smelting business area has five units (including Factory 1). They have business area specific reporting, which they do not share with Head Office, such as production data, although compulsory reporting is performed (Chief Financial Officer, 03/11/2010). The monthly reporting information gathered from the units is combined at the business area level. The company has one consolidation system for financial reporting and each unit enters their reporting packages into that system. Each unit produces a verbal and written report explaining their performance and deviations. The controller for the smelting business area receives reports from five smelters and inputs the financial figures into the system. Next, he prepares monthly reporting for the business area. The production units have the same process for budgeting and long-term business planning. The controller also compiles and prepares the report for the business area (Controller 2, 03/11/2010). According to the CFO, monthly reporting forms the basis of management accounting:

> *Management accounting is the reporting that we produce each month. Monthly reporting is absolutely vital to managers because it answers the question of "Why are we here?" We are here to report the performance; to make profit (Chief Financial Officer, 03/11/2010).*

The company's course of action is reflected within its monthly reporting structure. The production data is very important due to the nature of the production process, which is why the company added production data into its financial packages. Production data belongs in the same reporting system as the financial data (Chief Financial Officer, 03/11/2010).

Metal Ltd has built up its reporting in order to increase transparency concerning its result structure:

> *We have made a lot of progress in the way we are doing management accounting and reporting. One example of that is the gross margin which now consists of many different items such as treatment charges, free metals, premiums and by-products. Before it consisted of just one item and all revenue items were put together. We didn't know where the revenue actually came from. At the beginning of summer 2009 each smelter reported different revenue items separately, which gave us much more information about the month or reporting period. We can now see more clearly how good we are when the gross profit is broken down into different revenue items. One reason for the gross profit breakdown was the demanding raw material situation (Controller 2, Head Office, Metal Ltd, 03/11/2010).*

In addition to reporting the figures, the qualitative information is important:

> *The figures don't say much if you don't have the qualitative information explaining the background. Basically, financial or quantitative reporting is only figures but, in addition, we should receive written statements which explain the figures in more depth. It is very difficult when reading only the figures to understand what is actually taking place. I would say that the qualitative or verbal information is sometimes even more important than the figures. If you have lots of figures but you don't know their background, they don't tell you anything.*

> *It's possible to notice that with different individuals. Some people are extremely good at calculating figures but they can come to a conclusion which is completely wrong, perhaps because the findings are based on the wrong input. Some other person can better understand what the figures mean. So you always need qualitative reporting as well (Controller 2, 03/11/2010).*

Even if not related directly to monthly reporting as such, the HR Manager of Factory 1 supports the above opinion that using only statistics does not provide a full picture. The next case demonstrates that reported facts are not necessarily comparable to others.

Within these cases, qualitative information supports the information gained solely from figures.

> *If we announce that the amount of employees is for example 400 persons it does not provide the right picture because we also have outsourced functions like maintenance operation who are not included in the amount of employees we have. If we compare our total employees to another company which has their own maintenance staff and they announce that they have 600 people, this is not comparable with ours. Also our turnover differs from turnover in traditional sense. Factory 1's turnover is the value added to the raw material (which is concentrate). This is due to the fact that Factory 1 does not own its raw materials. The truth depends on who is looking at that. Generally, the figures are not fully comparable (HR Manager, Factory 1, 04/11/2009).*

From this point of view it seems that many reported figures are not always comparable with each other, even if they are so called main factors like the number of personnel or turnover. The following example from Pulp Ltd supports the view that figures such as profit do not always offer the correct picture:

> *Sometimes capital may be tied up both at the beginning and at the end of the production process when revenues have decreased considerably or even halted. But, the company's profit seems to be okay (Senior Vice President, Finance, 05/03/2010).*

The upper example demonstrates that the power associated with a particular MA inscription varies depending on the context and the background to the figures. To summarise, accounting inscriptions (such as reporting) are powerful because they have been made strong by the multiple attachments that make up the accounting phenomenon. This research focuses on those actors which are more active in situations of strategic change. Such inscriptions serve as mobilisation devices during a turbulent situation. Reporting inevitably has a strong association with accounting information systems and it has a central role in the financial process of company but its role in strategic change seems insignificant in comparison.

3.4.3.2 Budgeting

In the literature, budgeting is described as one of the cornerstones of management control (Anthony 1988). Anthony's approach is an accounting-based view of control, whereas strategic planning is viewed as a separate field of study (Hansen et al, 2003). Budgeting or the budgeting process has inspired several writers (see for example Chua

1995; Miller & O'Leary 2007) and practitioners in Europe, who have recently proposed a distinct approach to address the shortcomings of traditional budgeting practices – the Beyond Budgeting approach (BB) (see for example Østergren, & Stensaker, 2011). A frequently cited example from the ANT field is the work of Preston et al. (1992), who examined the fabrication of a budgeting system in an organisation. A vast majority of prior research in MA has implicitly or explicitly assumed that budgets serve what Simons (1990) refers to as a diagnostic role, or an interactive role when budgets are used as a dialogue, learning and idea creation machine. More recent studies (see Frow, Marginson & Ogden 2010) have introduced such concepts as "continuous budgeting," which contributes to firms that operate in more complex and more flexible organisational forms; firms that have sought to attain competitive advantage through a greater emphasis on innovation and learning as well as flexibility and adaptation. These developments have seen some organisations shift away from the use of traditional, mechanistic command-and-control arrangements (Frow et al. 2010, 444).

Metal Ltd

In Metal Ltd the budget period is currently 10 years. The period is so long because of the nature of the business, especially the long lead times in Metal Ltd investment projects (Chief Financial Officer, 03/11/2010). The second reason for the longer budget period is to better forecast the mines' ore reserves. Head Office sets basic aims for the budget but the units draw up their budgets quite independently (General Manager until 05/04/2010, Factory 1). Factory 1 utilises a budgeting model that calculates the estimates for the metal content and the amount of sulphuric acid in each concentrate. The same model offers an estimate of the profit of Factory 1 in the coming ten-year period. The budgeting includes two rounds because the basis for the budgeting, such as the production amounts, can change. Each alternative is explained in the written part of the budget which is called the business plan (Controller, Factory 1, 23/09/2009).

Budgeting has faced a lot of criticism and led to debates as to whether it has any future in management control systems (see Hansen et al. 2003; Otley 2006). According to some opinions presented in Metal Ltd, budgeting looks to the past and is already old when it is ready. Nevertheless, notwithstanding their limitations, budgeting practices are still regarded as an organisational imperative if costs are to be controlled and the expected financial performance achieved (Frow et al. 2010, 445).

Chua (1995, 138) points out that the figures generated in a budget are consistent enough to hold together diverse purposes, because budgeting is an example of a process where reality did not come first but only after socialised processes of making and judging representations.

> *The final budgeting figures have frequently been the end result of the negotiations of several parties as to why their commitment to the budgeting process is*

> *particularly important. It is important to shift the budgeting responsibility to the departments in order to make them responsible for their department's costs. Otherwise, it is difficult to get them to operate according to the budget if they have not taken part in its planning before (Production manager, Factory 1, 05/11/2009).*

The Production Department has a significant role in the budgeting process, for example, the Production Manager is responsible for the budgeting of production tons in Factory 1 because he knows the boundary conditions for raw material purchasing. The Production Manager also participates in the budgeting negotiations with some strategic partners. In this study the focus is to analyse the role of budgeting or the budgeting process as related to the ongoing change period. In particular, the economic recession affected the budgeting process by increasing the need to reinterpret and rewrite it when revising the budget at the end of the budgeting process:

> *Some of the company's units were forced to alter their production figures in December 2008 due to the coming recession. When the production amounts changed, the whole budget changed as well because the production amount affected many factors (Controller, Factory 1 23/09/2009).*

The competing demands of control and flexibility demand new kinds of budgeting practices. Frow et al. (2010) suggest a new and an integral component called continuous budgeting which is more involved with processes of strategic implementation than the narrow focus of simply ensuring pre-set budgetary targets. Their model, although confined to one organisation, offers an example of how budgets may be deployed in ways which contribute both to financial discipline in terms of achieving a pre-determined set of targets and to a manager's capability for rapid and creative responses to unforeseen contingencies. While criticisms of traditional budgeting suggest that it is entirely unsuitable for organisations faced with conditions of uncertainty and highly competitive environments, evidence from the study by Flow et al. (2010) demonstrates that the abandonment of budgeting is not the only, or necessarily, the best option for organisations to pursue. They (2010, 460) point out that budgeting under conditions of uncertainty may contribute effectively to management control when suitably supported by other organisational resources and practices.

To summarise, the turbulent economic environment affected budgeting, resulting in a need to update the budget by the end of the year in order to provide a correct picture of the coming year. However, the budgeting process was not directly connected to the strategic change situation. Budgeting operates in a network kind of environment which had quite strong associations with various actors, such as the Production Department and many others. So, the budgeting seems to have a central role in the process of forming

the organisation's social structures. Consequently, it is clear that power relations are not only concentrated to the accounting function but also dispersed to different functions.

In the following subchapters a closer examination of forecasting is made.

3.4.3.3 Forecasting

Pulp Ltd

Management accounting has largely directed its operations towards considering the needs of the future, but in Finland the focus of attention has been action on the basis of real-time information, since this offers an opportunity for managerial actions which are tuned in accordance with the current situation. In Finland, the orientation towards the future is thus significantly based on knowledge of the present (Granlund & Lukka 1998, 200).

Forecasts are selected as their own category of analysis because both case companies face demands to improve their forecasting. In the current study, forecasting concerns all kinds of forecasts, excluding the budget which was described in the previous subchapter. Pulp Ltd and the pulp business call for a scenario analysis in order to understand the trends in the industry (CEO, 11/10/2010). Pulp Ltd's forecasts analyse the megatrends, risk scenarios and irregularities that highlight the significance of market surveys as well as the competitive analysis, the anticipation of the future and the strategy processes. The forecast acts as the background information for greenfield investments – a form of foreign direct investment where a parent company starts a new venture in a foreign country by constructing new operational facilities from the ground up (Eloranta et al. 2010, 172).

A scenario analysis is an evolving concept and it is a systematic way of thinking about the future. The term scenario characterises the systematic framing of uncertain possibilities in which a distinction can be made between quantitative (modelling) and qualitative (narrative) traditions of scenario analysis (Swart, Raskin & Robinson, 2004). In Pulp Ltd the scenarios used include variables such as the price of raw material, the availability of raw material, the supply and demand balance in the industry, trends and the exchange rate trend. The effects of these are estimated using combinations which can occur simultaneously (CEO, 11/10/2010). Scenario analysis, which often includes new participatory and problem-oriented approaches, provides a powerful tool for integrating knowledge, scanning the future in an organised way and internalising human choice into science (Swart et al. 2004, 137). After becoming part of the group the focus of interest in Pulp Ltd shifted from the gearing ratio and short-medium term financing to the next quarter:

> *In the past, the main purpose of Pulp Ltd was to get 12% or 15% return on capital, which was calculated over the economic cycle. Currently, return on capital is not the interest of many, instead a closer look is directed to the cash flow or profit during the coming quarter or during the coming year (CEO, 11/10/2010).*

The statement from the CEO demonstrates that after becoming part of the group, the demand for short-term forecasting and profit maximisation has increased. Nowadays, Pulp Ltd's profit is fully consolidated into the group which implies that the importance of forecasts has increased and that the purpose is to foresee the potential change drivers as early as possible and to understand their effect (CEO, 11/10/2010).

The group also has the duty of disclosure on the stock exchange, which has shortened the overall time horizon of control and reporting in Pulp Ltd. The growing significance of forecasts has increased the need to eliminate all factors which worsen their validity, such as technical problems (Mill Controller, mill 1, 17/05/2010).

> *One mill had a technical problem which meant a need to cut downtime. The sales margin loss was a few million euros (using November 2010 pulp prices). Thus, these unscheduled downtimes are a severe thing because they affect the forecasts (CEO, 11/10/2010.)*

The trend is to minimise the amount actors which make forecasts uncertain. Thus, the aim is to develop and improve the validity of the forecast models. Some factors which cause uncertainty and difficulties will always remain present in forecasts, such as the exchange rate (Senior Vice President, Finance, 05/03/2010). Forecast models have an important role in wood procurement because the case company utilises them in order to forecast the development of the wood price (Senior Vice President, Production, 31/05/2010). In particular, Pulp Ltd had to improve its short-term forecasts when they are being transferred from the resource company to the group company due to duty of disclosure. Pulp Ltd believes that the trend in management accounting will be more forward-looking which calls for the ability to react rapidly and to produce information on the effects of various factors.

To conclude, forecasts have become more important and the tendency in the companies is towards acquiring more accurate information. Both companies emphasised the significance of accurate forecasting and similar results appeared from reports which analysed the trends of the case companies' industries (see Eloranta et al. 2010; Hetemäki et al. 2011). However, the real life examples about forecasts utilised were far more restricted than the general statements expressed concerning their significance. The representatives of both case companies emphasised that in the future the ability to make correct forecasts will be more crucial than ever before. Hence, the need for alternative calculations and sensitivity analyses will increase.

3.4.3.4 Investment calculations

Even if the corporate use of capital budgeting techniques has been examined extensively (see for example Miller & O'Leary 2007; Miller & O'Leary 2005; Alkaraan & Northcott 2006; Carr & Tomkins 1996, 1998; Haka, 2007), the literature within accounting on capital budgeting has developed surprisingly little in recent decades, particularly with respect to the study of the actual capital budgeting practices deployed within and between firms and other agencies. For example Miller & O'Leary (2007) used the term mediating instruments to refer to those practices that frame the capital spending decisions of individual firms and agencies, and that help to align them with investments made by other firms and agencies in the same or related industries. Next, the focus is on the investment process in Metal Ltd as analysed from the perspective of Metal Ltd's Head Office and Factory 1.

Metal Ltd

In cases of greenfield investment, Metal Ltd's head office conducts research in order to find out if a potential target is available. The case company has a particular sheet which it employs to gain information about the greenfield operation. The sheet includes a list of indicators which are rated according to accepted standards. First, the mine is estimated from a technological perspective; geology, resources, quality of assets and so on. Then the Financial Department estimates the mine from a financial point of view by using investment calculations, such as the return on investment or the net present value. Sometimes the company employs sensitivity or scenario analyses. Frequently, the technological staff and financial staff work together (Chief Financial Officer, 03/11/2010).

When the team (the team consists of a few persons who are responsible for the development of the overall business) finds a potential investment target, the team members discuss details with Head Office. The members can still conduct additional research on the investment target. The search for a potential investment target includes various ad hoc calculations in addition to investment calculations (Manager, Business Development, 22/01/2010). According to a manager who works in the team searching for investment opportunities, the company should have a method of calculation that is followed in cases when a potential target is found. When the investment is made there should be time to make an audit of the project and check how the project succeeded. This is particularly important in cases where there was failure, even if people are reluctant to do such audits. Metal Ltd analyses some of its projects afterwards but cannot do all due to time and resource limits (Manager, Business Development, 22/01/2010).

If a potential greenfield investment target, such as a mine, is found it can even change the strategy of the case company:

> *The investment target which turns out to be a success project can even change the strategy at least to some extent. However, a typical case is that strategy determines the potential investment targets. But I would say that the situation could also be the other way around (Manager, Business Development, 22/01/2010).*

This case is extremely interesting because it turns the generally presumed "the strategy determines the investments" around and offers another option. In doing so it suggests that accounting has potential to influence strategy in some circumstances. This probably concerns cases where a potential mine is either found or bought. However, in general, investment opportunities have to fit the company's strategy and ideology:

> *To a large extent, strategy determines the focus areas of investments. Statements [about strategy] such as "now it is not time for enlargement investments except by removing the existing bottlenecks" mean that it is not a good time to suggest any other investment. If the strategy stated that "now it is time to concentrate on secondary raw materials," that would tell us it is easier to suggest investments which suit that frame (General Manager, Factory 1, until 05/04/2010).*

Next the focus is shifted to Factory 1's investment process which is mainly controlled by the Head Office – investment approval limits (maximum values) are determined by the unit's CEO, business area managers and management teams (President, Smelting Business Area, 03/04/2010). Annual investment plans are accepted by Head Office and determine the units' investments to a large extent. Investments are classified by departments and investment classes in the plan. The most important investment class from the strategic change point of view is the enlargement investment, which means the same as taking the business in a new direction (Development Manager, Factory 1, 03/11/2009). The following example illustrates the production enlargement project in Factory 1, called "Focus".

> *The final approval was provided by the management board at the end of 2005 and the project was completed in 2007. Before the approval Factory 1 and Head Office carried out a feasibility study in order to sort out possibilities for conducting the production enlargement. In addition, the case company did market surveys and profitability analyses using a model which was particularly tailored for the purpose (Controller, Factory 1 23/09/2009).*

During 2010, Factory 1's investment plan concentrated on operations whose aim was the development of nickel smelting operations and environmental protection (Development manager, Factory 1, 19/03/2010) The budget was first prepared without the enlargement investment (the basic version of the budget) and after approval was given by

Head Office the investment was included in the budget. This order of action implies that budgeting is strongly associated with investment analysis. Before the enlargement investment decision was made long-term planning was conducted, which concerned such factors as the feasibility study of different investment alternatives (Controller, Factory 1 23/09/2009).

Pulp Ltd

Lifecycle planning directs investments in Pulp Ltd, where it is called extra-long time planning, and includes a rough estimate of financial needs concerning planned investments and renovation.(Vice President, Mill Manager, 06/05/2010). The general purpose is to guarantee that short-term plans are in line with long-term plans and to determine the changes during the period, such as significant maintenance works, operative or strategic investments.

Mills have lifecycles and stages of their own. The lifecycle plan is updated every third year which is the checkpoint for searching for factors that could change plans. The purpose of lifecycle planning is to manage the mill via maintenance and production work so that the mill maximises its profit. In practice, this means that the managers allocate the required investment and renovation work to each year (Senior Vice President, Production, 31/05/2010).

A maximum amount of investment per year is determined based on the turnover of the mill. The percentage varies according to the mill's lifecycle stage. A general principle is that there is no need for large investments at the end of a mill's lifecycle but, at the beginning the need to invest is bigger. Investments are divided into operative and strategic. Strategic investment is, for example, a remarkable expansion in production capacity, an issue connected to improving pulp quality or a considerable improvement in cost effectiveness. Operative investments are, for example, a replacement investment which does not expand production capacity (Senior Vice President, Production, 31/05/2010). Head Office determines a financial investment plan for each mill. Each mill has a list of potential investment objects which they use in order to select the most important ones and the final investment plan is accepted in the monthly production department meeting. Appropriate calculations are conducted and the cause and effect relationships are analysed using a multivariate analysis (Production Manager, Mill 1, 17/05/2010). During 2010, Pulp Ltd began two significant investment projects to improve the efficiency of one particular mill (Senior Vice President, Finance, 05/03/2010).

To sum up, the current strategy of the company determines investment to quite a large extent but sometimes an investment target can change strategy, which indicates that the one way direction (contingency theoretical view) between strategy and management accounting is reversed. An estimate of the financial needs and investment calculations are included in the planning process together with feasibility studies and market surveys and an estimate of other work needed to be done at particular target. In rela-

tion to larger or strategic investments, feasibility and market surveys are conducted together with investment calculations to demonstrate the connection between investment calculations and sensitivity and scenario analyses, so as to reinforce the overall picture.

The study will next focus on ad hoc calculations, including calculations for raw materials and calculations for production issues.

3.4.3.5 Ad hoc calculations

Raw material calculations

Metal Ltd

This subchapter analyses the calculations associated with raw materials from the perspective of Head Office, which buys the raw materials for all factories, and then from the perspective of Factory 1. Smelters utilise raw material concentrate which comes from as far as South America, Australia and the Far East. The raw material market is very challenging from the accounting point of view due to the characteristics of the concentrates and prevailing conventions in purchasing. The price of raw material comes from many variables, thus the development of appropriate accounting models is particularly challenging in the case of copper because many additional metals influence the result. The result also depends on the situation of the smelter at that moment (Controller 2, 03/11/2010) Secondly, the price of the concentrate is unknown at the time of transaction. The price is settled one to three months after delivery.

The company analyses the concentrate in order to find out its profitability. If the price or purchasing terms are not favourable, the company can decide to cut production. However, cutting production can cause more damage than the buying of the concentrate at unfavourable terms because the concentrate is bought in order to keep production running (Controller 2, 03/11/2010) During a tough economic situation, raw material calculations are conducted more frequently and much work is done with different calculation models. Then the profitability of a particular concentrate is calculated – even on a batch basis in Factory 1 (Financial Manager, Factory 1, 31/08/2009).

The decisions which deal with the use of concentrate are made at the business field, i.e. smelter level. There are particular forums which deal with smelters' raw material questions. One is a copper operational meeting. The person from Factory 1 participates in these meetings, which discuss the usage of concentrates between smelters (General manager until 05/04/2010). Units such as Factory 1 set different boundary conditions concerning raw materials, which is the background work relating to raw materials (Development Manager, Factory 1, 03/11/2009). About 70% to 80% of Factory 1's raw materials come from long-term contracts with mines and are normally made for the next 10 to 15 year period. The long-term contract means that the mine commits to supplying

the smelter with an exact amount of concentrates per year. The rest of the contracts, about 20-30%, are short-term so called spot contracts. Short-term contracts are often more complicated because they may include concentrates which have some factors which restrict their employment in the production process and cause more work than the long-term contracts (Financial Manager, Factory 1, 05/03/2010). Sometimes, the bottleneck factor can be the by-product of the production process, which restricts the process more than the availability of raw materials (at the end of 2008 the bottleneck factor was sulphuric acid due to the severe problems of selling it). Factory 1 was even forced to restrict its main production because of the problems it had with sulphuric acid. Head Office inquired about various points relating to raw materials and calculations were made about the shipping costs of sulphuric acid, for example. Project managers even checked the level of sulphuric acid containers many times a day. Circumstances improved at the end of 2009 when the market began to buy sulphuric acid (Controller, Factory 1 23/09/2009).

Generally, the raw material buyers made decisions with a greater degree of independence, when using their calculation models, before the recession, than after when the buyers had more discussions with Factory 1 about the suitability of a particular concentrate for the production process. Basically there are two reasons for the current development trend. Firstly, the profitability of a concentrate is currently based on many factors compared to only a few in earlier times. Secondly, the spot-concentrate markets are always short-term as to their durability, and the conditions of the contracts are quite tough, which is why the Financial Department analyses the profitability of these concentrates. Previously, it was possible to roughly estimate the profitability of the concentrate. Now it is more difficult because the profitability of concentrates is near the break-even point in many cases.

During this tough economic climate comparisons have been made between the choice of buying raw material or discontinuing production, for which the shutdown costs can become significant. Metal Ltd has evolved simplified and partly static calculation models in order to determine the profitability of a particular raw material batch (General Manager, 06/04/2010). The power of the Financial Department has expanded in the buying decisions as production staff, who could calculate the profitability of a particular concentrate alone, now desire to increase communication with the Financial Department due to the recession. Metal Ltd has suffered from a lack of raw materials in previous times but for different reasons. Earlier raw material shortages arose from the temporary problems at mines. Generally, they were not as severe as they are now (General Manager from 06/4/2010).

> *Early in 2010 we did a variety of calculations many times a week related to the lack of concentrate and the competition situation concerning the copper concentrate. That was because there is another unit in the company which competes with us for copper concentrates. Then we calculated to which copper smelter the*

> *concentrate should be delivered in order to maximise Metal Ltd's profit. Decisions were made concerning the production reductions between the copper smelters. Thus the market situation and other abnormal things have increased the alternative calculations (Controller, Factory 1, Metal Ltd 05/03/2010).*

When a situation is severe, raw material calculations are made continuously and can result in strategic decisions, which can, in extreme cases, lead to statutory labour negotiations or production allocation decisions. In the most critical situations, calculations were made regarding the final port for a freighter when it was already on its way.

> *There have been arrangements at the last possible moment concerning the final destination of a ship. When a ship has been on its way to one of our copper smelters there has been work going on as long as possible concerning the final destination of the ship. Sometimes changes have even been made at the last minute. Then the decision criterion is not about profit but the minimisation of losses or damage (General manager, Factory 1, Metal Ltd from 06/04/2010.)*

To sum up, the trend in metal processing is that the purchasing side has become more important than the sales side because the profit is made in the purchasing side. Metal Ltd had developed statistical models for the profitability inspection of raw materials. Accounting inscriptions utilised in raw material purchasing are frequently models which compare different raw materials with each other. These models have the ability to influence the current situation concerning whether a particular batch is bought or not. This has a further influence on production reductions and can even initiate redundancy negotiations.

Pulp Ltd

This subchapter analyses the making of raw material calculations after Pulp Ltd became the market pulp company. Decisions concerning raw material suppliers or customers are centralised at Head Office and raw material purchasing is part of the business support operations in Pulp Ltd (Senior Vice President, Finance, 05/03/2010). When Pulp Ltd became part of the group it began close collaboration with other group companies concerning raw material purchasing and logistic solutions. In Pulp Ltd the Vice President in Wood Procurement is responsible for purchasing. In addition, the company has a "Wood Group" which meets to discuss various issues related to wood procurement, such as the availability of wood. When Pulp Ltd operated as a resource company, the members of the Wood Group came solely from Pulp Ltd but when it became a group company, representatives of the company began to take part in meetings as well. In addition, mills have their own local wood groups (Vice President, Wood Procurement, 14/07/2010). Companies have several different forums which they utilise in order to

control and to secure the availability of raw materials. When necessary, forums operate as the channels through which questions relating to raw materials are broadly discussed.

> *When there is a threat of lack of wood, the company can decide to let a particular mill stand. The Wood Group in Head Office analyses the situation. So called "ship wood" is the most expensive wood material and so it covers about 10% of the whole wood stream at maximum. Its cost can be even double compared that of normal wood material. But when the pulp price is good, buying ship wood can be a sound solution compared to letting the mill stand (Production manager, Pulp Mill 1, Pulp Ltd, 17/05/2010).*

Generally, the company evaluates the wood market situation and its effects in the longer time period by conducting a strategic analysis about the need and availability of wood for the next five years. The potential amounts of wood are calculated concerning domestic and imported sources (Vice President, Wood Procurement, 14/07/2010). If the amount needed for production at a particular moment and the availability of wood do not match, the company assesses ways to bridge the gap. There are many ways to do that, such as logistical methods or changing the chip mix or searching for marginal wood batches. The latter way is a very expensive alternative and thus it is utilised only for birch (*Vice President, Wood Procurement, 14/07/2010).* Production sets the demands for the requirement for wood and asks for calculations that pay attention to several factors at once. The company makes sensitivity analyses in order to estimate the effects of the price of wood on its profit:

> *Sensitivity analysis has shown that a minor increase in the wood price has a considerable effect on profit. If the price of pulpwood expands two euros per cubic meter it does not sound very bad but its effect on profit is 26 million euros. To sum up, it is vital to make sure that there is wood available at a reasonable price because even minor increases in the wood price have a considerable effect on the profit of the company (Senior Vice President, Finance, 05/03/2010).*

The group receives wood orders from all of its subsidiaries (such as Pulp Ltd). Subsidiaries send their wood order to the group which aggregates the orders. Then the group fills the wood orders from different sources (Vice President, Wood Procurement, 14/07/2010). The common aim is to optimise wood orders for the whole group soundly (Vice President, Production, 31/05/2010). The decisions analyse cases from the point of view of the whole group and sometimes decisions are made which seem unfavourable from the unit perspective but successful from the whole group's perspective. Pulp Ltd follows the development of the wood market and prepares reports about the structure of wood reserves for the group. The staff members continuously follow and update the situation in mill stocks. During a stable period a check is conducted once a month at

roadside storages but during a turbulent situation a checkout is conducted every week and even daily when the situation is really severe. The aim of a check is to guarantee that the coming week's wood supply is secured (Vice President, Wood Procurement, 14/07/2010).

Due to large fluctuations in the price of wood and pulp, Pulp Ltd will slow down production if the wood price rises (in 2008 the high price of wood cut the profitability of the company) or the pulp price decreases – because it does not produce pulp for warehouses. In both cases, the company has a reduced ability to achieve a positive financial result and it is forced to take action to find a solution to its problems. Pulp Ltd has measures, such as using the customer's or the port operator's inventory situation, that assist in following the situation (Senior Vice President, Finance, 05/03/2010). Furthermore, the case company has made plans to move production between its factories (Senior Vice President, Finance, 31/05/2010).

To summarise, the availability of raw material is critical for Pulp Ltd. For this reason, the company spends a considerable amount of time analysing market conditions. The production requirements and the availability of raw materials are constantly compared and possible sources are considered in detail beforehand. Sometimes, a case-by-case analysis is conducted, but the time horizon can be longer as well. Companies will also form wider coalitions in order to influence such issues as the availability of wood at a reasonable price. The study now looks at production allocation decisions, which are closely associated with a situation in which a company is forced to restrict its production, for example, due to lack of raw materials. Production calculations form the second category under ad hoc calculations within the study.

Production calculations

Metal Ltd

> *Production, marketing and accounting were once separate functions but the challenging period clearly united us. People realise that we have to discuss things together now (Financial Manager, Factory 1, 31/08/2009).*

That quote indicates places in the organisation where debates occur, interpretations are made and coalitions are formed. So, the emergence of accounting is usefully linked to negotiated conceptions of product and factory (Ezzamel, Willmott & Worthington 2004, 299) In this study, production calculations are related to production allocation decisions or benchmarking issues. In the background of production allocation decisions there are usually calculations concerning the economic efficiency of decisions. Production allocation is a strategic level decision which is made either at the business area or unit level.

At the business area level it means an allocation decision about the reduction of production in the copper smelters if there is a shortage of raw material. Another case in-

volves making decisions concerning the priority role offered in production to copper or zinc, if there is a decrease in demand for sulphuric acid (General Manager, 06/04/2010) The reason behind the central role of allocation decisions is the nature of the production process. The best result is achieved while operating at full capacity. Nevertheless, factors such as market distortions, the availability of raw material and raw material composition restrict the amount produced.

Production allocation decisions can be made at the unit level as well. In Factory 1 decisions are made concerning which metal, nickel or copper is allowed priority in production. During the research period nickel reached the required capacity and copper saw its production reduced. There are two reasons for that. To begin with, nickel has been the more profitable metal, and there has been a lack of copper concentrate which means that copper production would have been reduced anyway. Production allocation decisions have boundary conditions. Factory 1 has to take account of the critical commitments to different partners. In the longer term, marketing factors set boundary conditions on decisions (General Manager, 06/04/2010)

Allocation decisions have been made based on profitability calculations at the business area or unit level. Profitability calculations are various ad hoc type calculations and models such as bonus per copper concentrate ton. Copper concentrates have different terms, which make the analysis more challenging. The difficulties can arise from a contracts' short- or long-term orientation. Nickel is easier because the previous year's actual costs operate as a basis for the coming year's costs when there is no other information available (General Manager, 06/04/2010).

The following statement from the new CEO (Factory 1) emphasises the real significance of the existence of Factory 1 – to make money. The CEO states that tons are only tools for achieving that purpose not an end in themselves. Somehow the statement turns around the traditional relationship between production tons and euros. The statement refers to the changed situation in which economies of scale have been replaced by economies of value.

> *We are not here in order to produce copper or nickel. Instead, we are here in order to make money. Copper and nickel tons are only tools for that. Engineers too easily base their thinking on tons, kilos and so on. We engineers should try to distance ourselves from the production process and understand that tons and kilos are not an end in themselves, even if they are important. We are here to earn money and the operation always has to be profitable. It can be even more profitable to produce less if it leads to a more healthy solution from an economic perspective. We should always see the euros and dollars behind production (General manager, Factory 1, from 06/04/2010).*

The view of the new CEO for Factory 1 reverses the traditional relation of tons to euros by emphasising that full capacity utilisation is not the end result but the profit. This

is the second example that clearly demonstrates how accounting can determine production or strategy.

Factory 1 has its own calculation model for working out production tons. Factors such as the amount of raw materials are inserted into the model and the model calculates the amounts of the final metals and other by-products. The dominant position of production becomes understandable when set against the budgeting process (budgeting begins from production tons), which further heightens the idea that production comes before accounting. Production allocation decisions are not the only significant case in which calculations have an important role to play. Another area of business in which they play a significant role is calculating how much maintenance downtime there should be within a company. The case company also works out how frequently it should make maintenance stops. Is it preferable to do that every year when it is shorter or every second year when it is longer? What impact could maintenance stops have on the market and what impact do they have on the bottom line? According to a Business Area Controller, calculations are constantly made when they have their monthly meeting (Controller 2, 03/11/2010).

Production related calculations can also deal with the benchmarking issues, either internal or external benchmarking, even if it is more analysis than pure calculations. More precisely, Metal Ltd utilises benchmarking when it tries to understand why one of its smelters has higher costs in one area than the other. The company tries to understand where it can improve and takes the best practice or decides which practice should be exchanged in order to adjust the cost (Controller 2, 03/11/2010).

To sum up, production allocation decisions were described at the business area and unit level. At the business area level the focus is on which smelter is allocated which raw material. At the unit level (Factory 1), production allocation decisions dealt with such issues as which metal copper or nickel is offered priority in the process.

Pulp Ltd

Pulp production has some central principles. The first important principle is maximum capacity utilisation. The second one is operating cost effectively but in a reliable way. The third is operating in an environmentally friendly way in all operations and the last is safe operation with no accidents (Production Manager, the Pulp Mill 1, 17/05/2010). These central principles direct pulp production to a large extent, but they also serve as the basic principles of continuous process production. Each Pulp Ltd mill is a cost and profit centre, but the mills do not compete against each other anymore as they did in the 1980s.

As well as the raw material decisions the production allocation decisions are centralised at Head Office. For example, production allocation decisions include the production transfers of a particular pulp grade from one mill to another. These kinds of analyses are often conducted simultaneously with budgeting (Senior Vice President, Fi-

nance, 05/03/2010). The following two examples describe the possible production allocation decisions in more detail.

> *Example 1: We were forced to analyse allocation decisions concerning several factors when we shut down Mill 5. One thing was how much birch pulp we can produce at each mill. The decision concerning the amount produced was based on an ad hoc type calculation. Similarly, ad hoc type calculations are made in other strategic decisions, such as when we can't fulfil the maximum capacity level due to a lack of wood or have difficulties selling the product on the market. Some points such as the customer profitability analysis are conducted monthly. Other ones such as production allocation decisions are case-by-case type calculations. Generally, the Financial Department makes the allocation calculations (Senior Vice President, Production, 31/05/2010).*

The final decision concerning the closure of Mill 5 was so significant that the company analysed several factors. The calculations were an ad hoc type composed in many cases within the Financial Department. This example demonstrates that MA inscriptions have significant in the power relations during strategic decision-making.

> *Example 2: Pulp Ltd had to temporarily stop production in its mills in 2009. The decision on which mill was stopped was based on the minimum damage principle. So, Pulp Ltd decided to stop the mill which had most expensive production or had least attraction for the market. The company has particular calculation models for these situations. Pulp Ltd then has to decide whether or not it allocates the production reductions to one or several mills. If the production reduction is wholly allocated to one mill during the winter season it can cause damage to the mill (Group controller 19/11/2009).*

The example clearly demonstrates that financial questions are important but not the only criteria in decision-making. When the market situation is not very good, the case company analyses whether it is reasonable to produce the whole production amount (to operate at maximum capacity). Then it reviews its least profitable pulp batches or customers. The purpose is to find out which customers are most profitable, in order to guarantee pulp supplies to them (Senior Vice President, Finance, 31/05/2010). The company analyses the division of the different pulp qualities between its factories from the viewpoint of costs occurred in the supply chain:

> *Pulp Ltd manufactures different pulp qualities in its different mills. The company did profitability analyses together with the group to which it belongs concerning the rationality of its current division of pulp qualities between the dif-*

> *ferent mills. The aim was to determine the costs of the supply chain (Production manager, the pulp mill 1, 17/05/2010).*

An allocation analysis is also conducted during the normal operating period, even if the intensity of analysis is heightened during turbulent periods.

> *Calculations are made when the amount of maintenance stops as well. Is it sound to make four maintenance stops, one longer maintenance stop in summer or to keep to a slow production speed when there is lack of wood? The Controller discusses all the factors which influence the decision with the Production Manager. These factors can be chemical losses or energy losses, etc. (Mill Controller, Mill 1, 17/05/2010).*

In addition to the production allocation analysis the company does benchmarking in order to determine the value of its mills according to different factors. Pulp Ltd compares its mills according to profitability, wood consumption and the use of chemicals (Senior Vice President, Finance, 05/03/2010). The company divides benchmarking into two categories which are internal and external benchmarking. The core of internal benchmarking is to find out the relative internal profitability of a particular mill (Group Controller 19/11/2009). In external benchmarking the profitability of the company is compared to competitors, customers and market area (Senior Vice President, Finance, 05/03/2010). The result of external benchmarking is a broad report which is written by people from different functions, such as financing and marketing and offers a comprehensive view of the position of the company. The report is part of the long-term strategy of the company (Senior Vice President, Finance, 31/05/2010). Pulp Ltd works in collaboration with external consulting companies in order to ascertain its own position in relation to its competitors (Senior Vice President, Finance, 05/03/2010).

To conclude, Pulp Ltd has faced challenges due to the fact that operating according to its underlying principles is demanding for many reasons. Production calculations are ad hoc type calculations, but in addition to an accounting perspective, there are other decision-making criteria. Pulp Ltd does internal and external benchmarking the purpose of which is to determine the profitability of a particular mill (internal benchmarking) or to compare the mill with other mills (external benchmarking). Benchmarking operates as a valuable way to gain information from distant locales and make it available for calculation at Head Office.

The objective of this chapter was firstly to analyse the economic conditions of both case companies. The case companies' strategic re-directions derived from many factors, which occurred simultaneously: firstly from the global trends discussed, but also from industry-specific trends. The situation of the case companies was made worse by the economic recession, which – together with economic cycles and the structural change – resulted in an increased negative effect on the industries. Thus, the chapter concentrated

on analysing such issues as globalisation and the growing importance of countries such as China. Furthermore, attention was given to such issues as growing service orientations in the global economy and on the industry level. Industry-specific trends (such as the growth of processed production – based on the rapid increase in the amount of plantations with fast-growing trees and the increasing significance of electronic communication) resulted in the need to find potential complementary revenue streams for the case companies.

After describing the economic trends the chapter concentrated on describing the background of both case companies. The researcher conducted the field work in Metal Ltd (23 interviews) and Pulp Ltd (18 interviews) between August 2009 and November 2010 in a turbulent economic period. The chapter explored information gained from the researcher's fieldwork concerning such issues as the strategies and management accounting actors. The strategies were described by utilising the classification based on positioning school definitions (see Minzberg 1998; Porter 1985). The economic recession operated as a kind of watershed which translated the case companies' strategies from cost competiveness towards differentiation. Next the chapter described the MA actors as being divided into human actors (controllers' role) and non-human actors (accounting information systems and MA inscriptions). In this study management accounting inscriptions were divided into five categories; reporting, budgeting, forecasting, investment calculations and ad hoc calculations (calculations associated with raw materials and production) according to the evidence gained from the case companies. Next, the chapter 4 concentrate to relate seemingly unstructured empirical anecdotes to more structured ones by using the actor-network concepts discussed in Subchapter 2.2.

4 DISCUSSION

The objective of this chapter is firstly to analyse and discuss the findings of the research by using ANT concepts as the theoretical background. The chapter explores the researcher's field experiences and observations of the actor-network theory concepts discussed in earlier subchapters. Actors, intermediaries, mediators and translation or fabrication process, are the core devices of analysis employed to describe the role of MA actors or their associations with each other. Secondly, the chapter analyses how research contributes and relates to earlier studies concerning the relationship between management accounting and strategy. The domain area theories attempt to explain how MA can be applied in order to analyse and explain the social surroundings being scrutinised. By doing this, a body of knowledge concerning from a research field is applied (see Malmi & Granlund 2009; Lukka 2005). The theoretical framework of this thesis is presented in Table 4, which shows how the theoretical contribution is divided according to the research questions. The theories and studies presented in Table 4 emerged from local contexts and they were restricted by the characteristics of this context (see Vaivio 2008).

Table 4 A summary of the theoretical contribution

Research question	**Method/meta theory = actor-network theory** **see Latour 2005; 1987**	**Domain/substance area = the strategic management accounting literature and the MA role literature**
1.What roles do management accounting actors operate in during periods of strategic change?	Actors (human or non-human), intermediaries and mediators, translations and networks	The strategic management accounting/ MA role literature The role of controllers: for example Granlund & Lukka 1998; Hyvönen et al. 2011; Burns & Vaivio 2001 The role of information systems: Dechow & Mouritsen 2005; Hyvönen et al. 2011, 2008; Chapman 2005 MA inscriptions: Robson 1992; Ezzamel et al. 2004 Other studies: for example Dent 1990; 1991
2a.What is the nature of the associations between management accounting actors and the strategy?	A macro-actor with its leaking black boxes, fabrication process, Latour's (1987) four tactics (see Callon & Latour 1981)	The MA-strategy literature Preston et al. 1992; Skaerbaek & Tryggestad 2010; Justesen & Mouritsen 2011; Boedker 2010 Hopwood 1983; 1987; 1990; Simons 2000, 1995; Kolehmainen 2012; Langfield-Smith, 2005; Hansen & Mouritsen 2005.
2b) What is the nature of the associations between management accounting actors and the external environment?	see Latour 1987; Law 1992	The MA role literature Justesen & Mouritsen 2011, Coad & Cullen 2006; Caglio & Ditillo 2012; Tomkins 2001

Research question 1 contributes to the literature which analyses the roles of selected MA actors in strategic change by using Latour's definition of intermediaries and mediators as indicators of different positions. It focuses on the role of various management accounting actors. In the context of ANT, accounting actors participate in shaping and constructing the activities of an organisation, and they play a central role in the process of change in which change is made acceptable or appropriate to an organisation (Latour 1987). Research question 2a contributes to the literature which analyses the relation-

ships between MA and strategy. Research question 2b contributes to both issues by analysing associations between MA and the external economic environment.

4.1 The roles of management accounting actors in strategic change

Management accounting operates as a group of actors which can be either human or non-human. Non-human actors are accounting technologies (Latour 1987). In this thesis non-human actors consist of two main groups: management accounting information systems and management accounting inscriptions (calculations). Human actors are mainly individuals from financial departments but the term includes others who do various calculations in organisations and take part in negotiations where strategic decisions are made.

A mediator is a concept utilised in the study to classify those MA devices which have power to influence others, including the strategic direction of the company. Mediators can translate or modify the meaning or other elements they are expected to carry. Cause and effect relationships between two actors are never simple when they operate as mediators because causes only offer circumstances or precedents. The opposite of a mediator is an intermediary, which can be human beings or a technical artefact that transports meaning without transforming it, thus defining its input is sufficient for defining its output. By adopting those concepts – mediators and intermediaries the researcher aims to reveal different MA actors and the power they hold in a strategic change situation.

Via propositions concerning accounting power, identity, effects and influence that are constantly being applied to accounting phenomena, it is possible to analyse the role of accounting in episodes of transformation (Justesen & Mouritsen 2011, 184). The transformation period of the analysis includes the years 2008 to 2010. In particular, the economic recession, globalisation and the China effect, and the growing service orientation of the case companies' industries have radically changed their operational environment. Furthermore, industry-specific trends, such as the lack of concentrate and the structural transformation of the pulp and paper industries, influenced the role of MA during the research period. This research contributes to existing strategic MA literature by analysing the power of selected MA actors in the transformation period from 2008 to 2010. Accounting phenomena are spread out in time and space towards heterogeneous elements that help to establish their identity (Justesen & Mouritsen 2011, 184). Together these different heterogeneous (management) accounting elements, such as human actors, management accounting information systems and management accounting inscriptions, have the ability to establish the whole picture of accounting phenomena. Even though the categorisations selected represent research findings from just two companies and so does not fully match prior MA studies, although they offer quite a broad picture of the different elements commonly associated with the MA field. The analysis of the two cases is not generalisable, but the researcher believes that it is capable of il-

lustrating both the tasks and roles of different MA actors. Those MA actors represent the categories which emerged during the field research interviews conducted in the case companies.

The common nature of strategic change is always slow in the case companies' businesses because a heavy infrastructure results in a remarkable amount of fixed costs in relation to variable costs and also leads to the rigidity of structures. However, Finnish metal processing and pulp industry companies have considered new operational methods. They began to move their operations from the rigid maximum capacity utilisation towards a more flexible alternative by reducing fixed costs. They sought flexibility by concentrating on their core businesses and searching for new revenue streams.

Next, attention is shifted to human actors. It should be pointed out that the classification of MA actors into mediators and intermediaries is inaccurate and suggestive. An accurate position for each actor is impossible to define in detail and their positioning is always open to interpretation. Thus, the classification provided in the next subsection does not offer a comprehensive picture of the roles of the different actors.

Human actors

In this study the role of controllers has been analysed by using many frameworks e.g. Granlund & Lukka 1998; Burns & Vaivio 2001 and Hyvönen et al. 2011. The Granlund & Lukka (1998) framework is selected because it describes the expansion of a controller's role away from those of business historians and company watchdogs towards occupying a more commercially oriented function. Further, it fits well with the role division of MA actors adopted in the current study (intermediaries and mediators). According to the co-classification adopted for analysing the controller's role in the work of Latour (2005; 1987) and Granlund & Lukka (1998), a mediator is considered in this study to be a controller who plays a role on a management board or is a change agent. In contrast to the role of mediator, there is that of the intermediary: a controller who operates as a historian or in a watchdog position. The case companies' production-oriented operation was reflected in the opinion of how their financial departments viewed their role. In some instances they experienced their operation as being alongside that of their production departments.

The human actors here are mainly from the financial departments but the term includes others, like production managers, purchasing or R&D staff, who have power to influence the strategic decisions. As Hyvönen et al. (2011, 15) point out, the papermaking industry has been the domain of engineers and their discourse has revolved around the technical properties of paper machines and capacity utilisation issues. The view adopted in the current study is identical with that of Preston et al. (1992, 567). They claim that any analysis should also include designers, users and those whose actions have a central role in the change situation.

The transformation process frequently begins from conversations between individuals which explains why the analysis of MA actors' roles begins from human actors. The translation as a process includes the definitions, interpretations and meanings that emerge from, and are shaped by, the actions and interactions of all participating individuals (Preston et al. 1992, 567). At first, it is necessary to identify core individuals and groups who are either directly or indirectly involved in the fact-building process and to ask why they are interested, or why and how they become interested in the construction of accounting figures. It is people who use accounting figures in specific ways to try and achieve certain objectives (Chua 1995, 116-117).

The research results reveal findings concerning the role of controllers in organisations. According to the empirical findings, the position of a controller inside an organisation also influences their role. Researchers, such as Granlund & Lukka (1998), claim that a mill's controllers often operate more as bean counters than as change agents. Hyvönen et al. (2011) point out that a mill controller's job description has become more focused on financial reporting and data inputting. Rouwelaar (2006) pointed out that business unit-controllers can fulfill two roles in business life: the support role and the control role. The support role is associated with supporting managerial decision-making in the business unit; the control role focuses on providing reliable and timely financial accounting information for the corporate level and ensuring that the financial function complies with relevant regulations. However, the evidence from this study offers partly a contrasting viewpoint on the mill controllers' role. In Metal Ltd the role has been more as a bean counter because the role of controller has been solely to calculate needed calculations and they did not take part in the decision-making in the unit. In Pulp Ltd the duties of a mill controller include a monthly reporting, the auditing of external companies and taking part in strategic projects, implying that the position is more that of a change agent.

Nevertheless, based on evidence from the closure of Mill 5 and that given by the Controller at Head Office, the role of controller can also be that of a watchdog or a "bean-counter". This is because a controller delivers the required information but does not necessarily take part in decision-making. Nevertheless, the evidence from the present research indicates that these positions are generally combined in the same person. To summarise, the evidence for such controller roles gained from this research contrasts to some extent with that from prior research. The evidence also suggests that the role of controller depends on the position of the controller inside the company.

However, the turbulent economic period influenced and also shifted controller roles in both case companies. Firstly, it increased communication between different departments and between the head offices and units. The production departments started to consider the question of how their financial department could offer information in certain decision-making situations. Secondly, the importance given to controllers was increased. This resulted in managers needing ever more information about the future, making new demands of controllers.

Using Granlund & Lukka's (1998) classification, the controllers' role has shifted towards that of a management consultant role during the study period. Generally, such specific trends as outsourced activities (basic monthly reporting) and the use of more advanced information systems support the observed general trend. On the other hand, the reality of individuals does not always meet with the trend. Sometimes a controller's work is compatible with the role of intermediaries. For instance, if the controller works in the centralised part of an organisation and merely collects data and consolidates corporate reporting. It seems that the power of a controller increases as a financial situation worsens and that the controller works as a mediator in an economic recession. In some cases, a controller can even provide the information leading to significant changes or strategic decisions concerning, for example, production site location.

Research results suggest that interfaces between professions have disappeared and changed. This trend is called hybridisation (see Burns & Vaivio 2001), which states that the role of management accountants is expanding to encompass other business activities or that other actors expand their roles to encompass accounting activities. Part of management accounting is transferred from the responsibility of the controller to that of managers. Such departments as the raw material purchasing, production and administration conduct significant calculations from the point of view of a company's operations. It is not self-evident that the financial departments always know of the existence of these calculations. Nevertheless, these calculation models can have strategic importance in decision-making situations.

The finding is interesting in many ways as it demonstrates that the financial department does not have a monopoly position on calculations, thus it changes the perception of the power offered to the accounting function inside the organisations. The new position of the accounting function provides an ability to make matters visible in a new way by demonstrating associations between various functions. The nature of those calculations calculated outside the financial department, for example, those relating to partnership strategies or the financial success of company demonstrate that strategically significant calculations are located outside the financial department. This demonstrates hybridisation in the way Burns & Vaivio (2001) identify it because the interfaces between the professions have (partially) disappeared. The prevailing reasons for the observed trends arise from many sources but two influential factors are perhaps the change to a less production-oriented manner of operation, which has traditionally overridden accounting, and the use of more advanced information systems, such as ERPs, which employees other than accountants are able to use.

The dominant engineering culture (see for example Dent 1991) and its focus on production tonnage and maximal capacity utilisation has begun to change due to the structural transformation of heavy industry. The search for new profit opportunities is now a quest for survival, indicating that the emergent business culture is evolving and incorporating quite different knowledge. The focus is now more on the bottom-line as the financial situation of the paper conglomerates has declined, thus increasing the im-

portance of the financial discourse. In a way, paper machines were increasingly being discursively turned into "money machines" (Hyvönen et al. 2011, 15). This has begun to construct the image of the case companies as being increasingly profit seeking (see for example Dent 1991, 725; Byrne & Pierce 2007; Hyvönen et al. 2011). The trend is observable for both companies, but it has particularly occurred in Metal Ltd. That change can be considered a cultural change and is the most likely factor for explaining the increasing communication with and importance given to financial departments. Thus, the turbulent economic environment cannot be said to fully explain the observed trends within the case companies.

To summarise, the research results of the research support Granlund & Lukka's (1998) study from the point of view that the bean counter role of a controller suits controllers who operate in the centralised part of the accounting function, such as that responsible for consolidation and financial reporting. However, concerning a mill controller's position the research results are in conflict with previous studies (Granlund & Lukka 1998; Hyvönen et al. 2011). This is interesting and demonstrates that complex relationships between the controllers' roles can depend on their position inside an organisation. Hyvönen et al. (2011) stated that most bean counters had been outsourced to external service centres. The current study supports that partly because Pulp Ltd outsourced its basic internal reporting and bookkeeping to an established service centre. Those controllers who remain work more as business partners. This complex relationship between the roles of controllers and the new interfaces between the professions would make an interesting subject for further study.

To conclude, the research results suggest that the importance given to the financial department and accounting knowledge during the turbulent economic period is pronounced. The role of controller has become more closely associated with the mediator role. Part of this change derives from changes in organisational culture, thus it is not possible to estimate the exact weight given to the change drivers. Further, it became evident that the direction of a controller's role, in the coming era of more advanced information systems and increased outsourcing, will become more like that of a management consultant and change agent. Thus, the increasing importance of controllers will probably mirror bigger shifts, which is why further analysis is needed on both the organisational and individual levels.

Management accounting technologies – MA information systems

In this research, information systems and accounting inscriptions have been described as systems of their own, even though they are interlinked. One reason for the distinction was the fact that during the research process the researcher observed that several strategically significant calculations emerged from outside formal information systems. In fact, calculations were frequently made by using calculation models or case-by-case

type analyses that are not, in many cases, connected with any formal basic information systems like SAP or ERP.

The implementation and use of enterprise resource planning (ERP) systems raises fundamental questions about the role of management accountants in an organisation (see Jack & Kholeif 2008). Such writers as Newman & Westrup 2005; McCosh 1986; Scapens et al. 1998 found that IT and ERP systems reduce or eliminate the role of management accountants as information suppliers. This results from the fact that employees other than accountants have begun to use and control ERP and SAP and that the roles of accountants have consequently been marginalised (see Newman & Westrup 2005). ERP systems can also enable a single controller to develop his business partnership skills as Hyvönen et al. (2011) demonstrated in their case study. They (2011, 15) point out that ERP automates routine accounting work and leaves more time for analysis. A controller can then become a group controller, allowing them to be more involved in providing more information for business decisions. The research results, particularly from Pulp Ltd, support the statement that the development of IT systems has allowed a greater focus on the development of management accounting, enabling it to focus on the business support role, offering managers different reports and value-added analyses.

Also, integrated information systems improve the availability of information to many parties. Nevertheless, according to Dechow & Mouritsen (2005), integrated information systems such as ERP do not necessarily strengthen management accounting. Instead they make separate versions of control visible which can bring new challenges and create much additional work. Consequently, management control is no longer the property of the accounting department.

Both case companies have had projects to integrate their accounting information systems inside their head offices with the aim of integrating different information systems into one integrated information system and bringing external and internal reporting into a single system. On one hand, the changes were linked to the purpose of improved internal efficiency which aimed to integrate the information systems package and make it more workable by reducing manual input into the system and spreadsheet use. The consequence of the integration project was to transfer the responsibility of MA regarding regular, monthly internal reporting to external accounting and an external service organisation. However, regardless of the integration project inside the head offices, Metal Ltd did not have plans to integrate the information systems within its different units. The reasons for this derive largely from the fact that the integration of accounting systems can result in new problems in organisations, bringing considerable additional work and costs. Hyvönen et al. (2008, 46) argue that the aim of ICT solutions is to create a new centralised form of control to allow the headquarters of companies to see the financial situation of their factories more clearly. Certain IT systems do not make the controls practiced in a firm's separate places visible, which may increase the importance provided by different inscriptions in the enhancement of the control of operations. The evidence from Metal Ltd supports this because the amount of various accounting docu-

ments it used was extensive, possibly due to the use of separate information systems between its units and head office.

Information systems often change during strategic shifts, for example when a company (Metal Ltd) is created or when a new CEO introduces his/her preferred information system. Dechow & Mouritsen (2005) refer to that as the techno-logic of a new CEO. Information systems are often tailored so that they are coherent with a production process but when a production process or logic changes, the information system changes as well. However, not all such strategic shifts necessarily involve change information systems, for example, Pulp Ltd when it divested its foreign operations in 2009. Furthermore, the case companies have clear aims to improve their accounting information systems on a continuous basis. It seems that the original reasons for the changes in the information systems did not directly arise from the external environment. Instead factors in the business environment indirectly affected organisational changes, and thus led to the aim to improve internal effectiveness. Through their closely allied modes of analysis writers such as Quattrone & Hopper (2001a) and Dechow & Mouritsen (2005) produce a clear sense of the importance of people and the organisational practices in which IT systems are embedded.

As such, the role of the accounting information systems does not appear to be particularly significant during the research period, which demonstrates their role to be more that of an intermediary than a mediator. The reasons for that are varied. Firstly, the units of Metal Ltd employ their own information systems in different countries, regardless of the group reporting systems, which can also be a root cause of why Metal Ltd has a huge amount of different reports for its different units. Secondly, accounting information systems are analysed separately from MA inscriptions, which may reduce their strategic importance. The third and final factor which reduces the importance given to the integrated information systems derives from the fact that the most powerful accounting actors in strategic change come from outside the IT systems and are calculated by using different spreadsheet formats such as Excel.

The visualisation of the case companies' main accounting systems is presented in Appendices 9 and 10. Both visualisations demonstrate that such formal accounting systems as ERP or related systems, such as BP/BW, have been framed together with other supporting information systems such as Excel or similar software packages. Such spreadsheet usage represents the varied control practices employed in many different locations within the organisation. The visualisation of the information systems demonstrates the intention of Pulp Ltd to move towards a situation where a particular information system would operate as the centre for different information systems by offering a so called "official truth" with which information received from elsewhere is compared. Pulp Ltd's goal is to create "the flower": a single information system at the company's centre that is supported by other systems and spreadsheets. Both visualisations indicate that production-related information systems are connected with the main information systems.

To summarise, IT systems can offer companies a competitive advantage which is derived from the aim of increasing internal efficiency or from the fact that an organisation's actors construct the meaning of an information system. The fact that the case companies improve their information systems every year demonstrates their commitment to renewing the meaning of information systems on a continual basis (see Hyvönen et al. 2008, 59). It should be taken into account that information systems do not necessarily possess the factors which makes management accounting stronger. Thus, the exchange of management accounting information cannot be totally relegated to formal and IT-based mechanisms (Caglio & Ditillo 2012, 73).

The results show that clerical accounting work is moving away from the accounting function. Advanced information systems have a role in this progress because the production of basic information has been outsourced to service centres, allowing resources inside the company to be harnessed for value-added operations. The development trends may lead to more sophisticated ERP systems in the future. Currently, the needs of management accountants may be not as advanced as the technology they use. There is an increasing tendency towards outsourcing and more sophisticated ERP systems, which allow better analyses and better cater to reporting needs, but also allow the centre to lead the proliferation of external units. However, according to Quattrone & Hopper (2001), it would be particularly beneficial to trace how control is related to integration and establishing order in work activities. This would also be an interesting research issue for those situations where companies have outsourced their basic accounting operations to concentrate on value-added analyses with fewer management accountants and more advanced information systems.

A significant future aim for studies of ERP should be to develop an understanding of their organisational and social significance. The study of ERP includes fascinating possibilities that might significantly further our understanding of the nature of management control (Chapman 2005, 688). In order to analyse the impact of integrated accounting systems, attention to control as a practice across a firm is required. The integration projects were either in their early stages or ongoing, which prevented an estimate of their results. However, he (2005) accepts that ERP may now be considered "old" technology but to frame it in that way is to miss its potential contribution. The next section will build a picture of how accounting can shape strategic choices and show how much accounting inscriptions are actually involved in the formulating of strategies and the enacting of the environment.

Management accounting technologies –Management accounting inscriptions

Inscription refers to a material textual translation of any setting, such as written texts, tables and charts, figures, lists and so on, which are to be acted upon (Latour, 1987). Management accounting inscriptions enable action at a distance (Robson, 1992), giving visibility to "invisible" objects (MacKenzie, 2009). In the current study MA inscriptions

have been divided into five groups: reporting, budgeting, forecasts, investment calculations and ad hoc calculations (raw material calculations and production-related calculations). Some of these categories are more common in the MA field (see for example Horngren et al. 2007), but others (such ad hoc calculations as raw material calculations, forecasts and production-related calculations) fall outside most traditional boundaries of MA. The categories emerged during the field interviews and were separated accordingly. The roles of MA actors are described by using the terms mediator and intermediary. Specifically, the aim is to discover those MA actors which operate as mobilisation devices (mediators) in a turbulent business situation.

Different inscriptions operate as translation devices which enable translation between distant departments and transmit the power associated with those inscriptions. Inscription refers to a material translation of any setting, which can be a written text, a table, a chart or a number (Latour, 1987). In ANT an accounting technology is never merely diffused in the sense of transmitting and passing on a fixed object. Instead, the MA actors are modified, strengthened and underlined in the process (Preston et al. 1992, 578). The argument indicates that MA inscriptions are dynamic concepts which have greater or weaker power depending on the particular context in which they operate. Latour's later work (see Latour 2005) makes it possible to understand the power of accounting inscriptions as it assumes that MA inscriptions are powerful because they have been made powerful by multiple attachments.

A main objective of the research is to understand the effects of inscriptions in a situation of change and by using the terms mediators and intermediaries to describe the role of inscriptions. Further, it analyses whether or not Robson's (1992) three major and interrelated qualities (mobility, stability and combinability) of inscriptions are suited to describing management accounting inscriptions in strategic change, which always involves uncertainty. The focus is on those qualities which serve as mobilisation devices, or which have a role in influencing strategy in a turbulent situation because not all inscriptions are equally convincing.

The first accounting inscription is reporting, which is viewed as monthly reporting, mainly to managers.

Reporting

The industries of both case companies have highly capital intensive businesses in which infrastructure, such as machines and buildings, plays a significant role. The importance given to machines is reflected in the thinking concerning operational principles in general. In fact, production tonnage and maximum capacity utilisation underline such thinking, further influencing the accounting reports produced.

Metal Ltd's traditionally strong engineering culture is reflected in its monthly reporting. Production data is central to the company and it has added production data into its financial packages. Accounting reports have traditionally concentrated on reporting the

profitability of the produced tonnage. Metal Ltd has made some reforms regarding its reporting, such as gross margin breakdown, which improved its knowledge of the origins of revenue. The companies have frequently used group reporting, which makes different versions of control (in different units) mutually dependent because they somehow have to be input and related in the collective database. Thus, the consequence is that management control is not a property of the accounting function.

Metal Ltd has increased its transparency by breaking down its gross margin into the different revenue items. By doing so the company's purpose was to strengthen reporting by increasing its transparency. The changes added knowledge about where the company's revenues actually come from. Somehow the change reflects the gradual shifts of Metal Ltd from an engineering culture towards becoming a business enterprise (see Byrne & Pierce 2007; Dent 1991). Possibly it also describes the increasing importance of the "bottom line" and its inner content (Dent 1991, 717). Perhaps the primary reason also relates to the prevailing economic surroundings and to factors associated with it, such as the lack of raw material.

Inscriptions possess enabling effects due to their mobility, stability and combinability. Robson's (1992) categorisation is adopted in order to analyse the basic characteristics of inscriptions. The mobility of accounting reports remains strongly attached to the use of written documents because such information enhances data that was previously presented only in numerical form. Robson's (1992) categorisation concerning mobility and stability of form is compatible with monthly reporting as such. However, the combinability is not always self-evident due to differences in the purposes the figures were collected for.

To summarise, monthly reporting remains a central part of management accounting but its role in the economic downturn did not seem to be very significant. It follows rules set by the group but does not seem to offer very valuable information from the strategic change point of view. However, the reporting possesses multiple attachments from various actors and MA inscriptions which are or can become powerful in strategic change surroundings.

Monthly reporting is an intermediary from a strategic change point of view – if we consider the strategic moves caused by reporting. If we consider the reactions in the human actors, such as the controllers who analyse the reports, monthly reporting seems even more of a mediator than intermediary. However, due to the focus of this research, monthly reporting does not significantly impact on the strategic change. In the future the purpose of reporting will increasingly be to improve the value of a company.

The following subsection concentrates on analysing the budgeting process (the second management accounting inscription) in greater detail.

Budgeting

Budgets are a major feature of most MA control systems and are used by management as a means of coordinating and communicating strategic priorities and, in conjunction with reward systems, are often used to facilitate lower-level managers' commitment to these priorities (Abernethy & Brownell 1999, 191). Such budgeting has faced much criticism and there has been a lot of discussion as to whether such budgeting is necessary. However, they still retain their position as a way to control costs and to predict forthcoming financial performance (see Frow et al., 2010). Factory 1 of Metal Ltd has also questioned the role of budgets because they are often outdated when they are created. The role of budgets at Metal Ltd appears to be the coordination of costs.

According to the field evidence, the budgeting process has spread widely within the organisation as budgeting operates in a kind of internal network which is involved in multiple attachments with other MA actors (monthly reporting and controllers) and several departments (such as production). Budgeting also has associations with the budgets of strategic partners because the goals set for strategic partners derive from the company's main budget. The budgeting process allows knowledge from distant locations to be mobilised and brought back to the calculation centre i.e. a company's head office). Generally, a budget is an example of inscription that is put into practice and the users of the budget – the fact-builders – explicitly acknowledge that the figures they use are flawed approximations of reality.

The research results demonstrate that a budget is also an example of an inscription which is subject to constant negotiation and reinterpretation particularly during changing circumstances. In particular, the central position of production is emphasised in the budgeting process within both case companies. The production manager collects information about the purchasing terms of the raw materials and takes part in the budgeting of strategic partners. In order to get people committed to the budget targets, it is important that the managers of a particular department participate in setting them. The statement supports Chua's (1995) view that figures should be consistent enough to hold together diverse purposes. Socialised processes are how budgets are made and judged.

When analysed according to Robson's (1992) classification, the stability and combinability of budgets become question marks. How stable is the budget when there is a need to fix it due to the changes in the external environment? During the research period, Metal Ltd had to update its budget in the latter stages of the budgeting process due to changes in its basic premises, such as the production level. This implies that the stability of a budget is lower during a turbulent time because its ability to forecast the future is lower. Budgets are based on different premises during an economic recession and can differ remarkably from stable, steady growth periods. So the combinability of a budget is highly associated with stability. In other words, when basic premises like the production amount change, the combinability of a budget is reduced. This demonstrates that budgets are less combinable during turbulent economic periods, because budgets

are subject to change. Mobility is directly tied to an inscription's ability to carry out "action at distance visible" (Robson 1992). Budgets are mobile inscriptions that enable them to carry out "action at distance visible," at least some extent.

To summarise, when the budget or budgeting process is analysed without its associations with other MA inscriptions, such as investment calculations, the budget does not have a significant role in relation to corporate strategy. In fact, its role is closer to that of intermediary than that of mediator in strategic change. But, when all such associations that budgeting has with other MA inscriptions are considered it has more power to affect the direction of strategic change. The network mode of operation expects the likely future of a company's budgeting process to be more tightly associated with those of its most significant partners. In partnership relationships, budgeting operates at the interface where companies meet, which further blurs the boundaries of companies. Thus, a company becomes visible to its shareholders via accounting documents. Such visibility is only partial but it has a significant role in the process of enhancing the visibility of an organisation to its shareholders.

Next, the study considers forecasting because a firm's ability to react rapidly and flexibly (on the basis of both real-time information and estimates for the future) is considered to be a critical factor for success.

Forecasting

A forecast is also an example of an inscription which has uncertain effects in convincing clients because it is derived from many variables. The heightened significance given to forecasting has increased the intention of companies to eliminate those factors that reduce their validity. A forecast is an inscription that may have more enabling effects than monthly reporting and, in doing so, it has the ability to make accounting concepts more powerful in relation to generating action. In the current study, the term "forecast" refers to all the forecasts companies reference when they wish to forecast the future trends of their business areas, such as scenario-analyses. Forecasts have frequently been associated with other MA inscriptions, for example Tomkins (2001, 163) suggests that the growing emphasis given to forecast models is linked to investment decisions and new product development.

According to the field evidence from Pulp Ltd, the turbulent environment and the structural transformations of the pulp and paper industry increased its need to foresee future trends. The second factor which increased the power of forecasts emerged from the point at which Pulp Ltd merged into a group and encountered pressures to develop more valid forecasts for the stock market. Currently, its focus has shifted from static measures, such as ROE or ROI, and it has developed a more dynamic and future-oriented view, which has the time horizon of the next quarter or year. The purpose is to see potential change drivers as early as possible and to understand their influence. The

above observations demonstrate that the role of forecasts increases during a turbulent period, thus the power associated with them places them in the role of mediators.

Forecasting demonstrates a situation in which the socialised processes of making and judging representations (Chua 1995, 138) are key points. The fact that a forecast allows an analysis over a longer time horizon indicates that it operates as a mobilisation device – by delivering translation. Forecasts have the ability to transfer and deliver power and can affect other MA actors that operate as mediators by translating their meaning to the next mediator. The figures included in the forecast have to be consistent to hold together diverse aims (Chua 1995, 138). The longer time horizon associated with forecasts guarantees that they are more dynamic than any single static key figure. If the accounting inscription dynamic dimension increases, its validity decreases because inscription combines information from longer time periods rather than being a specific snapshot of a particular moment.

To summarise, the importance of forecasts and scenario analyses has expanded. In particular, their role has changed from being intermediaries and instead they have become mediators as occurred when Pulp Ltd became a group. As the importance of forecasting has increased, the associations between forecasts and factors which can influence the validity of a forecast have become more important. When Robson's (1992) three major qualities of inscriptions are used in order to explain the power of forecasts, it seems that stability and combinability are problematic.

The combinability of forecasts is questionable for forecasts and scenario analyses because the factors or premises included in the models differ for many reasons. Factors are frequently different, reducing the combinability of forecasts with each other. As such, forecasts become mobile by bringing visibility about the operations and plans of a company. They offer not only a dynamic view of a situation but also expectations concerning the future, indicating that forecasts only partly remove the problem of distance. The stability of forecasts is a more problematic issue because of the basic nature of forecasts, which always represent the best possible estimate of the reality of the future. Stability in the forecast and its context is almost impossible to achieve due to many changing variables. However, if stability is understood in such a way that enables the information concerning such issues as prices, volumes or costs to always be collected according to the same principles, the stability of the forecasts will be higher than when stability is related to the figures in the forecasts. The stability of the figures depends, for example, upon the time horizon of the forecast, its premises and the context or the industry which it deals with. This implies that Robson's three qualities are more appropriate for management accounting inscriptions like budgeting or reporting. Inscriptions as scenario analyses or quarterly forecasts will probably increase in the future and carry more weight within companies.

Investment calculations

In this study, capital budgeting technologies have been grouped together and analysed under the term "investment calculations". The focus here is particularly on strategic investment decisions, known as greenfield investments or SIDs, because the external economic environment of this study encouraged the companies to search for new revenue streams. Investment calculations can be accomplished in special information systems and programs, but frequently they are calculated using spreadsheets. The research results demonstrate that investment calculations are mobilisation devices in strategic change, particularly when utilised together with supporting written information such as feasibility or market surveys. According to the material gained from both case companies, the assessment of a (strategic) investment target is frequently based on a combination of numerical (investment calculations) and qualitative data (feasibility studies).

According the empirical results the two main factors which determine corporate investments are strategy and the lifecycle of the mill. The usual case is that strategy determines the focus areas of investments but when an extremely promising target has been found it can even change a company's strategy. However, investment targets are generally sought so that they fit within the frames of strategy.

It is characteristic that investment calculation faces constant challenge, negotiation and reinterpretation because investment calculations include values which are open to interpretation due to their future-oriented time horizon. The issue demonstrates the balancing effect of final calculation in cases where parties remain in disagreement concerning the appropriate values to be included in a calculation. Investment calculation can have a balancing effect in "failure projects" because they can offer reasons for a project's failure to the managers concerned. However, after the investment project has been completed people rarely have time to go back and analyse the project, even if this could offer much valuable information.

To sum up, considering the factors presented, it seems that management accounting (investment calculations) has a mediator role with technological factors that influence decisions concerning the suitability of greenfield investments for a company's frames. When utilised systematically with additional information investment, calculations are clearly mobilisation devices in strategic change. Investment calculations have the potential to engage their users and make investment materialise but they are also subject to constant question, negotiation and reinterpretation.

The fate of investment calculation lies in hands of financial and technical staff, while other factors, such as the economic environment, the lifecycle of a mill, feasibility studies and the strategy of the firm influence the end result of investment projects. This view is compatible with Latour (2005) who argues that the fate of a technology (an investment target) lies in the hands of people other than those actors who actually perform the calculations i.e. make the investment calculation. In other words, it is those who directly influence the technology being used by supplying the figures for the estimation

of an investment target that are the ones who directly influence whether a project is realised or not. Nevertheless, investment calculations have the potential to engage their users and to influence to final decisions concerning the fate of a particular investment target: hence they are mediators particularly in strategic change.

Investment calculations operate as strong mediators that have the ability to affect even macro-level actors (strategy). Using Robson's (1992) qualities of inscriptions the stability of investment calculations relates largely to the context and the nature of an investment decision. Stability between the investment calculation and the context (investment object) is often quite strong during the short or medium time horizon – depending on the investment planned. Stability is problematic, for example, due to inflation which corrupts the stability of figures. Thus, when local events change, calculations should be checked for the need for them to be updated. Basically investment calculations are mobile, which enables action at a distance. It seems that in order to improve the mobility of investment calculations, they are often connected with feasibility studies or other qualitative additional information. The combinability of investment calculations is sound when calculations are conducted concerning the same investment target, but it is reduced when two different investment targets are compared with each other.

Ad hoc calculations - Raw material calculations

The economic recession influenced the purchasing of raw material in the both companies and was the critical driver of strategic change. Raw material calculations represent ad hoc type calculations which have been associated with problems relating to raw materials. Raw material calculations do not represent a conventional category within the management accounting field but during the field research period they turned out to be a significant MA actor and had the power to change prevailing courses of action. Calculations have strategic significance in circumstances when companies are considering whether to buy a particular raw material batch or to restrict production. However, raw material calculations are rarely the impulse which stimulates a company to search for new revenue possibilities, but they can indirectly influence a decision to begin a change strategy.

Raw material calculations are often presented in spreadsheet form. Both case companies have tailored models (often spreadsheet-based) for analysing the profitability of a particular raw material batch. The development of accounting models suitable for raw materials is not always simple. For example, the many variables that determine the price of copper concentrate constitute challenges to the process. Further challenges derive from the prevailing purchase conventions of copper concentrate. For Pulp Ltd, analysing the wood market situation over a longer time period is necessary if it is to be ready for any forthcoming restrictions concerning the availability of wood. A turbulent economic period increases the need for frequent calculations and more accurate calculation models. Even if the actual purchase decisions are made in head offices, units set the

boundary conditions for raw material purchases. The power of financial departments has thus increased in purchase decision-making because revenues are often derived from several sources, which further complicates any analysis.

Companies have several different forums which they utilise in order to control and to secure the availability of raw materials. These forums, such as the Copper Operational Meeting or the Wood Group, represent important parties (mediators) which have the power to influence both the politics and the results of strategic issues relating to raw materials. Those who take part in these meetings also come from outside the financial departments, revealing that important calculations do emerge from outside financial departments.

To summarise, the models employed in raw material calculations have an important role in the development of knowledge and they serve as mobilisation devices by influencing vital strategic decisions such as the final destination of a shipment of raw materials. Some of these models have regular types of calculations and are more stable than those that are made on a case-by-case type analysis. It seems that different raw material calculations, especially case-by-case type, operate as mediators during a turbulent economic period when they have a critical role in determining whether or not a particular raw material batch is to be bought. Significantly, calculations which direct many strategic level decisions concerning production or raw material issues are made with the help of a spreadsheet. If the end result of raw material calculations is unfavourable, a company can decide to restrict production. Raw material calculations do not fit particularly well with Robson's (1992) classification due to their ad hoc nature. For example, their combinability is problematic due to the many premises that determine the price of raw material and the different batch sizes. On many occasions the case companies' calculations for raw materials were applied only to a particular raw material batch, thus reducing their combinability with each other.

Raw material-related calculations have strong associations with production-related calculations because they are performed simultaneously with them. The following subsection focuses on the production-related calculations which are frequently made simultaneously with raw material calculations.

Ad hoc calculations - Production related calculations

Production related calculations play a crucial role in both companies: both of them have included production related data in their financial packages. Production allocation decisions are taken at company, business area or unit level. At the business area level, the decisions can deal with such matters as which production unit a particular raw material batch is delivered to, or where a product is produced. Inside a particular unit, production-related decisions can deal with such issues as whether copper or nickel is to have the primary role in the production process. Production allocation decisions are always based on profitability calculations, which are ad hoc type calculations, or on calculation

models. Companies have strategic plans in cases where they need to allocate products between factories or in situations where the decision-making criterion can be cost efficiency from the viewpoint of the whole company. As with investment decisions, production allocation decisions are made by combining information from various sources. Calculations have associations with other information sources and the final answer always combines information from various sources. There also are many (also strategic) production-related calculations which do not necessarily have a direct influence on corporate strategy. Some of them deal with the number of maintenance stoppages and others with benchmarking issues.

A strong production orientation has been the dominant mode of operation in the case companies, which has affected the language generally utilised. The work of production and the engineering have overridden the accounting function, especially in Metal Ltd. The language and the symbols have emphasised the tonnage produced and the utilisation of maximum capacity. However, this previously dominant orientation has now been displaced by a new way of thinking (see, for example, Dent 1991). The shift has been from economies of scale to economies of value. The core fact of this new way of thinking is the realisation that production tonnages are only tools for earning money and that operations also have to be profitable, which can sometimes even mean that production should be reduced. The issue implies that engineers should consider the costs behind the operation of production. The economic recession has produced a shift towards a more economic and customer-oriented way of thinking. The end result of the production-related calculations is not necessarily that more is better, but that the more profitable option is wiser.

To conclude, it seems that production-related calculations are mediators which direct the strategic orientation of a company concerning production prioritisation or constraint decisions. Production-related calculations concern different tasks, such as production prioritisation decisions as to where production should be carried out or which factory should receive production constraints. The case companies utilise various models tailored for the purpose and analyses are frequently made in cooperation with budgeting, especially in Pulp Ltd.

Using the Robson (1992) classification, production calculations face similar challenges to those faced by raw material calculations. The statement implies that production-related calculations, such as production allocation calculations or benchmarking calculations, do not have large enabling effects. This is because their mobility, stability and combinability is weaker, meaning their accounting concepts are not as powerful. However, they still have power to influence action like strategic production allocations, even if they do not fit with Robson's (1992) classification. Therefore, it seems that Robson's (1992) classification remains more applicable to those MA calculations which are traditionally included in the field of MA, such as budgeting, monthly reporting or cost calculations. Yet, depending partly on the model – ad hoc type or static calculation calculations – the production-related calculations identified in study operate as mediators.

A summary of the discussion of the roles of the MA actors in strategic change

To conclude, the first research objective classified the roles of MA actors' in strategic change. In doing so it concentrated on an analysis of the fragility of selected MA actors in strategic change. This fragility dimension was derived from Latour (1987), who argued that technical facts are the result of an elaborate process of translation. The fragility of a particular MA actor was analysed by using the terms intermediaries and mediators. The classification is, however, purely approximate in the demonstration of the relative power relationships of MA actors in strategic change. The research objective analysed the processes in which MA actors were involved; the MA actors were classified under the categories of human actors and MA technologies that consist of accounting information systems and MA inscriptions.

Human actors are mainly involved in financial departments but that term includes others from production or administration as they may also have power in strategic decision-making. The research results demonstrate that the position of controller inside the organisation influences his/her role. The evidence from the case companies offers a different viewpoint on the role of mill controllers compared to such writers as Granlund & Lukka (1998) and Hyvönen et al. (2011). According to them, mill controllers operate as bean counters by focusing more on financial reporting and data inputting. However, in Pulp Ltd the Mill Controller operated as a change agent by focusing on broader issues. At the same time, the Controller in the Head Office operated more as a bean counter. The classification Granlund & Lukka (1998) used was adopted to analyse development trends in the role of controllers in turbulent economic environments. It was found that the power given to financial departments increases and the role of controllers is altering to become more that of a management consultant. Trends like the outsourcing of basic MA activities as well as the use of more advanced information systems support the observed patterns in the development of management accountants' role. A particularly interesting topic concerning the role of management accountants would be to analyse how the increasing tendency towards outsourcing influences the positions of management accountants within companies.

A significant finding was that the accounting function has spread outside the financial department in a trend called hybridisation (see Burns & Vaivio 2001). The purchasing, the production and the administration departments conduct significant calculations and it is not self-evident that the financial department knows about the existence of those calculations. The calculation models that are calculated by the production department can have strategic importance, changing the perception of the power offered to the accounting function inside an organisation. This also implies that calculations have the ability to make matters visible in a new way by demonstrating associations and relations between functions.

Information systems were described as systems of their own even though they are inter-linked with MA inscriptions. The reason for this derived from the fact that the most powerful MA inscription calculations emerged from outside the formal accounting systems. Appendices 9 and 10 demonstrate the case companies' goals of creating "the flower" of IT systems in which the core IT system forms a centre and information gained from elsewhere is compared with that centre. The central role of production becomes evident in relation to IT systems because the accounting and the production systems are closely associated. Both the companies have ongoing projects that have the aim of integrating their accounting information systems. The research results from these integration projects support the view that they allow companies to concentrate on more advanced MA issues (the business supporting role), which is the role that management expects it to have. The research results from Metal Ltd demonstrate how different IT systems between a head office and its units can create trading-zones and increase the importance offered to various inscriptions in order to make patterns of control practiced in separate locations visible.

According to the research results, information systems often change during major strategic shifts. However, the field evidence also suggests that not all such strategic shifts necessarily change information systems. Even if both case companies appeared to have the intention to improve their accounting information systems on a continuous basis, that continuous improvement was not particularly significant during the research period. There may be several reasons for that but one particularly important one can be the fact that accounting information systems are analysed separately from MA inscriptions. In the future, the increasing tendency towards outsourcing and more sophisticated ERP systems may lead to the proliferation of centres and peripheries in a way which requires a focus on this ongoing change. ERP holds many interesting possibilities for future studies that might significantly further our understanding of the nature of management control.

Management accounting inscriptions enable action at distance (see Robson 1992), but also give visibility to invisible objects (see MacKenzie 2009). Robson (1992) states that inscriptions have enabling effects that can be estimated by using concepts like mobility, stability and combinability. By utilising those concepts the power of accounting concepts can be estimated. Each MA inscription that was analysed in this study displayed a mixture of mobile, stable and combinable qualities. According to the research results, Robson's (1992) categories describe traditional management accounting inscriptions such as reporting and budgeting. However, they do not fit very well with those management accounting inscriptions which turned out to be the strongest mediators in a strategic change situation.

Those MA inscriptions which operate as mediators in strategic change do not necessarily make visible, to any notable extent, action at a distance. The point becomes understandable against the noted fact that these ad hoc calculations have on many occasions been conducted outside the formal information systems. The second point that differen-

tiates MA inscriptions – which operate as mediators from those which are more intermediaries – is the time dimension a particular inscription focuses on. Some inscriptions are connected with a process that has a very long time span, while others reflect very rapidly changing situations. However, in the main, those calculations which appeared as mediators are located somewhere between those two opposites.

From Robson's (1992) point of view, the different categories can be seen to describe the characteristics of those MA actors which form a package of controls in a strategic change situation. The notion of a control package dates back to Otley (1980). Malmi & Brown (2008) who state that a management control system package can be viewed as a general conception which is formed by a collection or set of controls and control systems. In this research, the view held by Fullerton et al. (2013) is adopted. They use the term package to denote the significant associations existing among a set of practices. The term practice is replaced by the word inscription. According to the research, in a turbulent economic situation a control system package is built by a collection of controls which are ad hoc-type, single calculations or calculation models that are often calculated on spreadsheet by a collection of staff from production and financial departments. They are not very mobile, nor stable or combinable with each other due to the differences in their basic premises.

According to the classification the strongest mediators are various ad hoc-type calculations: investment calculations, raw material calculations and production calculations. Such MA actors as reporting or budgeting have a relatively restricted role in a turbulent economic situation. Figure 15 positions management accounting inscriptions on the basis of the two axes which analyse MA actors. The first axis classifies inscriptions according to their roles in situations of strategic change when they are classified as either mediators or intermediaries. The second axis uses Robson's (1992) classification to analyse an inscription's ability to make action at a distance visible.

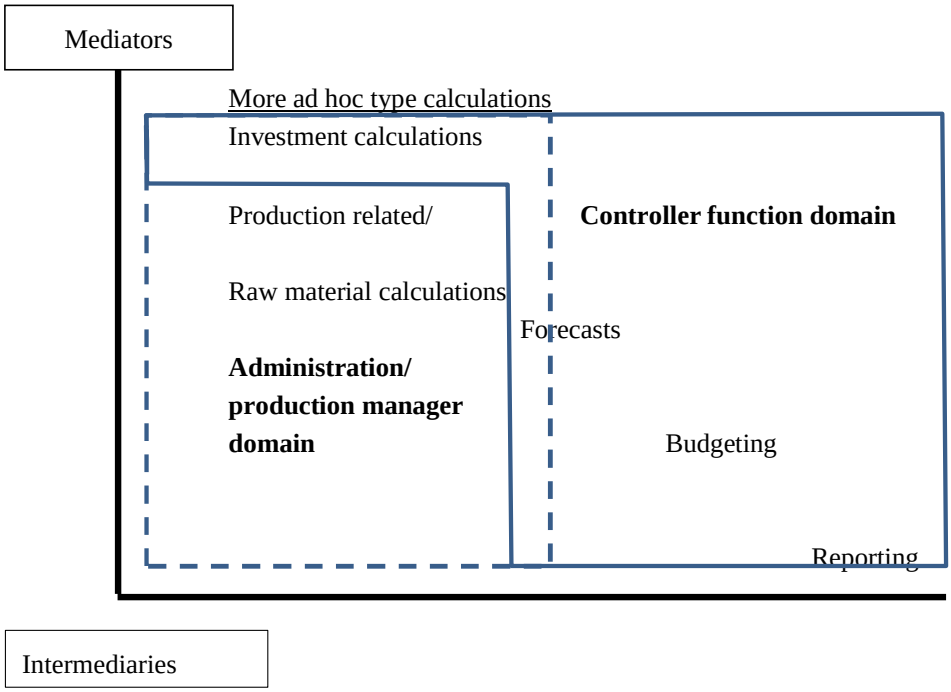

Figure 15 The roles of MA actors (classified as intermediaries-mediators) in the current research

The figure portrays two main domain areas: the controller function domain and the administration or production manager domain. The classification of the strongest mediators in strategic change demonstrates that the most powerful MA inscriptions in strategic change are located outside either the traditional MA field or the controller function domain area. The figure suggests that if the examination is restricted only to the financial department it offers only a partial picture of the role of MA actors in strategic change. The following subsection concentrates on the analysis of management accounting associations with strategy and external economic conditions, and on the way in which the association between strategy and management accounting could be further strengthened.

The general implication from this is that the existing production-oriented, engineering culture has begun to change. This new culture does not emphasise economies of scale or maximal capacity utilisation but instead focuses on a more customer-oriented way of analysing operations. The focus is now more on the bottom line. Companies have realised that the previous manner of operation no longer works and operations have thus become more genuinely customer-oriented.

4.2 Management accounting opportunities for co-constructing company strategies and external economic conditions

The second research objective is divided into two sub-categories: 2a) What is the nature of the associations between management accounting actors and strategy? and 2b) What is the nature of the associations between management accounting actors and the external environment? This study adopts a view which assumes that the world is a complex place where linear pathways and prediction is not possible: strategy and change are not two independent concepts but instead they are intertwined – strategies include the components of change.

4.2.1 Associations between management accounting and strategy

The objective in this subchapter is to analyse the nature of the associations between management accounting actors and strategy. The purpose is to examine the role of selected non-human and human actors in enacting and formulating strategy. In this research the theoretical background of the strategy concept derives partly from the ANT and practice views (see Whittington 2006), but also from the positioning school's concepts regarding the content of strategy (see Mintzberg et al. 1998). The definition of strategy here is based on the definitions by Callon & Latour (1981) and Skaerbaek & Tryggestad (2010), which state that strategy is a macro-actor which is connected to several linking parts (black boxes) that have a constant flow of information between them (leaking black boxes). Thus, strategy is a multi-faceted whole which includes several connections with entities such as partnership strategies and strategic projects.

The practice view emphasises local understanding and strategy as a situated activity and the innovation potential of skilful actors in relation to their impact on organisational strategy (Ahrens & Chapman 2005). The practice view operates as a basis for this study as it supports and adds a dynamic dimension by assuming that the world is a turbulent place where linear pathways and precise prediction are not easily possible, and because it supports the assumption of the field research that strategies have moved closer to practice. In any event, the practice view offers a useful vocabulary with which to illuminate the processes of strategizing (Jorgensen & Messner 2010).

Skaerbaek & Tryggestad (2010, 122) argue, accounting devices can be actively involved in enacting and framing a strategy. A significant question is how MA operates in this role. Practice theory has been particularly well-received in recent strategy research. MA studies have adopted such terms as "strategizing" when they analyse the processes of strategy formulating and implementation (see for example Jørgensen & Messner, 2010). Practice theory emphasises the role of local actors and the importance of situated practices in formulating the strategies of the units[6]. The research findings pointed out that strategies are nowadays more associated with concrete objectives that relate more to practice compared with the situation 10 years before, which bound accounting more to the strategy process.

Latour & Callon (1981) point out that strategy is not the outcome of an outsider nor is strategy established and maintained solely by people. Their argument is supported by the empirical evidence from Metal Ltd where the strategy process was both a top-down and bottom-up model. Strategy was thus a combination of local and outside factors put together in order to formulate corporate strategy. Thus, the research results support Skaerbaek & Tryggestad's (2010, 122) viewpoint that strategy is an emerging calculative collective and temporary achievement that transgresses distinctions. The temporal nature of strategy implies that strategy is never a fully closed entity, instead it includes a constant movement called translation. The argument implies that strategy include parts which are open for some reason such as disagreements.

The content of strategy is described by using Porter's (1985) classification, in which the basic strategies are cost competitiveness and differentiation. This classification provides the background against which the changes in the strategy have been described in the case companies. Due to the nature of the case companies operations, cost competitiveness is their main strategy. However, the economic recession has begun to push their strategies towards differentiation. The main change drivers are new raw material options, customer- and more quality-oriented operations and new business opportunities.

The new business concept sets new challenges for the control of the businesses. If the focus is directed too much to minor revenue streams it can shift thinking away from the main business. Accounting forms the boundary object which determines the frames where strategy is formulated because the return requirements of the group have been determined for the long-term, but companies have considerable freedom to formulate their strategies within the limits set by their head office. The concept of "boundary object" derives from Star & Griesemer (1989) who describe the term in following way, "Boundary objects are objects which are both plastic enough to adapt to local needs and

[6] While actor network theory is sometimes regarded as a practice theory, it should be mentioned that most authors writing in that tradition do not rely on the concept of practice as a distinct ontological category. Rather they seek to explain order by looking at how entities (actors) connect to each other. In other words, they equate practice with the practicing of the actors. But, some writers such as Skaerbaek & Tryggestad (2010) go beyond this by combining the empirical interest in practicing with a conceptual concern of how practices can be theorised as ontological phenomena.

constraints of the several parties employing them, yet robust enough to maintain a common identity across sites. They are weakly structured in common use, and become strongly structured in individual-site use. They may be abstract or concrete and they can have different meanings in different social worlds but their structure is common enough to more than one world to make them recognisable". The second notable boundary object is the production process which determines strategies available to case companies via their existing infrastructure, which includes machines and other facilities. Companies always have several boundary objects depending on the context under analysis which operates on different levels but with the accounting and production processes being significant from the strategic point of view.

The multi-faceted nature of translations indicates that the fabrication of strategy is an on-going process, which implies that the traditional distinction between a design phase and an implementation phase becomes irrelevant (Justesen & Mouritsen 2011, 170). According to the adopted view, translation is an integral part of strategy and therefore strategy described in the traditional way is always a situational snapshot, which is part of a never ending development. ANT has adopted the view in which history matters and field evidence demonstrates that a particular historical turning point affects both case companies' strategic options to a considerable extent. Firstly, the decision of Metal Ltd to concentrate expansion in the mining business – as well as to improve productivity and flexibility in the smelting business – influenced the strategic options available at the unit level. Secondly, the point at which Pulp Ltd became a subsidiary to its owner, and thus part of a new established group, means it now has to focus on producing benefits for the whole group. This influenced Pulp Ltd's future image in many ways: for example it adopted a new corporate name and visual layout.

The facts described demonstrate how the economic recession during the research period operated as a kind of boundary object of an abstract nature by dividing the translations but also by demonstrating translations between periods. The case companies formulate strategies at different levels of their companies: at the whole company or group level, in the business area and at the unit level. In addition to translations at a particular level, there remain translations between different levels: For example, units offer their ideas to head office concerning their technological capabilities for the coming years. After that there is constant translation between corporate strategy and its linking parts (the black boxes). This factor suggests that strategic planning and strategy implementation are inseparable and partly overlapping parts in the translation process. According to the field evidence acquired, the MA actors have different roles within and between the strategy and its related parts, i.e. the partnership strategies and strategic projects.

To summarise, the associations between management accounting and strategy are multi-dimensional. An analysis which concludes that accounting merely adapts or formulates the prevailing strategy is insufficient. According to the evidence from the case companies, accounting forms the boundaries which, together with production, determine the frames where strategy is formulated. In addition to traditional information flow

(from top-down or bottom-up) there is also information flow between strategy and its linking parts (such as partnership strategies with partnership companies).

The ambitions of the case companies are to work towards a light balance sheet while also gaining the flexibility that emphasises their aim of building service networks, i.e. partnership strategies). As such, there has been significant growth in the volume of longer-term inter-corporate alliances, to the point that some writers now consider them to be a design necessity and not an option (Doz & Hamel 1998; Spekman, Issabella, & MacAvoy 2000). Already in Factory 1 (Metal Ltd) some 40% of total costs arise from service business operations, demonstrating the structural transformation of Finnish heavy industry companies. Both case companies have outsourced their strategic support functions to partners and crafted strategies with them in order to commit them to developing their operations.

There are a number of studies (see Chua & Mahama 2007; Miller & O'Leary 2007) which focus on how inter-firm alliances may be optimally designed and managed using accounting controls. These studies provide analytical insights and enable models to be predicted and empirically tested. Often the ANT framework frames the buyer-supplier relationship as part of a complex and dynamic network of relationships (see Chua & Mahama 2007). Chua & Mahama (2007) draw on actor-network theory in order to understand the complex, dynamic and fragile nature of alliances and the implications of these characteristics for accounting choices. They highlight how accounting figures can simultaneously generate order and control as well as ambiguity and disorder. Furthermore their paper discusses how accounting is not merely a form of technical control. However, extant research offers only a limited understanding of the complex reality of the practice in which alliances are part of larger networks. In order to overcome this Chua & Mahama (2007, 54) seek to explore the issue by locating inter-firm alliances within their action nets – because the notion of action nets redirects attention to the network of relationships that makes buyer-seller relationships long-lasting. The case companies use tailored accounting controls, such as calculation models and bonus-sanction measures to control and further develop relationships with partner companies. In ANT accounting controls are part of the emergent socio-technical systems that simultaneously create order and disorder. Thus the "same" performance measure that brings order and control can simultaneously be the source of ambiguity and even controversy. The ANT framework frames the buyer and supplier relationship as part of a complex and dynamic network of relationships (Chua & Mahama 2007, 78). What matters are the processes through which particular accounting controls acquire their existence, form, meaning and influence within a network of relationships (Chua & Mahama 2007, 79). Chua & Mahama (2007, 80) suggest that in order to understand the functioning of accounting controls, one needs to comprehend the location of calculable frameworks within a larger set of connections. The tendency of the case companies towards differentiation resulted in the need to update the goals set for its strategic partners. In the present research, such calculations are located outside the financial department. If the analysis

was to be conducted solely within the accounting function, it would provide only a partial picture of the role of accounting controls within the relationships with partner companies.

There has been an extensive ongoing discussion about the benefits and disadvantages of revealing a firm's cost information to other firms. Open-book accounting is mentioned as one way to achieve success in business and this is especially the case in manufacturing networks (Kulmala 2002, 157). Open-book accounting is a method suggested for tackling the problem of hidden costs in supply chains which means that full transparency about financial data and reporting will create a better organisation, and also demands greater accountability from investors, stakeholders and company officials (Axelsson et al. 2002; Seppänen et al. 2002). So open-book accounting encourages companies to share financial information with their partners. According to the field evidence, Metal Ltd does business partly using the principles of open-book accounting. Some documents are open to both parties within a particular subcontractor relationship so that both parties can be sure of the exact amount of produced tonnage per month, for example. However, the case companies do not explicitly refer to the principles of open-book accounting. An approach toward analysing networks as an accounting environment is emerging and this encourages the expansion of open-book analysis to cover networks as well (Kulmala 2002, 158).

To sum up, the purpose of partnership network establishment was mainly to adapt to the fluctuating demand and to change fixed costs to variable costs. Metal Ltd has built highly tailored strategies with its most important partners and set appropriate standards for them. It utilised different measures in order to evaluate a partners' performance. The example demonstrates the mediating role of accounting measures within partnership relationships. Those measures are the responsibility of the Administrative Manager (Metal Ltd), which demonstrates that they can be created and tested outside of the Financial Department. The costs of partnership operations were included in Factory 1's budget as its own expenses. The measures used to control the partnership relationships are their own controlling role between strategy and its linking parts. They also affect, to a considerable extent, the result of the unit.

The second related part of strategy consists of projects which have strategic significance. Strategic significance indicates that the purposes of selected projects derive from the corporate strategy. The focus here is on two very different projects: the efficiency improvement project and the closure of Mill 5. Those projects demonstrate the multifaceted nature of strategy and its linking parts. In the first project, an efficiency boosting project was applied throughout Metal Ltd. The project's overall purpose rests upon Metal Ltd's strategy and is supported by the purposes of the smelting business. Thus, the objectives of the project connect with Metal Ltd's strategy, particularly in relation to the smelting business. Next the focus is directed to an analysis of the projects and the role played in them by MA actors.

The efficiency boosting project labelled “New Metal Ltd” represents an upper level project to increase the company’s internal efficiency, particularly in the smelting business area. The overall project is divided into subprojects within Metal Ltd’s Head Office and units. The implementation of the project follows the same principles as the overall strategy process in Metal Ltd. Head Office allows units a great deal of freedom to decide how to follow the project. Even the aims of the project were highly practical, the fundamental reason for the implementation of the project lay in the structural transformation of the industry during the research period. The aims of the project emphasise the overall effectiveness of operations and processes. Further, the project harnesses the internal efficiency of Metal Ltd to react to the challenges of the external economic environment.

Nevertheless, the project is its own entity, the goals of which are sufficiently common to provide it with a specific role. The project offers a shared platform which enables it to communicate with its partners. Furthermore, the communication concerning the company’s strategic aims is easier if a common name is used which relates to efficiency. In the future, the significance accorded the different service functions will increase and these will be a central function in supporting the company’s core business, which implies that the companies require the programmes in order to communicate their strategic aims to their partners.

The second strategic project, the role of which is analysed in the present work, is Pulp Ltd’s so called “exit project” i.e. “The Closure of Mill 5”. The original reasons for the closure derived from both external factors – the prevailing market situation and a lack of wood – and internal factors – Mill 5 was the oldest and the most unprofitable mill of Pulp Ltd. The project is comprised of three stages, each having a different focus area.

The first stage of the project consisted of work relating to cost controlling and reporting. Two particular factors indicate that the role of accounting was primarily that of adapting the strategic decisions made. The first factor involved the strategic guidelines which determined that the cost allocation decisions in the project were laid down beforehand. The second factor arose as a result of a special contract which determined the cost allocation between Mill 5 and the neighbourhood factory. Thus, even if some costs emerged unexpectedly during the project, the allocation of cost followed the strategic guidelines laid down at its inception. As such, cost allocation played a significant role, determining the boundaries of Pulp Ltd when certain operations were conducted by Pulp Ltd’s staff for the needs of the neighbourhood factory. The result was disagreements with the neighbourhood factory on many occasions during the closure project. The disagreements demonstrate the fact that the strategy is never a fully closed entity (black box).

ANT seeks to explore how these conflicts and controversies are resolved or managed, albeit temporarily in many cases and how these apparent opposites come to depend upon one another within particular sets of relations. This fact implies that ANT is

able to consider the control paradox in which the means of control are simultaneously the sources of conflict and controversy (Chua & Mahama 2007, 55). Some calculations appear to have a stabilising effect in the case of disagreements with the neighbourhood factory. The disagreements faced were solved by the re-calculation of various factors. After these re-calculations the situation often stabilised. The example demonstrates how calculations can have constitutive roles in forming the boundaries between firms. The process of calculation in MA thus helps to develop new boundaries between what is inside and what is outside a company's responsibility during a dispute with another. ANT-inspired accounting research claims that organisational boundaries are mediated and partly constructed by accounting calculations, although the calculations are also translated by the organisational actors (Justesen & Mouritsen 2011, 175).

The closure project was unique from the accounting point of view because the calculations were specific to a particular situation and varied depending on the stage of the project. The Project Controller's role turned out to be more intermediary than mediator. Primarily, the role of controller was to collect the numerical data and summarise factors numerically. Many apparent decisions made in the closure project were actually decided beforehand. The role of the Project Controller was to adapt those decisions rather than to shape the decisions made. To summarise, both examples demonstrate the heterogeneous nature of strategic projects which are related to the main corporate strategy. Together they form the larger and wider concept of strategy (the macro-actor) within this study. Management accounting operates as a boundary object on different occasions inside and between the various linking parts of corporate strategy. MA associations with corporate strategy highlight three different roles. Firstly, management accounting operates in a traditional controlling role; secondly it has the information role because it demonstrates the strategic goals of the company to the internal and external interest groups and by making the operations visible, for example, in partnership relations); and lastly, it plays the balancing role in a situations of disagreements.

The association between strategy and management accounting is often connected with performance measurement systems such as the balanced scorecard (BSC). BSC is a strategic planning and management system. It is used extensively in business and industry, government, and non-profit organisations worldwide to align business activities to the vision and strategy of an organisation, improve internal and external communications, and monitor an organisation's performance against its strategic goals. It was originated by Robert Kaplan (Harvard Business School) and David Norton as a performance measurement framework that added strategic non-financial performance measures to traditional financial metrics to give managers and executives a more 'balanced' view of organisational performance (see Kaplan & Norton 1996). However, the role of BSC did not turn out to be significant from the strategic planning point of view in the case companies. The group controller of Pulp Ltd considers its role mainly to be that of a collective tool. The BSC was included in Pulp Ltd's information systems package, but its usage and exploitation raised further questions (Group controller, Pulp Ltd. 21/9/2009).

Next, we analyse how accounting devices enact and formulate company strategy (see Skaerbaek & Tryggestad 2010). The focus is on the fabrication process which reinforces selected management accounting actors.

The fabrication process is a continuous process which utilises resources both within and outside a particular project. The theoretical background of the following discussion is adopted firstly from Latour (1987) who emphasises such concepts as translation and fabrication and from Preston et al. (1992), who emphasised the processes by which accounting, especially the budgeting system, brings economic logic into hospital management. Their core idea is that it is naïve to assume that by simply assembling the components of a system, the desired outcome is achieved – because the design of a system represents only part of the fabrication process. Preston et al. (1992) offer a number of images which derive from Latour's (1987) seven methodological rules. The core idea of both is that the design of technology, such as MA inscription, needs a sufficient amount of resources to be committed to the translation process: Additionally the technology requires convincing information on the purpose and effect of the particular MA technology. The last point relates to the promotion and selling of the technology in question. Because the design of technology is only part of the fabrication process the term co-construct was adopted to describe the power of management accounting inscriptions to co-construct strategies together with other resources.

Preston et al. (1992) begin from the statement that unspecified social, political and economic conditions enable a number of weak technological possibilities to emerge. The external environment was divided into two levels: the global and the industry specific. The levels form the context in which companies and management accounting operate. The turbulent economic situation and the cyclical industries caused the heightened joint effect, which caused the need for the structural transformation of the Finnish manufacturing companies. Their competitive advantage is threatened by companies which operate at a lower cost level than Finnish manufacturing companies. Management accounting also faces new demands. It has to support the remaining situation by adding value and producing more accurate information for the decision-making process.

Investment calculations are thus selected for closer analysis because the results from the first research objective indicate they have a role as a mediator with the power to change the strategy of company in certain cases.

The second stage of the fabrication process adds convincing arguments to support selected MA inscriptions because after the realisation that such MA actors as investment calculations can influence a change in strategy, there still remains uncertainty about their likely effects in relation to the final investment decision. A financial department will estimate the potential investment target mainly from the financial point of view. If the investment target seems to be appropriate to the company, further negotiations will be conducted as required by their head office, which frequently demands further analysis of the investment target. Within the current study head office is considered to be a critical audience requiring additional information.

Latour (1987, 57) presents four tactics: fortification, stacking, staging and framing and captation which help a text to withstand the assaults of a hostile environment, and to organise such translation into more convincing arguments. Three of them – stacking, framing and captation – are seem as being appropriate for strengthening the selected MA actor in this research.

In its original meaning stacking brings together figures in order to convince the reader and enable the text to move from detail to generalisations and it is used in this study in relation to the investment calculation, (Latour 1987, 57). The original meaning of stacking was reversed by the researcher: Instead of bringing together the figures, stacking was understood as the bringing of qualitative information to support figures. In the greenfield investment calculations this relates to the listing where potential investment objects have been analysed from the overall risk point of view. Feasibility studies are used to gain more information about the investment object. These documents add to the data which explains and opens up the information acquired solely from the figures. The evidence acquired from the investment process indicates that investment calculations alone offer only a partial picture of the investment object because the general uncertainty concerning the object declines when the financial information is connected with technological or marketing knowledge. The example demonstrates how stacking as a tactic is used to reinforce information gained solely from figures. The spreadsheet used in strategic investment decisions is a significant inscription into which potential investment objects are converted. In addition, it represents a highly effective translation device which has the power to change corporate strategy because the mobility of accounting reports remain strongly linked to the use of writing (Robson 1992).

In addition, in a strategic investment decision-making situation, qualitative information is necessary on several occasions as different individuals are better at understanding more fully either the figures or written texts. Inscriptions, even if they make operations visible, do not always provide a correct picture of the target. A person can be extremely capable of calculating figures but incapable of understanding the aim to which the figures refer. In these cases the qualitative information explains what a particular figure actually means. The reasons for that derive from the different purposes of the figures. In order to avoid this, inscriptions in numerical format have to be supported by the framing or qualitative information that increases knowledge about the background to such figures and explains them. The figures alone do not offer wide-ranging information if they do not have supporting information, which allows for more insight to be gained.

ANT encourages a consideration of how “technical knowledge” or “technical controls” are grounded in often tacit, institutionalised norms and meaning frameworks that are localised and shared among actors to lesser or greater degrees. Consequently, knowledge of “technical” controls does not allow us to predetermine satisfactorily how an action net will operate because there is a need to understand how actors flexibly interpret and make sense of and assign value to the various actions and connections within

the net (Chua & Mahama 2007, 54). In order to share knowledge of tacit norms and meaning frameworks, which can be highly localized, written information is vital. Qualitative and subjective information offers information on the background to the figures, which demonstrate that together they have the potential to co-construct the strategy. The findings support the study of Kolehmainen (2012) who pointed out that the inclusion of qualitative and subjective elements in management accounting could strengthen its strategic role. According to her, the introduction of qualitative elements can facilitate the inclusion of factors which are not easily quantifiable in the analyses of strategic investments. But the introduction can also facilitate subjective managerial insights when making strategic investments or formulating strategies. The investment process of Metal Ltd includes traditional technical investment calculations but also a much wider analysis concerning, for example, the political risks of investing in the target country. The bureaucracy of the process is high but if the process is not followed then the investment target will not be attained.

The second tactic utilised was framing, which provides both a framework for controversy and a benchmark for evaluating success or failure (Latour 1987, 57). Writers have associated the word framing with many meanings and it often refers to the activities which frame a particular operation (for example the establishment of IT systems) (see Bloomfield 1995; Bloomfield & Vurdubakis 1997; Hyvönen et al. 2008). The common meaning interprets framing as providing a framework or the background for companies, enabling them to compare their performance. Inscriptions, for example can offer the background against which the comparison of a particular factor is carried out. Companies have many possible inscriptions which could offer a background for the evaluation of their own or that of some other target. For example, the reports produced by external consulting agencies, other internal reports or information from public sources.

A natural background for the evaluation and comparison of a company's performance in relation to others is the benchmark report. Both case companies use benchmarking internally and externally. The information from competitors or from customers is extremely difficult to get and demands collaboration with external consulting agencies. In particular, external benchmarking reports offer a comprehensive view of the position of the company, which is then used to form part of the long-term strategy. In doing so the external benchmarking report indicates that it is the inscriptions which hold power.

Framing reinforces the power of management accounting to influence corporate strategy by offering a background to the evaluation of its figures. When a case company's own figures are framed by other actors' performance reports they gain more power to shape long-term strategy plans. The framing background contains different information which can be either written or numerical. The usefulness of this information is increased if the reliability and validity of the framing information is sufficiently high in relation to the information to which it is compared. Yet, framing as a tactic is so common that it can be used in many different ways. For example, it can be understood as

particular actions which frame the implementation of an accounting system. In order to increase the benefit from the benchmarking report, the enhanced comparability of their figures – by opening up the background to them, would improve their value in the strategic decision-making situation.

Both tactics described, stacking and framing, highlight the point that accounting information power increases when it is supported with information which is acquired from outside the accounting function. Generally this information relates either to technical factors which derive from a production department or to sales factors from the marketing department. The boundaries between different functions and actions will become blurred in the future, calling for new management tools which emphasise and support cross-sectional action between functions. Both observed factors: the increased amount of qualitative data (for example from the production or the marketing department) and the blurred nature of the professional interfaces (concerning for example the controller's role) demonstrate and support the development. The trend calls for new value-added MA solutions which connect information from different locations in order to analyse calculations. So called traditional management accounting faces new trends which emphasise the optimisation of the whole network's operations.

The third tactic, captation, is a contrast to stacking and framing. It directs attention to the common orientation of strategy rather than to the associations between management accounting and strategy. The tactic indicates that something is located in a set of higher ideals that are difficult to object to (Latour 1987, 47). Captation demonstrates the usual tendency of the strategy to reflect the higher goals of the organisation. According to information from the field, strategies have moved closer to practice. That viewpoint is supported by two indicators. First of all, the aim of companies is to set more practical strategic goals. Second, bottom-up communication between head offices and units has become significant. Consequently, the practical orientation of strategy has improved the possibilities of management accounting to be involved in the strategy process because strategic targets are more easily quantifiable.

The three tactics describe a process in which investment calculation presents the convincing arguments and finally becomes more powerful and accepted. In addition, the tactics demonstrate how individuals' interpretations and responses modify officially intended patterns related to control mechanisms (Preston et al. 1992, 574). Management accounting inscriptions hold more power when there is qualitative information which supports the figures, i.e. stacking. The second tactic utilised was framing, which reinforces the power of management accounting figures to influence corporate strategy by offering a background for the evaluation of figures, so that they gain more power to shape the long-term strategy plans of company. The third tactic, captation, describes the general strategy or the higher ideals that are difficult to object to. However, the general tendency in captation is reduced in the strategy process, which is more closely tied with the accounting process. The tendency towards a more practical orientation is demon-

strated by more practical strategic goals and by an increasing amount of bottom-up communication.

The third stage of the fabrication process is an accepted and taken for granted MA actor (closed black box). This occurs when managers accept both the premises and the end result of calculation (see Preston et al. 1992, 566-567). It should be remembered that MA actors, such as the investment calculations, have been modified in each text which discusses them and in each implementation which puts them into practice.

The fabrication process conveys a number of images, particularly building, fragility and machinations (see Preston et al. 1992, 566). Research objective 1 focuses particularly on the fragility dimension of the fabrication process, which analysed the roles of MA actors and the building dimension in research objective 2a. The machination dimension underlines different tensions and prevailing power relations between various interest groups. Kolehmainen's (2012) study focused particularly on this. She argued that managers can be flexible concerning their financial objectives or can even manipulate them so that their strategically important investment projects would be accepted.

The research results indicate that management accounting's opportunities to co-construct companies' strategies are multi-dimensional. The traditional model, which emphasises top-down or bottom-up information flows, offers only a partial picture of a situation. The network nature of operations describes and determines the information flows to a greater extent. Strategy is always temporary and open to various disagreements, which emphasises the balancing effect of MA, which occurs when MA inscriptions stabilise the contractual disagreements of other parties. The production technology determines the strategic options available to manufacturing companies, a factor which emphasises the role of production (and production technology) in the strategy process.

In the future, it will be vital to widen the research beyond traditional management accounting and strategy concepts because accounting has become directly relevant to the new parts of organisations. The analysis inside the financial department offers only a partial picture of the MA role in organisations. The accounting function or the financial department has a significant role in producing numerical information about a company's profitability, but many strategically significant calculations are located outside financial departments, thus demonstrating that management accounting has become diffused through different departments. The first example of this is the advanced pricing principles developed and utilised by administrative managers in Metal Ltd in order to control and to co-ordinate the partnership relationships with their most important strategic partners. The purpose of those pricing principles was to make sure that so called win-win situations actually benefit both partners. Many management accounting mediators – human or non-human actors – are found outside the financial department and they are calculated by staff outside the accounting department. The second example is the calculation principle, which analyses and estimates the financial success of Factory 1. That inscription is also located outside their financial department but it holds central criteria when an estimate is needed concerning the overall success of the whole unit.

This demonstrates that the controller operates as one actor in the network together with staff from the production, purchasing and administration departments. This co-operation offers different parties new tools for the further development of the scope of their own tasks.

4.2.2 Associations between management accounting and external economic conditions

International investors investing in Finnish industry companies need a clear picture of a company's position in a market. Large foreign institutional investors ask for transparent data and the clear communication of figures – results and balance sheets. But they also ask for strategic visions. Generally, the CEO's in the Finnish case companies have been working hard on these strategic commitments. One consequence of this practice has been the publication of ratings and the relative positioning of each firm by market share in each of the product groups they operate in (Lilja & Moen 2003, 156). Furthermore, economic conditions facing a particular firm play a prominent role in the transformation of organisational products, structures and technologies (Robson et al. 2007, 415).

The main trend in this study is globalisation, represented as worldwide networking between actors. ANT recognises that economic exchanges take place not only between isolated individual actors but also within a larger social context that affects buyers and suppliers unequally (Latour 1987; Law 1992). Basically the development of the global market is determined by the global supply and demand balance which largely derives from the timing of greenfield investments and the increase in the number of customers. The definition is not exclusive but it roughly covers elements which underline the development of global markets. Actor-network theorists extend the economic explanations of bargaining power by investigating whether economic or social ties with significant actors modify the relative bargaining power of the buyer and seller (Latour 1987; Law 1992).

In the metal processing and the pulp industries, particular operators determine the development of markets from the new perspective of greenfield investments and the increase in the number of customers. The most remarkable single factor from the point of view of both case companies has been the economic development of China which largely determines the relative strength of how the world economy will develop. China's economic development should be analysed on the basis of the amount of Chinese companies' greenfield investments and by the development of the purchasing power of the Chinese which largely depends on the growth rate of its population and, more generally, its economic growth. Furthermore, other developing economies, particularly the E7-countries, also have power when the relative strength of the world economies is determined.

The second global trend in the current study is the growing service orientation of economies and industries. The growing service orientation is closely tied to globalisa-

tion and it has become one way in which European companies can differentiate their own products when the production of (bulk) goods moves to lower cost level countries. The increasing significance given to services can be analysed from the either the perspective of the company's own product or the supporting, outsourced services. When the increasing significance of services is analysed from a company's own product perspective it can be viewed as the company's attempt to add new service components into the core product in order to differentiate it from a competitor's substitute products. Justesen & Mouritsen (2011, 176) suggest that the completeness of an accounting phenomenon is determined less by its relation to an underlying economic reality than by its role in the particular network that makes it important and translates it in a particular way. Companies have outsourced their support functions more and more to networks of subcontractors. Therefore a network is much more than a just bilateral relationship between a company and its subcontractor:

> *An organisational network can be thought of as consisting of a number of positions or nodes occupied by firms, business units, universities, governments, customers or other actors, and links or interactions between these nodes (Tidd, Bessant & Pavitt 1997, 210).*

This statement implies that inter-firm relationships are nested within a wider network of relationships. These networks will have a significant influence on the exchange of MA information in future. (Caglio & Ditillo 2012, 73) Know-how concerning operations in the network will become an even more significant success factor in the future than it currently is. Accounting calculations are understood to be inscriptions that are the contingent effects of specific procedures rather than a more or less precise mirroring of the world (Justesen & Mouritsen 2011, 176). This statement implies that the network in which a particular MA actor operates determines the meaning to greater extent than does the outside environment. Evolving service networks have certainly influenced management accounting, which suggests that companies should co-operate with outside companies in order to develop new solutions for the coordination and controlling of these networks. In the optimal case, MA solutions would create the platform for the further development of relations.

Trust between operating partners is also increasing its significance within service networks. Trust is a key variable in relationships and it can change the focus of business controlling by allowing transactions that would ordinarily require hierarchical arrangements to be completed by a network of partner organisations (Coad & Cullen 2006, 344). The trust which is needed in particular relationship will determine where the information system needs to focus and with what intensity (Tomkins 2001, 185). In inter-organisational relationships, high levels of trust are expected to reduce the costs of governance, to increase relationship investments in specific assets, to expand the scope of inter-organisational activities, and to increase the performance of partner organisations

(Langfield-Smith & Smith 2003; Dekker 2003). The meaning given to trust is particularly significant for relationships between Metal Ltd and its subcontractors. The fluctuations in demand had a straightforward influence on the subcontractors during the economic recession period in 2008 and 2009. This occurred when the group offered general guidelines concerning operational principles to its smelters as they had direct influence over their subcontractors. Factory 1 represents a kind of group to its subcontractor, which resulted in a situation in which the changes initiated by the group also affected the subcontractors. In such cases, the implementation of common strategy can slow down or be temporarily interrupted. This calls for mutual trust between partners. Accounting techniques certainly have an impact on trust which should be considered and analysed in detail within these relationships. This does not indicate that new basic accounting techniques are necessary; rather that the impact of planned and actual events across two organisations can be traced. This calls for a more complex analysis in most fields of accounting (Tomkins 2001, 186). The research results indicate that there is also a need for an analysis which is conducted outside the Financial Department – in order to find different calculation models and routines.

Accounting will also have to consider cross-firm effects concerning, for example, cost behaviour analyses and target costing exercises (Tomkins 2001, 161). The accounting models should be flexible and tailored, so that they allow measurement in a way which enables a win-win situation regarding the intensifying of operations. In Metal Ltd the bonus and sanction factors often relate straightforwardly to the particular contractor and the industry. They emphasise various factors such as costs, customer satisfaction or timetable monitoring and they require on-going development work due to changing environmental conditions if they wish to have optimal control. The notion of transparency in information systems offers a valuable field of enquiry both in relation to alliances and in the wider fields of accounting (Tomkins 2001, 186). The demand for transparent information exchange indicates that companies have to move into an interactional system, and this increases the importance of open communication (Eloranta et al. 2011, 173). Coad & Cullen (2006) highlight the blurring of boundaries between intra- and inter-organisational phenomena. They suggest that it is expedient to describe cost management practices within and between organisations. In fact, clear boundaries between the two do not exist (Coad & Cullen 2006, 367).

The economic environments of the case companies were dominated by particular trends. In the metal processing business the prevailing predominance of smelting capacity in relation to mining capacity complicated the availability of concentrates for smelters. In the pulp industry the trends were largely tied to the paper industry because the demand for pulp is largely determined by the operating level of paper machines. In the pulp industry the lack of raw materials and the decreased operating time rate of paper machines resulted in a search for new revenue opportunities such as bioenergy.

The characteristics of economic actors and of markets arise from, amongst other factors, the calculative mechanisms which they are made from (Callon & Muniesa, 2003).

The argument underlines the fact that accounting with other activities affects society. Accounting has played a role in building up the prevailing economic life in industry. The joint influence caused by the industry-specific trends and the economic recession has forced companies to analyse their strategic options from new perspectives. The situation particularly emphasises various ad hoc type calculations and the need to construct valid forecasting models.

Qualitative or subjective elements have further strengthened the position of accounting. The addition of elements which emphasise transparent and open communication within a network of companies improves the exchange of information between partners. Within management accounting, the fluidity and blurring of organisational boundaries has led to an increasing interest in the concept of inter-organisational cost management (IOCM), which involves cooperative actions between buyers and suppliers for the purposes of achieving cost reductions and creating value (Coad & Cullen 2006, 343). The second concept which has received increasing prominence has been open-book accounting (Kulmala 2002; Axelsson et al. 2002; Seppänen et al. 2002). Even if such technologies can turn out to be particularly relevant, they should not be introduced simply because they seem to be rationally apposite (Tomkins 2001, 186). Neither of the case companies explicitly referred to the principles or the terms of open-book accounting but Metal Ltd partly applied the principles of open-book accounting.

Figure 17 portrays the translations between the global and the local level and the role of MA in that. The arrow to the right represents the traditional direction of translations from the global to the local level. The arrow to the left illustrates the more unusual direction of the movements when companies aim to exert their influence on trends at the level of the industry as a whole. The figure demonstrates that the relationship between companies and the external environment is two-way by showing the technologies of accounting are co-constructed with their economic, social and cultural environments (Latour 2005). This indicates that the accounting technologies and contexts are co-produced and co-dependent. Thus, the purpose is to show the wider transformative relationships within MA technologies and adaptations as well as effects within the metal processing and pulp industries (see Robson et al. 2007, 410).

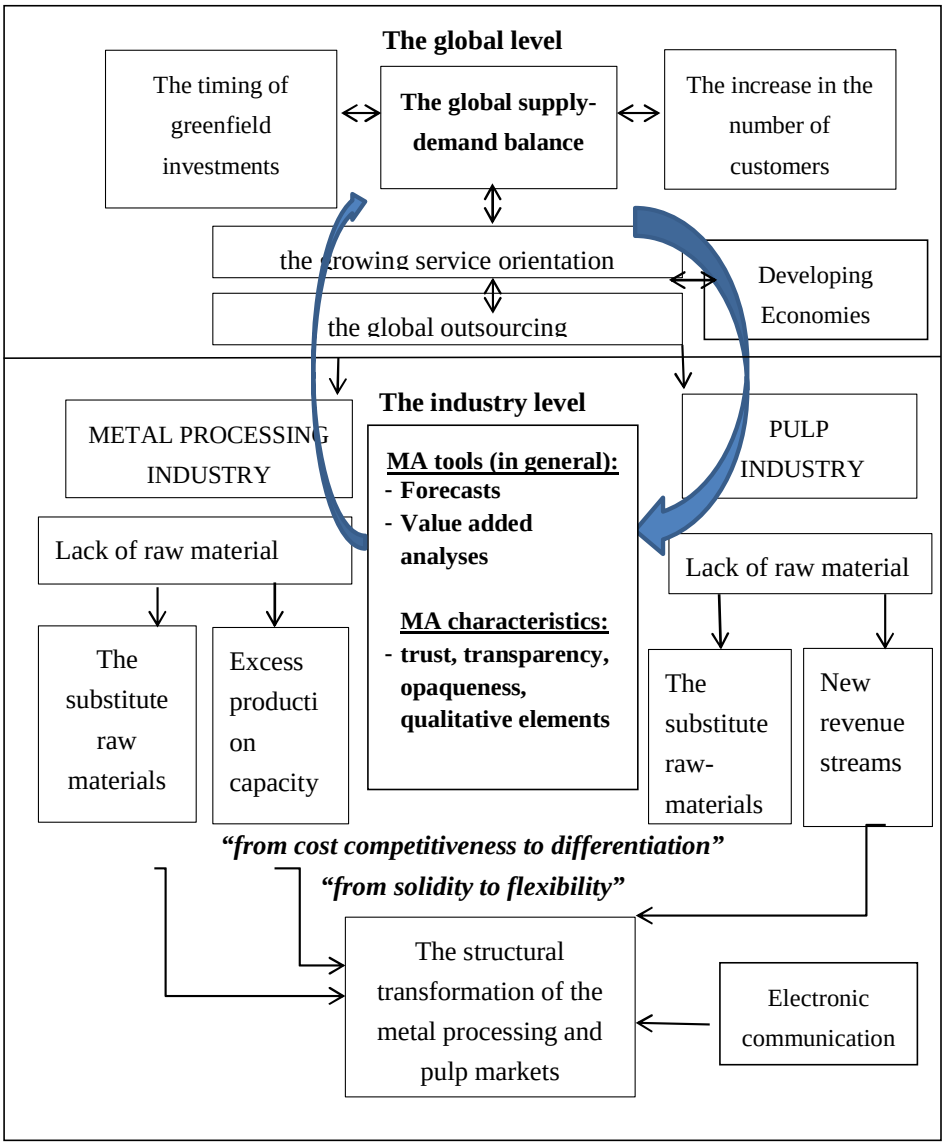

Figure 16 Translations between the global and the local level and the MA role

Using the term "co-construct", the purpose is to emphasise the significance of the co-construction and co-presence of internal technologies and external environments in the production management accounting change (Robson et al. 2007, 415). This declaration suggests that the purpose should be related to the transformations of MA technologies and the wider transformative relations, adaptations and effects within the metal pro-

cessing and the pulp industries. The research findings suggest that it is in the interest of companies to influence the trends of their industries at different levels. The unit or the factory tries to influence its environment by providing suggestions to its head office as to what they might produce during the coming years. Such information is vital to head offices from the viewpoint of future strategies. Company such as Pulp Ltd can gain market power by broadening their range of products within their product portfolio, by operating as the agent dealer and by aiming to increase its opportunities to influence development within its market area. Accounting has the role of offering the required information concerning the planned operations. Companies can also influence the political climate and decisions concerning matters which are in their interest, for example, the use of bioenergy. If companies succeed in their ambitions to influence the development of their industries, they manage to globalise local tendencies. Nevertheless, it is evident that a single company's abilities to affect its environment and industry are always limited.

According to ANT, inscriptions and calculations are central to the explanation of activities: they are not simply the effects of conditions and contexts. However, the accounting entities derive their power from associations between calculations and conditions (Latour 1986). According to Latour (1986) accounting explains actions, as opposed to merely acting as a passive actor by describing effects. The view is contrary to contingency theory, according to which accounting has been presented in a passive role in relation to its environment. The current trend in Finnish factories sets new questions for management accounting because it has to support managers, particularly by adding value to business instead of transaction analyses. This does not necessarily demand new information systems but new ways of calculating and connecting information – both financial and non-financial. The value of an accounting actor is not based on its technical characteristics but on the added value it can offer. Those MA actors which operate as mediators make action at a distance possible.

It may be argued that the traditional paradigm of paper industry companies was more, wider and faster and that this will be replaced by a new production paradigm which emphasises operational characteristics like intelligence, flexibility and quality-orientation – all focused on the customer. In future, the strength of Finland's heavy industry will be particularly based on whatever adds value in the opinion of customers, which demonstrates that the growth of Finnish industry will increasingly depend upon old customers' new demands, or upon new customers.

To summarise, the structural transformation of Finnish industry indicates that its focus has shifted from economies of scale to economies of value. Finnish heavy industry companies will have to find new ways to earn money in addition to their sales from bulk production. Nor can Finnish heavy industry companies in general or management accounting in particular derive advantage from cost competitiveness, instead they have to differentiate. This calls for information of a type which adds value to a business. It can be, for example, the management accounting control system, calculation routine or any

single ad hoc calculation which supports the search for and the evaluation of business innovations.

Secondly, more weight needs to be given to a variety of ways of forecasting. An increasing emphasis on simulation, especially linked to investment decisions and new product development, might be expected (Tomkins 2001, 163). The future aim of Finnish companies will be to develop more accurate forecasts and to place more weight upon forecasting generally. When Finnish industrial companies become involved in multiparty networks, more complex simulation models will be required to support negotiation over sharing tasks, risks, and profits and control events, but they may not need to be excessively complex (Tomkins 2001, 186).

Thirdly, the observed trends will place controllers in a new position. Management accounting will be more strongly linked with other functions inside the companies than it was before because the traditional boundaries between functions such as financing, production and administration will become more blurred. A controller's role at that point will be to operate more as a change agent, operating in positions which traditionally have been associated with managers, for example, the formulation and implementation of strategies. Thus, the research results support such studies as Tillmann & Goddard (2008) who highlight the importance of the extensive professional skills of management accountants. It is not enough to simply know accounting or management accounting techniques, but there is a need for a much broader know-how. In the future, such MA tools as forecasts and forecasting, value-added analyses and also open-book accounting will acquire more value. The characteristics which underline the position of MA emphasise the factors of trust, transparency and give heightened importance to qualitative elements. It is even likely that the trends associated with the role change controllers are expected to experience, will also alter the education given in universities.

4.3 Refining the use of ANT in MA research

Scholars working in the field of management accounting have different perceptions of what is taken to be theory specific to the field. Those theories which are considered to be such by the research community of management accounting are imported mainly from other social sciences. Additionally, there are approaches which are not regarded as theories, but which – because they attempt to explain how to apply MA in order to achieve superior performance (see Granlund & Malmi 2009) – may reasonably be considered theories. The purpose of this study is to establish the plausibility of the substance area theories within the discipline. These are primarily the strategic management accounting and the MA role literatures.

The mainstream research conducted within the area of management accounting and strategy mostly contributes to contingency theory literature. The alternative view is described in the articles by Baxter & Chua (2003) and Chua (2006) and ANT studies be-

long to that field of research. The fact that ANT has borrowed from other fields presents challenges concerning its characteristics as the research strategy. This does not alter the fact that ANT is a proper theory for the investigation of organisational thinking and practice, although certain characteristics, such as boundedness and its ontologically relativist nature, make it difficult for the researcher to see a clear picture ahead of the end results of the research. The normative domain area theories have their challenges because they are not regarded as theories by the academic community. The substance area theories offer a background against which comparison and analysis concerning the empirical field evidence can be conducted. By aiming to contribute to those substance area theories the researcher's objective is to proceed towards building accounting theories that explain practice and which can be more easily communicated. In this study, theories are primarily understood as a local description and explanation.

ANT as a theory was selected as the theoretical lens of the current study for many reasons. Firstly, it was chosen because it was developed by Latour (1996) to describe a technological environment where investments in infrastructure were significant. The present research, which was conducted in the metal processing and the pulp industries, emphasises similar characteristics concerning investment in infrastructure within a certain time period. Many management accounting studies are conducted in public companies, for example, in the health care context, within hospitals rather than the private sector large manufacturing companies. They have also dealt with operative rather than strategic issues. On account of context in which ANT was first developed, technology assumes a central role in the theory. Technologies can shape the decisions people make, affect action and behaviour. In this research, technologies have been viewed as accounting technologies and divided into two categories: management accounting inscriptions and management accounting information systems. This study has analysed the power of management accounting technologies to influence the decisions people make and the effects their actions have.

The second reason for selecting ANT is that it has the characteristic of being blank and sufficiently flexible to allow the investigation of the key developments in organisational practice. The prevailing situation, particularly in the forestry and pulp and paper industries, sets Finnish pulp and paper industry companies within a structural transformation which demands new modes of operation. Additionally, the metal processing industry faces challenges that push it towards the search for new revenue streams. The empirical background of this study underlines the need for a theory which is empirically realist so that it can deal with organisational change processes. The ontologically relativist nature of ANT allows the researcher to conduct the research without a clear picture of what type of entities he/she will discover. Hence, ANT studies have in many cases only been inspired by ANT and it has not been applied straightforwardly. That implies that the studies conducted so far have utilised the concepts adopted from ANT but their use has been quite moderate. Thus, although ontological relativism presents some challenges to the researcher's capacity to see the nature of the potential end results

beforehand, as the research process proceeds a researcher will become conscious of the gradual emergence of findings concerning the strategic management accounting.

ANT includes analytical concepts such as actors, translation, network, black box and fabrication all of which were described in detail in Subchapter 2.2. Some of these concepts are crucial for the analysis of the different roles of management accounting actors. Translation has been employed in MA studies in order to carry out the modelling of accounting systems, but in the present research it offered a framework for describing the constant movement and fabrication of management accounting actors. Overall, it was the concept which described the very basics of the research target, such as the term fabrication, which is frequently considered a synonym for translation. In this study it has been utilised to describe the associations between management accounting and strategy – the fabrication of accounting facts – through the process of translation, by using Latour's (1987) four tactics to ascertain the second research objective.

The term black box forms one of ANT's key assumptions in the end product of the fabrication process. In this study, the term black box refers to the formation process of certain management accounting inscriptions and other significant actors. Network was the term used to describe the way in which management accounting technologies and human actors operate. In ANT all such attributes which are normally ascribed to human beings are generated in networks. However, the researcher's main aim has not been to describe the networks as such. The reasons for this derive from the danger known as the fathom of networks (see Justesen & Mouritsen 2011). As the research process proceeded it became evident that a static snapshot of network – one that is concerned with a particular moment – does not match the dynamic nature of the analysis. Hence, the next part analyses the way in which the present research contributes to alternative management accounting studies, the theoretical background of which derives from ANT. A detailed description of these alternative ANT studies was provided in Subchapter 2.3). The contribution of this study is analysed through the use of the classification of Justesen & Mouritsen (2011), and this contribution is particularly based on three of their five categories.

The first category in their classification consists of studies which view accounting as inscription. This category includes such studies as Miller (1990, 1991) and Robson (1991; 1992), who were the first writers to introduce Latour's work to the accounting field. Robson's (1992) classification of the qualities of inscriptions has been adopted for analysing the power of different management accounting actors in strategic change. The research results of the current study indicate that Robson's (1992) classification describes traditional management accounting inscriptions better than those which turned out to operate as mediators in strategic change. Thus Robson's (1992) notion that the enabling effects of inscriptions via their mobility, stability and combinability does not suit the describing of the enabling effects of most powerful mediators in strategic change. However, this study supports the statement presented in a range of works (Joerges & Czarniawska 1998; Lowe & Koh, 2007; Mouritsen, Hansen & Hansen,

2010; Mouritsen, Hansen & Hansen, 2001; Mouritsen, Larsen & Bukh, 2001) that inscriptions play a central role in organisations. In particular, this research has enlarged the role of inscriptions by paying attention to those management accounting inscriptions which are particularly significant in organisations involved in strategic change. This study has expanded Lowe's (2004) view that the production of facts is not simply about inscriptions, but is also reliant on the conventions and culture of accounting as a profession and a professional practice. According to the research results presented here, the conventions and cultures Lowe (2004) specifies should be supplemented by a range of other related functions, such as the administration, the production and the purchasing functions, and their common professions and professional practices.

This research also contributes to the second category in the Justesen & Mouritsen (2011) classification of accounting studies which produce accounts of implementation processes. This means that the notion of translation or fabrication is utilised in order to question rationalistic and functionalist approaches. The concept of translation was utilised for research objective 2a, which aimed to analyse the associations between management accounting actors and strategy. By using Latour's (1987) four tactics, the purpose was to describe how initially quite weak management accounting inscriptions, at least in the opinion of critical and sceptical company management, can be strengthened. Investment calculation was selected as an example in the analysis for research objective 2a. In particular, the framework of Preston et al. (1992) was adopted as a theoretical base for the analysis of associations between management accounting inscriptions and strategy (see also Briers & Chua, 2001). The study by Preston et al. (1992) describes the implementation process of a particular management accounting technology. The findings of this present work also support Skaerbaek & Tryggestad's (2010) viewpoint on the role of accounting in relation to strategy. They find that accounting plays an enacting role in which it influences the strategic direction of a company. The accounting devices become strategic in the role of reformulating strategy and rationales rather than being limited to implementation. During the research, it became evident that accounting inscriptions such as investment calculations do indeed have the power to reformulate strategy. The suggestion made by Skaerbaek & Tryggestad (2010, 609) that accounting devices have an active strategic role in co-producing a firm's economic conditions seems to be true. Furthermore, the present research partially supports Justesen & Mouritsen's (2011) argument that the completeness of an accounting phenomenon is determined less by its relation to an underlying economic reality than by its role in the particular network, because the fate of a particular management accounting inscription is initially determined by external economic conditions, although it is the particular context which determines its fate at a later date.

The third category in Justesen & Mouritsen (2011) comprises those ANT studies which analyse the question of whether technology stabilises or extends control and integration. The research contributes particularly to such studies as Dechow & Mouritsen 2005; Hyvönen et al. 2011 and Hyvönen et al. 2008), which analyse the role of ICT

solutions within organisations. The viewpoint held by Hyvönen et al. (2011, 15) is supported by the findings that the case companies use ERP to automate routine accounting work and create more time for analysis. Hyvönen et al. (2008, 46) argue that the aim of ICT is to create a new centralised form of control that allows a head office to see the financial situation in its factories more clearly. If the IT systems do not make the controls practiced in a firm visible, it may increase the importance provided to different inscriptions in order to enhance the control of operations. The evidence from Metal Ltd supports this because in this case the amount of accounting documents was extensive, possibly due to the use of separate information systems between its units and head office.

According to the case evidence, information systems often change during major strategic shifts (see Dechow & Mouritsen, 2005). The research results from both case companies support the view that they will have fewer information systems in the future and that the companies aim to become less reliant upon those systems which only transform information. This indicates that those information systems which remain in companies will work as mediators, while those which operate as intermediaries will be moved out of the company. The integration projects were in their early stages or ongoing, which prevents a full assessment of the results of the projects.

Contributions to the present study have also been made by studies which deal with the role of management accountants within organisations (Hyvönen et al. 2011; Granlund & Lukka 1998; Burns & Vaivio 2001). The classification of the role of a controller is based on Granlund & Lukka's (1998) work in which they picture moving from being historian and watchdog to being a member of the management team and having the role of a change agent. This change is viewed as being synonymous with the mediator's role in the present study. The research results support Granlund & Lukka's (1998) study from the point of view that the bean counter type of role model of controller operates in a centralised part of the accounting function. Writers such as Hyvönen et al. (2011) and Granlund & Lukka (1998) have claimed that mill controllers often operate as bean counters rather than as change agents. The findings of this research contradict that somewhat as they show that during turbulent economic periods, communication between different departments and between head offices and units increases. This suggests that the work of controllers is probably subject to influences from the activities of those people with whom controllers operate in a close working relationship with. In other words, the job description of a controller will overlap with those who work closely with them. This trend is called hybridisation (see Burns & Vaivio 2001).

Whereas earlier discussion focused on the analysis of the research contribution to alternative (mainly ANT theory) studies, the focus has now shifted to mainstream studies, because there is an extant literature which deals with the relationship between management control systems (MCS) and strategy. Mainstream research has mainly been based on studies which use contingency theory but also on research which is positivist in tone. However, the deeper comparison of these completely different philosophical back-

ground studies is not possible. The findings of this study reject the view of a static or one-way relationship between strategy and management accounting because management accounting also has the power to influence corporate strategy. However, there are mainstream writers such as Kober, Ng & Paul (2007) who have previously suggested that there is a two-way relationship between MCS and strategy and adopted the views of alternative studies in which MCS shapes and is shaped by strategy.

The influential contributions to the subject of the relationship between management accounting and strategy have been those of Hopwood (1987); Burchell, et al. (1980) and Dent (1990). Hopwood (1987) and Dent (1990) both speculate that MCS might take a proactive role in influencing strategy. That idea created the platform for studies which have adopted the dynamic view for the description of the relationship. This study supports Hopwood (1987) and Dent (1990). Hopwood (1987) emphasises the various roles of accounting, using the division between the constitutive (the particular visibilities created by accounting systems and the means by which they, in turn, shift perceptions of organisational functioning) and the reflexive roles of accounting. This study reveals these visibilities, which are often created by ad hoc type calculations that emerge from outside the accounting department but have the power to shift perceptions of organisational functioning.

This study contributes to accounting knowledge by providing insights into strategic management accounting in organisational settings. Within Finnish SMA studies, the research results of this study continue the stream initiated by Vaivio (2001) and Kolehmainen (2012) in which they state that the introduction of qualitative elements can facilitate the inclusion of new factors as well as shift the remaining functional and professional boundaries within organisations. Furthermore, this study supports such studies as Lord (1996), who argued that the techniques and elements of strategic management accounting may, in many cases, already be found in firms, even if the information may not be quantified in accounting figures, and may not be collected and used by management accountants. Rather, the techniques for gathering and using the information necessary for survival in a hostile and competitive environment may be part of the operational management of firms. So, what has been proposed as the results of strategic management accounting are, in fact, the natural outcomes of effective operational management processes (Lord, 1996). The research results of this study support and continue the research stream initiated by Lord (1996) by stating that significant calculations, such as various ad hoc type raw material and production calculations, have the power to shift the strategic direction of a company, particularly when these calculations are supported by qualitative information that deepens the information gained from the accounting figures. Tillmann & Goddard (2008) highlighted the importance of the controllers' extensive professional skills because accounting is becoming an increasingly multidisciplinary practice, which is why specialist knowledge is needed. The research results support the view of the role of controllers and the relationships between MA and the external environment.

5 CONCLUSION

5.1 The major results of the study

The first research objective focuses on the fragility dimension of the fabrication process. The objective was to analyse the roles of management accounting actors by using concepts such as intermediaries and mediators. Management accounting actors were divided into two main categories: management accounting technologies (non-human actors) and human actors. The former were further divided into two groups: management accounting information systems and inscriptions. Management accounting inscriptions were then divided into five further categories and their roles were analysed separately in the study; they are: reporting, budgeting, forecasting, investment calculations and ad hoc calculations (raw material and production related calculations). Figure 17 demonstrates how the current study contributes to the two dimensions of the fabrication process – the dimensions are fragility and building dimensions.

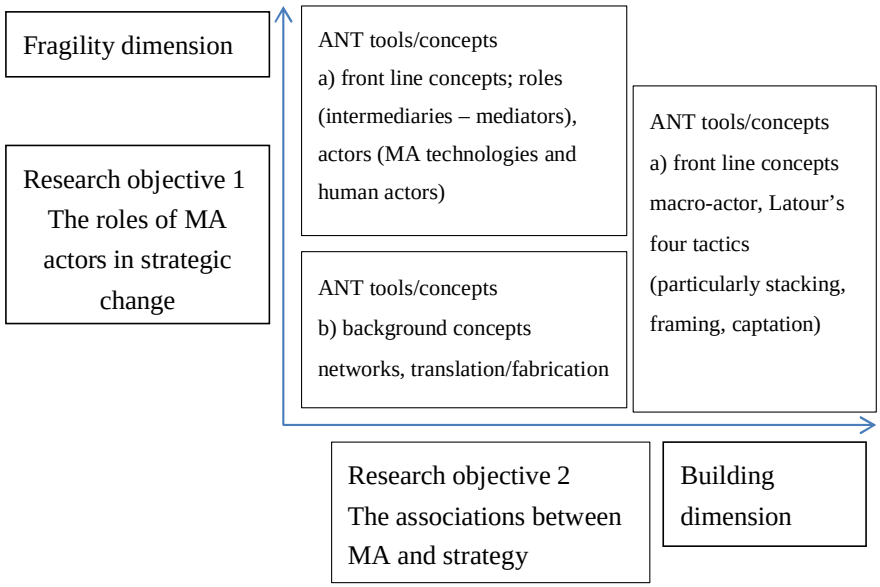

Figure 17 The two dimensions of the fabrication process (fragility and building dimensions) and the contribution of the present research to them

The classification of management accounting actors into intermediaries and mediators is inaccurate and suggestive: the accurate position of each actor is impossible to define in detail and their positioning is always open to interpretation. Those ANT concepts which solely contribute to the first research objective are here referred to as front line concepts whilst those which relate more to the overall research are referred to as background concepts. The fragility dimension demonstrates how powerful MA actors are in turbulent economic situations. The second research objective concentrates on the analysis of associations between MA and strategy. It utilises such ANT concepts as the macro-actor with its leaking parts (black boxes) and Latour's (1987) four tactics to strengthen the associations. In this way it provides a contribution to the building dimension of the fabrication process. The building dimension demonstrates how MA actors gain the power to affect the strategic direction of a company. By visualising the two dimensions of the fabrication process the aim of researcher was to clarify how its two research objectives utilise the theoretical concepts of Latour, but also to show how the fabrication process becomes an underlying theoretical concept, even if its role proved to be more in the background than the front of the analysis. Figure 17 also underlines the role of translation within the analysis of the research. MA inscriptions always emerge in the process of never-ending translation because they are dynamic concepts which have greater or weaker power, depending on the context in which they operate. Translation operates in the background of all the actions but it does not become visible as such. The following section summarises the contribution and the main findings in relation to the fragility dimension – the roles of MA actors.

The case companies' industries have highly capital intensive businesses in which infrastructure, such as machines and buildings, plays a central role. The tonnage produced and maximum capacity utilisation have been foremost in company thinking, a factor which further influences the accounting inscriptions produced because accounting reports have concentrated upon reporting the profit of produced tonnage and other production-related matters. The reasons for this may lie with the traditional production-oriented way to operate, sometimes known as a dominant engineering culture (see Dent 1991) in which the focus has been on the tonnage produced rather than the search for new revenue opportunities. However, the economic environment has begun to change due to the structural transformation of industries, meaning that the search for new profit opportunities is now a quest for survival. The observed shift in operations implies that the business culture is now evolving.

Human actors are mainly individuals from financial departments, such as controllers, but the term also includes others, for example, production and administration managers, who have the power to influence strategic decisions. The role of controllers has been analysed by use of frameworks developed by Latour (2005; 1987), Granlund & Lukka (1998), Hyvönen et al. (2011), Burns & Vaivio (2001). According to the co-classification adopted, a controller who operates as part of the management board or in a change agent role was considered a mediator, whilst a controller who operated more

as a historian or in a watchdog position was viewed as working in the role of intermediary. The findings reveal that the controller's working position within the organisation influences his/her role, even though the relative significance of "watchdogs or bean-counters" appears to be diminishing, there remains a need for this kind of role in the centralised part of an accounting function where consolidated corporate reporting is the major issue. The work of a mill controller is more closely associated with a business support role. However, it should be pointed out that the role of a mill controller varies depending on the person, the task, the situation, the organisational culture and other factors.

Previous literature (Caglio 2003; Newman & Westrup 2005; Burns & Vaivio 2001) has observed that the role of management accountants has become increasingly subject to hybridisation. Hybridisation states that as the role of management accountants expands to encompass other business and information systems activities, other actors expand their roles to encompass accounting activities. The findings of the current research indicate that MA has been distributed to other departments, suggesting that people from administration, production and purchasing both calculate and utilise existing calculation models. However, it is not self-evident that a financial department is always aware of those calculations.

Management accounting information systems form the first part of the management accounting technologies considered in the present research. Those studies which analyse the role of ICT solutions and contribute to this study are such as Dechow & Mouritsen (2005); Quattrone & Hopper (2006) and Hyvönen et al. (2011). The visualisations of the case companies' IT systems (Appendices 9 and 10) demonstrate a movement towards more integrated information systems. The research results from the two case companies support the view that there will be fewer information systems in the future. With Metal Ltd the differing information systems between its head office and units have the potential to create trading zones and locally customised information systems. Furthermore, this difference between the information systems may increase the importance offered to different inscriptions and enhance the control of operations. The tendency towards more sophisticated IT systems is closely tied to the companies' intentions to outsource basic operations to outside service centres and to the trend of altering the job of a controller so that it develops into a role that produces added value.

Management accounting inscriptions were classified into categories (reporting, budgeting, forecasts, investment calculations and ad hoc calculations) according to findings from the research field. The purpose was to identify MA inscriptions which operate as mobilisation devices during the research period. Inscription refers to a material translation of any setting which can be a written text, a table, a chart or a number (see Latour 1987). The roles of MA inscriptions were analysed by the use of Robson's (1992) categorisation, in which she utilises three major and interrelated qualities: mobility, stability and combinability.

The first MA inscription analysed was reporting, which deals with daily business requirements rather than changing and rapidly moving economic conditions. Its role in strategic change may be more that of intermediary than mediator. The second MA inscription analysed was the budgeting process. Budgeting operates in a kind of network within the organisations and it has multiple attachments, not only with other MA actors, but also with other parts of an organisation, such as the production department and the budgets of strategic partners. The budgeting process allows knowledge from distant locations to be mobilised and brought back to the centre of calculation. The research results indicate that when budgeting is analysed without associations to other MA actors, its role is closer to that of intermediary, whereas when it is seen to operate within a network with other MA actors, it receives greater power to affect the direction of strategic change. Particularly in partnership relationships, budgeting can operate at the interface of a company, thus further blurring the boundaries of the company because the company becomes visible to its interest groups via accounting documents. It is evident that this particular visibility is only partial but it plays a significant role in the wider process which changes the visibilities of organisations. Basically Robson's (1992) categorisation satisfactorily describes traditional MA inscriptions, such as monthly reporting and budgeting.

The findings of the present research suggest that a turbulent economic environment and the structural transformation of industries strengthen the desire of companies to foresee future trends. The common trend in both case companies emphasises a shift from static measures, such as ROI or ROE, towards a more dynamic and future-oriented view, with a longer time horizon. Forecasts represent important mobilisation devices which can transfer and deliver power and by so doing they can affect other mediators by translating their meaning to the next mediator. The heightened importance given to forecasts has increased the need to eliminate factors which reduce their validity, such as technical problems. Forecasts bring operations and plans into view, and it is this which indicates their mobile character. Two prevailing qualifications are more problematic: the first is that the combinability of forecasts depends largely on the premises upon which they have been based; the second is that stability is stronger or weaker depending on such factors as the time horizon or the context.

Various capital budgeting techniques were grouped together and analysed under the term investment calculations. The research results suggest that investment calculations are the mobilisation devices that have the power to convince decision makers when they are utilised systematically and together with additional qualitative information, such as feasibility or marketing surveys. Investment calculations are frequently the subject of constant challenge, negotiation and reinterpretation because they include values that are open to interpretation due to their future-oriented time horizon. In these cases, investment calculations can have a balancing or informative role when disagreements remain concerning the appropriate values to be included in the calculation. Traditionally, investments have been conducted within the frames of strategy, but in the case of a very

promising target the relationship can be turned around. Thus, Robson's (1992) qualities of inscriptions are more difficult to apply – in the case of such ad hoc type calculations – as forecasts and investment calculations due to the characteristics of uniqueness they possess and the longer, future-oriented time periods on which they focus.

The prevailing management accounting inscriptions are ad hoc calculations which have associations with either raw material or production-related issues. They turned to be significant mediators during the field research period as they have the power to change prevailing courses of action. Both case companies had constructed models in order to analyse raw material or production decisions. The decisions were taken at the group, business area and unit level and dealt with such issues as which unit should a particular raw material be delivered to or the choice of location for production. Even if raw material or production-related calculations are rarely the actual impulse which causes a shift of strategy or trigger a search for new revenue streams, they indirectly influence the possibility that strategy will change. Due to their ad hoc nature, neither raw material calculations nor production related calculations match Robson's categorisation.

This research supports Fullerton et al. (2013), who use the term package to denote the significant associations that exist among the set of practices. In present research the term practice is replaced by the word inscription – as opposed to each practice working in isolation. According to the research, in a turbulent economic situation a control system package is built by a collection of controls which are ad hoc-type single calculations or calculation models often calculated on a spreadsheet by a collection of staff from different departments and the financial department. The control package is built by inscriptions which are not very mobile and nor are they stable or easy to combine with each other due to the differences within their premises.

To conclude, the production and the engineering function have traditionally overridden accounting in the case companies in which tonnage produced and maximum capacity utilisation have been emphasised. The dominant culture within both case companies, but particularly in Metal Ltd, was centred on engineering and production concerns. Accounting was more or less incidental in this culture. Nevertheless, thinking has begun to change, because the turbulent economic recession in 2008 and 2009 altered the culture. Previously, the focus was merely on costs (e.g. when a supplier was selected), but recently Metal Ltd has started to consider the need of alternative measures, such as customer satisfaction. The shift has been from economics of scale to the economics of value. This implies the emerging role of business cultures in which the focus is more "bottom line" and constructs the notion of Metal Ltd as a profit-seeking enterprise. Thus, this is no longer *just* a matter of "cost efficiency" (see Dent 1991). The core of this new way of thinking is the realisation that the tonnage produced is only a tool for earning money, i.e. operations have to be profitable and sometimes a lower level of production can produce a better operational result.

The research results imply that officially intended patterns of accountability and control have changed as the accounting function has spread beyond the financial department. The trends observed have interesting implications for the field of accounting because the shift in business orientation is viewed as a positive development concerning the roles of management accountants (see e.g. Granlund & Lukka 1998). The evidence from Pulp Ltd clearly supports this view. The consequence can be that pressures created by other managers can generate tensions in management accountants' identity narratives (see Morales & Lambert 2013, 241). When management accountants cooperate with managers from other departments this can increase work, which is consistent with the desired role (business orientation) of management accountants, although it becomes "dirty" when a production or administration manager associates it with a devalued identity. Dirty work is a task that is incompatible with the aspirational identities of management accountants (see Morales & Lambert 2013). As they (2013, 242) point out, the definition of "dirty" work and its manifestations depend on how the symbolic dimensions that are associated with each task are materialised in a specialised context. According to the research results of this study, it is expected that management accountants will work in close co-operation with other managers in the business support role in the future. This may increase the amount of "dirty" work in an accounting department and result in management accountants' struggle for recognition and also change organisational practices. Thus, the role of management accountants may be very different ten years from now.

The management accounting opportunities for the co-construction of companies' strategies and external economic conditions

Firstly, research objective 2a concentrated on the examination of the role of selected non-human actors and human actors in enacting and formulating strategy. The theoretical background of the strategy concept was derived not only from ANT and practice theory but also from the concepts of the positioning school. The practice view emphasises local understanding, while strategy is viewed as a situated activity. This operates in the background by adding a dynamic dimension that emphasises the messiness of the world and the fact that linear pathways and predictions are not always possible. According to the research, strategies have moved closer to practice, a trend which further supports practice theory assumptions.

The definition of strategy was based on Callon & Latour (1981) and Skaerbaek & Tryggestad's (2010) definitions. According to them, strategy is a macro-actor which has associations with many related parts. The term macro-actor indicates that strategy creates its own space and time and is capable of defining what precedes and what follows. In this research, particular attention was paid to two leaking parts associated with strategy: partnership strategies and strategic projects. Partnership strategies include those strategies that companies have formed together with their most significant partners after

they have outsourced their support functions to them. The second leaking part deals with strategic level projects, which include those projects which have strategic significance for the case company. The content of the strategy concepts has been described by using Porter's (1985) classification. By using the basic categories, the issue of cost competitiveness versus differentiation and the shifts in case companies' strategies became visible. Porter's (1985) typologies offer a conceptual toolbox for the analysis of the changes, but due to their static nature they were insufficient for describing such dynamic situations.

When strategy is described in the traditional way, it is a situational snapshot with a traditional distinction between a design phase and an implementation phase. The approach adopted here took a different starting point and sees strategy as part of a never ending movement. The ongoing change in strategy implies that the traditional distinction between a design phase and an implementation phase becomes irrelevant. The economic recession period from 2008 to 2010 began the transformation period which altered the companies' strategies from being one of cost competitiveness to that of differentiation. Nevertheless, cost competitiveness is and will remain the main strategy for both companies. The viewpoint presented here is partly contradicted by Porter (1996) who points out the importance of trade-offs, which create the need for choice. However, he argues, the simultaneous goals of improved cost competitiveness and differentiation are possible only when a company begins far behind the productivity frontier or when the frontier shifts outward. He claims that straddling two different positions is harmful and limits what a company can offer.

The main change drivers that have pushed the case companies' strategies towards differentiation were new raw material options, more customers and quality-oriented operations and new business opportunities. In the future, the utilisation of many new revenue streams will present new challenges for the business control practices of the case companies. Furthermore, if considerable attention is paid to minor revenue streams, it can shift the concentration away from the main business. The research results demonstrate that the economic recession period operates as some kind of boundary by dividing the translations of strategy. Such historical turning points include Metal Ltd's decision to concentrate on expansion in the mining business and to improve productivity in the smelting business. Pulp Ltd's owner's decision to buy a majority share in it also considerably affected its future strategies.

Companies always have several boundary objects depending on the context under analysis. However, accounting and production processes are significant from the strategic point of view in the current study. On some occasions, accounting operates as the boundary object, such as when it possesses the power to determine and frame the strategy. For example, the return requirements, which are offered by a head office to a unit, represent one example of such an object. A second notable boundary object is the production process which determines the strategies available to case companies via their existing infrastructure, which includes machines and other facilities. Production has a

crucial role, particularly in heavy industries where technologies largely determine the strategies that are affordable for companies. The third boundary object in the research period was the economic recession, which operated as a kind of boundary object but one that was abstract in nature as it divided translations but also demonstrated translations between periods. The concept of "boundary object" was adopted from Star & Griesemer (1989) who describe them as objects which are robust enough to maintain a common identity across sites. They are weakly structured in common use, and become strongly structured in individual-site use. They may be abstract or concrete and they can have different meanings in different social worlds. Even if the focus was not the analysis of boundary objects, the research results support earlier studies, such as Star & Griesemer (1989), that suggest that accounting is a significant boundary object inside companies.

The research results suggest that MA actors can play various roles both within and between the strategy and its linking parts. The prevailing economic environment demands a more flexible manner of operation that allows immediate reaction to changing situations. This enhanced the role of service networks, which are now referred to as partnership strategies. Both the case companies outsourced support functions to partnership companies and crafted strategies with them. The increasing importance assigned to the different service networks and the partnership strategies (the first linking part of the strategy) demonstrates that accounting operates on the boundaries of companies, raising new questions concerning transparency and open communication.

In order to control and further develop a relationship with their partners, the case companies developed calculation models, such as bonus and sanction measures. A significant fact is that these calculation models are employed to control and to coordinate relationships with partner companies that are located outside the financial department. The calculation models are tailored for each partner and are quite sophisticated.

Accounting controls, such as bonus-sanction measures, can generate not only order but also disorder. The research results support Quattrone & Hopper's (2001a, 410) statement in which they claim that accounting is a practice that creates a calculation centre but also allows disorder. If they are used to avoid the potential conflicts caused by these new accounting measures, companies should pay attention to the processes through which they acquire their existence, meaning and influence within their particular service network. Methods exist for tackling the potential problems faced within supply chain relationships in manufacturing settings and one of them is open-book accounting. Open-book accounting is a method for tackling the problem of hidden costs in supply chains. Its aim is full transparency regarding financial data and reporting in order to create a better organisation (Axelsson et al. 2002; Seppänen et al. 2002). According to the field evidence from Metal Ltd, it does its business partly by using the principles of open-book accounting. Some documents are open to both parties within a particular subcontractor relationship so that both parties can be sure of the exact amount of produced tonnages per month, for example. Even if open-book accounting is suggested as a potential means in the drive for success in business, the fact that information, and there-

fore power, are always asymmetrically distributed makes the control of the relationships between the buyer and the supplier a matter of challenge.

The second (strategy related) part (black box) consisted of projects with strategic significance. Attention was directed towards two projects: the efficiency improvement project at Metal Ltd and the closure of Mill 5 at Pulp Ltd. The latter project turned out to be particularly interesting from the accounting point of view, because it contained an array of accounting actors, which shaped the options within the project. It also consisted of many smaller sub-projects, which formed a larger whole when combined. The closure project raised significant points related to the controller's role in it, and the power of accounting to influence final decisions. For example, the closure of Mill 5, which was the so called "exit project," demonstrated that the accounting role in the project was primarily to enforce the strategic decisions made earlier. The project controller's main duties in the closure project were cost control and the determining of contractual obligations. Then the project controller undertook certain re-calculations and when they were made the situation was stabilised. That demonstrates how contracts were changed due to knowledge created by calculations. This point exemplifies the stabilising effect of accounting in the case of contractual obligations and supports Chua & Mahama (2007), who highlight how accounting figures can simultaneously generate order and control as well as ambiguity and disorder. The findings also demonstrate how accounting controls are part of emergent socio-technical systems that simultaneously create order and disorder.

The associations between management accounting and strategy are multi-dimensional. Any analysis (see Minzberg et al. 1998) which concludes that accounting merely adapts or formulates strategy is inadequate. The disagreements faced in the closure at Pulp Ltd demonstrate that strategy is never a fully closed entity. Strategy is always a temporal whole and is receptive to change. The dynamic view of strategy which is used in this study derives from the practice perspective (see e.g. Whittington 2003; 2011), which conceptualises strategy as a situated, socially accomplished activity. Strategy and change are linked together in Jørgensen & Messner's (2010) study where they have adopted the term strategizing, which implies that strategy is a temporary concept where constant movement or "translation" is always present. Strategizing comprises the actions, interactions and negotiations of multiple actors and the situated practices that they draw upon in accomplishing an activity (see Jarzabkowski, Bagolun & Seidl 2007). Thus, the two linking parts of strategy specified above demonstrate the multi-faceted nature of strategy, which is part of never ending movement and change. Skaerbaek & Tryggestad (2010) point out also that strategy is indeed constituted by a whole array of accounting devices. This is true, but during the research it became clear that, in order to gain the full picture of how management accounting is interlinked with strategy, it is crucial to examine the calculations conducted outside financial departments, and particularly outside traditional accounting inscriptions, for example, budgeting and monthly reporting.

Having considered the first aspect of objective 2a, attention is now turned to the second, which addresses the question of how accounting can enact and formulate strategy. The theoretical background of analysis is derived from Latour (1987) and from Preston et al. (1992), Preston et al.'s research was on the processes by which accounting could bring economic logic into hospital management and it provides a particularly valuable base for the analysis. The core of the article was the realisation that the design of technology requires that resources are committed to a translation process, and that the technology requires convincing arguments concerning the purpose and the effects of a particular MA technology. The analysis concentrated upon the question of how selected MA inscriptions could be strengthened in order to withstand strong criticism. In this research, the investment calculation was selected as the target of the analysis because the research results indicated that it is its role as a mediator which has the power to change even corporate strategy.

In order to analyse how the selected MA actor, investment calculation, is strengthened, Latour's (1987) four tactics (known as fortification, stacking, staging and framing and captation) were adopted. Three of them turned out to be significant in the strategic change situation. Both stacking and framing highlighted the fact that accounting information power increases when it is reinforced by supporting qualitative information gained from outside the accounting function. The evidence acquired from the investment process suggests that an investment calculation by itself only offers an incomplete picture of an investment object. The evidence gained from this study is compatible with Kolehmainen's (2012) general conclusion in which she points out that the inclusion of qualitative and subjective elements in management accounting could strengthen its strategic role. According to Kolehmainen (2012) the introduction of qualitative and subjective elements can facilitate the inclusion of factors that are not easy to quantify, such as synergies, because they are not measurable through purely quantitative means. The general uncertainty connected with investment decisions declines when financial information is connected with technological or marketing knowledge.

The second tactic, framing, reinforces the ability of management accounting figures to influence corporate strategy by offering a background, which is expressed in numerical form, against which to compare their performance. According to Latour (1987) framing statements provide an agenda for debate, an object for criticism, a framework for controversy, a benchmark for evaluating success or failure. The last one appears to be the way in which framing statements support strategic decisions because when figures are framed by other actors' performances, they gain greater power to shape long-term strategy plans. Companies possess several potential inscriptions which can offer a base for the evaluation of success but benchmarking reports were selected because they offer a natural background against which to evaluate and compare the performance of a company. In particular, the external benchmarking report offers a comprehensive view of the position of a company and can thus form part of a company's long-term strategy. From this point of view, the current research supports Kolehmainen's (2012) research

concerning the inclusion of qualitative elements. Benchmarking reports represent qualitative elements which provide a background against which the performance of both numerical and qualitative elements can be estimated and compared.

The third tactic concentrates more on the common orientation of strategy – the reflection of the higher aims of an organisation – than on the associations between management accounting and strategy. The findings from the literature indicate that strategies have moved closer to practice, which demonstrates a reduced tendency towards captation. A trend of moving closer to practical strategies as opposed to highly abstract strategic ideas was observed. This offers a sound platform to management accounting for strengthening its position in relation to strategy because it improves the potential of MA to be bound to the strategy process, owing to the fact that strategic targets have become more quantifiable. The trend strengthens the existence of "strategizing" which analyses how strategy is being practised in the everyday operations of an organisation (see Jørgensen & Messner 2010). The evidence gained from the case companies supports the view that company objectives are currently being increasingly directed towards the attaining of more concrete and practical goals than they were a few years ago. The same trend was visible in the MA inscriptions.

Strategizing emphasises the actions and interactions of multiple actors in local contexts (Jarzabkowski, Bagolun & Seidl 2007). The role of local actors appears to be particularly important in formulating the strategies for units if a head office is unaware of an organisation's technologies possibilities. Consequently, it is crucial to offer ideas concerning a unit's operations to Head Office, the ideas can even consider potential projects and change that look several decades into the future.

To conclude, several empirical findings support the view of strategizing in which weight is given to local actors and their knowledge concerning the local context. Strategies have moved closer to practice and the aim is to tie accounting, such as the budgeting period, more closely to practical processes because strategic targets have become more quantifiable. Communication between units and head office should therefore be two way because units often have the best possible knowledge concerning their technological possibilities. At the same time this indicates that the associations between management accounting and strategy are multi-dimensional as the former has, in various ways, become involved with strategy, demonstrating that such research results that merely analyse the management accounting role in the formulation or implementation of strategy are inadequate. Management accounting has more power in relation to strategy if it is framed within qualitative, supported and supporting information which opens up numerical data. Furthermore, management accounting requires a background against which it is possible to compare figures.

Associations between management accounting and external economic conditions

Objective 2b concentrates on the analysis of the associations between management accounting actors and the external economic environment. The structural transformation of Finnish industrial companies has meant that their focus has shifted from economies of scale to economies of value. Among the trends in the external economic environment, global and industry-specific trends were distinguished and, respectively, a simple instance was chosen to illustrate each one; the increasing significance of China's economy and the increasing service orientation of companies involved in heavy industry.

Accounting has played a role in creating the prevailing industrial economic life. Additionally, the joint influence of industry-specific trends and the economic recession has forced companies to analyse their strategic directions from new perspectives. Companies have increasingly outsourced their support functions to service networks, something which has affected management accounting as it has increased the need to develop new solutions for the coordination and the control of the networks. In the optimal case, new MA solutions, such as open-book accounting, create a platform for the further development of relations. The second characteristic associated with service networks is the increasing significance of trust between partners. According to Tomkins (2001) accounting techniques have had an impact on trust, and this influence should be considered and analysed in detail within those relationships. Trust, for example, determines where an information system needs to focus and with what intensity. There is not necessarily a need for new accounting techniques as such, instead a more complex analysis within the fields of accounting may be what is required.

By adding elements which emphasise transparent and open communication to the network of companies, the exchange of information between partners is improved. Accounting has to take cross-firm effects into account in connection with such matters as cost behaviour analyses and target costing exercises (see Tomkins 2001). The blurring of organisational boundaries makes the cost management practices used within and between organisations difficult because clear boundaries no longer exist (Coad & Cullen 2006). The prevailing economic situation has made clear the need to construct more accurate and valid forecasting models. Lastly, when Finnish industrial companies move to multi-party networks, more complex simulation models are needed to support negotiations over the sharing of tasks, risks, and profits (see Tomkins 2001).

To summarise, the traditional paradigm of paper industry companies of more, wider and faster is being replaced by one which emphasises characteristics like intelligence, flexibility, quality-orientation and a customer-focused way of operating. This current trend in Finnish factories sets new questions for management accounting as MA has to support companies in their drive to develop new innovative business and production solutions. Finnish heavy industry companies have been forced to change their strategies and move from cost competitiveness towards differentiation when they add new business opportunities to their business portfolio. This results in new demands in relation to

the information produced by MA as it has to add value to a business. The increase in outsourcing together with advanced information systems underlines the focus of MA because controllers are expected to produce not only new and innovative value-added calculations, but also supporting information tailored to specific purposes. Tomorrow's controllers and CFO's will operate as general managers by understanding the wider perspective of their business. The increasing business orientation of management accountants will also set new demands for their education in universities. Educational institutes will have to offer diverse and wide-ranging diplomas that give students the ability to analyse the businesses of companies from a variety of perspectives.

5.2 Theoretical and practical implications

The theoretical contribution of this dissertation is made to domain and substance area theories, specifically the research contributes to the strategic management accounting field. ANT was a valuable theoretical lens for enhancing the understanding of the power associated with each MA actor in strategic change. In general, Latour's (2005; 1987) actor-network theory provides a valuable framework for exploring the fabrication process, particularly in terms of fragility and the building dimension. Actor-network theory also provides valuable theoretical concepts for the domain area of management accounting, resulting in a better understanding of management accounting during a turbulent economic period.

The starting point was that traditional approaches, such as a contingency approach, cannot effectively cover and analyse the complex nature of strategic change, due to their static nature and their linear cause-effect relationships. Chua (1986) pointed out that an alternative research tradition could potentially enrich and extend our understanding of accounting in practice. The domain/ substance area consists of two main fields: literature which analyses the role of MA in organisations, and strategic management accounting literature.

The contribution of this research to the strategic management accounting field covers not only studies which have applied ANT as the theoretical background, but also others, such as those by Hopwood (1987; 1990) and Dent (1990; 1991). This study argues for the constitutive potential of accounting originally proposed by Hopwood (1987) and also Dent (1991). It demonstrates how the strategic focus of the case companies shifted from pure cost competitiveness to differentiation and how the emerging business culture started to evolve. The companies' focus is on the bottom line, which demands new knowledge about business operations and a shift in the roles of management accountants as well as emergent trends in MA.

ANT was a valuable and sufficiently flexible theoretical lens for enhancing the understanding of the power associated with selected MA actors in the organisational surroundings during the turbulent economic period. The first research objective revealed

that ANT concepts like translation, actors and intermediaries or mediators offer valuable information for the analysis of the role of various MA actors. The first research question also shed light on the fragility dimension of the fabrication process by analysing human and non-human actors through the use of ANT concepts such as intermediaries and mediators in describing the fragility of selected MA actors. Other concepts, such as translation and network, describe the MA actors' structural dynamics, with the result that their role turned out to be less visible, even if it represented the manner in which actions were organised throughout a company. In order to cope with the ontologically relativist nature of ANT, which makes it difficult to estimate the forthcoming results beforehand, the researcher selected additional theoretical frameworks. These served as a means to deepen the analysis relative to the human actors' role (see Lukka & Granlund, 1998), or the MA information systems (Hyvönen et al. 2008; Dechow & Mouritsen 2005; Quattrone & Hopper 2006), or the role of MA inscriptions (Robson 1992). To conclude, the research findings demonstrate that accounting can play an active part in creating a domain of economic action. Robson's (1992) different categories described the characteristics of MA actors that form a package of controls in strategic change. A package of controls is formed by a set of controls which have associations with each other. In a turbulent economic situation a control system package is built by combining a collection of controls which are ad hoc type single calculations or calculation models often calculated on a spreadsheet by a collection of staff from production and financial departments. They are not very mobile, not very stable and are difficult to combine with each other due to differences in their premises.

The research question 2a contributes to the MA strategy relationship literature when it adopts such concepts as macro-actor (see Latour & Callon 1981) with its leaking parts in order to describe strategy. Studies on strategizing (see e.g. Jarzabkowski, et al. 2007; Whittington 2003; 2006; Jørgensen & Messner 2010) problematise the relationship between corporate strategy and management accounting. This study contributes to the literature by suggesting that accounting has various roles both inside and between the leaking parts of strategy, which are much more complex and multi-dimensional than contingency theory supposes.

The research conceptualised the strategy concept in a dynamic way to demonstrate the fact that strategy and change are intertwined. The dynamic nature of the strategy concept derives from practice theory where the concept of strategizing was adopted to describe strategy as a dynamic whole. This research presents strategy not only as a dynamic and constantly changing entity but also as an entity which consists of several linking parts such as partnership strategies and strategic projects. The aim was to demonstrate ongoing communication in and between the different levels of the group, the area, the unit and between the main strategy and its linking parts.

This study follows the framework created by Preston et al. (1992) concerning fabrication processes, in which selected MA actors are strengthened by use of Latour's (1987) four tactics. The research itself contributes to two dimensions within the fabrica-

tion process (see Preston et al. 1992); the first research objective concentrated on analysing the fragility dimension whilst the second elucidated the building dimension. The selected ANT concepts, such as the fabrication process and Latour's four tactics, demonstrate that MA power increases when there is framing information which supports the calculations. The first and second research objectives together demonstrate that ANT is capable of providing descriptions of dynamic organisational processes. In particular, such ANT characteristics as boundedness and flexibility enable it to explore changing conditions and the multi-faceted nature of organisations and actors.

The research objective 2b analyses the associations between management accounting actors and the external environment. A variety of trends form the dynamic and constantly changing background, in which the translations between the global and the local levels make demands upon and set challenges for the role of management accounting. The research results suggest that certain MA tools, such as forecasts and value-added analyses will gain greater importance in future. Open-book accounting will also have greater significance in partnership relationships, where its role will be to bring transparency to particular operations and cost. The joint effect caused by economic trends (global or industry specific) and other factors (cyclical industries, economic recession and the structural transformation) forced the companies to construct more accurate forecasting models. Furthermore, the use of more advanced information systems together with outsourcing creates the need for more value-added analyses. MA characteristics such as trust, transparency, opaqueness and qualitative elements will underline calculations and analyses in the future.

The researcher's objective was to proceed towards constructing accounting theories that can be easily turned into practice. The research results indicated that such common MA actors as reporting or budgeting do not act as the most powerful actors in strategic change. Instead the most powerful MA actors, such as investment calculations and ad hoc type calculations (raw material and production related calculations), come from outside financial departments. The results indicate and emphasise an increase in the interactions between departments and actors. They also support the view that actors from different departments conduct calculations that influence organisational strategy (see e.g. Ahrens & Chapman 2005). The differences found relate not only to categorisations but also to the importance given to traditional management accounting techniques in a strategic change situation. The research widened the field of MA by drawing attention to new ad hoc calculations which come from outside the traditional controller's domain area. Such calculations may derive from production or administration departments, and in some cases the controller may remain unaware of their existence.

Furthermore, the research results imply that a shift has occurred in the engineering culture within the case companies (see for example Hopwood 1987; Dent 1991). The speed of structural change is always slow, indicating that the shifts which occur are minor but observable. The shift from cost competitiveness towards differentiation is demanding new ways to manage operations or control a business as economies of scale

are replaced by economies of value. The shift towards differentiation implies that the Finnish companies studied will have to add new value-added elements to their business operations, such elements can be derived from customers, quality requirements or new business operations. Management accounting has a position within this development due to the value-added information it offers companies.

The practical validity of this study was also been tested by evaluating its effects on the case firms (see Granlund 1998), even though such an analysis is always inaccurate and suggestive. As such, the results of this study have provoked discussion particularly in Metal Ltd. The researcher presented some of the findings from Factory 1 at a meeting with staff from their accounting department. The results obtained raised questions about the reasoning behind the findings given. The findings were debated in the meeting and the research topic gained more attention from Factory 1's Management Board. Kolehmainen (2012, 55) points out that empirical management's accounting studies repeatedly report significant discrepancies between practical management accounting applications and those proposed by the management accounting literature, which highlights the need for continuing empirical research.

5.3 Evaluation of the study and possibilities for further research

The concepts of reliability and validity have been the subject of scholarly debate in the qualitative management accounting research[7] (see Abernethy et al. 1999; McKinnon 1988; Lukka & Modell 2010). Many authors have argued that the evaluation of validity, reliability, and generalisability is not meaningful in interpretive case studies (see for example Tynjälä 1992). Broadly defined, reliability is concerned with the question of whether the researcher is collecting data on which she/he can rely. Validity, on the other hand, is concerned with the question of whether the researcher is studying the phenomenon she or he purports to be studying (McKinnon 1988). Validity can be further classified into construct validity, internal validity and external validity (Abernethy et al. 1999; Yin 2003). Because change is a somewhat abstract concept, it always causes validity problems (see Granlund 1998). In order to improve the internal validity the researcher allowed the research issues to emerge from the practices of the company to a considerable extent. The extent of strategic change was identified by the interviews conducted in several departments.

Management accounting and management scholars have suggested several strategies and tactics for increasing the reliability and validity of qualitative management accounting research. These include spending a substantial length of time in the field, triangulation between different empirical materials, the trust-building behaviour of the researcher

[7] The term qualitative management accounting research is used to refer to management accounting studies which utilise qualitative data as the principal source of evidence.

in the field, and making notes and asTulen itse toimimaan TuKKK, Porin yksikön edustajana ohjausryhmässä. king probing questions (McKinnon 1988). The researcher's purpose was to attain a deep and wide understanding of the research target and to find a credible and logical way to report the research results. Vaivio (2008) emphasises the interaction between theory and evidence and the overlap between data analysis and data gathering. The present research adopted several procedures in order to increase the validity and reliability of findings. Forty-one theme interviews were conducted over a period of one year and the researcher spent considerable time in the field. The interviewees represented several key functions of the companies, representing several layers of management and a group of highly knowledgeable experts for analysing the phenomena from different perspectives. The data collected via interviews were complemented with several other data sources – from public sources and also confidential internal documents. The data gathering and data analysis took place simultaneously, enabling the researcher to go deeper into initial ideas (McKinnon 1988; Vaivio 2008). The researcher was aware of the background of each interviewee and addressed topics relevant to that person – sometimes the traditional language of management accounting was abandoned and replaced by terms more familiar to the interviewee. The researcher's aim in so doing was to make the situation more comfortable for the interviewee. In particular the researcher avoided expressing her opinions during the interviews. Her aim was to provide a consistent degree of reference to the empirical material, in order to improve both construct and internal validity.

Vaivio (2008) emphasises that a researcher should avoid a situation where she or he overgeneralises their findings. Vaivio's (2008) statement implies that the observations of this study are not sufficiently numerous to identify a systemic pattern of behaviour (see Granlund 1998, 316). However, the observations are not randomly collected but made after careful selection. This should be taken into account when the contextual rhetoric of generalisation (see Lukka & Kasanen 1995) is adopted. The contextual rhetoric was introduced in greater detail in Subchapter 1.4. in order to fulfil the purpose the researcher describes and not only provide a historical context of the case companies but also to describe the wider context of their market situation. The limited number of research objects makes the generalisation of the research results problematic. However, when a slightly broader view of contextual generalisation is adopted, the generalisation of results can be analysed in the context of similar European heavy industry companies that operate in cyclical industries.

As Granlund (1998) points out, generalisability can be analysed over time. This procedure is challenging and depends on many factors. Firstly, generalisability depends on the overall economic situation. Secondly, it depends upon the firm-specific factors. However, the structural transformation of Finnish industrial companies is expected to continue in the near future, which demonstrates that the market trends described in the present study will remain valid in the future. Sometimes cyclical industries will have the

need to make rapid changes. Nevertheless, the overall pace of change is slow in both the metal and pulp industries.

The present research opens up possibilities for further research. Writers (such as Granlund 1998; Hopwood 1990) have expressed the view that more case studies have to be conducted in order to deepen the understanding of the changing role of accounting. In order to deepen the understanding of the MA role, case studies could concentrate on analysing each MA actor in greater detail. In particular, such case research should deepen the understanding of those MA actors which emerged as the strongest mediators in strategic change. It may also offer a more comprehensive picture of the MA field within manufacturing organisations. Such research should collect data particularly from outside the financial department, and aim to widen the traditional view of management accounting actors. The second main area for further research is the analysis of the relationship of management accounting to strategy, which should be undertaken in order to deepen our understanding of management accounting interrelationships and leaking parts within corporate strategy regarding partnership strategies and strategic projects. Further research in this area could also offer valuable knowledge about the complex and dynamic relationship between MA actors and corporate strategy.

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APPENDIX 1: List of expert interviews in Metal Ltd (first and second round)

First round at Factory 1 (from August 2009 to January 2010)

Person (position on the date of interview)	**Date**	**Interview method**	**Interview time**
1. Financial Manager	31 August 2009	Semi-structured	2 h
2. Financial Manager	23 September 2009	Semi-structured	1 h
3. Controller 1.	23 September 2009	Semi-structured	2 h
4. Administration and Technical Services Manager	6 October 2009	Semi-structured	1 h 30 min
5. Development Manager	3 November 2009	Semi-structured	1 h 30 min
6. Manager, Business Excellence	3 November 2009	Semi-structured	30 min
7. Manager, (Quality and Operations Development)	4 November 2009	Semi-structured	2 h
8. Manager – (Human Resources)	4 November 2009	Semi-structured	1 h 30 min
9. Production Manager	5 November 2009	Semi-structured	1 h
10. Manager (Business Development)	22 January 2010	Semi-structured	1 h

Second round at Factory 1 (from March 2010 to April 2010)

Person (position on the date of interview)	**Date**	**Interview method**	**Interview time**
1. Financial Manager	15 March 2010	Structured	1 h
2. Controller 1.	15 March 2010	Structured	1 h
3. Administration and Technical Services Manager	16 March 2010	Structured	2 h
4. Development Manager	19 March 2010		1 h 30 min
5. Manager, Business Excellence	31 March 2010	Structured	1 h
6. Manager, (Quality and Operations Development)	31 March 2010	Structured	1 h
7. Manager – (Human Resources)	24 March 2010	Structured	1 h
8. General manager (until 05/04/2010)	18 March 2010	Structured	1 h
9. General manager (from 06/04/2010)	9 April 2010	Structured	1 h

Head Office staff interviewed (from March 2010 to November 2010)

Person (position on the date of interview)	**Date**	**Interview method**	**Interview time**
1. President (Smelting Business Area)	4 March 2010	Semi-structured	1 h
2. Chief Financial Officer	3 November 2010	Semi-structured	1 h
3. Controller 2.	3 November 2010	Semi-structured	1 h 30 min
4. Manager – (Copper Concentrate)	3 November 2010	Semi-structured	1 h 30 min

APPENDIX 2: List of expert interviews in Pulp Ltd (first and second round)

First round at Head Office (from November 2009 to June 2010)

Person (position on the date of interview)	**Date**	**Interview method**	**Interview time**
1. Group Controller	21 September 2009	Semi-structured	1 h 30 min
2. Group Controller	19 November 2009	Semi-structured	1 h
3. Controller 1.	19 November 2009	Semi-structured	1 h 30 min
4. Senior Vice President, Finance (CFO)	5 March 2010	Semi-structured	1 h 30 min

First round at Pulp Mill 1 (November 2009)

Person (position on the date of interview)	**Date**	**Interview method**	**Interview time**
1. Mill Controller	25 November 2009	Semi-structured	1 h 30 min
2. Controller 2.	25 November 2009	Semi-structured	1 h 30 min
3. Vice President, Mill Manager	23 November 2009	Semi-structured	1 h 30 min

First round at Pulp Mill 2 (June 2010)

Person (position on the date of interview)	**Date**	**Interview method**	**Interview time**
1. Controller (Pulp Mill 2)	14 June 2010	Structured	1 h 30 min
2. Vice President, Wood Procurement	14 June 2010	Structured	1 h 30 min

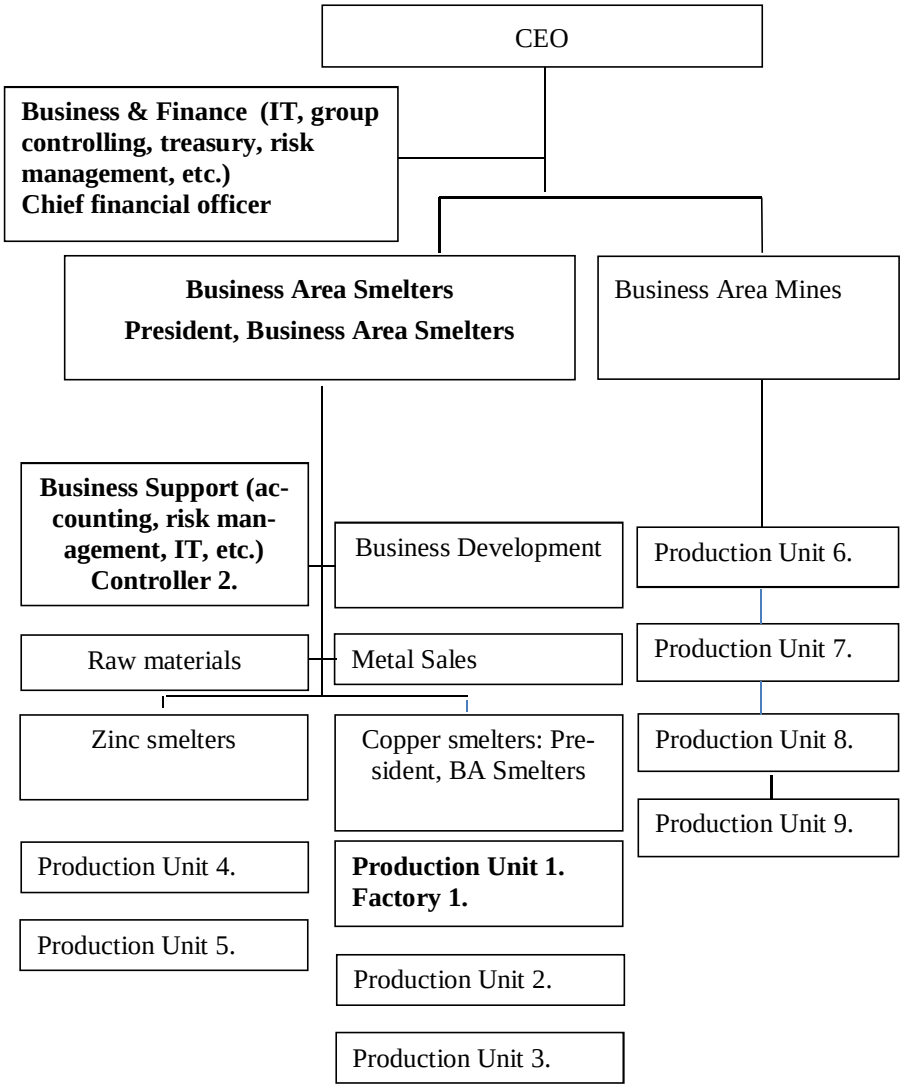
Second round at Head Office (from November 2009 to November 2010)

Person (position on the date of interview)	**Date**	**Interview method**	**Interview time**
1. Group controller (head office)	21 June 2010	Structured	1 h
2. Senior Vice President, Production	31 May 2010	Structured	1 h
3. Controller 1.	21 June 2010	Structured	1 h
4. Senior Vice President, Finance (CFO)	31 May 2010	Structured	1 h
5. CEO	11 October 2010.	Semi-structured	1 h

Second round at Pulp Mill 1 (May 2010)

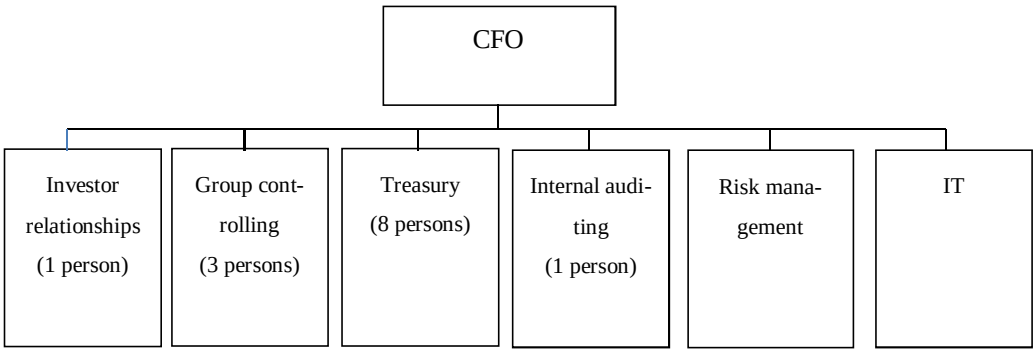
Person (position on the date of interview)	**Date**	**Interview method**	**Interview time**
1. Mill controller	17 May 2010	Structured	2 h
2. Production manager (the pulp mill 1.)	17 May 2010	Structured	1 h 30 min
3. Service supplier steering	17 May 2010	Structured	1 h
4. Vice President, Mill Manager	6 May 2010	Structured	1 h

APPENDIX 3: Organisation chart of Metal Ltd

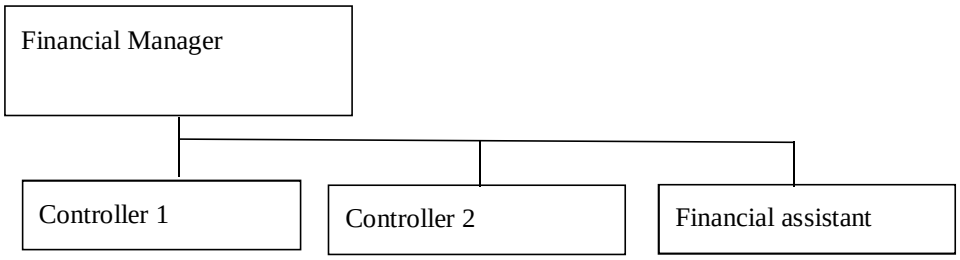


APPENDIX 4: The financial organisation charts of Metal Ltd

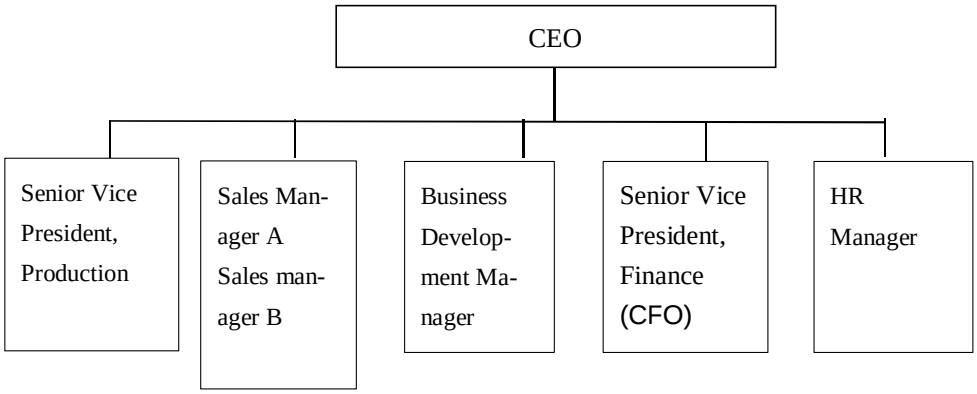
The Financial Department of the Head Office (Metal Ltd)



The Financial Department of Factory 1 (Metal Ltd)

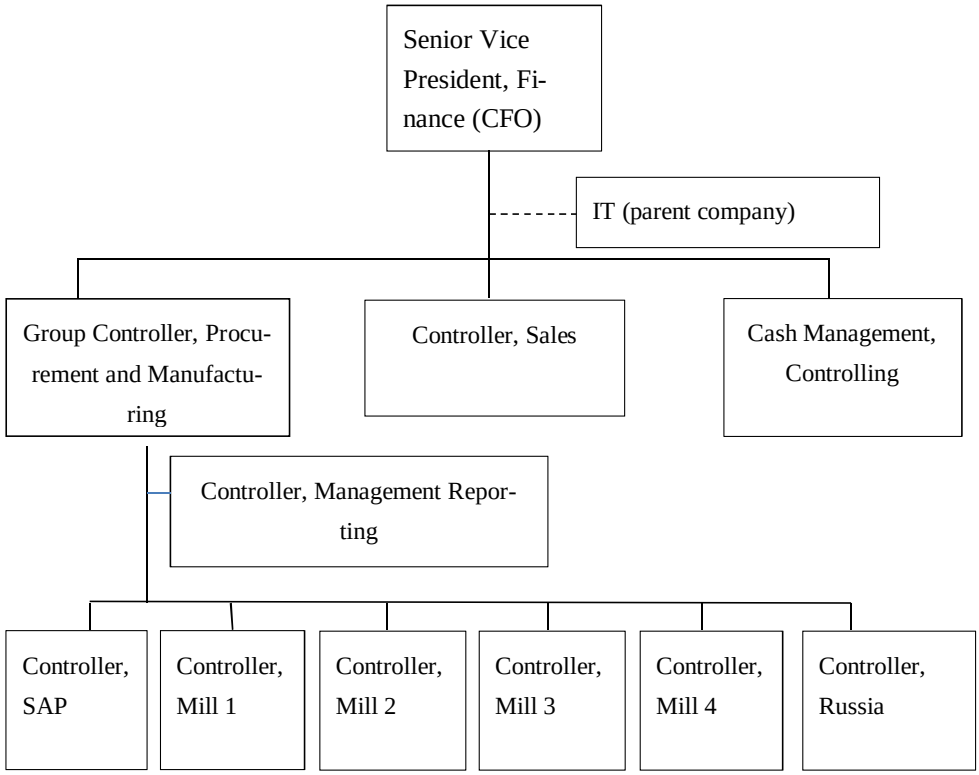


APPENDIX 5: Organisation chart of Pulp Ltd



APPENDIX 6: The financial organisation charts of Pulp Ltd

Financial Department and IT operations (after Pulp Ltd became part of the group)



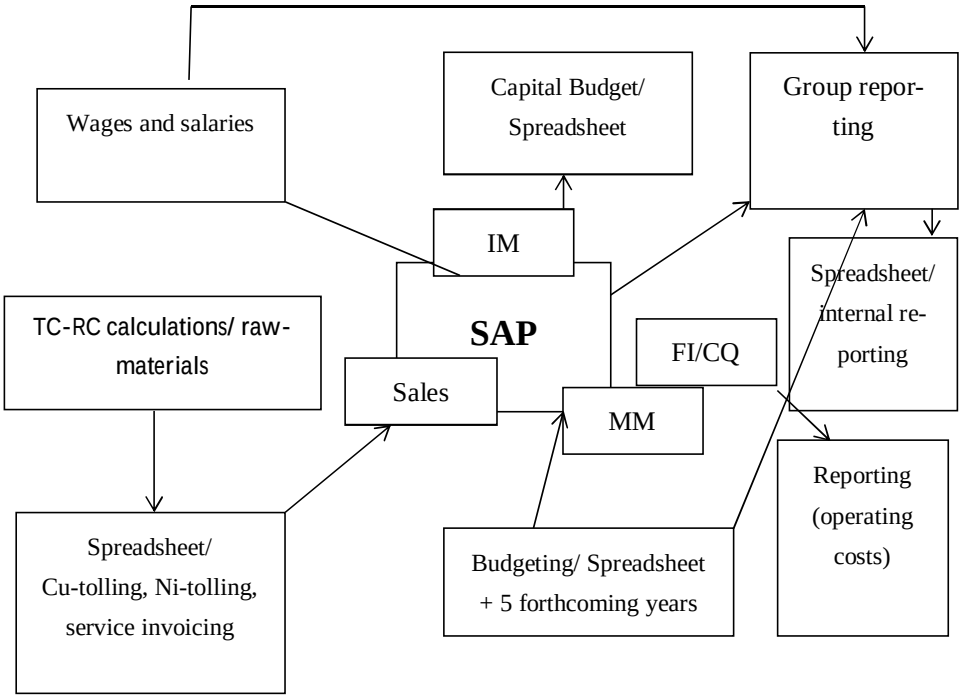
APPENDIX 7: The overview of general facts from both case companies (Metal Ltd and Pulp Ltd)

	Metal Ltd	Pulp Ltd
Business field	Metal Ltd is a European metal company whose operations focus on the initial stages of the metal processing chain in exploration, mining, smelting and recycling. The head office is in Sweden. The main metals are copper and zinc (because Factory 1 produces copper, the research focused mainly on analysing the copper business). The extraction of lead, gold, silver and other products is important in terms of profitability.	Company manufactures bleached pulp grades. Its head office is located in Finland. Previously, it operated as a resource company, but currently it is part of a bigger group and one of the world's principal suppliers of market pulp. The company manufactures printing and writing papers, boards, speciality and tissue papers. It has additional revenue streams such as electricity, heating, bark fuels, crude tall oil and turpentine.
Number of employees	4400 employees	800 employees (before the divestment of foreign operations the amount of employees was 2000)
Organisation	Operations are organised into two business areas which are mines and smelters. It has 4 mining areas and 5 smelters in the Northern European region. The commercial department comprises operations such as raw material purchasing, metal sales, risk management operations and accounting.	Currently case company has 4 pulp mills in Finland. It closed pulp Mill 5 during the research period. In addition, the company had a mill in South-America which manufactured pulp from Eucalyptus trees. It describes its organisation as processes which are management, customership and sourcing and operations. Personnel are organised into competition centres.
Accounting department (group level)	Metal Ltd's accounting and financing department includes IT operations, group control functions, treasury, and internal auditing and risk management operations. There are 13 personnel (three of them work in reporting/controlling and eight in the treasury unit and one person both in internal auditing and in investor relations).	Before the company became a group company, its financial administration was divided into four parts: bookkeeping, reporting and group controlling, financing and ICT services. After being moved to the group, Pulp Ltd's bookkeeping and ICT were outsourced to the group's financial organisation.
Accounting level (unit level)	Factory 1 has a financial department managed by the financial manager with two controllers and financial assistant.	Each mill has a mill controller of its own.

APPENDIX 8: The main trends in the metal processing and in the pulp industries during from 2008-2010

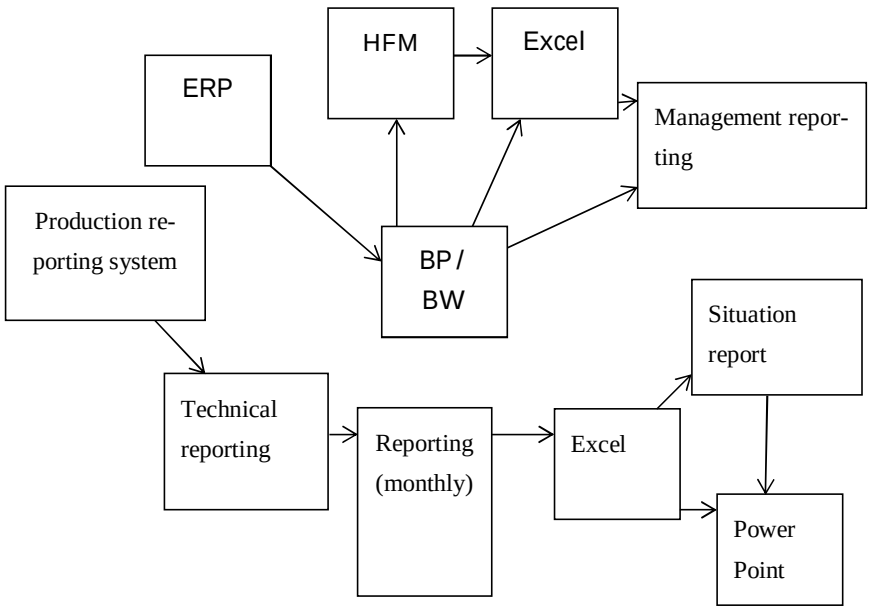
Year 2008	Year 2009	Year 2010
Metal processing market - Zinc and copper prices halved - The world's zinc and copper mines and smelters operated at loss - Getting concentrates was a problem. - Production reductions in zinc smelters due to falling demand - The demand for sulphuric acid declined dramatically	**Metal processing market** - The demand for metals was weak - Production cuttings in copper smelters - Signs of a slow economic recovery in North America and Europe started in the latter half of the year. - Strong demand in China resulted in a rise in the prices of zinc and copper - Sulphuric acid market improved during the year - The shortage of copper concentrate continued	**Metal processing market** - Signs of economic recovery started to emerge during the year - The demand for metals was vigorous - A worldwide shortage of mining capacity - The overcapacity of the global smelting industry pushed treatment and refining charges down and resulted in a fall in the smelters' profitability
Pulp market • The domestic wood supply was limited and the round wood export duties set by Russian authorities caused a rapid rise in the cost of wood and deteriorated the profitability of Finnish mills. • The global economic downturn decreased the demand for paper which resulted in a need for production cuts • The dramatic decrease in the pulp price was a real problem. • The growth of pulp inventories. • A new CEO was appointed on 1st September.	**Pulp market** • Quite weak first part of year due to the stagnation of Finnish wood trade. • The recovery of China's economy. • From mid-2009 Asian customers began to buy pulp again. Inventories normalized. • The decision to shut down Mill 5 was made in January. • Mill 6 was sold to the owner of Pulp Ltd in October 2009. • In December the company became a subsidiary of Owner A and statutory labour negotiations were started (e.g due to synergy benefits)	**Pulp market** • Strong year in the pulp business due to high pulp prices, the lack of production capacity in the world and the strong dollar • The production level of Pulp Ltd's factors remained high. • Pulp Ltd became a market pulp agent for many producers. • New business opportunities were planned (such as bioenergy).

APPENDIX 9: (Accounting) information systems in Factory 1(Metal Ltd)

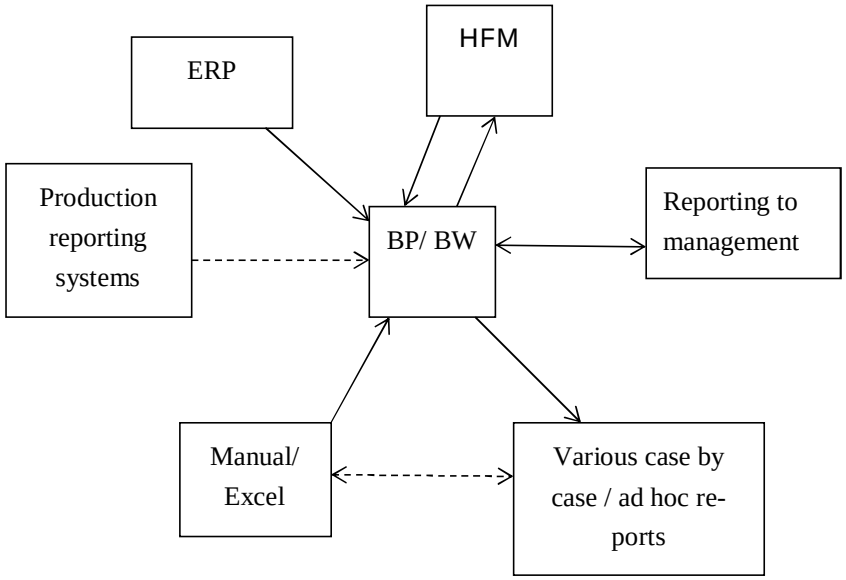


Visualisation Factory 1's accounting systems (year 2010)

APPENDIX 10: (Accounting) information systems in Pulp Ltd (year 2010)



(ACCOUNTING) INFORMATION SYSTEMS IN PULP LTD (the objective which was presented in 2010)



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