

The Valuable Organisation

A study of how activities are
calculated, controlled and made
valuable

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For my parents

Foreword

This volume is the result of a research project carried out at the Department of Accounting at the Stockholm School of Economics (SSE).

This volume is submitted as a doctor's thesis at SSE. In keeping with the policies of SSE, the author has been entirely free to conduct and present his research in the manner of his choosing as an expression of his own ideas.

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What counts? This question also expresses most
succinctly a challenge for economic sociology.
What is valuable, and by what metrics of value
and what performance criteria?

Beunza and Stark (2004, p. 369)

Everything may be made to be the measure of
everything else.

Latour (1988, p. 158)

Turning and turning in the widening gyre
The falcon cannot hear the falconer;
Things fall apart; the centre cannot hold;
Mere anarchy is loosed upon the world
From *The Second Coming* by *W. B. Yeats (1919)*

Chapter 1

Introduction: A study of how organisational activities are calculated, controlled and made valuable

This thesis is about the question of how organisational activities become valuable. This is one of the most central questions in organisational life, because organisations are, as Stark (2009, p. 6) notes, fundamentally engaged “in a search for what is valuable”. Managers devote a great deal of their time discussing what is ‘good business’, and what activities and strategies their companies should pursue. They engage in questions such as what goals and objectives the organisation should have or by what performance measures and standards people and activities should be evaluated? They tackle practical questions such as which products the organisation should bring to market, which production processes the organisation should adopt, and how they should define a valuable balance sheet. This thesis investigates how organisations deal with such questions, and how organisational activities become valuable in practice.

In addressing this practical concern, this thesis will also engage with the theoretical discussions about the concepts of accounting and control in the social studies of accounting literature and about the concept of valuation in the broader social science literature. There has been a renewed interest in the concept of valuation in the social science literature in recent years (see

Caliskan and Callon 2009; Vollmer et al. 2009; Fourcade 2011; Lamont 2012; Muniesa 2012; Helgesson and Muniesa 2013). This literature sees valuation as a foundational social activity that is closely related to the construction of social order (see Lamont 2012; Kjellberg et al. 2013). It has been argued that “when systems of value get established, value and order become indistinguishable” (Poon 2012). Hence, valuation is here understood not as an activity that aims to represent the value of things accurately, but as an activity through which things are made valuable. As Kjellberg et al. (2013, p. 18) put it, valuation is an activity which “aims to *signify* the world rather than accurately account for it [emphasis in original]”. This means that standard questions such as whether certain valuation models are accurate or whether there is a difference between valuations performed in a market or within an organisation become less interesting. Studies within this line of research have rather emphasised the processual nature of valuation (ibid.). The value of things has been seen as a result of complex and contingent processes.

This conclusion resonates with the view taken in the social studies of accounting literature (see Chapman et al. 2009).¹ In the mainstream literature, accounting has usually been seen as a tool for rational decision-making and the efficient administration of resources (see Chandler 1977; Chandler and Daems 1979; Kaplan 1984; Johnson and Kaplan 1987). It has often been argued that development of better accounting techniques or valuation models could provide more accurate information about the value of particular organisational activities (see Solomons 1991a; 1991b). New accounting techniques, be they in the form of financial accounting standards, valuation models, investment calculations, or performance measures, have been presented as providing more accurate measures of value. Thus, accounting has often been presented as an answer to the practical problem of determining what is valuable.² However, the ability of accounting to reflect unambiguously an underlying reality has been questioned in the social studies of accounting literature. Arguing that there is a problematic correspondence between ‘the real’ and the representation of ‘the real’, this line of research has seen accounting less as a window to the world and more as actively taking part in constituting the world (see Robson 1992; Chua 1995). It has been argued that accounting does “more than mirror economic reality”; it

also “could shape and create social relations” (Chapman et al. 2009, p. 18). Thus, rather than assuming that the economic realities that accounting calculations are to reflect are out there, ready-made, and that the central question is whether these calculations provide an accurate window to the world, the central issue in this literature has been to analyse how accounting may participate in shaping and creating particular economic realities.

In particular, this line of research has argued that accounting participates in shaping the world by enabling “action at a distance” (see Miller and Rose 1990; Robson 1992). That is, in this view, accounting conveys the ability to certain people, or groups of people, to act upon other people and contexts that are spatially or temporally distant. Thus, the role of accounting has been closely linked to the question of control; rather than a tool for measuring value, accounting becomes a tool that enables control at a distance. As a consequence, this line of research concerns itself with the formation of specific “centres of calculation” (Latour 1987) and how these attempt to control a surrounding periphery. Departing from a constructivist position, these studies do not assume that control necessarily follows the formal organisational hierarchy or that power always resides with the top management, although this could be a result. Instead, the question is how certain people or groups of people, be it a group of accountants, a governmental agency, or the top management for that matter, attempt to establish themselves as a *centre*, which controls the *periphery* such that an asymmetry is created “between controllers (the centre) and the controlled (the periphery)” (Quattrone and Hopper 2005, p. 737). Thus, the question of value has also been linked (at least implicitly) to the question of control in this literature; the central question here has not been whether accounting accurately measures the ‘real’ value of things, but how it enables certain people, or groups of people, to influence the valuations performed in distant contexts. The value of things has largely been seen here as a result of particular centres’ attempts to control the actions in the periphery.

In particular, this book will consider two conceptualisations of control at a distance that have been influential in the social studies of accounting literature. We can call the first ‘control through the disciplinary power of numbers’. This stream of research largely builds on Foucault’s (1977) influential analysis of the workings of disciplinary power in modern society (see

Hoskin and Macve 1986; 1988; Hopwood 1987; 1990; Knights and Collison 1987; Miller and O’Leary 1987; 1994; Preston 1989; Roberts and Scapens 1990; Roberts 1991; 1996; 2005; Miller 1992; 2001; Sewell and Wilkinson 1992; Hopper and Macintosh 1993; 1998; Townley 1993; 1994; Carmona et al. 1997; 2002; Covaleski et al. 1998; Vaivio 1999; 2006; Jeacle and Walsh 2002; Lambert and Pezet 2011; Jeacle 2012). Foucault (1977, p. 170 et seq.) argued that disciplinary control works through a combination of “hierarchical observation”, “normalising judgement” and “examination”, which combine to render peripheral actors into docile and useful bodies from the perspective of the centre. In the accounting literature, this stream of research has often focused on how centres (such as the top management) construct a central observation tower through the accounting system, from which they can surveil the organisational periphery and intervene to correct non-valuable behaviour. It has also emphasised the disciplinary effects of norms and standards, such as standard costing or performance standards, that make individual behaviours measurable and amendable in relation to a centralised definition of what is correct and valuable behaviour.

The second conceptualisation of control considered here can be called ‘control through the mobilisation of networks of alliances’ (see Robson 1991; 1992; 1994; Bloomfield et al. 1992; Preston et al. 1992; Ezzamel 1994; Chua 1995; Lowe 1997; 2000; 2001; Briers and Chua 2001; Mouritsen et al. 2001; Jones and Dugdale 2002; Jeacle 2003; Skærbæk and Melander 2004; Quattrone 2004a; Cuganesan and Lee 2006; Preston 2006; Chua and Mahama 2007; Skærbæk 2009; Pipan and Czarniawska 2010; Whittle and Mueller 2010; Dambrin and Robson 2011). This research stream largely builds on the work within the tradition of actor-network theory (ANT) (see Latour 1987) and, in particular, on Callon’s (1986) influential article on “the process of translation”, i.e. the process through which certain actors attempt to build a network of allies. In the accounting literature, this stream of research has often discussed the attempts by certain actors (network-constructors) to overcome the scepticism and resistance of other (heterogeneous) actors, enrol their support, and establish themselves as ‘obligatory passage points’ or ‘spokespersons’ (a centre). If these network-constructors

are successful, they will be able to mobilise the entire network, which will behave according to the strategies of the centre.

These two research streams have provided several useful insights about the role of accounting and control in organisations. They have heightened our attention to the constitutive role of accounting, i.e. how accounting participates in shaping organisational action. They have also gone beyond the notion of taken-for-granted centres of control and the idea that control automatically follows the formal organisational hierarchy. Instead, they have drawn our attention to the fact that different people or groups of people may establish themselves as centres of control, and these streams have provided detailed analyses on how such control is achieved. However, recent studies have argued that these two conceptual approaches may have certain limitations for understanding the questions of control and value in contemporary organisations. Czarniawska (2004, p. 773), for instance, notes that the notion of “centres of calculation” is reminiscent of organisational forms, such as “the laboratory” or “the factory”, which are “no longer central in today’s world of work organisations”. Hence, she argues, there is a need for developing a new conceptual vocabulary. Similarly, other studies, both in the social studies of accounting (see Law and Akrich 1994; Law 1996; Quattrone and Hopper 2001; 2005) and in the broader social science literature (see Star 1991; Helgesson and Kjellberg 2005; Law 2008; Alcadipani and Hassard 2010), have pointed out that certain questions have been downplayed in these two research streams and need to be examined more in detail.

In particular, it is possible to identify certain (explicit or implicit) assumptions in the two research streams that may require further examination. Firstly, several studies have pointed out that studies within these two research streams have typically taken the perspective of an implied centre as the starting point in the analysis (see Star 1991; Law 1999). Helgesson and Kjellberg (2005, p. 146) observe, for instance, in relation to ANT, that “with a vocabulary that included terms such as enrolment and domestication (Callon 1986) and programme/anti-programme (Latour 1992a; 1992b), early ANT-studies clearly took the implied centre as the favoured vantage point when discussing the associations that constitute macro-actors [such as organisations].” Thus, while the two research streams under discussion,

both working within a constructivist tradition, have been concerned both with de-centring a human subject that is no longer seen as “the centre of rational control and understanding” (Cooper and Burrell 1988, p. 91) and with rejecting the idea of taken-for-granted centres of control following the formal hierarchy (see Calás and Smircich 1999; Ahrens and Chapman 2007), these studies have at the same time taken as a central research question the question of how centres may become established and how control may become centred. ANT, for instance, has been described as a way of “asking empirically how centredness, order and difference arise and are maintained” (Lee and Stenner 1999, p. 93). This insistence on the perspective of an implied centre has perhaps been particularly accentuated in the accounting literature, as Townley (2005) notes in a discussion of the use of Foucault in the accounting literature. In particular, she argues that the historical connotations of the concept of control have led to an undue focus on the question of ‘*who* is in control’ in this literature, as opposed to the question of *how* control is practiced. She writes (ibid., p. 646): “Are not the concepts of ‘control and resistance’ so heavily imbued in a framework of interests and sovereign agents, be this management, class or the organisation/corporation, that they take the sovereign subject as the focus? Even as we have offered power/knowledge analyses, an implicit ‘control’ perspective still pervades.”

Secondly, this practice of taking the perspective of an implied centre as the starting point in the analysis has further consequences. One is that all the actions that the centre takes may appear, from the perspective of the centre, as a part of a coherent attempt to control the periphery. Centres are generally assumed to have a clear set of goals, the most important of which are to establish themselves as the centre and to make the periphery follow its strategies. As Kirk and Mouritsen (1996, p. 247) put it, “The work of centres is to mobilise peripheries. In this mobilisation, centres categorise the affairs of the periphery so that it becomes an extension of the former’s strategies.” As a consequence, different control attempts, such as the introduction of different forms of accounting, are seen as parts of a cohesive attempt to control the periphery, which is consistent with the centre’s strategies. Some studies, however, have started to examine more closely the assumption that different forms of calculation and control will produce

coherent and unambiguous effects (see Law and Akrich 1996; Mouritsen et al. 2009; Skærbæk and Tryggestad 2010). These studies focus on the potentially constitutive effects of the co-presence of multiple accounting calculations in organisational practice. Thus, while it is widely acknowledged that organisations are characterised by the circulation of different numbers (see Vollmer et al. 2009), these studies have moved the question of relationships between different forms of calculation to the forefront of the analysis. The trust of the argument in these studies can be said to be, in the words of Law and Akrich (1994, p. 558), “the relations between various technologies of calculation are contingent rather than representing the expression of a deeper consistency”. Thus, these studies have heightened our attention to the need to analyse the effects of different forms of calculation more in detail. Whatever from the perspective of a centre may appear as a coherent attempt to control the periphery and to impose a coherent mode of valuation may, from the perspective of the periphery, appear as a set of ambiguous and mutually conflicting calculations, which could have different implications for how organisational activities should be valued.

Thirdly, another consequence of the choice of an implied centre as the vantage point is that everything else in the organisation may appear as a peripheral element, i.e. as elements which the centre attempts to control. As a consequence, the actions of these peripheral actors are understood only in relation to the action of the centre. That is, they are only understood as reactions to a particular centre’s attempts to control the periphery, or as “resistance” (see Preston et al. 1992) or “scepticism” (see Skærbæk 2009). However, as several recent studies have pointed out, calculation and control are often dispersed in contemporary organisations (see Czarniawska 2004; Quattrone and Hopper 2001; 2005). Czarniawska (2004, p. 778), for instance, concludes that there was a “multiplication of centres of calculation [which] led to a situation in which it is pointless to speak of ‘centres’ or ‘specific sites’ [in which calculation resides]” in her study. Similarly, Quattrone and Hopper (2005, p. 738) conclude that contemporary organisations may best be characterised as having “multiple loci of control”, with the result that “feelings of being in control may appear spasmodically, but only on a small scale, and never from an enduring, unique centre”. Hence, these studies have pointed to the need for recognising that there may be *multiple*

centres that attempt to control the valuations performed in the organisational periphery and that these need to be analysed as centres in their own right.

Against this background, the thesis has two related purposes: Firstly, it aims to foreground the question of value without reducing this question to a narrow focus on the technical properties of particular accounting techniques or valuation models. Building on the renewed interest in the concept of valuation in the broader social science literature, this thesis sees valuation as foundational social process. Drawing on Kjellberg et al. (2013), I define valuation processes as the manner in which particular organisational activities (or more generally, objects) are ordered, signified, and ascribed value.³ The thesis takes the process of valuation and the role of accounting and control within such processes as the foci of the analysis. To this end, the general research question is: *how do organisational activities become valuable?*

Secondly, building on this general research interest, the thesis aims to re-examine some of the assumptions in the previous literature on the role of accounting and control in processes of valuation. In particular, the thesis takes the issues outlined above as a starting point to investigate how organisational activities become valuable, without taking the vantage point of an implied centre.

In sum, the thesis takes a ‘de-centred approach’ to the study of accounting, control, and value (see Law 2002). It focuses on the valuations performed in organisational practice at particular points in time, and on the conditions and processes that made these valuations possible. Focusing on valuation in this manner is a way of revisiting long-standing questions related to the role of accounting and the relations between centres and peripheries in the social studies of accounting.

The study

In order to investigate the stated research issues, I have conducted a three-part case study within the context of a single case company. I have studied the valuations of three central organisational activities – corporate strategy, product development, and production – within this case company. In the first study, I have followed the changing valuations of corporate strategies

over a period of nearly 20 years, from the early 1990s until the end of the first decade of the 2000s. In the second study, I have followed how product development activities were valued over the course of two product development projects. Finally, in the third study, I have followed the valuations of production activities in one production unit at different points over a period of almost 30 years, from the early 1980s until the end of the first decade in the 2000s. By focusing on different organisational activities, I employ each of these studies to highlight different aspects of how organisational activities become valuable. However, since these studies are undertaken within the same case company, they are also complementary. There are links and relays between these different studies, and taken together they provide a richer understanding. Hence, while each of these studies could be read separately, they are intended to be read together.

The case company in which I have undertaken these three studies is a global engineering company called Sandvik. The company has a long and rich history. It was founded as a steel producer in 1862 by Göran Fredrik Göransson, who was the first person in the world to successfully use the Bessemer-method for steel production on an industrial scale.⁴ It has since expanded into many different markets and businesses, and in 2009, when all the studies in this book end, it had more than 40 000 employees in over 130 countries around the world. In 2009, the company was organised into three business areas – Sandvik Materials Technology (SMT), Sandvik Mining and Construction (SMC), and Sandvik Tooling (Tooling) – which were all market leading in their respective niches (see Annual Report 2009).⁵ The SMT business area manufactured advanced products made from stainless steel and special alloys for different industries. SMC was a supplier of equipment, tools and services for the mining and construction industries. Tooling was a market-leading supplier of tools and tooling systems for automated metal cutting, servicing manufacturing companies around the world. The history of the case company is presented more in detail in the beginning of chapter four.

Since it is of some consequence for this study, it should be noted that Sandvik has generally been highly valued during most of the studied period. It has, for instance, repeatedly been described both as one of the most ‘well-managed’ (see *Dagens industri* 5 Nov 1990; Deutsche Bank 28 Oct

2002) and as one of the ‘most profitable’ (see *Veckans Affärer* 19 Aug 1992; Morgan Stanley 7 Feb 2007) companies in Europe. However, this does not mean that questions of what activities and strategies the company should pursue were uncomplicated. To the contrary, the value of particular activities and strategies was deeply contested both within and beyond the organisation. There were often multiple versions of what activities and strategies the company should pursue. It is these different valuations – and the processes through which certain activities and strategies became valuable – that are the focus of this thesis. Hence, rather than seeking to evaluate, with the benefit of hindsight, whether things which were valuable at one point should have been valuable, the foci here are the practices through which and the enabling conditions under which these things actually became valuable.

To theorise about the valuations performed in these three studies, this thesis develops a conceptual framework building on work within what Mennicken et al. (2008) call the “technological turn in economic sociology” (see Callon 1998a; Callon et al. 2007; MacKenzie 2009). This line of research can be described as an extension of ANT – or science and technology studies more broadly (see Vollmer et al. 2009) – to the study of markets, and economic behaviour more in general (see Callon 1999; Caliskan and Callon 2009). However, in adapting ANT to this empirical domain, and relating it to theoretical discussions in economic sociology, there has been, as Law (2008, p. 151) points out, “a vital metaphorical and explanatory shift”. Hence, this conceptual vocabulary could provide different explanations and bring new issues to the front of the analysis. In particular, by building on this line of research, this study adopts a conceptual vocabulary that is specifically geared towards understanding the processes of valuation which are at its heart (see Lamont 2012). In so doing, this study also sides with the number of accounting scholars who have argued for the increased cross-fertilisation between the social studies of accounting and this work in economic sociology (see Mennicken et al. 2008; Miller 2008; Chapman et al. 2009; Hopwood 2009; Vollmer et al. 2009).

In particular, the conceptual framework I have adopted in this thesis focuses on three things: calculative agencies, i.e. those who perform economic valuations, economic frames, and framing processes. I argue that

particular forms of economic behaviour do not reside in human nature – they do not constitute an “a-historical reality”, as Callon (1998b) puts it – but that the establishment of particular economic frames produces them. Hence, this conceptual approach directs attention to the framing processes through which these economic frames are constituted. These framing processes involve a series of investments that different agencies make with the purpose of configuring the socio-material arrangements framing a particular situation. This thesis will trace the socio-material arrangements framing each situation and analyse the processes through which these arrangements change.

By theorising in such ways about how organisational activities become valuable, this thesis will propose several contributions. Firstly, in relation to the accounting literature, this thesis will argue both that we need to shift the focus from the attempts of particular centres, in whatever form that these may take, to control the valuation performed in the periphery to the question of how organisational activities become valuable in practice. That is, in addition to studying centredness, we also need to study de-centred processes of valuation. Consequently, I sketch several potential implications for our understanding of the role of accounting and control of this shift and I identify and discuss the methodological consequences of this shift.

Secondly, this thesis also suggests alternative ways of understanding accounting and control. In particular, in relation to accounting, this thesis proposes that the notion of *calculative device* is a useful way to refine our understanding of the role of economic calculations in organisational practice. I argue that this concept provides a more nuanced understanding of the various material and technical devices that could participate in performing economic calculations in practice. This concept could also help us to analyse the relations between different forms of calculation. In addition, this thesis suggests an alternative conceptualisation of control in contemporary organisations. Rather than operating through the use of disciplinary techniques or the building of networks of alliances, control is here understood to operate through the distributed configuration of the calculative arrangements that produce calculative agencies. This is arguably a more de-centred conception of control, one that works through the configuration of the calculations of autonomous agencies.

Thirdly, this thesis also offers insights to the theoretical discussion about valuation in the broader social science literature, and in particular in recent work in economic sociology from which I draw the conceptual vocabulary of this thesis. Firstly, this thesis seeks to provide a “more nuanced understanding or the capacities and roles of the various calculative practices that populate the socio-economic domain” (Mennicken et al. 2008, p. 3). As pointed out elsewhere, this is one area where accounting research could contribute to economic sociology (see Mennicken et al. 2008; Vollmer et al. 2009). Furthermore, this study also seeks to extend the conceptual vocabulary – which has mainly been developed in relation to the study of valuations performed in markets – towards the study of valuations performed in formal organisations. I identify and discuss some implications of this shift from markets to organisations.

Outline of the book

The following chapter, chapter two, concerns previous research and the thesis’s conceptual framework. The chapter has two parts. In the first, I position the thesis in relation to the relevant discussions in the social studies of accounting literature. Here I argue, as previously noted, that the social studies of accounting literature have seen the question of value primarily as a problem of control at a distance, i.e. as a question of how centres attempt to influence the valuations performed in the periphery. I review two influential conceptual approaches to understanding such control at a distance, and two sets of studies that have highlighted certain potential limitations with the previous conceptual approaches are identified and reviewed. Thereafter, the second part of this chapter presents and discusses the conceptual vocabulary that I will use to analyse the different empirical studies in this thesis.

Chapter three concerns the methodological considerations that have guided this study. The chapter also has two parts. The first part discusses the principles of the study. Here, it is argued that this study has been conducted in the spirit of what MacKenzie (1996) called “ethnoaccountancy” because of the study’s focus on how economic calculations are performed in practice. This is consistent with the conceptual framework of this thesis,

which views realities as being enacted through socio-material practices, and which could be described as an ethnography of socio-material arrangements. This part also discusses the implications of these starting points in terms of what it means for a researcher to be a ‘good observer’. The second part of this chapter then describes the practices of collecting and analysing the empirical material, and the methodological considerations made during this study.

The following three chapters – four, five, and six – present the empirical studies. Chapter four presents the study of corporate strategy. The chapter begins with a short description of the background of the case company up until the end of the 1980s. The chapter then follows, chronologically, in a series of episodes, how corporate strategies were valued over a period of nearly 20 years from 1990 to 2009. In particular, I call the reader’s attention to a shift from one economic frame in the early 1990s – which I will call a profit frame – to another economic frame – which I will call a value creation frame. We will follow the slow process through which these frames transformed and how particular activities became valuable at different times.

Chapter five presents a study of product development. It follows a series of episodes in which decisions are made about concrete issues such product design or machine investments over the course of two product development projects, called Alpha and Beta. The chapter will trace the socio-material arrangements that made particular product development activities valuable at each point. We will see how the product development frame changed over time, and how different product development became valuable. We will also see in this chapter how there were often different versions of the value of particular product development activities at the same time.

Chapter six presents the study of production. This chapter describes how concrete production activities were valued at different points within a production unit. The chapter begins by examining the substantial investments that were made in order to re-configure the economic frame in this production unit in the late 1980s. It then follows how this new economic frame developed at different points in this production unit: first in 1994, more as a background, then in the year 2000, and again in 2008/2009. I illustrate how continuous investments were made in order to maintain this

economic frame over time. Yet, we will also see how, although the formal performance measurement system remained largely unchanged during this period, there were still different versions of the value of production activities, both at different times and at the same time. The chapter traces the investments through which these valuations changed.

Chapter seven draws together and discusses the findings from these three studies in relation to the research issues in this thesis. This discussion is organised into three parts. The first part is called ‘making things valuable’ and it discusses the findings of this thesis in relation to the understanding of how, according to the previous literature, things become valuable. I argue that rather than being an inherent quality of particular objects or a consequence of people’s preferences, the value of things is produced through particular arrangements. The second part is called ‘calculating organisations’ and discusses the findings of this thesis in relation to previous conceptualisations of the nature and role of accounting. Here I argue that we need to broaden our understanding of the different material and technical devices that could participate in the performance of economic calculations in practice. Finally, the third part is called ‘action at a distance revisited’; this part discusses the findings of this thesis in relation to different understandings of control at a distance in contemporary organisations. I argue that rather than ‘discipline’ or ‘the mobilisation of networks of alliances’, control in contemporary organisations could be better understood in terms of the distributed configuration of calculative arrangements, which configures the calculative capacities of autonomous agencies.

In the final chapter of this book, I summarise the main conclusions of this thesis and suggest avenues for future research.

Chapter 2

Previous research and conceptual framework

This chapter positions this study in relation to the previous literature. The chapter has two parts. The first part positions the study in relation to the relevant discussions on how things become valuable in the social studies of accounting literature and especially in relation to constructivist, or what Cooper and Hopper (2007) call “post-structuralist”, approaches to accounting. Here, the literature has understood the question of how things become valuable as a problem of ‘action at a distance’. Hence, the central question has been how particular centres are able to influence and control the valuations performed at an organisational periphery. The chapter discusses two different, though related, conceptualisations of how such control at a distance operates. Building on recent studies, the chapter identifies and discusses some potential limitations with these extant conceptualisations of control. In the second part of chapter, I present a conceptual framework for addressing the general research issue in this thesis – how organisational activities become valuable – and the specific issues that the first part of the chapter has identified.

2.1 Action at a distance: Constructivist approaches to accounting and control

2.1.1 The problematic correspondence between 'the real' and the representation of 'the real'

In the social studies of accounting literature, a foundational conclusion has been that accounting does “more than mirror economic reality”; it “could shape and create social relations” and influence “the ways in which individuals and organizations understand the choices open to them” (Chapman et al. 2009, p. 18). Based on an empirically grounded understanding, this line of research has questioned “the notion of an independent reality that can be represented unambiguously by accounting numbers or used as an epistemic standard to adjudicate between knowledge and non-knowledge” (Chua 1995, p. 114). That is, rather than assuming that the economic realities which accounting calculations are to reflect are out there, ready-made, and that the central question is whether these calculations provide an accurate window to the world – the mainstream position – the central issue here is to examine how accounting may participate in shaping and creating particular economic realities.

Robson (1992) has perhaps most consequentially developed this understanding. In his seminal contribution, Robson shows how accounting's claim to represent (unambiguously) an independent reality is problematic since “the terms and concepts of explanation do not unambiguously correspond to the real” (ibid., p. 690). He writes:

Rather than assuming that language [such as accounting] is a ‘window’ to the world, it is argued that we have no access to reality other than through structures of representation such as speech and writing, structures which have their own categories, codes and consequences. (ibid., p. 690)

For Robson, accounting can thus not be understood in terms of what it purports to represent and in terms of whether these representations accurately capture an underlying economic reality, but rather in terms of what it does, and what it enables others to do; “by creating what can be seen, so

accounting conditions, as well as enables, action” (ibid., p. 702). In particular, what accounting does, Robson proposes, is to enable “action at a distance”. That is, accounting conveys the ability to act upon people and contexts which are spatially, temporally or otherwise distant.⁶ Thus, Robson reformulated the central question for accounting research from the question of whether accounting accurately captures an underlying economic reality to the question of how accounting enables ‘action at a distance’:

A lack of ‘correspondence’ between the terms of explanation ‘here’ and the objects to which they refer ‘out there’ is only a problem for those who which to act at a distance. Problems of correspondence between representations and their referents do not arise, at least to the same extent, if one is located in the context one wishes to act upon. (ibid., p. 691)

From the perspective of the research issue in this thesis, namely, how things become valuable, this meant that the focus shifted from the question of whether accounting accurately measured the value of things to the question of how accounting enabled certain people or groups of people to influence the valuations performed in remote contexts. The question of what was valuable thus became closely linked in the social studies of accounting to the long-standing practical and principal concern with how to achieve control at a distance.

2.1.2 Control at a distance: The establishment of centres and peripheries

The term ‘action at a distance’ was originally adapted into accounting research from the work of Latour (1987, p. 215 et seq.) (see Justesen and Mouritsen 2011; Lukka and Vinnari 2014). For Latour and his colleagues (see Callon 1986; Law 1986), the central question was “how to act at a distance on unfamiliar events, places and people” (Latour 1987, p. 223). In particular, they were concerned with the question of how certain European states in the sixteenth through eighteenth centuries were able to colonise and dominate unfamiliar people living in faraway corners of the world (see Law 1986; 1991; Latour 1987). The answer, they propose, is that this was only possible because these remote places were “mobilised” through vari-

ous technical methods, such as the drawing of maps and the measurement of stars and tides, and thus brought back home to the “centres of calculation” which were formed in these cities, where this flow of information could be calculated and acted upon (Latour 1987, p. 232 et seq.). It was through this accumulation of information that particular centres could be formed that were able to dominate a realm of people and processes on a distance. As Miller and Rose (1990, p. 9) summarise Latour’s thesis:

Mobile traces that were stable enough to be moved back and forth without distortion, corruption and decay, and combinable so that they could be accumulated and calculated upon, enabled the ships to be sent out and return, enabled a ‘centre’ to be formed that could ‘dominate’ a realm of persons and processes distant from it. This process, he suggests, is similar whether it is a question of dominating the sky, the earth, or the economy; domination involves the exercise of a form of intellectual mastery made possible by those at a centre having information about persons and events distant from them.

Following this line of reasoning, the research focus in the social studies of accounting literature shifted towards the formation of particular *centres*, and how these were able to control a *periphery*. The notion of centre should be understood here as a theoretical concept, i.e. it does not necessarily have to correspond with the corporate management, a centralised controlling department, or an investment centre, which are conventionally seen as organisational centres, but there could be other types of centres. A distinction was made between centres and peripheries in that the centres were considered to have the ability to perform strategic calculations which could result in actions elsewhere. This recursive process of constructing and accumulating (accounting) information was taken to create an asymmetry “between controllers (the centre) and the controlled (the periphery)” (Quattrone and Hopper 2005, p. 737). As McKinlay et al. (2010, p. 1016) summarise the use of ‘action at a distance’ in accounting research:

Just as innovations in navigation were crucial to the emergence of managerial power, so the possibility of ‘government at a distance’ hinges upon a calculative centre gathering information about an institutional periphery. This information asymmetry also construes unequal power relations between the coherent, strategic centre, and the managed, dispersed organization.

The question of how particular centres are established has since been studied in many different settings, ranging from the Jesuit order in the sixteenth and seventeenth centuries (Quattrone 2004a) to contemporary pharmaceutical companies (Dambrin and Robson 2011). The identity of the ‘centres’ in focus in these studies has also taken different forms. Briers and Chua (2001), for instance, follow the sequential attempts by a group of accountants to establish a new cost accounting model for a production unit. The accountants sought to establish the model, in competition with others models such as the existing costing model and an alternative model created by a business analyst group, as an “obligatory passage point through which the management must pass in order to deliver a better future” (*ibid.*, p. 249). In this case, Briers and Chua (*ibid.*) find that the accountants were able to build a strong enough network of alliances supporting their model. As a result, they were able to establish themselves, and the model, as a new “centre of calculation”, which resulted in that the valuations of the production activities changed – in particular in relation to a product called plate, which was now shown to be un-profitable and dropped from production. Miller (1991), in contrast, focuses on the emergence of a specific program for realising growth in the UK in the 1960s. In particular, this program focused on certain techniques for calculating investment decisions, such as the Discounted Cash Flow model. Miller (*ibid.*) finds that for the government, which was a central actor in the formation of this program, these new techniques represented a possibility to “act on a distance” on the valuations performed by a multitude of independent companies (the periphery). Whilst the government could not itself directly control the investment decisions of independent companies, they could persuade the managers in these companies of the advantages of DCF techniques, which would replace the existing practices of ad hoc calculations and “gut feeling”. Thus, the government could push its strategic agenda, and install its mode of valuation, in these independent companies.

Thus, a central research issue in the social studies of accounting literature has been the formation of particular centres, and the question of how these centres are able to act at a distance on the periphery. Accordingly, the question of value has also been investigated in this literature as a question of how particular centres are able to control the valuations performed in

the periphery, rather than as a question of the technical properties of particular accounting models. This book considers two conceptual approaches to how centres are able to exercise control at a distance, both of which have been influential in the social studies of accounting literature. I will call these two approaches for *control through the disciplinary power of numbers* and *control through the mobilisation of networks of alliances*. While these have not been the only approaches used, they have arguably been two of the most influential approaches for understanding control at a distance in this literature.

Notably, both these research streams follow a constructivist tradition and have sometimes, therefore, been seen as complementary (see Ezzamel 1994; Quattrone 2004a). Yet, both research streams suggest different conceptual understandings of how control at a distance is achievable, e.g. although the results could be similar, the analysis of how these results eventuate are different. However, while both these research streams suggest somewhat different understandings of how control is achieved, the central questions in both these research streams have been similar. The focus in both these research streams has been on how centres are formed and able to control a periphery.

2.1.3 Control through the disciplinary power of numbers

A first strand of research suggests that control at a distance works through a range of disciplinary techniques through which a centre is able to act upon the conduct of peripheral actors and render them into docile and useful bodies, from the perspective of the centre (see Hoskin and Macve 1986; 1988; Hopwood 1987; 1990; Knights and Collison 1987; Miller and O’Leary 1987; 1994; Preston 1989; Roberts and Scapens 1990; Roberts 1991; 1996; 2005; Miller 1992; 2001; Sewell and Wilkinson 1992; Hopper and Macintosh 1993; 1998; Townley 1993; 1994; Carmona et al. 1997; 2002; Covaleski et al. 1998; Vaivio 1999; 2006; Jeacle and Walsh 2002; Lambert and Pezet 2011; Jeacle 2012). This line of research builds on Foucault’s (1977) analysis of the emergence of disciplinary power in the eighteenth and nineteenth centuries (see Mennicken and Miller 2012). In particular, Foucault proposes that disciplinary control – which he saw as an unobtrusive but yet invasive form of control – works through three different, though

related, techniques: “hierarchical observation”, “normalising judgement”, and “the examination” (Foucault 1977, p. 170 et seq.).⁷ Together these techniques constitute a positive form of power, which, rather than acting through suppression or repression, “positively produced ways of behaving and predispositions in human subjects” through the specification of behavioural norms and standards and the establishment of a continuous field of visibility and (hierarchical) observation (Hoskin and Macve 1986, p. 106). Foucault argues that such a disciplinary system, at its most complete, functioned as a ‘panoptic system’, so called after Jeremy Bentham’s design of a prison in which a central tower could surveil and control all the actions of the prisoners in the surrounding cells (Foucault 1977, p. 200 et seq.). The panopticon was, in the words of Hoskin and Macve (1988, p. 59), “a total architectural design for visible subjection and invisible supervision, where an observation tower which could not be seen into dominates and looks out onto every square inch of the institution and its inmates (prisoners, guards, soldiers and officers).” The panopticon has been used in accounting research as a metaphor for understanding how top managers (or others) construct a central observation tower (a centre) through the accounting system from which they can observe and control the actions in the organisational periphery (see Hopwood 1990). Thus, by making things visible and calculable, accounting enables managerial interventions in order to correct non-valuable behaviour (see Rose and Miller 1992).

The accounting literature has also emphasised the importance of numbers for establishing “normalising judgment” (see Miller 2001; Vollmer 2003). In particular, accounting has been considered by the accounting literature to foster disciplinary power by providing norms and standards. Such norms and standards are, as Foucault (1977, p. 178-179) writes, central to disciplinary control:

...it was a question of making the slightest departures from correct behaviour subject to punishment... [...] ...non-observance, that which do not measure up to a rule, that departs from it. The whole indefinite domain of the non-conforming is punishable: the soldier commits an ‘offence’ when he does not reach the level required...

Accounting research has devoted particular attention in this regard to the development of standard costing. In an influential study, Miller and O’Leary (1987) examine the development of standard costing in the early twentieth century. They locate the development of standard costing in the emergence of a broader programmatic discourse concerning the efficiency of both companies and society. Standard costing, they argue, was a “constitutive element in a form of normalising socio-political management whose concern is with rendering visible all forms of activity of the individual in view of their contribution to the efficient operation of the enterprise and of society” (ibid., p. 240). Once in operation, standard costing was considered to function as an unobtrusive, but effective, form of control:

[This] process of rendering visible alighted on the individual person. It did so by surrounding the individual at work by a series of norms and standards. Through such norms and standards the inefficiencies of the person were rendered clearly visible. [...] In the nineteenth century discipline within the enterprise took the form of direct confrontations between the worker and the boss. In the early twentieth century, and through the changes we are referring to, the employee comes to be surrounded by calculative norms and standards, interposing between him and his boss a whole range of intermediary mechanisms. With this shift, discipline comes to be seen to reside not in the will of the boss but in the economic machine itself, in the norms and standards from which the worker can be seen to do his part. (Miller and O’Leary 1987, p. 239)

Thus, this line of research has seen the establishment of norms and standards, such as performance targets or standard costs, as defining normal or abnormal behaviour, or in terms of the research issue in this thesis, valuable and non-valuable behaviour. It is through such norms and standards that the actions of the peripheral actors can be compared and evaluated, and sub-standard or non-compliant behaviour identified. This research sees accounting and control practices as locating individuals in a calculable space, in which the consequences of these individuals’ actions become calculable in relation to a behavioural standard (see Miller 1992).

The research has also seen the operation of disciplinary control to depend on ceremonial examinations, such as the exam in schools (see Hoskin and Macve 1988; Walker 2010) or performance evaluations in organisations (see Townley 1993; 1994). It is through such examinations that the periph-

eral actors are made to internalise the norms and standards set by the centre, as Vollmer (2007, p. 581) observes:

Disciplinary effects emerge once participants realize the possibility that numbers given off by them or attached to them might be read as symptoms, if not testimonies, by others, e.g. by managers interpreting them as gradual deviations from some expected standard or by investors assessing actual and potential returns.

As Hoskin and Macve (1988, p. 68) write, for disciplinary effects to emerge requires “the continuous anticipation of having their performance measured which predisposes them, in thought, word and deed, towards an internalized self-discipline”. In a study of the relations between corporate managers and institutional investors, Roberts et al. (2006) illustrate the disciplinary effects that are understood to follow from such forms of ‘examination’. In particular, studying the case of company-fund manager meetings, Roberts et al. argue that these were situated in a broader context which enabled the capital market actors to observe the behaviour of corporate managers from a distance and to exercise “normalising judgement”. This visibility, Roberts et al. argue (*ibid.*, p. 277), “made possible processes of executive subjection”, in particular “through the anticipatory self-discipline of executive’s exhaustive rehearsals for the [company-fund manager] meetings”. It was the presence of such examinations, in the form of these meetings in which the management was being judged and held accountable, the authors argue, that ultimately disciplined the management and committed them to the ideal of shareholder value creation.

In sum, this line of research suggests that organisational control operates through ‘hierarchical observation’, ‘normalising judgement’, and ‘examination’. Crucially, this research does not consider organisational control to follow automatically from the organisational hierarchy or formal authority, but rather sees it as following from these disciplinary techniques, through which the centre, given its position in the disciplinary machine, is able to control the peripheral actors. Hence, this line of research has often focused on the actions of a particular centre; how this centre constructs a panoptic gaze through the use of accounting, how it defines standards and norms, and how it monitors and examines the behaviour and performance of the

peripheral actors (see Townley 2005; Brivot and Gendron 2011 on this point). Disciplinary power has been seen as a “hierarchical form of accountability” (Roberts 1991; 1996) or as an example of “bureaucratically oriented control” (Covaleski et al. 1998). Thus, it can be said, in terms of the research issue in focus in this thesis, that the value of organisational activities is in this view largely seen as dependent on how the centre sees and regulates the actions in the periphery, the fields of visibility that are created, and the norms and standards that it sets.

2.1.4 Control through the ‘mobilisation’ of networks of alliances

A second strand of research has suggested a different, albeit related, understanding of how particular centres are able to control the actions in the periphery. In particular, this line of research has focused on how control is achieved through the construction of a stabilised and coherent network of alliances (see Robson 1991; 1992; 1994; Bloomfield et al. 1992; Preston et al. 1992; Ezzamel 1994; Chua 1995; Lowe 1997; 2000; 2001; Briers and Chua 2001; Mouritsen et al. 2001; Jones and Dugdale 2002; Jeacle 2003; Skærbæk and Melander 2004; Quattrone 2004a; Cuganesan and Lee 2006; Preston 2006; Chua and Mahama 2007; Skærbæk 2009; Pipan and Czarniawska 2010; Whittle and Mueller 2010; Dambrin and Robson 2011). Drawing on the work by Latour (1987) and his associates (see Callon 1986; Law 1986), these studies suggest that control results from a “process of translation”, i.e. a process in which certain actors attempt to establish themselves, or the strategy or technology that they are promoting, as an “obligatory passage point” and to “enrol” and “mobilise” the support of other (human and non-human) actors (see Justesen and Mouritsen 2011). In an influential article, Callon (1986) suggests that a ‘successful’ process of translation involves four parts: problematisation, intressement, enrolment, and mobilisation.⁸ If all these parts are successful, the network-constructors – in Callon’s case three marine biologists who sought to develop and gain support for a conservation strategy for a population of scallops in the St. Brieuc Bay – may be able to transform themselves into a centre which can (at least temporarily) control the other actors in the network (the periphery) and make them move in a certain direction (see Latour 1987, p. 103 et seq.).

As before, this is seen as a subtle and complex form of control that does not follow (at least not automatically) from formal authority and organisational hierarchies. Instead, it builds upon the translation and alignment of interests and the building of alliances, through a variety of means.⁹ In the accounting literature, studies of this ilk have therefore often focused on the (more or less successful) attempts by a certain actor or a group of actors to overcome the “scepticism and resistance” (see Preston et al. 1992, p. 589) from other actors and enrol their support for a particular strategy or a new accounting technology. These central actors have been variously referred to as “accounting fabricators” (Preston et al. 1992), “fact-builders” (Chua 1995), “the enrolling agency” (Lowe 2000), “network constructors” (Cuganesan and Lee 2006), or “the instigating actors” (Skærbæk 2009), and they have taken different forms.¹⁰

Preston et al. (1992), for example, follow the attempt to introduce management budgeting in the NHS. In particular, they analyse the various rhetorical and persuasive tactics used by the governmental and managerial actors leading the attempt to install this new mode of valuation in the health care practice. However, in a testament to the uncertain nature of such attempts of control, the authors find that the initial attempts to construct a strong network supporting this new budgeting system failed, primarily because the network-constructors had failed to enrol the support of the doctors in the hospitals. In order to overcome this scepticism and resistance, the actors therefore repositioned the budgeting system and modified both its purpose and its technical configuration to enrol the support of the clinicians. It changed from a system for “the more efficient use of resources” (and the control of doctors) to a system that could also be used “for the management of treatments”.

These studies often present accounting as a potentially powerful ally that can hold a certain “persuasive power” (Chua 1995). However, accounting is only powerful if the other actors could be convinced that the numbers are ‘reliable’ (see Dambrin and Robson 2011). As Dambrin and Robson note (*ibid.*, p. 433), if there is any suspicion that the numbers are ‘corrupted’ then there is a risk that:

...people can no longer see any interest (intressement) in the [numbers], they have difficulties in buying into them and the network of [numbers] is thrown into jeopardy. This, in turn, creates a problem of enrolment without which there can be no mobilisation of the network.

Accordingly, particular attention has been devoted to the network-constructors' attempts to make the accounting numbers convincing enough to persuade the other actors "to 'consent' to the numbers" (Chua 1995, p. 113). For example, Chua (ibid.) followed the attempts by a group of actors (the University Project Team in particular) to introduce a new case mix-based accounting system in three public hospitals. One of the most crucial battles for the Team in this attempt to change the modes of valuation in the hospitals, Chua writes, was to enrol the Yale Cost Model (which was the basis for the new accounting system). In order for the Team to enrol this model successfully, it had to show that the model worked; only after it had been shown to work could the model become a powerful representational device that could command consent. Chua shows how this entailed modifying the model so that the numbers generated were aligned with the common conceptions of what were consistent, material, and credible numbers. It also entailed enrolling the support for the project from various other actors, making it more difficult for the sceptics to resist it. In the end, Chua (p. 111) writes:

Change emerged not because there was certain knowledge of positive economic outcomes but because an uncertain faith, fostered by expert-generated inscriptions and rhetorical strategies were able to tie together shifting interests in an actor-network.

Thus, accounting may be a powerful ally for those who attempt to position themselves as a centre in a network. However, accounting is not seen here simply as a tool that the actors can use to persuade others, but also as an actor in itself. As Mouritsen et al. (2010, p. 297) write:

Being an actor means being able to bend the world around itself and thus make the world speak its language in certain situations. People are obviously actors when they make changes to interactions with other people. [...] It is more controversial that ANT also proposes non-human entities to be actors. The target

costing system itself is an actor when it takes part in persuading the supplier to invest more in innovation.

That is, accounting calculations may not only be potential allies that can help to enrol other actors in the network, but they may also produce unintended consequences in relation to the central actor's strategies. For example, Mouritsen et al. (2001) analyse the introduction of two accounting techniques (open book accounting and functional analysis) in two small, high-tech companies in order to attempt to control the actions of their suppliers from a distance. They authors find that these two accounting techniques enabled the focal companies to act on the suppliers from a distance. However, these accounting techniques also affected the internal organisation in the focal companies by "re-presenting corporate phenomena such as technology, organisation and strategy and thereby re-translating the 'identity' and 'core competence' of the firm" (ibid., p. 221). Hence, as Mouritsen et al. (p. 223) write:

...neither LeanTech or NewTech were allowed to rest as centres. When being engaged in control and action at a distance, they themselves became part of the inter-organisational network of production affairs and of the flow of products and services and were transformed by the new management controls. The introduction of new inter-organisational controls impacted not only on the firms' ability to influence inter-organisational relations; they also influenced intra-organisational relations.

Thus, these new accounting techniques were actors in their own right and participated in the construction of the organisational network, with its centres and peripheries. The distribution of centres and peripheries did not only follow the intentions of the management of the focal companies.

In sum, this stream of research suggests a somewhat different understanding of how control is achieved compared to the disciplinary-approach; rather than discipline, control follows from the translation and alignment of interests and the building of alliances. Yet, the focus in this research stream has also been on the formation of particular centres. Studies within this research stream have usually taken the perspective of 'the network constructors' as the starting point in the analysis – be it in the form of a central

management, a governmental unit, or a project group – and focused on the tactics that these have employed to overcome the skepticism and resistance of other (human and non-human) actors and to make them comply with their strategies. If these network-constructors were able to establish themselves as the centre of the network, they have been seen as being able, at least temporarily, to control the behaviour, and the valuations performed, in the periphery. This view, however, is also highly sensitive to the precariousness of control; control is not seen as following automatically from the centre's attempt to construct a network of alliances, as such attempts may also produce unintended consequences.

2.1.5 Control and the co-presence of multiple forms of calculation

The two research streams discussed above – ‘control through the disciplinary power of numbers’ and ‘control through the mobilisation of networks of alliances’ – have arguably remained two of the most influential approaches for understanding organisational control in the social studies of accounting literature. However, recent studies have drawn attention to some important questions for our understanding of control and valuation in contemporary organisations, which have perhaps been somewhat obscured in these two research streams. These questions are discussed in the following two sections.

To begin with, a first set of studies has focused on the co-presence of multiple forms of calculation. While the literature has often acknowledged that organisational life is characterised by multiple forms of calculation (see Vollmer et al. 2009), previous research has often focused on the effects of particular accounting calculations, such as standard costing (see Miller and O’Leary 1987), case-mix accounting (see Chua 1995; Lowe 1997), or on the effects of accounting in the aggregate (see Miller and Rose 1990; Robson 1992). Furthermore, by taking the actions of ‘the centre’ as a starting point, these studies have often treated the existence of different forms of calculation as part of a coherent attempt by the centre to control the periphery. Disciplinary control, for instance, usually assumes the existence of enclosed spaces (such as the family, the school, the military, and the factory), each

with its own coherent set of norms and standards (see Foucault 1977; Knights 1992; Townley 1993). These studies have seen the ability to specify unambiguous standards for such enclosed spaces, as in the case of standard costing, as a prerequisite for disciplinary control. Thus, accounting has been seen to funnel the individual subjects along certain pre-defined directions within such enclosed spaces, as the notion of disciplinary gaze implies, and less attention has been awarded to the possibility of multiple standards and overlapping calculable spaces.

Alternatively, previous literature has analysed the presence of different forms of calculation as an instance of resistance or competition to the actions of the central actors (see Ezzamel 1994; Hansen and Mouritsen 1999; Mouritsen 1999; Vaivio 1999; Lowe and Kuh 2007). Vaivio (1999), for instance, follows the attempts by a group of actors, led by the Commercial Director, to introduce new measures of customer service performance, “The Quantified Customer”, in one organisation. He finds that other organisational actors, such as the sales managers, resisted this attempt, which introduced a competing, largely non-quantitative, form of calculation, called “The Sales Customer”, in an attempt to undermine the centralised attempt to control the customer relations. Vaivio (*ibid.*) concludes that the introduction of this alternative version of customer performance forced the commercial management to re-evaluate its position and made the sales managers more powerful again. Hansen and Mouritsen (1999) focus on the competition between different technologies for calculating competitiveness in a small firm. They focus in particular on “how centre-periphery relations shift between business technologies and managerial technologies” (*ibid.*, p. 453). They find that the managerial technologies, such as order performance, used by the central management were to a certain extent able to dominate the competing business technologies, and direct the organisational behaviour towards certain activities. However, these technologies were “not universally strong”, but only emerged “in episodes where expectations were not met”, and in other situations the business technologies “took the centre” and were able to direct the organisational behaviour towards other activities (pp. 467-468).

In sum, the previous literature has primarily analysed the existence of multiple forms of calculation either as part of a coherent attempt to control

the periphery, or as resistance or competition to such attempts. Thus, the analysis in previous literature of the existence of multiple forms of calculation has mainly been in relation to a central actor, and a central question has been whether this actor is successful in controlling the periphery. However, other studies have drawn attention to the fact that the relations between multiple forms of calculation may be more complex than this, and that the co-presence of multiple forms of calculation may produce particular effects for how things are valued.

Law and Akrich (1994), for instance, in a study of the commercialisation of a research laboratory, including the introduction of a new cost accounting system, find that the laboratory practices had, in part, been reorganised in line with this new cost accounting system. However, this had not completely exhausted every other form of calculation in the organisation. Scientific and technical calculations remained important in practice, and the managers still calculated and reasoned in ways which did not have to do with costs. Hence, the authors (*ibid.*, p. 554) conclude that the managers were “located in several spaces of calculation”, or that they were “constituted in a *multivalent calculative space* [emphasis in original]”, which affected the operating decisions. Thus, Law and Akrich shifted the analytical focus from the action of the centre to the effects of multiple forms of calculation on the actions taken in the periphery.

Similarly, Mouritsen et al. (2009), in a study of the product development practices in three small high-tech companies, focus on the effects of the co-presence between different accounting calculations. In particular, they conclude that whereas the presence of only one accounting calculation in a particular situation simply extended or reduced the innovation activity, the co-presence of conflicting accounting calculations could produce tensions and discussions in the organisation about the role of innovation. These discussions concerned not only “preferred types of innovation activities, but also about their location in time and space”, i.e. they were also related to the company’s broader innovation and sourcing strategies (*ibid.*, p. 739). Skærbæk and Tryggestad (2010) also focus on the constitutive effects of the relations between multiple accounting devices in their study of corporate strategy within a ferry division. Like Mouritsen et al. (2009), they find that the co-presence of multiple accounting devices could fuel tensions

and discussions about different strategic options, as each of these options emerged in interaction with particular accounting devices. However, Skærbæk and Tryggestad (2010, p. 121) also show how each strategic option was co-produced by “a stream of independent accounting devices”. For example, the authors show how the option of a “proactive strategy” depended upon the company’s IPO prospectus, which in turn depended upon the construction of an independent balance sheet and annual report for the ferry division. These accounting devices, and more, participated in making ‘the proactive strategy’, and the associated expansive capital investment program, a valuable strategic option.

In sum, this latter set of studies hint at the importance of shifting the attention from the actions of particular centres, and the reaction to these actions, to the effects of the relations between different forms of calculation on the valuations performed in the periphery. If we attend more in detail to the relations between different forms of calculation, we see that these relations are complex, and that they could produce different effects, as these latter studies show. This thesis follows in the footsteps of this latter set of studies by paying close attention to the relations between multiple forms of calculation. In doing so, we can see, as Law and Akrich (1994, p. 555) note, how the effect of any form of calculation depends on “the presence or absence of other forms of calculation”. This thesis thus takes as its starting point that “the relations between various technologies of calculation are contingent rather than representing the expression of a deeper consistency” (ibid., p. 558).

2.1.6 Control and the existence of multiple centres

A second and related set of studies has focused on the existence of multiple centres. Like the studies focusing on the co-presence of multiple forms of calculation reviewed earlier, these studies have also raised questions about the understanding of control in previous studies, and, in particular, on the focus on the actions of particular centres in these studies. Several studies both in the social studies of accounting literature (see Law 1996; Quattrone and Hopper 2001; 2005; Czarniawska 2004; Andon et al. 2007) and in the broader social science literature (see Star 1991; Helgesson and Kjellberg

2005; Law 2008; Alcadipani and Hassard 2010) have argued that the focus on the actions of an implied centre in previous studies might have overshadowed other important aspects of the operation of control in contemporary organisations. In particular, they have argued that rather than one centre of control, there may be different and shifting centres of control in contemporary organisations.

Czarniawska (2004, p. 773), for instance, argues that the notion of “centres of calculation” is reminiscent of certain organisational forms, such as ‘the laboratory’ or ‘the factory’, which are “no longer central in today’s world of work organisations”. Czarniawska (*ibid.*) illustrates this assertion through a study of a utility company in which she finds that calculation was not located exclusively in any specific site, but that there were many different centres of calculation which affected daily operations. To begin with, there were several versions of the finance department, the present one and the old one, which had made a mistake in the long-term planning and, therefore, still affected the present operations. In addition, there were separate accounting units in each department which calculated costs and produced budgets. Furthermore, Czarniawska (p. 778) finds that, in addition to these specific accounting units, “practically everybody in management calculated and was prepared to defend her or his calculations against everybody else’s”. This led to “a situation in which it is pointless to speak of ‘centres’ or ‘specific sites’ [which are reserved for calculation]” (p. 778), but in which calculation should be seen being “dispersed”.

In a similar vein, Quattrone and Hopper (2001), on the back of a study of the implementation of a new ERP technology in one organisation (Think-Pink), question the understanding in the previous literature of change as emanating from “centres of calculation” (*ibid.*, p. 406), “from whence order can be conceived, represented and executed” (p. 410). In contrast, the authors find that in their case study there was “no evolution towards a centre” (p. 420); rather, each attempt to order the events in this case was “incomplete and unable to centre the organisation in itself” (p. 428). Hence, following the implementation of this new ERP technology, there was no longer any stable centre of control in this organisation:

The exertion of control after implementing SAP denote a passage from a ‘totalitarian’ view of control (where an identifiable locus in space and time, say the controller at the reporting period end defining what is ‘good’ and ‘bad’ performance) to a multiplicity of loci. [...] Before implementing SAP, control in Think-Pink traditionally resided with the accounting function. The accountants reproduced centralized control from specific spaces in time and space... This ceased once SAP was in place. Control became dispersed across many business functions (spaces) at indiscriminate intervals (time). (Quattrone and Hopper 2001, p. 420, emphasis in original)

The organisation had thus become “a-centred”. The notion of “a-centred organisations”, Quattrone and Hopper (2001, pp. 428-429) argue, intends to show how things such as knowledge, rationality, action, and ‘best practice’ “are constructed on a daily basis” in the organisational practice, and how organisations are therefore “in a continuous state of flux”.

Other studies have subsequently further developed this notion of “a-centred” organisations. Andon et al. (2007), for instance, in a study of an attempt to manufacture new performance measures in one organisation, show how the performance measurement agenda “drifted” as different organisational participants moved in and out of the change processes. Hence, they find that this change process was “a-centred,” as it took place in “loosely coupled and shifting collectives” (ibid., p. 299). As a result, there were different meanings and versions of what the new performance measures were to be, causing the change process to drift. Quattrone and Hopper (2005) also continue this line of thought in a continuation of their previous study, this time focusing on the implementation of an ERP system in two multinational companies, Sister Act and Think-Pink. They find that while the implementation of the ERP system in Sister Act reproduced the existing distances between the centre and the periphery in the company, making the central management the only space capable of overseeing the company, the implementation of the same ERP system in Think-Pink resulted in that the distance between centres and peripheries, and between controllers and those controlled, was dissolved. The new ERP system:

...broke down functional barriers and distance. New information could be accessed and inputted from different locations, for different purposes, for different bosses: everyone can slice the information as they wish. Accounting

categories defining centres and peripheries, and accounting reports enacting action at a distance disappeared: everyone is an accountant now. This produced a flatter organisation structure than in *Sister Act* but eliminating distance did not centralise control. Instead it marked a proliferation of constantly changing centres, varied and vacillating reasons for wanting accounting information, and managers with 'minimalist' control. (ibid., p. 761)

The implementation of this new ERP technology made it "difficult to know who was controlling whom, and when" (p. 757). This lack of a stable centre left managers "with a minimalist attitude", which meant that "feelings of being in control may appear spasmodically, but only on a small scale, and never from an enduring, unique centre" (p. 738). Hence, the authors conclude, "It is more pertinent to trace continual changes in the loci of control rather than trying to identify a specific centre that exerts control at a distance" (p. 760).

Taken together, these studies have begun to problematise the assumption in previous research that control and the value of things follows from the actions of particular centres, and the reactions to these actions. Rather than taking the actions of any centre as the starting point, these studies have illustrated how there may be different and changing centres in the organisational practice. They have also begun to identify some of the empirical consequences of the existence of multiple centres, such as drift and the feelings of minimalistic control. This thesis elaborates further on these insights by treating the existence of multiple centres as a general theoretical condition. Hence, this thesis shifts the focus from particular centres' attempts to control the periphery to the effects of multiple control attempts on the valuations performed in organisational practice.

2.1.7 Concluding comments on the previous literature: On the need for a new conceptual vocabulary

In sum, this chapter argues that social studies of accounting literature has explored the question of value mainly as a problem of 'control at a distance'. Two influential conceptualisations of such control have been reviewed, called 'the disciplinary power of numbers' and 'control through the mobilisation of networks of alliances'. These research streams provide im-

portant alternatives for conceptualising organisational control and the construction of organisational order. I share with these research streams a concern with the relations between centres and peripheries, and a concern with the complex and constitutive relations between accounting, control, and organisational order. However, recent studies have highlighted certain questions which previous research has somewhat obscured. In particular, these questions have concerned the effects of the co-presence of multiple forms of calculation and the existence of multiple centres. These questions have been presented as important for understanding the valuations performed in organisational practice. I want to give greater attention to these questions in this book. I also want to focus more directly on the question of value, in a way that the two conceptual approaches reviewed above perhaps do not.

For these reasons, rather than using the conceptual vocabulary suggested by the disciplinary-approach or the traditional ANT-approach, this thesis adopts a conceptual vocabulary drawn from work within the recent technological turn in economic sociology (see Callon 1998a; Callon et al. 2007; MacKenzie 2009). This conceptual vocabulary has the advantage that it has been specifically developed for analysing the processes of valuation which are at the heart of this study (see Lamont 2012). In addition, this conceptual approach is also attentive to the relations between multiple forms of calculation, and to the potentially complex relations between centres and peripheries.

2.2 Conceptual framework: Calculative agencies, economic frames and framing processes

The following section discusses the central aspects of the conceptual framework I adopt in this thesis. To understand how organisational activities become valuable, according to the view this thesis takes, we have to begin with the question of agency.¹¹ Economic valuations require an agent that calculates. Who performs these calculations? How can we understand the behaviour of such agents?

2.2.1 Calculative agencies reside in socio-material arrangements

It is often assumed that the ability to calculate the value of things resides with human beings (see Callon 1998b). Certain forms of economic behaviour are assumed to be a natural part of our existence. Microeconomic theories, for instance, tend to assume that people are utility maximising decision-makers (see Jensen and Meckling 1976). However, to assume that people are pre-disposed to perform certain valuations requires us, as Callon (1998b) points out, to make arduous assumptions about human nature and our ability to perform complex calculations. Instead of assuming that humans are pre-disposed to certain forms of economic behaviour, it is, from Callon's perspective, precisely the emergence of such behaviour that needs to be explained. The central question is rather this: if we can observe that people perform certain valuations, what are the conditions that make this behaviour possible?

In contrast with the assumption that action is reserved for human beings, some argue that agency resides in social macro-structures that act on people and compel them to perform certain valuations. Economic agency, for instance, has been located in things such as institutions, cultures, or conventions that are considered to impose a calculative logic upon people (see Callon 1998b). It is, for instance, not uncommon both in academic and in common debates to refer to abstract notions such as "the spirit of capitalism" or the existence of "an overall logic of a mode of production" in order to explain particular forms of economic behaviour (Callon 2005, p. 5). However, this view assumes both that the properties of these structures and the casual links that bring them into action are known and stable. Such a view therefore, as Callon (1998b) points out, fails to capture adequately the complexities and dynamics of practice.

In addition, another problem with the assumption that all action resides in human minds or in socio-cultural institutions is that it obscures the potentially important role that material and technical devices play in the constitution [used throughout in the sense of *the constituting of* or *the process of the constituting of*] of particular forms of behaviour. There are – as has been convincingly argued elsewhere (Latour 1988; 1992a; 1992b) – good reasons for not making a distinction between humans' and material and technical de-

vices' capacity for action, but rather to consider action as distributed between humans and non-humans. The role of material and technical devices is perhaps particularly striking when it comes to economic action (see Chapman et al. 2009; MacKenzie 2009). It is, for instance, as Beunza and Stark (2004) point out, difficult to analyse economic behaviour in the financial market without considering the various material and technical devices that analysts and traders use to value an investment. Without the calculative power of the computer programs, the data from the market networks, and calculative models such as the Discounted Cash Flow-formula, the calculations of a company's value would become impossible, or at least very different.

Who is it, therefore, that performs economic calculations? Three points can be made. Firstly, rather than residing in the minds of individual human beings or in socio-cultural institutions, economic action is seen here to reside in particular arrangements (or assemblages) made up of "human beings (bodies) as well as material, technical and textual devices" (Caliskan and Callon 2010, p. 9). Following Callon and Muniesa (2005, p. 1236), I refer to the particular socio-material arrangements, or "hybrid collectives", which acts in economic situations as *calculative agencies*. The term calculative agencies is appropriate because, as Callon (1998b) argues, economic action is calculative, in one form or another; "calculation and agency" are here seen, as Chapman et al. (2009, p. 19) note, as "two sides of the same coin". Calculation is conceived of here in a broad sense, including both quantitative calculations and qualitative (calculated) judgments (see Callon and Law 2005). Furthermore, the notion of agencies might also help us to escape some of the connotations of the term agents, which usually refer to human beings. The notion of calculative agencies conveys the idea that the calculative capacities are distributed amongst humans and the devices with which they are equipped. This is, however, as Callon and Muniesa (ibid.) note, not the same as saying that humans may use tools to help us solve difficult calculative problems, which is a common understanding, but rather that these arrangements of people and devices mutually define the nature and content of the calculations made, and the actions taken.

Secondly, it follows from this definition of calculative agencies that many different forms of agency are possible. If agency, rather than being

hidden in human nature, resides in socio-material arrangements, it becomes possible to analyse how this agency changes as a result of the configuration of these arrangements. Particular forms of economic behaviour are not natural or inevitable; different forms of behaviour could be brought into being depending on the configuration of the socio-material arrangements in which agency resides. Thus, this understanding of agency shifts the focus from the question of “what do we call economic behaviour” to “how are behaviours, institutions, [arrangements] and rules of the game economized” (Callon 2009, p. 22). The central question is not what forms of economic behaviour exist, but how particular agencies are brought into being. “The objective may be to explore the diversity of calculative agencies forms and distributions”, as Callon (1998b, p. 51) puts it.

Thirdly, the emergence of particular calculative agencies is considered the result of a process of configuration, or framing. As Callon (2005, p. 4) puts it: for action “to be attributed to a particular agency, it has to be framed”. This was the point that Callon made (1998b, p. 22) when he – discussing the existence of a particular form of agency, *homo economicus*, postulated by economic theory – famously proclaimed:

Yes, *homo economicus* does exist, but is not an a-historical reality; he does not describe the hidden nature of the human being. He is the result of a process of configuration...

Hence, this view sees the existence of particular agencies as a result of the establishment of particular *frames*, which produce these agencies. The remainder of this chapter focuses on the character of such frames and the framing processes that constitute them.

2.2.2 Economic frames: On the character of the frames that produce calculative agencies

Callon (1998c) drew on Goffman’s (1974) work about frame analysis and social performances when he introduced the notion of frame. According to Goffman, Callon (*ibid.*, p. 249) notes, a “frame establishes a boundary with-

in which interactions – the significance and content of which are self-evident to the protagonists – take place more or less independently of their surrounding contexts”. For Goffman (1974), a frame could be seen as setting the rules for how a particular social situation should be enacted; it orders the situation by establishing the meaning of what is going on and then structures the different participants’ activities according to this understanding. Hence, Goffman imagined that when people act in social situations, they do not act so much as they perform according to a frame for what is appropriate behaviour in the situation. That is, according to Goffman, when people present themselves to each other, “they present not so much themselves but a self, a persona, a mask” (Mol 2002, p. 34).

Callon’s contribution to Goffman’s work is, as Christensen and Skærbæk (2007, p. 106) point out, “the idea that the framing process does not just depend on the [human] actors themselves, but also that it is rooted in various physical and organisational devices”. To illustrate this understanding of the concept of frame, Callon (1998c) uses the example of a theatre performance, an example which Goffman often used himself. “The theatrical frame” (see Goffman 1974, p. 123), Callon (*ibid.*) argues, depends on series of both social and material arrangements. There is, he writes (p. 249), “a whole series of material means [that] are used to demarcate the theatrical space and the actions that take place within it: the building itself; its internal architecture; the bell, the dimmed lights and rising of the curtain to indicate the start of the performance.” In addition, there are also other arrangements that contribute to frame this situation, such as the carefully written drama, the long hours of rehearsals that the actors have gone through, and the audience’s previous experiences of attending a theatre performance (p. 252). Taken together, these socio-material arrangements demarcate a specific situation (the theatre performance), specify the relevant agencies in this situation (in particular, ‘the actors’ and ‘the audience’), and provide a script for how these agencies should enact the situation (the roles that the actors should play, the acceptable ways in which the audience should behave). Hence, in contrast with Goffman (1974), who imagined that frames reside in people’s minds, frames are here considered to be held by socio-material arrangements.¹²

More generally, we can define a frame as a distinct and delimited socio-material arrangement that circumscribes a particular situation and provides a script for how this situation should be enacted. A frame thus demarcates a situation, specifies the relevant agencies and objects in this situation, and defines how these should enact this situation, i.e. what they are and how they should behave. Different frames may produce different forms of behaviour.¹³ Depending on how they have been framed, agencies can be “deliberative, have adaptive behaviour, reflexive competencies, calculative or non-calculative capacity or disinterested or selfish subjectivity, whether collective or individual” (Caliskan and Callon 2010, p. 10). In this thesis, I focus in particular on what I call *economic frames*. An economic frame is any frame that produces particular forms of economic, or calculative, behaviour. That is, an economic frame defines a situation as economic and produces “a distinction between ‘things’ to be valued and the ‘agencies’ capable of valuing them” (Caliskan and Callon 2010, p. 5) such as to allow the performance of economic calculations, in one form or another. The focus in this thesis is on the constitution of economic frames and on the calculative practices that these frames produce.

A couple of further comments can be made about the nature of frames that are relevant to this thesis. Firstly, there is no analytical distinction made between the sizes of different frames. That is, frames can be as large as entire markets, or as small as a single agency in a specific situation, such as ‘a CEO at an investor meeting’. This is akin to the longstanding ANT argument that, other than size, there is no principal difference between macro-actors and micro-actors (see Callon and Latour 1981). As Caliskan and Callon (2010, p. 10) note, “an appropriately arranged firm can act as a single entity: it is neither simpler nor more complicated than a single human being”. It follows from this principle that the size of any frame is an empirical matter, which cannot be defined a priori (see section 3.1.2 for a discussion of how particular frames can be identified).

Furthermore, it follows from this definition that any frame might contain, or consist of, other frames. A “market frame”, for instance, may contain a series of different frames that contribute to structure the precise script for how a market transaction should take place (see Callon 2005, p. 7). Caliskan and Callon (2010, p. 22), for instance, talk about at least three

different “types of framing”, which make up the broader market frame. There could also be several different frames within an organisation, each circumscribing a particular situation and producing a script for this situation. There could be, for instance, a specific frame for an organisational unit, such as a factory, which circumscribes this situation so that the action within this frame takes place more or less independently of the surrounding context. Each frame is, however, as Callon (1998c, p. 249) notes, never completely independent of the “outside world”, e.g. the action within this unit also takes place within the broader organisational frame.¹⁴

Finally, the scripts provided by these frames are rarely unambiguous, like the one provided by a carefully written drama, which closely delimits the range of possible interactions. Rather, these scripts could more often be described as multivalent, which means that they stipulate a range of possible actions and metrics of value. This is, in part, a consequence of the connections between different frames, as discussed above, and, in part, of the multiple agencies that are involved in the framing processes. Thus, a frame may produce different agencies, some of which “can be likened to macro-actors capable of strategies, of instrumentalisation,” while others “are reduced to points, sometimes to bodies, condemned to repetition, to automatic behaviours”, as Callon (2005, p. 4) notes. Therefore, it is rare that frames will have a self-fulfilling character (see Callon 2007), which happens only if all the agencies has been reduced to automatic behaviours; more often, frames can be enacted in a (more or less limited) range of possible ways.

In sum, we see a frame here as a delimited socio-material arrangement which demarcates a specific situation and produces the script for how the relevant agencies should enact this situation. Different types of frames are possible depending on how the socio-material arrangements constituting a frame have been configured.¹⁵ Thus, the central question in this view is not so much what types of frames there could be, but how particular frames are configured and brought into being.

2.2.3 On framing processes: Frames are constituted through distributed investments made by multiple agencies

This section discusses the character of the processes (to be called framing processes) through which particular frames are brought into being. These framing processes have two central characteristics: they involve a series of socio-material investments and they are collective, involving the investments made by dispersed agencies over time.

The constitution of a frame is the result of a series of socio-material investments

The emergence of an economic frame results from the distributed investments made by different agencies in order to (re-)configure the socio-material arrangements constituting the frame. There is, as Callon and Law (2005, p. 4) conclude, “nothing natural about [calculation]”; nor, they continue, is there “anything natural about the absence of [calculation]”, but the focus should be on the investments which are made in order to configure arrangements that either allow calculation or make it impossible. The constitution of such arrangements is costly. To make something calculative, in one form or another, involves substantial investments, as Callon and Law (*ibid.*) note:

No doubt there are many different spatial and temporal versions of [calculation]. Common to them all, however, is that they take effort. Supermarkets, legal systems, and pocket calculators don't grow on trees. They take time and money to organize. Time, money and effort.

A useful starting point for considering the range of the investments involved in constituting a particular frame is the classic study by Garcia-Parpet (2007 [1986]) of the re-framing of the strawberry market in Fontaines-en-Sologne, which was so influential for Callon when he first formulated his approach to economic sociology (see Callon 1998b; MacKenzie et al. 2007). In particular, Garcia-Parpet (2007 [1986]) follows the transformation of the strawberry market from a rural market – where the transaction took place through dispersed personal interactions between buyers and

sellers – to new form of market that closely resembled the perfect markets envisioned by microeconomic theory.¹⁶ Garcia-Parpet (*ibid.*) finds that the re-framing of this market from a ‘rural frame’ to a ‘perfect market frame’ involved a series of investments. Firstly, it included the building of a new warehouse, so that the previously uncoordinated transactions between buyers and sellers, engaging in inter-personal relationships, could take place in one place and at the same time. The specific architectural design of this warehouse also contributed to frame the behaviour of ‘the buyers’ and ‘the sellers’. In particular, the warehouse was designed so that the buyers and the sellers could not see each other during the auctions; the first floor was for the sellers and the second floor for the buyers. The buyers and the sellers, however, could still see the batches of strawberries being sold and the electronic board where the prices were displayed. Thus, this warehouse contributed to frame ‘the buyers’ and ‘the sellers’ as independent, calculative agencies, whose role was to perform economic calculations, rather than engaging in inter-personal relationships. Secondly, a range of other technical and material devices also contributed to frame this situation. These included the new devices used to measure the quantity and quality of the strawberry batches, the electronic board to register the prices, and the specific bidding-algorithm that was used during the auctions. Thirdly, Garcia-Parpet also traces the substantial efforts made by different agencies in order to bring this particular market into being. Garcia-Parpet highlights in particular the role a young counselor at the Regional Chamber of Agriculture played. Far from being able to construct this market by himself, this counselor, being well versed in economic theory, still played a central role by educating other agencies about their role in this market.

This case study illustrates the range of the different investments involved in the constitution of a particular frame. In general, the investments made during framing processes come in two different forms: The first is in the form of the addition of new elements to the socio-material arrangements constituting the frame, such as the introduction of new measurement devices in the strawberry story, or the subtraction of elements from these arrangements, such as a company replacing a CEO or ceasing to use an incentive system. The second form is through the modification of the existing elements of the socio-material arrangements constituting the frame.

Muniesa et al. (2007, p. 5), for instance, draw our attention to how material and technical devices are “tinkered with, adjusted and calibrated”. Both these forms of investments contribute to re-configure the socio-material arrangements framing a situation.

More generally, each of these forms of investment are attempts to inscribe particular scripts into the socio-material arrangements framing a situation, thus attempting change the script provided by the frame (see Akrich and Latour 1992; Kjellberg 2001). Akrich and Latour (1992, p. 259) discuss the example of the heavy weights that are sometimes attached to hotel keys as an example of the process of inscription. The script that the hotels wanted their clients to follow is: “do not forget to bring the keys to the front desk”. This script had been inscribed into the keys through the heavy weights, in order to force the clients remember to enact this situation in a specific way and to bring back the keys to the front desk. As Kjellberg (2001) notes, the concept of inscription also applies to elements which are generally considered to be social. “Upbringing, socialization and education are,” he writes (*ibid.*, p. 467), “examples of explicit attempts to inscribe frames that are generally thought of as ‘exclusively human’”. Yet, while it could be useful for presentational purposes to distinguish between social and material investments, the view of this thesis is that it is impossible to separate the effects of social and material investments, as these are mutually constitutive. Therefore, in the context of this thesis, I view all investments as a form of socio-material ordering.

In sum, the constitution of any frame depends on investments through which particular scripts are inscribed into the socio-material arrangements framing a situation. The script which a frame provides is nothing else (no more, no less) than the sum of the different scripts which the framing process has inscribed into the socio-material arrangements constituting the frame. This is one reason why frames could be multivalent, since different scripts may have been inscribed into the socio-material arrangements through the investments made by various agencies during a framing process.

On the central role of calculative devices in configuring calculative agencies

This thesis awards particular attention to the investments that particular agencies have made in the addition, subtraction, or modification of, what I will call *calculative devices*. Calculative devices play a central role in the constitution of calculative agencies and the performance of economic valuations. Callon (1998b), for instance, points out “the existence of calculative agencies correlates closely with that of accounting tools”. However, to be open to the variety of material and technical devices that may participate in configuring calculative agencies and performing economic calculations in practice, this thesis uses the concept of calculative devices, rather than accounting tools. Compared to similar notions such as accounting tools (see Callon 1998b) or accounting devices (see Skærbæk and Tryggestad 2010), an advantage of the concept of calculative devices is that it frees us from the connotations of the word accounting, which has been so effectively inscribed into us during our education. Hence, the use of this concept could help to free the researcher from having a priori definitions about what type of devices will participate in performing economic valuations in practice.

The concept of calculative devices, as it is used here, draws on the concept of “market devices” suggested by Callon et al. (2007; see also Muniesa et al. 2007). Muniesa et al. (2007, p. 2) define market devices as “the material and discursive assemblages that intervene in the construction of markets”. The notion of market devices has been studied in relation to various technical and material devices such as the stock ticker (Preda 2006), supermarkets (Cochoy 2007), credit scoring (Poon 2007), and health economics (Sjögren and Helgesson 2007), which have all played a central role in the configuration of specific ‘market frames’ and ‘market agencies’. This thesis follows this idea in that it focuses on the central and active role of various material and technical devices in the constitution of particular agencies. However, since this thesis is concerned with broader processes of valuation than only valuations that are performed in markets, I will use the notion of calculative devices instead of market devices. A calculative device is any technical or material device which intervenes in the constitution of calculative agencies, in whatever form that these may take.

The concept of calculative devices, as it is used in this thesis, also draws on Callon and Muniesa's (2005) broad definition of calculation. Callon and Muniesa (*ibid.*) define markets as "calculative collective devices", which made certain forms of calculation possible. This, in turn, built on a broad definition of calculation, which they saw as involving three different steps. Firstly, for calculation to be possible there needs to be a calculative space, i.e. a single space to which the entities to be calculated could be moved (either literally or by delegation). Then, these entities had to be arranged and ordered within this space, so that, finally, a specific result could be extracted (such as a sum, an ordered list, or a conclusion). This result should be able to leave the calculative space without taking the whole calculative apparatus with it. Such calculative spaces, Callon and Muniesa (*ibid.*) conclude, should be conceived of in a broad sense: "an invoice, a grid, a factory, a trading screen, a trading room, a spreadsheet, a clearing house, a computer memory, a shopping cart – all these spaces can be analysed as calculative spaces, but all will provide different forms of calculation" (*ibid.*, p. 1231). Hence, a calculative device could be seen as any device that participates in shaping and formatting the calculative capacities of particular agencies by providing a calculative space that enables particular forms of calculations.

Notably, calculative devices are also the result of framing, i.e. the configuration of particular socio-material arrangements. As Poon (2009, p. 659) notes, in relation to market devices, these are "by no means technologically determined, that is to say, they do not exist prior to their own implementation in actual practice". The crucial point is thus not the technical properties of different material and technical devices, or what type of operations that these have been designed for, but rather how these are enacted in practice. Hence, calculative devices are also, like calculative agencies, framed. It follows that calculative devices could take on different shapes and forms in practice. An important part of the analysis is to identify the different calculative devices involved in a particular situation.

The collective and historically contingent character of framing processes

Another central characteristic of these framing processes is that they are collective, involving investments made by different agencies. Thus, rather than foregrounding the actions of any particular agency, this conceptual approach could be seen to draw our attention to multiplicity of different agencies involved in the constitution of particular frames. As Caliskan and Callon (2010) observe, it is part of the analysis to draw up an inventory of all the different agencies involved in the framing process. Thus, this view emphasises the collective nature of such framing processes; each such process may be best described as being “multi-linear”, rather than linear (see Muniesa et al. 2007).

In this it is perhaps possible to identify a difference between two conceptual approaches reviewed above, the research streams building on the work of Foucault and traditional ANT, and the conceptual approach suggested here. In particular, the approach suggested here offers a different conceptual vocabulary that could lead away from the focus on centredness in previous studies and more towards a focus on *de-centredness* (see Law 2002). Law (2008, p. 151), for instance, concludes that the conceptual vocabulary adopted here entailed “a vital metaphorical and explanatory shift” in relation to the traditional ANT work, which Law (*ibid.*, p. 146) called for “actor-network theory 1990”. As a result, Law (*ibid.*, p. 151) continues, the concepts of construction and translation “will no longer serve”. It is no longer necessary to identify any prime mover, such as the fact-builders or the network-constructors, and to take this as the focal point of the analysis; “we are no longer dealing with construction, social or otherwise: there is no stable prime-mover, social or individual, to construct anything, no builder, no puppeteer”, he writes (*ibid.*). Thus, there is a shift here from a focus on construction, and the constructors, to the question of how particular arrangements emerge. Law’s (*ibid.*) comments on the strawberry story recounted above (see Gracia-Parpet 2007 [1986]) are illustrative of this shift. The explanation of this story provided by this new conceptual approach, he writes, focuses is not so much on construction, but rather on the emergence of particular arrangements: here “buyers, sellers, notice boards, strawberries, spatial arrangements, economic theories, and rules of conduct,

all these assemble and together enact a set of practices that make a more or less precarious reality” (ibid.). Therefore, rather than construction, the conceptual approach adopted here could best be described as “an ethnography of socio-material [arrangements]” (Callon 2005, p. 4). The ambition can be said to be to describe the de-centred processes through which particular arrangements assemble and enact particular realities.

In addition to being collective, these framing processes are also historically contingent. That is, the configuration of the socio-material arrangements constituting a frame depends not only on the investments that present agencies make, but also on the investments that past agencies have made. As Muniesa et al. (2007, p. 4) note, “‘being economic’ is a path-dependent feature, which implies that the economy is always an issue whose formulation partly depends on (but is not fully determined by) previous events and trajectories”. One example of this historically contingent nature of framing processes is the MacKenzie and Millo (2003) study on the incorporation of the Black-Scholes formula at the Chicago Board Options Exchange in the 1970s. In particular, MacKenzie and Millo (ibid.) find that once this formula had been incorporated into the informational infrastructure in this market, it also came to structure the subsequent framing processes. A similar example is in Poon’s (2009) study of the U.S. credit market. Poon (ibid.) finds that the establishment of certain devices for credit scoring in the 1970s became the starting point for a series subsequent investments, which eventually resulted in a change from a “risk screening” to a “risk management”, leading up to the ‘sub-prime crisis’. Callon (2007) refers to this historically contingent character of framing processes as a case of socio-material lock-in or path dependency, which depends on the investments that agencies have made both in technical arrangements and in configuring organisational arrangements. Thus, in this approach, it is part of the analysis to trace the historical investments that have contributed to a particular frame and to treat these investments not just as background to present events but as part of the conditions that frame a particular situation.

Finally, it follows from this historically contingent nature of framing processes that particular frames may become (temporarily) durable. That is, they may influence subsequent framing processes. The durability of any

frame depends on the investments that agencies have made over time in constituting this frame. The more investments that have been made in the constitution of a particular frame, the more robust will this frame be. Here, it is perhaps possible to identify another difference between the two conceptual approaches reviewed above, building on the work of Foucault and the traditional ANT, versus the conceptual approach I adopt here. In particular, one can say that the approach suggested here allows for an explanation that, using Law's (2002) terminology, takes place in 'larger blocs', both in time and space, compared to the explanations that the traditional ANT approach provides. That is, rather than focusing on the situated construction of new objects, such as scientific facts (see Latour and Woolgar 1979) or new accounting models (see Chua 1995), this conceptual approach takes the existence of certain entities, such as markets and organisations (see Caliskan and Callon 2010) as a starting point and focuses on how these arrangements are re-configured.¹⁷ Yet, these explanations still remain "smaller" (Law 2002, p. 62) than the epochal and societal explanations often suggested by a Foucauldian-perspective (see Foucault 1972; 1977; Burchell et al. 1991). The explanation that I provide here remains attentive to the contingent, dynamic, and sometimes surprising nature of organisational practice.

Indeed, the historically contingent nature of framing processes does not mean that, although a particular frame exists, it will necessarily remain durable. Rather, the durability of any frame also requires maintenance. As Poon (2009, p. 657) notes, each frame should be understood as being "perpetually under construction, controversy and maintenance". Frames may be changing over time, which is also an illustration of their multivalent character; "What seemed to be verified because it was actualized at a particular point in time and a particular place is 'de-realised' when circumstances change, that is, when other sociotechnical [arrangements] are established for a variety of reasons", as Callon (2007, p. 336) writes. Thus, the focus in this conceptual approach is to describe the collective and historically contingent processes through which frames evolve and change over time.

2.2.4 Concluding comments on the conceptual framework: On frames and formal organisations

The preceding sections have outlined a conceptual vocabulary for studying the question of how things become valuable. However, since this conceptual vocabulary relates to valuations performed in markets, and since this thesis deals with valuations performed in formal organisations, some comments about the relations between the valuations performed in markets and in organisations are relevant. To begin with, this study does not see any principal differences between valuations performed in markets and other valuations. This follows from the position that underlies this conceptual approach (see section 3.1.1.). Caliskan and Callon (2010), for instance, argue that this approach focuses not so much on what counts as economic behaviour, but rather how particular forms of economic behaviour are brought into being. Hence, rather than trying to define different forms of “the economy”, the focus should be on “the processes through which behaviours, organizations, institutions, and, more generally, objects are constituted as being ‘economic’”. Similarly, Vollmer et al. (2009), in their call for a conjoint research programme between accounting research and economic sociology, called the sociology of valuation, note that whether “valuations are arrived at by organisational decision-making or by reiterating transactions on markets”, they need not “draw on fundamentally different institutional or technical support”. The difference between markets and organisations is thus an empirical rather than an analytical matter.

Nevertheless, the observable existence of formal organisations may raise certain questions (see Czarniawska and Hernes 2005), much like the observable existence of markets raises certain questions (see Caliskan and Callon 2010). One question that may become more important in an organisational setting is the question of control; for organisations have to hold together, in a way that markets perhaps do not, in one way or another (see Law 1994). The technological turn in economic sociology has not directly addressed the question of control. However, this literature has discussed the question of the emergence of asymmetries between different ‘market agencies’. A central question has been, as Callon (1998b, p. 45) put it: “why are certain calculative agencies able to impose the events, actions, and rela-

tions that other calculative agencies have to take into account in making their decision?” For Callon (*ibid.*), the answer to this question primarily depends on the power of the calculative devices that each agency is equipped with:

The calculative power of an agency depends on that of its calculative tools. These are characterized above all by the number and variety of relations and agencies which they are able to take into account. [...] The more an agency is able to complicate and broaden the network of entities and relations to be taken into account, the greater the capacity to create asymmetries between itself and other agencies. (Callon 1998b, p. 45)

Thus, agencies with a greater calculative power are able to impose their modes of calculating value on other agencies:

Inequalities derive from the unequal power of calculating agencies that loop back to reinforce themselves. Due to these asymmetries, the most powerful agencies are able to impose their valuations on others and strongly impact on the distribution of value. (Caliskan and Callon 2010, p. 13)

To illustrate this point, Callon and Muniesa (2005) use the example of a supermarket, in which, they argue, consumers are never alone in performing economic calculations and making decisions about things such as whether to buy a detergent and which brand of detergent to buy. In contrast, they argue that ‘the consumer’ in this situation “is distributed and makes assessments that invoke references, brands and all sorts of preformatted and precalculated information supplied by the supermarket and its arrangements” (*ibid.*, p. 1238). Thus, the calculative devices supplied by the supermarket frame the calculative capacities of the consumer; “by walking down the supermarket aisles, inspecting shelves and reading labels, consumers continue a calculation that was started and framed by qualified professionals” (*ibid.*, p. 1239). The consumers are in a weak position compared with “the calculative power of supply”, which include an armada of professionals armed with computers, statistics, management models, and other forms of calculative devices (*ibid.*, p. 1238). Thus, Callon and Muniesa

(ibid.) argue, the supermarket can impose its modes of valuation on the consumers.

However, this conceptual approach is also attentive to the fact that such relations may be changing rapidly. Callon and Muniesa (2005) also emphasise that consumers can reverse the relationship of power vis-à-vis the supermarket by equipping themselves with new calculative devices such as a budget, a shopping list, or the product ranking in a consumer journal. In addition, this conceptual approach also recognises that there could be different agencies that are powerful at the same time, as they participate in framing the valuations performed (see Caliskan and Callon 2010).

Building on such observations, this thesis takes one further step towards extending this conceptual vocabulary, not only in principle but also in research practice, to the study of valuations performed in formal organisations. In doing so, this study also extends the recent studies in the accounting and organisational literature that have begun to use certain concepts drawn from this line of work for analysing particular organisational phenomena (see Miller and O’Leary 2007; Roberts and Jones 2009; Woolgar et al. 2009; Skærbæk and Tryggestad 2010; Cushen 2013; Vinnari and Skærbæk 2014). In relation to these studies, this study suggests a broader conceptual framework and focuses specifically on the question of how organisational activities become valuable.

Taken together, building on work in the recent technological turn in economic sociology this thesis has adopted a conceptual framework that is particularly geared for understanding the processes of valuation that are at its heart. The starting point in this conceptual approach is that particular forms of economic behaviour are not natural, but result from the constitution of *economic frames*, which produces *calculative agencies*. This conceptual approach thus directs the attention to the processes through which particular economic frames are established. These processes are historically contingent and involve distributed investments. Of central interest in these processes is the role of various *calculative devices*. This conceptual vocabulary is used herein to characterise the socio-material arrangements that constitute particular frames in each of the three studies presented in this thesis. Before the analysis of these three studies can be presented, however, the

next chapter discusses the methodological considerations involved in the making of this study.

Chapter 3

Methodological considerations

3.1 Assuming a position: Principles for studying how organisational activities become valuable

3.1.1 A study of practices

This study has been guided by a focus on practices. The importance of studying practice has been long acknowledged in the accounting literature (Hopwood 1978; 1983). It has been argued both that accounting should be investigated as a variety of “calculative practices” (Miller 2001), and that accounting should be seen as a verb and studied ‘in action’ (Chua 2007). These calls have reinforced the message that “an understanding of what accounting is and does cannot be detached from the practices which generate it” (Quattrone 2009). In keeping with this tradition, this thesis follows the principles of what MacKenzie (1996, p. 59-61) calls “ethnoaccountancy”; that is, the aim is to study how accounting is practiced:

Just as ethnobotany is the study of the way societies classify plants, a study that should not be structured by our perceptions of the validity of their classifications, ethnoaccountancy should be the study of how people do their financial reckoning, irrespective of our perceptions of the adequacy of that reckoning and of the occupational labels attached to those involved.

For MacKenzie (1996), ethnoaccountancy is one aspect of the larger topic that he calls the construction of the economic. He argues that economic phenomena such as profit and markets are “not just ‘there’ – self-sustaining, self-explaining – but exist only to the extent that certain forms of relations between people exists” (p. 61). To understand how the economic is constituted, one must therefore study how economic calculations are performed in practice.

This stance is consistent with Callon’s (2005, p. 5) methodological advice to study economic situations and economic behaviour through “an ethnography of socio-technical [arrangements]”. Such an approach takes its starting point in a pragmatic position, which means that it seeks “to avoid ex-ante explicative principles” and is “attentive to the empirical intricacies of agency” (Muniesa et al. 2007, p. 1). With this view, the qualities of objects, such as organisational activities, are not inherent, but rather continuously generated effects of the arrangements and practices in which the object is located (Law 1992). Realities are thus *enacted* (Callon 2007). Furthermore, this approach insists on maintaining a generalised symmetry between people and things in the analysis.¹⁸ “Action,” Callon (2005, p. 4) writes, “including its reflexive dimension that produces meaning, takes place in hybrid collectives comprising human beings as well as material and technical devices, texts, etc”. Accordingly, as discussed in chapter two, an overarching interest is to trace the socio-material arrangements that frame a particular situation (see Hardie and MacKenzie 2007), and the processes through which these arrangements are (re-)configured (see Caliskan and Callon 2010).

The present study adopts this view of realities as enacted through socio-material practices and seeks to investigate how economic valuations are performed in practice. However, since the thesis concerns events that occurred over long time periods, it has been practically impossible to undertake a full-fledged ethnographic study.¹⁹ Hence, this study follows the spirit, rather than the letter, of the Callon’s (2005) ethnographic ambition.²⁰ Arguably, Callon’s (ibid.) advice to undertake an ethnography of the socio-material arrangements was ever only intended to be taken as an analytical guide, rather than a firm prescription for how studies should be conducted. Caliskan and Callon (2010, p. 2), for instance, explicitly note that a socio-

material approach is “appropriate for both contemporary cases and those remote in time and space”.²¹ Indeed, many studies within this research tradition have investigated historical phenomena using retrospective interviews or archival data (see MacKenzie and Millo 2003; Preda 2007; Kjellberg 2007; Poon 2009). Thus, this study follows the general principles of this research tradition.

A focus on socio-material practices also chimes well with recent developments in accounting research. Chua (2007), for instance, notes that the recent calls to study accounting in practice differ from a traditional ethnomethodological research agenda in that more attention is paid to the various material devices that participate in enacting organisational phenomena and to phenomena that span different sites and situations:

Some could argue that the above agenda looks remarkably similar to the calls for greater interpretive research in accounting in the 1980s when there was some interest in symbolic interactionism, ethnomethodology and the work of writers such as Goffman and Garfinkel. Indeed, it could be pointed out that the concept of ‘script’ was offered as means of linking ‘macro’ and ‘micro’ levels of analysis... [...] Clearly, a concern with situated practice will require an investigation of how specific interpretive frames/rules/scripts influence practical, meaningful action. But recent developments in the social sciences has also encouraged us to look at how machines and other ‘actants’ may play an active role in the shaping of human action. There is also greater awareness that the kinds of ‘actor-networks’ or ‘action nets’ that should be studied are simultaneously ‘larger’ and ‘smaller’ than the types of micro-interactions studied earlier. They are larger in the sense that action or actor nets could cover linkages that span many actors (both human and non-human) and span large physical distances. They are ‘smaller’ in that detail will need to be paid to all manner of texts produced by machines – from mobile phones to large mainframes. (ibid., p. 492)

In sum, this thesis follows the principles of what MacKenzie (1996) calls ethnoaccountancy by investigating how organisational activities become valuable in practice. Given these starting points, the next question that arises is how to become ‘a good observer’ and how to provide ‘a good account’. In particular, I have wrestled with the question of how to observe and analyse frames and framing processes, given the methodological and

analytical importance of taking practices seriously. This concern also relates to longstanding debates about the role of theory and the role of the researcher in qualitative case study research.

3.1.2 On becoming a 'good observer' and making a 'good account'

It is well-known that traditional theories and research methods tend to emphasise generalisation, and to prescribe a separation between the researcher and that which is being researched.²² Thus, theories are separated from and elevated above the empirical data, which only serves to potentially disprove a generalised theory.²³ In this view, a researcher becomes a good observer by using legitimate, rigorous methods that separate the researcher from the investigated objects (see Latour 1987, 1991 on this point). It is by being independent from the empirical phenomenon that the researcher can uncover the patterns of an underlying reality. Mol notes (2002), for instance, that this was Goffman's (1990[1959]; 1974) stance in his famous analysis of frames and social performances; "Goffman had his scholarly distance to rely on when he studied performance, a distance that made him aware of the curtains" (Mol 2002, p. 37). However, Mol continues, this position quickly becomes untenable if we are serious about taking practices seriously.

Indeed, the notions of independent researchers and independent theories are problematic from the perspective adopted here, according to which social theories (Callon 1998a) and research methods (Law 2004) are considered to participate in the production of realities (see also Latour and Woolgar 1979; Hacking 1983; Quattrone 2004b on this point). When attending to practices, one must recognise that both theories and research methods are part of constituting the practices that are observed, as Law and Urry (2005, p. 402) note:

Heisenberg wrote about a version of this problem in physics: 'what we observe is not nature itself, but nature expressed through our method of questioning.' There is little difference between physics and social science here: theories and methods are protocols for modes of questioning or interacting which also produces realities as they interact with other kinds of interactions. This means that

we are not saying that reality is arbitrary. The argument is neither relativist nor realist. Instead, it is that the real is performed in thoroughly non-arbitrary ways, in dense and extended sets of relations. It is produced with considerable effort, and it is much easier to produce some realities than other. In sum, what we are saying is that the world as we know it in social science is both real and produced.

Given this recognition of their potentially constitutive role, Law (2004) argues that the conventional understanding of the role of theories and methods is problematic. While not arguing for the complete abandonment of theories and methods, Law (2004, p. 9) notes that several aspects need to be re-thought:

My aim is thus to broaden method, to subvert it, but also to remake it. [...] I want to move from the moralist idea that if only you do methods properly you will lead a healthy research life – the idea that you will discover specific truths about which all reasonable people can at least temporarily agree. I want to divest it of what I will call ‘singularity’: the idea that there are definite and limited sets of processes, single sets of processes, to be discovered if only you lead a healthy research life. [...] To do this we will need to unmake many of our methodological habits, including: the desire for certainty, the expectation that we can usually arrive at more or less stable conclusions about the way things are; the belief that as social scientists we have special insights that allow us to see further than others into certain parts of social reality; and the expectations of generality that are wrapped up in what is often called ‘universalism’.

To capture the complexity of practice, we cannot rely on objective, general theories to provide us with ostensive definitions and categorisations. Nor can we become good observers by using theories and methods that will make us independent and distant from the practices that are studied. To take a practical example from this study: if frames are practical achievements, and we want to maintain their variability and multiplicity, then we cannot rely on any ostensive definition of ‘a frame’ to provide generalised criteria and precise definitions of specific frames. But if we cannot rely on these traditional ideas about how to observe and analyse the phenomena that we are studying, how is it possible to become a good observer of the frames and framing processes that are in the focus of this study? I propose a three-part answer to this question:

A first methodological tactic is to take agencies and their definitions seriously. This entails listing and exploring references to different devices and metrics of value, as well as justifications, arguments, and their ‘because’s since these things are all potentially indicative of the script for a given situation. This tactic is close to Caliskan and Callon’s (2010) methodological advice to draw up an inventory of the socio-material arrangements in each case. Caliskan and Callon (*ibid.*, p. 8) note that the notion of socio-material agencements (here, socio-material arrangements) is “a methodological term designed to respect and render the diversity...[which] demands that a panoply of entities be flexibly taken into account and described, in detail, whether they are human beings or material and textual elements”. I have followed this methodological tactic in so far as that I have attempted to follow the various agencies in particular situations and to provide as full of a description as possible of the socio-material arrangements constituting these situations.²⁴ This also means that the punctalisations that are made by participant agencies will be reflected in the empirical account; in any reality there are things that are foregrounded while others are taken for granted (Law 1992).

However, precisely because of the attentiveness to practices, this methodological tactic is not enough to capture all the issues at stake in the present study. A second methodological tactic is therefore to be attentive to frictions, conflicts and negotiations. These things are important because frames are perpetually under construction and controversy, and clashes and transgressions can make diverging agendas and scripts visible. This is similar to Callon’s (1998c) advice to study “hot situations,” in which a particular issue or a particular frame is being debated. It is by being attentive to such frictions that we can begin to see the conflicts between different agencies and frames, and the efforts made in order to establish particular frames. Such frictions might indicate the boundaries of a frame, or that the frame is changing.

A third methodological tactic is to look at contrasts over time and in space. Rather than defining a priori what agencies, activities, objects and values are and why they change, this can be investigated by looking at the changes in practice. This is the solution suggested by Mol (2002) after she concluded that Goffman’s position – that the researcher is a good observer

because he/she is standing outside the practice that he/she observes – was untenable. Drawing on Butler (1990), Mol (2002, p. 38) concludes that it is rather because things are different that it is possible to become a good observer:

Because doing a woman is not the same thing in a supermarket as in a classroom, because staging a man in bed is quite different from staging a man at a professional meeting, it is possible to investigate what it is to perform this, that, or the other gender. Instead of distance, now, here, it is contrast that makes it possible to be a good observer.

In a similar vein Callon (2007), drawing on Mol (2002), suggests that the enactment of realities varies from one practice to another, from one socio-material arrangement to another. In the context of the present study, where the starting point is that frames are temporary and situated achievements, it is to be expected that frames and framing processes will differ over time and space. This study has been designed to enable temporal and spatial comparisons between the three cases. Thus, here, as in Mol (2002), it is contrast rather than distance that makes it possible to be a good observer.

Taken together, these three methodological tactics have guided the analytical work in this thesis. Having thus clarified the main principles that have guided this study, the following section describes the practices of collecting and analysing the empirical material. In line with the chosen approach, this is not done to demonstrate that the researcher has collected enough empirical material to fully represent every empirical aspect in the case organisation. Rather, the purpose is to describe how the researcher's explanation of the events described in this thesis emerged, and to discuss the methodological considerations involved in the making of this account.

3.2 The practice of the study: Collection and analysis of the empirical material

3.2.1 The practice of collecting empirical material: On interviews, documents, and observations

This thesis builds on an extensive set of empirical material, collected using a variety of sources. To be able to study the valuations of organisational activities across time and space, I have used past and present interviews, documents, and observations. In total this thesis builds on 70 interviews; documents including more than 1700 pages of newspaper articles, more than 1000 analyst reports, and a wide array of internal documents; and observations made during seven weeks on site in the company. The main part of this empirical material (apart from the past interviews) was collected between the spring of 2008 and the spring of 2010, with some complementary information being collected afterwards. Of the 70 interviews that the analysis in this thesis partly builds on, the researcher personally conducted 31, including the interviews conducted in 2008 and 2009 in the product development and production studies. Regarding the other interviews, the researcher was given access to interview reports or detailed transcripts. The practices of collecting the empirical material are discussed in this section and the practices of analysing this material are discussed in the following section.

It should be noted from the outset that the aim of this thesis has not been to study the entirety of the events in this large, complex case organisation. Rather, I have investigated events that are pertinent to the research issues in three different, localised settings. That is, I have analysed the valuations performed in these settings and traced how the socio-material arrangements framing these particular setting were (re-)configured. Accordingly, this thesis consists of three different studies, within the same case company, each following valuations of certain organisational activities: corporate strategy, product development, and production. It should also be noted that while the empirical material was collected specifically for each of the three sub-studies in the thesis, there were also important connection

points between these studies. The material collected for a specific study could thus help to explain events in the other studies. Hence, while these studies are described separately below (in the order in which they are presented in this thesis), this division is somewhat arbitrary since some material applies equally to more than one of the studies.

Collecting the empirical material in the study of valuations of corporate strategies

To investigate the valuations of corporate strategies, I conducted a longitudinal case-study of how decisions about corporate activities and strategies were publicly calculated, discussed, justified and valued between the early-1990s and the end of the first decade in the 2000s. The empirical material is based on an extensive collection of documents, reports, and other public material related to discussions and decisions about corporate strategies in Sandvik.

First, I collected public documents from the case company, such as annual reports and company presentations. Second, I collected the newspaper articles written about the case company in local and international business press during the studied period. These articles included interviews with corporate managers, investors, and analysts discussing particular corporate activities and strategies and explaining how certain decisions had been made, or should be made. They also included more general commentaries and analyses about the case company and the business environment. These articles were collected using the Factiva and Affärsdata databases.²⁵ Taken together, the studied newspaper articles amounted to more than 1700 Word-pages. Third, I collected analyst reports written about the case company between 1990 and 2009. These reports were included in the study since analysts and investors were frequently mentioned as important agencies in this situation. In total, more than 1000 analyst reports were collected and reviewed in the study. These reports were collected using the Thompson Investext research database. While this database is not exhaustive, it includes a broad range of both local and international analyst firms and investment banks. These reports included both quantitative and qualitative valuations of the company and its activities. The majority of the identified

reports in the database were issued after 1998, and there were virtually no reports prior to 1990 in this database.

The decision was made that this study should be based only on public documents, although there were interviews and internal documents available that could have provided more information about the developments in the later stages of this period. This decision was made to ensure analytical comparability throughout the study. Thus, the analysis focused on what was said and done when it happened. It can be said that I have followed what Skærbæk and Tryggestad (2010) calls for “document trails”.

The starting point of this study was chosen for practical reasons. Originally, I intended the study to begin in the mid-1980s, following the introduction of a new corporate strategy in 1984, as described in the beginning of chapter four, which seemed to be a good starting point. However, since there were, as mentioned, virtually no analyst reports available prior to 1990, the decision was made to use 1990 as a starting point. Furthermore, the end point in this study was chosen to be the year-end of 2009. This choice was also made for reasons of coherence: since the other two studies focused on events taking place up to the end of 2009, this point was selected as the end point also for this study.

Collecting the empirical material in the study of valuations of product development activities

In contrast with the study of corporate strategy, which was entirely based on documents, the study of product development activities was primarily based on interviews. To investigate how product development activities become valuable, I followed the valuations made in a Product Development Department in the case company during the course of two product development projects, called Alpha and Beta. The empirical account is primarily based on 11 semi-structured interviews with project managers, project group members, and members of the steering committee in these two product development projects. Specifically, the interviews included the first and the second project manager (the second project manager replaced the first during the project), the two lead engineers, the product management manager, and a project group member responsible for the production process in Alpha. They also included the project manager and the product

management manager in Beta as well as three steering committee members for both Alpha and Beta (they shared the same steering committee). In addition, this chapter also builds on 3 interviews with members of the group business control unit in Sandvik, including the head of group business control and the person responsible for the new steering model. Furthermore, the chapter also builds on interviews with managers and controllers in the Production Department in the business area in which the Product Development Department was located. Of the interviews conducted in the Production Department – the details of which are presented in the following section about the production study – there were in particular five interviews that partly concerned issues related to the relationship between production and product development, the Alpha and Beta projects, and/or the investment practices in the production department, which came to be important in this case. Finally, the description of the changes in the company in the mid-2000s is also informed by 1 interview with the group controller in 2002 and 1 interview with the company's CFO and the group controller in 2004, the transcripts of which I have been given access to. Specifically, these interviews concerned the structure and practice of management control in the company at those points.²⁶

The interviews in the Product Development Department and the group business control unit were conducted between May and December 2009 (except one interview in the group business control unit that was conducted in 2008). The interviews lasted between 70 minutes and four hours, with an average of approximately 100 minutes. All interviews but one were tape-recorded and subsequently transcribed by the researcher. Notes were taken during the interview that was not tape recorded, and these were written up in detail afterwards. In the interviews, the guiding principles of good conduct in case study research was being followed (see Scapens 1990). The academic purpose of the research was explained to the interviewees, to avoid becoming identified with managerial interests or consulting work, and it was explained to the interviewees that they would remain anonymous. It was also explained to them that if there were any sensitive issues they could ask the researcher to turn off the recording. In general, I attempted to build an atmosphere of trust and respect during the interviews. This included at times mentioning sensitive information obtained during previous interviews

to demonstrate to the interviewee that the interviewer had been deemed a trustworthy person by other organisational members. Care was also taken in these interviews not to introduce theoretical concepts that could lead the interviewees into preconceived patterns of explanation. Instead, while guiding them to areas of theoretical interest, I attempted to encourage the interviewees to provide their own descriptions and explanations. This was done with the aim of providing emergent insights and rich accounts (see Ahrens and Dent 1998). All interviews included general questions about the interviewees' experience of product development and/or management control. Here, the interviewees were routinely asked to provide concrete examples and justifications for their answers to these questions, which proved a useful way to bring forth key issues of concern. In addition to general questions about management and control, most of the interviews focused specifically on the Alpha and Beta projects. The interviewees were asked to reconstruct the events of these projects. Both open-ended questions, such as "what happened?" and "how did it happen?", and specific questions that focused on the involvement of particular calculative devices, such as project budgets and project time plans, were posed.

Whilst interviews were the primary source of data, the empirical material also builds on documents, observations and informal conversations. As part of the broader study in the case company, and as will be described in the following section, I made extensive observations in a production unit and in a controlling unit in the Production Department in the business area in which the Product Development Department was located. More directly related to this study, I observed a testing session of one of the products (Alpha) in focus in this study in the Product Development Department's testing facility, and I also was given a detailed tour of the production of one of these products (Alpha) in one of the three production units involved in its production. These observations provided me with a better understanding of the everyday practices in the Product Development Department and helped me to get a grip on the technical complexities involved in the development work. Detailed field notes were kept during these observations. These observations also provided ample opportunities for informal conversations with the managers, engineers and controllers about both mundane and philosophical aspects of their work. Many informal conversations also

occurred before or after each interview, as the interviewees often treated the interviewer to lunch or coffee. During these informal conversations it was possible to get more details or context about certain issues.

Finally, I have gained access to numerous internal documents during the study, such as presentations, policy documents and accounting and management manuals and reports. During the time when I was embedded in the controlling unit in the Production Department, I was giving full access to the company's intranet, which included documents such as the business area's the management manual and the product development manual. In addition, all interviews took place at the interviewees' own offices, which provided the opportunity to review and discuss reports and presentations pertaining specifically to the Alpha and Beta projects and the topics of the discussion. It frequently happened that the interviewees brought out certain documents, presentations, or reports to illustrate some issue that was being discussed. A systematic and extensive analysis of external and internal documents related to corporate strategy and management control has also been carried out as part of the broader study in the case company.

Collecting the empirical material in the study of valuations of production activities

The study of the changing valuations of production activities in a production unit in the case company builds primarily on interviews collected at different points, but also on observations and documents. This production unit produced tools for industrial metal cutting, and it is therefore referred to here as the Tool Production Unit. This study started with that I was doing interviews and observations in the Tool Production Unit in 2008 and 2009. However, I soon realised that in order to be able to examine the valuations performed in this production unit I needed to trace the developments of the socio-material arrangements framing this situation over time. Fortunately, this was possible since there were a couple of previous academic studies that had been conducted in the same production unit, and which I had been given access to. In particular, a first study was conducted in the Tool Production Unit in 1994, as reported in Lind (1996; 2001). This study included interviews covering the re-organisation of this production

unit in the 1980s, as well as interviews concerning the management and management accounting practices in the production unit in 1994.²⁷ I was given access to these interview reports. Then, a follow-up study focusing on the management and management accounting practices in the Tool Production Unit was conducted in 2000. I was given access also to the detailed transcripts of these interviews.

Given the access to this unique empirical material, it was possible to conduct a longitudinal study and to trace the changing valuations of production activities in this production unit over time. The mid-1980s, before the re-organisation of the Tool Production Unit in the late 1980s, was taken as a starting point for this study, as it would provide a background to the later developments. Whilst this empirical material did not allow me to study the practices during all the years between the mid-1980s and 2009, it did allow me to study the valuations of production activities performed at certain points: in the mid-1980s, in 1994, in 2000, and in 2008/2009. The choice of these points was pragmatic: it was the years for which there was detailed empirical material.

All the interviews conducted with the managers in the Tool Production Unit at the different points were semi-structured interviews. All these interviews followed the same basic interview protocol (see Lind 1996). This interview protocol focused on the management and management accounting practices in the daily production activities in the Tool Production Unit. It included questions such as: How do you manage your operations? What is important for that the operations should achieve a good result? Which economic reports do you use and how? Which questions do you most often discuss with the operators in the flow groups, and how do you discuss them? How are you evaluated? And, how do you evaluate the performance of others? However, since these interviews were semi-structured, there was also room for other questions. In practice, these interviews often included asking the interviewee to provide an explanation of some issue that had come up in the discussion, or asking them to provide a more detailed description of their daily practices.

Regarding the interviews in 1994, I was given access to 13 interview reports concerning the management and management accounting practice in this production unit in 1994. These interviews included nine flow group

managers, two section managers, the head of the Tool Production Unit, and the head of the production unit in which the Tool Production Unit was located. Furthermore, I was given access to 5 interview reports with former production managers concerning the management and management accounting practices in the Tool Production Unit in the mid-1980s, and to 9 interview reports with flow group managers and senior production managers concerning the re-organisation of the Tool Production Unit in the late-1980s. I was also given access to a series of documents pertaining to the re-organisation of the Tool Production Unit in the 1980s. These documents included strategy and accounting reports, such as the Production Strategy Report from 1984 and the Report on a new Incentive System for the Flow Group Organisation from 1987. My analysis of the re-organisation of the Tool Production Unit in the 1980s also builds on the description of the changes in the production practice in Lind (1996) and Lind (2001), which built on extensive observations. This empirical material enabled me to analyse the re-framing of the Tool Production Unit in the mid-1980s. However, while the interview protocols from 1994 were written up in detail, these interviews were not tape recorded and transcribed, in contrast to the interviews conducted in 2000 and 2008/2009. I therefore decided to primarily focus the analysis in this chapter on the practices in 2000 and 2008/2009. The interviews concerning the management practices in the Tool Production Unit in 1994 were still included in the analysis, but more as a background to the later events.

Regarding the interviews in the year 2000, I was given access to 10 interview transcripts. As before, these interviews concerned the management and management accounting practices in the Tool Production Unit, and they included eight flow group managers, one section manager, and the head of the Tool Production Unit. As mentioned, these interviews had been carefully and comprehensively transcribed. These interviews also followed the same basic interview protocol as described above. However, the interviews also often diverged into detailed descriptions of production practices, or longer explanations of practical problems concerning how to evaluate and manage certain production activities.

The study of the events taken place in 2008/2009 included interviews and observations conducted between the spring of 2008 and the spring of

2009. The main part of these interviews and observations were conducted in the autumn of 2008, during which the researcher spent a considerable amount of time embedded in the controlling unit in the Production Department in the business area in which this production unit was located, and in the controlling unit in the Tool Production Unit, which were located conjointly. In total, the researcher spent 33 full working days in site in this part of the organisation, spread out over a period of eight months. The majority of these observations occurred between September and November 2008, while the last observation occurred in April 2009. During this time the researcher was given a desk in the open office landscape that was the home of the controlling unit, an access card with access to the factory, and a computer with full access to the company's intranet. While this was no participant observation, the researcher was eating lunch and having coffee breaks with the members of the controlling unit daily, and the researcher also participated in certain meetings in the controlling unit (in particular in relation to the target setting and budgeting process). Notes were taken continuously during these days on site in the company. As part of these observations, the researcher was also given several formal and informal tours of the production processes in the production unit. Importantly, these observations also included two full days of observations on the factory floor in two of the flow groups in the Tool Production Unit. These observations were conducted between seven o'clock in the morning and about six o'clock in the evening both days. During this time the researcher was talking to operators and managers, being guided around the production process in the flow groups, participating in meetings, and observing the daily practices. The focus of these observations was on the daily production and management practices in the Tool Production Unit. Detailed field notes were kept throughout these observations.

During this period, I also conducted a series of interviews concerning the management and management accounting practices in the Tool Production Unit. As before, most of these interviews were conducted in the autumn of 2008, in October and November, with the first interview being conducted in May 2008 and the last interview in May 2009. As described above, a good scholarly conduct for case study research was being followed in these interviews (see Scapens 1990). Steps were taken to ensure an at-

mosphere of trust and respect, including emphasising the academic purpose of these interviews, explaining to the interviewees that they would remain anonymous and that they could ask the researcher to turn off the recording if some sensitive issue was being discussed. In regards to the management and management accounting practice in the Tool Production Unit, 11 semi-structured interviews were conducted with five flow group managers, two section managers, the head of the Tool Production Unit, and three controllers in the Tool Production Unit. The interviews lasted between one hour and two hours. All interviews except three were tape recorded and subsequently transcribed by the researcher. Detail notes were taken during the interviews that were not tape-recorded. These interviews used the same basic interview protocol as before. However, care was taken to also encourage the interviewees to provide longer descriptions and to reason about their daily practice. For example, the researcher would routinely ask the interviewees to provide examples from the last couple of days, or last couple of weeks, instead of making generalised statements. In addition, the researcher would also routinely ask for further explanations of some of the answers given, such as ‘how did that happen?’ or ‘what do you mean by that?’ and so forth. Furthermore, these interviews were complemented by 3 interviews with the head of control in the Production Department in the business area, 1 interview with another controller in the controlling unit in the Production Department, and 1 interview with a senior manager in the Production Department. One of these interviews was tape-recorded and transcribed and detailed notes were taken during the other interviews and written up afterwards. These interviews covered – in addition to talking about control in the Tool Production Unit – issues related to production and control more in general, including topics such as the organisation of management control in the company, the new steering model, the investment analysis, and the relationship between production and product development. These interviews lasted between one hour and three hours.

The formal interviews were also complemented by informal conversations. During the weeks that I was embedded in the controlling unit, there were many occasions for informal conversations regarding topical issues such as the financial crisis or professional issues such as how to accurately conduct a full costing calculation or how to make the production managers

look at other things in the accounting reports than only the production cost variances. In addition, there were many occasions for informal conversations with the operators during the two days that I spent on the factory floor. During this time, I also conducted 1 formal interview with one operator responsible for production planning about the daily production activities in this flow group (lasting about 45 minutes). Detailed notes were taken during this interview. In addition, I had informal conversations with about ten operators in the two flow groups I visited. These conversations concerned things such as what they were doing at the moment, what their daily assignments were, how the machines and the production process worked, and how they made decisions about the production flow. Detailed notes were taken following these conversations. Furthermore, in relation to the interviews with the managers in the Tool Production Unit, I was often having lunch or coffee with the interviewees. These occasions provided many opportunities to talk more about particular issues that either had been covered in the interviews or that came up during the discussions afterwards. Notes were taken also after these meetings.

Finally, this study also included an extensive review of internal documents. As mentioned, during the time that I was on site in the company, I was given full access to the company's intranet. This included things such as the management manual in the company and in the business area, the management accounting manual, internal presentations and training material, internal communication in the form of newsletters, comments and reports and so on.

Some comments on the research process

To follow Law's (2004) methodological advice that we should be reflexive about our research methods, some comments on the character of the research process are in order. One important characteristic is that the topic of the thesis evolved gradually, as often seems to be the case in empirical-oriented case study research (see Preston 1986). That is, the decision to study the three settings in the chosen case company, and to study them in way in which they were studied, was not made before the study started. It is more accurate to say that the precise design of the research project evolved as a consequence of an early commitment to follow practice, and as a result

of the continuous iteration between the empirical material and theoretical concepts. Thus, this thesis did not start with a predetermined research question and then proceeded in a straight line from data collection to the presentation of findings. My research process was rougher and more process-driven, with continuous adjustments being made in the search for new empirical material and new theories that could provide an explanation to the phenomena being studied (see Law 2004).

The research project can therefore be characterised as an abductive process (see Alvesson and Sköldbberg 2008). Rather than focusing on the empirical testing of hypotheses derived from existing theories (deduction) or starting from empirical observations with the aim of generating generalisable theories (induction), I have followed a process that starts from the empirical material but does not deny the role of prior theoretical knowledge in the search for plausible and interesting explanations (see Lukka and Modell 2010). An abductive process involves the successive alternation between theory and empirical observations, in a process where both are reinterpreted in relation to each other. Lukka and Modell (*ibid.*, p. 467) note that while both abductive and inductive reasoning starts from empirical observations there is a difference in that “whilst induction is characterised by a kind of semi-automatic generation of theoretical generalisations from data, abduction relies on the skilful development of theoretical explanations with the help of everything that is known empirically and theoretically about the issue being examined”. It is in this way that this study has evolved: through the continuous going back and forth back between various theoretical and empirical observations in order to provide a plausible and interesting explanation.

Specifically, I entered the study with two broad objectives: to study the practices of managerial accounting in the everyday life in an organisation, and to study the connections between the organisation and its surrounding environments. In particular, I intended to study the connections between the organisation and the financial market, and between the organisation and its customers. These objectives played an important role in the selection of the case organisation. Sandvik was a large, listed, high-tech, manufacturing company, which made it an interesting organisation to study. Sandvik was

also a pragmatically appropriate choice, as it was possible to negotiate good access through established contacts.

As described above, the first empirical study focused on the management accounting practices in the company in general, and the use of management accounting in the Tool Production Unit in particular (chapter six). This work was then followed, with some overlaps, by the study of product development practices (chapter five) and the study of corporate strategy (chapter four). This sequence of studied case settings emerged through my engagement with the empirical material. Being attentive to the empirical material, it became increasingly clear that there were other, more interesting, research issues than my original research ideas. In particular, I became aware that the central question was perhaps not how particular forms of accounting, such as the new steering model, affected the evaluation and organisation of activities, but how organisational activities were calculated and valued in the first place. Furthermore, my iteration of empirical observations and different theories also indicated that I needed to study longer and broader processes. Thus, I began to trace developments in the different studies backwards in time. This effort was partly driven by the growing theoretical interest in what can be called for the construction of value, and the theoretical interest in the (re-)configuration of economic frames. It was also driven by empirical observations that encouraged me to study the developments over longer periods, and to study these developments not just as a passive background or context. For instance, in one interview with a controller a few weeks into what became the production study, the interviewee insisted that I needed to take a more historical view on the new steering model: “[the new steering model] is not that interesting in itself. What you should look at is the broader trend, all the changes that has been made in the company over in the last five years or so. Because that is interesting”. The study developed by taking such empirical observations seriously as I deemed that these past developments “made a difference” to the things I observed in the contemporary organisation (see Lukka 2014, p. 560).

As the empirical material developed, so did the conceptual vocabulary. Indeed, I have exhausted quite a few theoretical concepts in the process of going back and forth between the empirical material and theory in order to

provide a plausible explanation. In the initial stages of the study, I had a fairly broad conception of theory, both in terms of domain theory and method theory (see Lukka and Vinnari 2014). I reviewed the literature on accounting and shareholder value as my domain theory, but I was also reading social studies of accounting research more broadly. Concurrently, I mainly tried to work with the industrial network approach to interorganisational relations as my method theory (Håkansson 1982; Håkansson and Snehota 1995; Håkansson et al. 2010). However, I also pursued other theoretical interests. For example, in the first year of the thesis project, I wrote a detailed report about actor-network theory and actor-network theory-inspired accounting research, so I was also familiar with this line of work. Subsequently, as the study progressed, I confronted the empirical material with several different theoretical concepts. I revisited actor-network theory when my research interest had shifted more towards the construction of value.²⁸ However, I found that it did not help to explain the particular phenomena I was interested in, in all the different settings that I was studying. I also attempted to work with the institutional version of the sociology of translation suggested by Czarniawska (see Czarniawska and Joerges 1996), before reading Callon (1998a; 2007) and finding a conceptual vocabulary that seemed to fit the empirical material and the research interests. The specific theoretical vocabulary used in this thesis has also been revised in many drafts as a result of the continuous process of going back and forth between the empirical material and the literature.

While the research process described above does not readily conform to recommendations regarding structure and sequence in many conventional methodological textbooks, I believe that the abductive character of the research process has opened up for the systematic evaluation of alternative approaches and explanations of the phenomena under study. As Law (2004, p. 10) argues, methods need to be “slow and uncertain”, and they need to be risky and require a lot of “time and effort”, in order to be attentive to the pluralities of practice and to allow for plausible and interesting explanations to emerge, rather than “simply giving over to mechanical replacement”. I believe that I can claim with some certainty that this research process has been “slow and uncertain” and required a lot of “time and effort”. But I also believe that the study has benefitted from it. The explana-

tions provided in this thesis and the openness to practice would not have been possible if I had I chosen to stick with one theory and a predetermined research design throughout this research process.

3.2.2 Analysing the empirical material: On coding, critical episodes, and choreography

As discussed, this thesis has followed an abductive process. Thus, the analysis of the empirical material started during the data collection and continued thereafter. The empirical material was analysed on two levels: within each study and across the three studies. This involved analysing each study on a case by case basis, and then combining the analysis at an aggregate level. Each study was analysed using various overlapping and iterative modes of analysis (see Ahrens and Dent 1998). In particular, the analysis can be said to have followed four main steps:

First, the empirical material – the interview transcripts, the field notes, and the various documents – were organised chronologically. This was done to be able to trace the developments of the events in each study over time. This step involved closely reading and re-reading the empirical material. It also involved identifying recurring themes from the empirical material that could guide the continued data collection and analysis. Questions such as who did what, with whom, when, how, why and with what were asked of the empirical material. From these recurring themes, specific empirical concepts were identified, and these were sorted into different categories.

A second step was to identify a series of critical episodes in each case that were related to the general analytical interest and the research issues (see Miles and Huberman 1994). These critical episodes were identified using several methods. One primary characteristic of a critical episode was high data intensity, as evidenced by the efforts made by various agencies to discuss a particular event or topic. In practice, this was done both through a careful reading of the empirical material and by keyword searches. For example, in the corporate strategy study the starting point was the list of ‘major events during the year’ in the annual reports. This was complemented by the systematic analysis of the topics discussed in the newspaper articles and

the analyst reports. Keyword searches based on the central empirical concepts in each episode were also conducted. In the case of the corporate strategy study, these key words included things such as ‘growth’, ‘overcapitalisation’, and ‘financial gearing’. This was done partly to follow Silverman’s (2007) recommendation to look for sequences rather than instances and to investigate “what precedes and follows any gobbet of data” (*ibid.*, p. 146). These keyword searches contributed to establish the boundaries of each episode, and to highlight the relationships between different episodes over time. Another primary characteristic of these critical episodes was that they involved concrete decisions about the value of particular organisational activities. For example, in the product development study the empirical account was organised around a series of episodes where decisions were made about concrete issues such as whether to proceed with a specific design or to make investments in production machinery. This focus was partly a methodological tool for mitigating some of the potential limitations of a largely retrospective study, since such key events may live longer and more clearly in people’s memory. Furthermore, it was also a methodological tool for foregrounding situations where there might be conflicting versions of the value of organisational activities, in line with the research interest in the co-presence of multiple calculative devices and with the methodological tactic described above to be attentive to frictions and conflicts in order to identify the boundaries of particular frames.²⁹

In a third step, the central themes and empirical concepts identified for each of these critical episodes were related to themes and concepts from other episodes. Lists were compiled for each episode and these were compared and contrasted with the lists for other episodes, both in the same study and in the other studies. The purpose was to look for similarities and variations of the phenomenon being studied across the various studies. These observations were also related to the analytical concepts from the conceptual framework. This was, as described above, an iterative process and the precise conceptual vocabulary emerged gradually as a result of the continuous going back and forth between empirical material and theoretical concepts. As this practice evolved, I became particularly attentive to the point made by Caliskan and Callon (2010) that there may be many different agencies involved in these processes, and to the point made by Callon et al.

(2007) that different and sometimes surprising devices could play an active role.

Finally, in a fourth step, the empirical material was choreographed to present the case analysis. Thus, the empirical chapters were structured according to the analysis conducted during the preceding steps. Notably, while theoretical concepts have been used throughout the thesis to characterise the empirical events, I have refrained from including more detailed theoretical discussions in these chapters. Since the theoretical interest in this book concerns issues common to all the three studies, I have instead saved these discussions to chapter seven. This choice was made in the interest of avoiding simultaneously repeating myself and fragmenting the argument.

This presentation is a simplification of the analytical process. In practice, the analysis was continuously ongoing during the research process and these four steps were overlapping and interrelated. As Coffey and Atkinson (1996, p. 6) note, analysis should not be seen as “the last phase of the research process”, but rather as something that is done continuously as the researcher generates and works with the empirical material, as well as when the researcher is reading and writing. Coffey and Atkinson (*ibid.*) also point out that coding is only one part of the analytical process, and that even a precisely defined coding procedure cannot replace poor analytical work. This is in line with Law’s (2004) comment that we need to understand research methods more broadly than simply as matter of clearly defined coding procedures. Thus, the analytical work in this thesis has been iterative and ongoing throughout the research process, until the final version of the thesis was written up.

An important part of the analytical work has been the practices of writing and presenting parts of this thesis in various settings. Writing has been a central part of the analytical process; both writing directly on this thesis and writing papers or practitioner-oriented articles on different parts of the empirical material together with various colleagues. These texts have also received comments from research colleagues, such as the supervising committee and in various conferences. These practices of writing and presenting have been important to help me identify the central issues and the relationship between the theoretical concepts and the empirical material in

the thesis. It is largely through these practices that the analytical steps presented above have been performed in practice.

Finally, two questions that I have given particular attention to in writing up this thesis are the questions of anonymity and of business sensitive information. Regarding the question of anonymity, I have changed several names, such as the names of the product development projects Alpha and Beta, to preserve anonymity. The only persons whose names I use are well-known from public documents. I have also refrained from making detailed descriptions at times. Regarding the question of business sensitive information, I have carefully considered what information to include in this thesis. While it has passed at least five years since the events described in this thesis, I have still tried to avoid using information that could be sensitive. For instance, I have refrained from using internal numbers that could be potentially sensitive. I have also refrained from writing out the details of certain organisational processes and opted not to include certain events in the analysis. I have made these choices based on indications from conversations with organisational members. As a principle, information that has been made publicly available has been considered to be less sensitive. It should be noted that the empirical chapters have been read and approved by the case company. I do not believe that these considerations have had a significant impact on the analysis.

In sum, this chapter has described how the empirical material was collected and analysed. The resultant analysis is presented in the following three chapters, beginning with chapter four that presents the analysis of the corporate strategy study. Notably, this chapter also serves as a background to the other studies. This chapter is then followed by the analyses of the product development study and the production study.

Chapter 4

From a profit frame to a value creation frame: The changing valuations of corporate strategies

This chapter follows the changing valuations of corporate strategies over a period of nearly 20 years. The chapter begins in the early 1990s, when there was a well-established economic frame for how corporate activities and strategies should be valued. I call this ‘the profit frame’, since profit was the main metric of value and the chapter discuss the enactment in practice of this economic frame in the early 1990s. In the remainder of this chapter, we follow the slow process through which a new frame, which I call ‘the value creation frame’, emerged. I locate this change in the re-configuration of the broader socio-material arrangements in which the company was operating and the investments by different agencies in order to change the modes of valuation. We then consider how the precise script for how this new frame was enacted changed over time. This chapter consists of six main parts: It begins by charting briefly the history of the case company until the end of the 1980s. It then follows the changing valuations of corporate strategies in five phases, called: ‘The early 1990s – enacting the profit frame’; ‘The late 1990s – towards a value creation frame’; ‘The first decade of the 2000s – enacting the value creation frame, part 1’; ‘The first decade of the 2000s – enacting the value creation frame, part 2’; and ‘Epilogue: changing valuations in the wake of the financial crisis’.

4.1 Sandvik, a brief history³⁰

Sandvik was founded by Göran Fredrik Göransson in the mid-nineteenth century following a successful technical innovation. Göransson was the first person in the world to use the Bessemer method for steel production on an industrial scale (see Hedebrant et al. 1987). The company was dedicated to international expansion from the beginning and has since successfully expanded into different businesses and markets around the world.

Sandvik's growth has largely been attributed to the continuous development of new products (see Fagerfjäll 2012). For example, in the 1860s, the company developed drill steel for rock drilling, in the 1920s it started to manufacture stainless steel products, and in the 1940s, the first cemented-carbide tools for automated metal cutting were produced (ibid.). In the beginning of the 1990s, when our story begins, the company was organised into seven business areas; in addition to the production of steel and stainless steel products, the company now also produced tools for rock drilling, tools for industrial metal cutting, hand-held saws and tools, and larger steel conveyor belts and process systems.³¹

Sandvik's rapid growth had also been the result of a dedicated focus on international expansion, which had been a strategic focus from the beginning of the company. In the 1960s and 1970s, in particular, the company made substantial investments to expand into new geographical areas, and subsidiaries were set up all over the world (Hedebrant et al. 1987). Sandvik became a multinational company, with a particularly strong presence in Western Europe. In 1990, more than 90 percent of the company's sales came from outside Sweden (Annual Report 1990).

Whereas the 1960s and 1970s were largely successful, with a strong sales growth and the expansion into new markets, the early 1980s was a dramatic period for the company. Sandvik's profits started to fall in 1980 as the business climate weakened. The problems accelerated in 1981, which saw a substantial decline in sales. The problems were also enhanced by poor performance in several recently acquired companies (Hedebrant et al. 1987). To stem the tide, the management conducted substantial cutbacks. Yet, the problems continued the following year, which resulted in further cutbacks and the divestment of several business units in order to reduce

costs (*ibid.*). These measures contributed to the company's ability to avoid reporting a loss in the income statement in 1982.³²

However, the problems continued in 1983, with reports of falling sales and increasing costs. At this point, Sandvik also announced that the company had lost 200 million SEK on a failed currency speculation (Hedebrant et al. 1987). This prompted one of the company's owners, the Swedish construction company Skånska Cementgjuteriet AB (Skanska), to make an attempt to wrest the control of the company from the current main owner, Kinnevik AB. Skanska engineered 'a dawn raid' that gave the company control over Sandvik in the fall of 1983 (see Barnevik 2011).³³ However, the profit continued to fall and the company reported a substantial loss in 1983. It was the first time in 62 years, and only the second time in the company's history, with red figures in the income statement (Fagerfjäll 2012).³⁴ As a consequence, several production plants and business units were closed and certain assets, such as the company's long-term power plant holdings, were "sold to rescue the cash flow".³⁵

Following Skanska's take-over in the fall of 1983, a new management team replaced the predecessor team. Percy Barnevik was appointed as the chairman of the board and Per-Olof Eriksson was installed as the new CEO. The strategic review that had been started by the previous management in response to the financial problems was continued and a new business strategy was implemented. Sandvik's highly centralised management structure was now considered to have been the root of the company's problems (Lind 1996), and the management introduced a new decentralised organisation that gave business areas increased autonomy. The stated purpose of this re-organisation was to break up the old chain of command and give the individual business areas more responsibility over their own activities and financial results (*ibid.*). In particular, the new structure aimed to achieve a "reduced bureaucracy and shorter decision-making paths" and an "increased awareness of results and costs at all levels [of the organisation]" (Fagerfjäll 2012, p. 209).

There was thus a shift in the strategic direction. The previous focus on growth and international expansion was supplanted by an intense focus on cost savings and efficiency. Profit was now to be increased by cost cutting, rationalisations, and productivity improvements (Hedebrant et al. 1987).

The management also adopted a restricted approach to investments and acquisitions, as it was determined to avoid the costly mistakes with failed acquisitions from the 1970s (Fagerfjäll 2012). Hence, the focus was on reducing costs, rather than growing sales. Indeed, during the first four years under the new management team, the sales did not increase (taking inflation into account) and the company did not make any substantial acquisitions (ibid.). Yet, the focus on cost cutting resulted in substantially reduced costs and improved profit margins, which returned to the pre-crisis level.

Towards the end of the 1980s, however, the sales increased rapidly again following a general upswing in the economy. The company reported record profits both in 1988 and in 1989. Given the restrained investment policy, the company was amassing cash during these profitable years, and it entered the 1990s with a strong balance sheet. At year-end 1989, the company had cash holdings of more than five billion SEK – equivalent to 25 percent of the total assets – and an equity-to-assets ratio of almost 50 percent (Annual Report 1989).³⁶

In the remainder of this chapter, we will follow how the valuations of corporate strategies changed over time. Notably, this chapter concerns the valuations both of the company's financial strategy – how the company's balance sheet should be structured – and the company's business strategy – how and in what businesses the company should compete. The story begins in the beginning of the 1990s, when there was a well-established frame for how corporate activities and strategies should be valued.

4.2 The early 1990s: Enacting the profit frame

The existence of the profit frame meant that corporate activities and strategies were valued in terms of whether they contributed to increase the company's profit, as reported in the income statement. Usually, it was the pre-tax profit that was used, i.e. the profit after financial income and expenses but before tax.³⁷ This did not mean that profit was not the only performance measure used in the early 1990s. Sandvik's annual report (1990), for instance, included measures such as operating profit margin, return on investment, return on equity, and earnings per share. However, profit was the most important metric of value in practice. The importance of the profit

was illustrated, for example, when the company's chairman, Percy Barnevik, presented the company's five-year strategic plan in 1990, a plan that entailed an intensified focus on efficiency improvements and rationalisations. This plan was valuable, he explained, because it was expected "to result in a total increase in the profit level of one billion [SEK]" by the end of 1995 (Veckans Affärer 5 Sep 1990). Thus, there was a clear script for how corporate activities and strategies should be valued: activities that contributed to increase the company's profit should be pursued, whereas those that did not should be abandoned. In the following sections, we see how this economic frame was enacted in practice in the early 1990s.

4.2.1 Making profit a central metric of value

Several longstanding arrangements had contributed to make profit a central metric of value in the early 1990s. In the case of Sandvik, these included the investments made in order to increase the "awareness of results and costs at all levels [of the organisation]" after the financial crisis and the strategic change in the early 1980s (Fagerfjäll 2012). These investments had resulted in profit becoming "the absolutely most important measure" in the company in the end of the 1980s (Sjöholm 1994, p. 104).³⁸ However, other arrangements had also contributed to making profit important. The financial accounting arrangements, for instance, produced a clear distinction between companies that made a profit and those that did not. This distinction had also been inscribed into the legal arrangements, which declared that the purpose of companies was to make a profit, and which prohibited companies from taking excessively large losses (and still remaining a company) (see 3 kap. 3 § and 25 kap. 13 § Aktiebolagslagen 2005:551). Hence, the concept of profit had long been established, as Quattrone and Hopper (2005) note, drawing on Law (1994), as a powerful normative "bottom line", which made a clear distinction between activities that were valuable and those that were not.

Importantly, profit was also a central metric of value in the financial market in the early 1990s. In the financial market, companies were primarily valued using two calculative devices – Earnings Per Share (EPS) and the Price/Earnings-ratio (P/E) – which were both based on the company's

profit level.³⁹ EPS, for example, was calculated by dividing the company's expected profit for the coming year (or the next couple of years) with the total number of outstanding shares. This was typically seen as a measure of the value that the company was creating for its shareholders. Similarly, the P/E-ratio was calculated by dividing the company's share price with its expected profit (per share) for the coming year (or next couple of years).⁴⁰ The evaluative principle was that if the P/E-ratio was low compared to a selected peer group, then the company might be undervalued (and vice versa). A report by Carnegie (1 Jul 1994), for instance, concluded that "Sandvik appears to be excellent value" as the company "trades on a P/E-ratio of 7.4 times 1996 profits", which was "a discount of 18 percent relative to the market" and "a 6 percent discount relative the Swedish engineering sector". Thus, these calculative devices directly linked the company's profit level to its value in the financial market.

Given these calculative practices, the financial market largely focused on the near-term development of the company's profit level, and activities that the financial market expected to affect the company's profit level were highlighted in the analyst reports.⁴¹ A report by Credit Suisse First Boston (22 August 1990), for instance, argued that the fact that a large part of the steel production was located in a high cost country such as Sweden could "influence the result negatively", if the management could not improve the productivity. Likewise, a report by Morgan Stanley (10 June 1991) concluded that the potential resolution of the "the pricing war" between Sandvik and Atlas Copco in the Rock Tools Business Area could add as much as "10-15 percent to EPS over the next three years". In sum, several arrangements contributed to enact profit as the central metric of value both in the company and in the financial market in the early 1990s.

4.2.2 Cash is king: The value of a strong balance sheet

One example of how this profit frame affected the valuations of corporate activities in the beginning of the 1990s is the case of the company's balance sheet. As mentioned, Sandvik had entered the 1990s with a 'strong balance sheet', as characterised by large cash holdings and a high equity-to-assets ratio. In the coming years, the company's balance sheet would come to be

in the centre of several debates about what strategies the company should pursue, but in the beginning of the 1990s, both the company and the financial market valued the strong balance sheet highly.

In particular, there were two reasons for this ascription of value. Firstly, the company's strong balance sheet was valuable because the large cash holdings generated a financial income, as cash was invested in money markets, which directly contributed to increase the company's pre-tax profit in the income statement. This was the main reason, as Per-Olof Eriksson explained, why the management had decided to keep the cash in the company in the end of the 1980s, rather than using it for acquisitions:

This is a mature industry, with an average growth rate of 1-2 % per year. Therefore you couldn't pay the fantasy prices that were required in the late 1980s. For us it was a better business to place our excess liquidity in the money markets, which at least gave us 13-14 % in interest. (Per-Olof Eriksson in *Veckans Affärer* 18 Mars 1992)⁴²

The value of this financial income increased further as the business climate started to weaken in the autumn of 1990, and the company's operating profits started to fall. As a consequence, the financial income came to make an even more "significant contribution to the company's profit" (*Barclays* 22 Aug 1990).⁴³ Thus, the large cash holdings became increasingly valuable. As a report by James Capel & Co (28 Nov 1990) concluded:

The value of a strong balance sheet is epitomized in these 9 months figures from Sandvik since, as mentioned before, it is the interest income which has saved the pre-tax profit from a more dramatic fall.

Secondly, a strong balance sheet was also valuable because it shielded the company's operating activities from the distraction of financial concerns. Strong balance sheets protected operating managers from having to make short-term decisions to rescue the cash flow. Instead, they could focus on improving the company's market position, and thus also its profit. The thrust of this argument was, for instance, expressed in an editorial in *Dagens Industri* (14 Nov 1989):

Companies with high solidity such as Avesta, SKF, Volvo, Saab and Sandvik have better possibilities to weather a downturn in the business climate. A high solidity provides a company with room to maneuver in a crisis.

Per-Olof Eriksson used a similar argument in the Annual Report for 1990, when he predicted that the coming years would see a “dramatic drying up of liquidity”, with the result that “the old saying ‘cash is king’ will come into its own”. Hence, the company needed to keep its cash reserves to be able to focus on its operations. In sum, the company’s strong balance sheet was valuable in the beginning of the 1990s because it, directly and indirectly, contributed to increase the company’s profit. In the following years, however, the value of the balance sheet, and in particular the large cash holdings, was increasingly questioned.

4.2.3 A contested strategy: The problem of having too much cash

In contrast with many other companies, Sandvik continued to report profits in the income statement during the severe economic downturn in Europe in the early 1990s. As a result, the company’s balance sheet became even stronger: the cash holdings remained around five billion SEK and the equity-to-assets ratio climbed to 60 percent at the end of 1993 (see exhibit 4.1 below).

Exhibit 4.1. Sandvik's balance sheet as of 31 Dec 1993.

Amounts in SEK million	1993	1992
ASSETS		
CURRENT ASSETS		
Cash and bank balances.....	1,049	909
Short-term placements..... Note 9	4,122	3,955
Customer bills and acceptances.....	683	599
Trade account receivables.....	3,914	3,453
Prepaid expenses and accrued income	322	354
Other current receivables.....	961	790
Inventories	5,724	5,774
	<u>16,775</u>	<u>15,834</u>
FIXED ASSETS		
Shares and participations Note 10	83	336
Equity interest in associated companies.....	607	558
Long-term receivables..... Note 11	157	174
Goodwill and other intangible assets..... Note 12	323	344
Construction in progress.....	157	200
Machinery and equipment..... Note 13	4,219	4,057
Buildings..... Note 13	2,806	2,507
	<u>8,352</u>	<u>8,176</u>
TOTAL ASSETS.....	25,127	24,010
Assets pledged..... Note 14	1,646	1,654

Sandvik's contested balance sheet as of 31 Dec 1993, with five billion SEK in cash holdings, corresponding to 20 percent of the total assets.

As the balance sheet grew stronger, there were growing calls for the management to do more with its cash pile. In particular, it was argued that the management should use the large cash holdings for larger acquisitions, which would immediately increase the company's sales and profits. An analysis in *Veckans Affärer* (5 Jun 1991) argued, for instance, that:

With 5 billion in cash reserves and the possibility to borrow another 10 billion, the pressure on the management increases. The profits are declining and the previously successful Sandvik has found it difficult to grow by itself. Now the company must expand by acquisitions. [...] It is only through acquisitions that Sandvik can grow in the short run and strengthen its market positions further.

Acquisitions were valuable in the financial market because they would directly improve the company's market value. In particular, financial com-

mentators repeatedly argued that the company's market valuation meant that there was "an expectation of substantially higher profits in the future", which meant that acquisitions were necessary in order to defend this market valuation (Dagens industri 1 Oct 1993).

At this point, the management was also increasingly seeing acquisitions as a complement to the company's rationalisation strategy. Percy Barnevik, for instance, declared that it was time to "exploit the capital" and acquire market shares, now that the prices were lower in the wake of the economic downturn (Dagens industri 22 Aug 1992). Per-Olof Eriksson added that company had now both the interest and the fire power to make large acquisitions:

While we had no interest in acquisitions in the 1980s, now is precisely the opposite. We will of course use our cash to buy market shares, now that the prices are right. And we surely have the possibility to borrow another 10 billion, in case we should need it. (Veckans Affärer 18 Mar 1992)

Indeed, the company did make a larger acquisition in 1992 when it acquired the tool manufacturer CTT Tools. However, since this acquisition was primarily financed through the issue of new shares, the company's large cash reserves remained virtually untouched (Dagens industri 19 Nov 1992). Thus, there was still a clear expectation in the financial market that the company was going to make further acquisitions. It was argued that the management needed to "increase the tempo in its expansion efforts" in order to live up to the investors' expectations (Veckans Affärer 24 May 1994). A report by Enskilda Securities (25 Nov 1993), for instance, concluded that:

The company still has a huge cash position and we believe that investors will find this unattractive, since part of the re-valuation of Sandvik was based on the fact that the company was to do exciting deals with its cash position. [...] Increasingly, we believe that the market, instead of valuing the cash position at a premium, will not pay a premium or even require a discount.

The report also noted that the company had "a demanding valuation", as it was trading at "a premium relative to the engineering sector of almost 40

percent (according to the P/E-ratio)". Thus, the report called for the management to make "a more aggressive move" in order to increase the profits and defend the then current market valuation.

These calls grew stronger as interest rates started to fall in 1993, which, coupled with an improving business climate, resulted in financial income becoming a less significant proportion of the pre-tax profit. Hence, the company's strong balance sheet was no longer as valuable as in the beginning of the 1990s, and it increasingly qualified as a problem in the financial market. An editorial in *Dagens Industri* (1 Oct 1993) summarised the general argument:

For years the market has faithfully paid an ever-higher price for the Sandvik share, all in expectation of a large acquisition. In expectation of this acquisition, Sandvik has been allowed to keep a large cash holding of 4.5 billion [SEK]. Cash that generated a large income for the company last year. But now this cash holding is starting to become an imposition. In today's environment with falling interest rates, the yield on this previously so profit-generating asset is decreasing. [...] The investors therefore require that Sandvik acquires complementary businesses to fend off stagnation. Sandvik can, according to estimates, make an acquisition of at least 10 billion without straining its balance sheet too much. In other words, the company has the means to change its character. [...] 'Of course we are looking at this type of acquisitions', says P-O Eriksson, 'and one thing is certain, if we buy something it will be a very large acquisition because when you enter a new market you need to buy big'. But the market has heard this story before and soon there will be no one left who believes in it. Today, it is almost theft of the shareholders' money to keep 4.5 billion in cash in the company. A more professional action from the board would be to distribute this cash to the shareholders.

We can view these calls as attempts to modify the script provided by the profit frame and to re-frame the calculations performed by management. It was in the midst of such opinions that the management presented a new business strategy at the capital markets day in 1994.

4.2.4 A new strategy: Using the cash to increase the growth and the long-term profit

These framing attempts contributed to qualify the company's large cash holdings as a problem that the company had to address. When Percy Barnevik and the company's new CEO, Clas-Åke Hedström, who had replaced Per-Olof Eriksson earlier in the spring, presented the new strategy at the capital markets day in August 1994, they explained that the problem with the company's large cash reserves had been the starting point for the strategic review that management had conducted (Finanstidningen 25 Aug 1994). The rationalisation strategy was no longer valuable, as it would result in an even larger accumulation of cash (SvD 27 Aug 1994). The management had therefore considered three alternative strategic options:

Firstly, they had considered using the cash for (one or several) large acquisitions, as proposed by analysts and investors. However, the management argued that this was a difficult strategy since there was a risk that the European competition authorities and anti-trust regulations would prevent the company from making further acquisitions in its core markets, as its market share was already too high in certain segments (Veckans Affärer 29 Aug 1994a).⁴⁴ This in turn would make acquisitions difficult since, as Barnevik explained, the asking prices had now climbed so high that the price premiums that the company would have to pay "required huge potential synergies" to be justified, which would be difficult to realise outside the company's core markets (Finanstidningen 29 Aug 1994).⁴⁵

Secondly, the management had also considered distributing the excess cash to the shareholders, either through an extra dividend or through an increased pay-out ratio. However, the management noted that the company already had one of the highest dividend pay-out ratios on the stock exchange (Veckans Affärer 29 Aug 1994b), and that it "had concrete plans for what to do with the money" (Clas Åke Hedström in Dagens industri 10 Dec 1994). Thus, they had decided to keep the cash in the company, at least for the time being.

Thirdly, rather than acquisitions or dividends, the management had decided to use the cash to fund an organic growth strategy. In particular, this new strategy entailed an aggressive expansion into Asia and Eastern Europe

(Annual Report 1994). Management argued that with an increased globalisation in the world, these markets were expected to grow more rapidly than the rest of the world in the coming decades. In addition, the strategy also entailed an intensified focus on product development, including investments in research and development as well as programs for reducing the product development throughput time (*ibid.*).

The stated purpose of this new strategy was to achieve “higher profits through more rapid growth” (Annual Report 1994). Thus, this strategy was valuable because it would lead to an increased profit level. According to the Annual Report (1994): “[The new strategy] should be possible to implement without noticeably affecting Sandvik’s favourable earnings. In the long run, this should lead to an even higher and more stable level of earnings.”

In particular, the management had calculated that the new strategy would lead to “a doubling of the sales in a decade” – an increase from 20 to 40 billion SEK (Percy Barnevik in *Veckans Affärer* 29 Aug 1994a). The analysts and investors were going to see the increased profit level they had called for. However, this was clearly a long-term strategy and it would take at least “5-10 years before the big money started to roll in”, as Clas-Åke Hedström noted (*Veckans Affärer* 29 Aug 1994b). In the meantime, the company’s cash holdings were necessary to finance “the complementary acquisitions and the tying up of capital in inventory and accounts receivables and so forth”, which would follow from this strategy (*ibid.*). As a result, the management predicted that the new strategy would reduce the company’s equity-to-assets ratio from 60 to 50 percent (*ibid.*). Thus, the new strategy provided a somewhat different script for how the company should enact the profit frame compared to the acquisition strategy proposed by the external agencies: rather than focusing on the near-term profits, the focus here was on profits in the long term.

The initial reactions in the financial market to this new strategy were largely negative. An editorial in *Affärsvärlden* (14 Sep 1994), for instance, noted that the management “had to brace themselves for the loud complaints from the analysts” that were sure to follow. In particular, the editorial argued that it would take too long time before the new strategy would

make any significant contribution to profit. A report by Enskilda Securities (2 Sep 1994) concluded:

[The new strategy] will be a short-term burden on profits (and possibly the share price), since the investments in the former Eastern Bloc and China are long-term, which cannot be expected to make any significant contribution to profits in the short-term. However, this probably raises the long-term growth rate from 2 %, which has been the historical growth rate, to some 5-6 %. The question is whether the stock market has the ability to evaluate and appreciate this strategy in the short to medium term.

Thus, there were two different versions of the value of the company's new strategy. The question was not so much whether the new strategy should contribute to increase the company's profit, which was taken for granted, but rather how, or more precisely when, it should contribute to increase the profit. The financial market version of the profit frame was, to some extent, different from the organisational version. One reason for this was that the analysts and investors were not equipped to calculate the value of the future profits promised by this new strategy. That is, their calculative capacities were configured differently.⁴⁶

To assuage the analysts and investors, therefore, management also introduced a new financial target in connection with the new strategy. The target was that the company should have an annual growth rate of 6 percent, which corresponded to the ambition of doubling the sales in a decade and which clearly exceeded the growth that the company had achieved in recent years (Veckans Affärer 29 Aug 1994a). This new target represented an attempt to reconfigure the calculative capacities of analysts and investors and enable them to calculate the value of the new strategy. With the introduction of the new strategy, and this new target, the company was qualified as a "high growth company" (Dagens industri 26 Aug 1995).

This new target soon became incorporated in the analysts' calculations, as indicated in the earlier quote from Enskilda Securities (2 Sep 1994), and the company became increasingly qualified as "a company with higher than average growth prospects" also in the financial market (Warburg 27 Dec 1994). Hence, a new script for how to enact the profit frame had now been established, both in the company and in the financial market. This was a

different enactment of the profit frame than in the beginning of the 1990s: rather than rationalisations, the company would now increase profits through growth.

4.3 The mid-1990s: Towards a value creation frame

Although the focus had shifted from rationalisations to growth, we saw in the preceding section how different agencies still primarily valued activities and strategies in terms of whether they contributed to increase the company's profit in the early 1990s. In the following years, however, the socio-material arrangements constituting this economic frame kept changing, and value creation increasingly came to replace profit as the central metric of value. This change was from the beginning driven by the introduction of a series of new calculative devices in the broader calculative landscape in which the company operated, and the associated investments in the concept of shareholder value creation.

4.3.1 The addition of new calculative devices: Shareholder value, value drivers and the cost of capital

The concept of shareholder value creation became important in Sweden in the mid-1990s (see Brodin et al. 2000). From the outset, this concept related closely to the introduction of a series of new calculative devices such as Economic Value Added (EVA), Cash Flow Return on Investment (CFROI), and the Free Cash Flow model (FCF), all of which claimed to measure shareholder value creation accurately (see Myers 1996; Jönsson 2006). These devices were heavily marketed in Sweden by different consultancy firms, and they – EVA in particular – received significant attention in the Swedish media in the mid-1990s.⁴⁷

The main message when EVA was first introduced in Sweden was that investors and managers, using traditional performance measures such as profit and EPS, were “missing the crucial cost of equity capital” (Månadens Affärer 8 Feb 1995). It was argued that equity had a cost, even though this

did not show up on the income statement. Furthermore, it was argued that the cost of equity was higher than the cost of debt, as the shareholders expected compensation for the risk they took. Thus, it was only when “the cost of all the capital that the company is using, including the capital the shareholders have invested” was taken into account that “the result would be accurate” (ibid.). Specifically, EVA was calculated by subtracting the cost of capital, including both debt and equity, from the company’s operating profit (see Stewart 1991):⁴⁸

$$\text{EVA} = (\text{Adjusted}) \text{ Operating Profit} - (\text{Adjusted}) \text{ Capital} * \text{WACC}^{49}$$

Where the WACC (Weighted Average Cost of Capital) was defined as:

$$\text{WACC} = (E/(E+D)) * K_e + (D/(D+E)) * K_d * (1-t)^{50}$$

Thus, a new valuing principle was inscribed into this calculative device: it was not enough simply to make a profit anymore, but the profit now also needed to exceed the cost of capital. According to the EVA calculation, value was created only when the company’s operating profit exceeded the cost of capital.

In the case of Sandvik, EVA became significant in the spring of 1996. The company had reported record profits in 1995 and the balance sheet remained strong, with large cash reserves and a high equity-to-assets ratio. As a consequence, there were still recurring calls for the management to do more with the company’s cash reserves (see *Affärsvärlden* 31 May 1995). These calls were given a new impetus when a ranking list produced by the American consultancy firm Stern-Stewart was published. This ranking list, which received significant attention in the Swedish media, ranked the “value creation” by Swedish companies between 1990 and 1994, in terms of their EVA and Market Value Added (MVA) performance.⁵¹ To general surprise, this ranking list qualified some of the most respected Swedish companies, including Sandvik, as “value destroyers” (see *SvD* 19 Mar 1996). In the case of Sandvik, the ranking list showed that while the company had generated a positive MVA, it had only created a positive EVA in

one of the five years measured – despite the fact that the company had reported a profit each year.

According to the ranking list, the main reason for the company's substandard performance was the strong balance sheet, and the associated high cost of capital. Thus, the EVA calculation qualified the company's financial strategy as non-valuable. Equipped with this new calculative device, it became possible to argue that the company could create more value by distributing the excess cash to the shareholders, and thus reduce its cost of capital. An analysis in *Affärsvärlden* (6 mars 1996), for instance, based on this ranking list, argued that:

In the case of Sandvik the main reason [for the company's poor showing in the Stern-Stewart ranking list] is that the company's capital structure, with a very high equity-to-assets ratio, is only ostensibly prudent. The equity capital is expensive. If Sandvik distributed a substantial proportion of its equity capital, and increased the share of debt capital, the company could lower its cost of capital significantly and thereby create much greater value to its shareholders. [...] According to the calculations that we have had Stern-Stewart perform, Sandvik could increase the EVA by 400 million [SEK] annually by lowering the solidity to 50 percent. Mathematically, Sandvik's MVA would then also increase by five billion [SEK]. Yet, Sandvik would still have far from an aggressive capital structure.

Thus, the introduction of EVA enabled new valuations of the company's balance sheet. The question was no longer whether the balance sheet helped the company to increase its profit, but whether it was creating value. Hence, the introduction of the cost of capital concept contributed to reconfigure the calculative capacities in the financial market (see Credit Suisse First Boston 6 Dec 1996). Equity now had a cost, which could reduce value creation.

Another calculative device that became important in the second half of the 1990s was the Free Cash Flow (FCF) model, which was primarily promoted by McKinsey & Co in the best-selling book 'Valuation' (Copeland et al. 1990). This "finance bible" was soon, as one commentator observed, "read not only by financial analysts but also by a growing number of CFOs" (*Finanstidningen* 30 Dec 1997). Like EVA, the FCF model was based on the principle that only companies "generating cash flows greater

than the company's cost of capital are creating value" (ibid.). Thus, this calculative device also made a direct link between the company's cost of capital and its value creation.

In addition, the FCF model also promoted a focus on the "value drivers" of the company's free cash flows (Copeland et al. 1990). The FCF model was based on the Discounted Cash Flow (DCF) approach (see Miller 1991), which meant that it calculated the value of a company by discounting the company's estimated future cash flows using its WACC.⁵² In particular, the FCF model provided a concise formula-based DCF approach, which made simplified assumptions about a company's cash flow streams so that it became possible to value the company's activities several years into the future (Copeland et al. 1990). Hence, rather than focusing on the company's cash flows per se, as the cash flow statement reported them, the FCF model suggested that the free cash flows should be derived from the income statement. The starting point was the operating profit, as measured in terms of the EBIT (i.e. the Earnings Before Interest and Taxes).⁵³ This number was then adjusted by adding back non-cash items in the income statement, such as depreciation and amortisation, and subtracting cash items not included in the income statement, such as the company's tax payments and capital expenditures, in order to derive the company's free cash flows, i.e. the cash flows after the necessary investments in the business, which could be distributed to the capital providers (ibid.):

$$\text{FCF} = \text{EBIT} + \text{Depreciation/amortisation} - \text{taxes paid} + / - \text{changes in net working capital} - \text{capex}$$

As a result, the FCF model promoted a focus on the drivers of the different components of the company's free cash flows. Perhaps the most important of these "value drivers" were the company's profit margins and growth rate, which were seen as the key determinates of the company's mid- and long-term EBIT (Copeland et al. 1990). The FCF model, for instance, assumed that the company would eventually enter a steady-state with constant profit margins and sales growth, which made the company's sustainable mid- and long-term profit margins and growth rate particularly important (see HSBC 13 May 1997). However, these value drivers also in-

cluded things such as the changes in the company's net working capital (NWC), changes in fixed assets, and the company's cost of capital, as illustrated by the calculation taken from a report by Carnegie (9 Sep 1999) in exhibit 4.2. below:

Exhibit 4.2. Example of FCF calculation.

Cash Flow Valuation of Sandvik		SEKm	SEK / Share	%			
Present Value of Free Cash Flow in Forecast Period		27,445	106	42%			
Present Value of Continuing Value		45,908	177	71%			
Enterprise Value		73,353	284	113%			
Net Interest-Bearing Debt (incl. Convertibles)		-8,412	-33	-13%			
Net Value of Associates and Minorities		0	0	0%			
Present Value of Shareholders' Equity as of	01-Jan-99	64,941	251	100%			
Dividend Paid		-1,811	-7				
Time Adjustment Factor	1.07						
Present Value of Shareholders' Equity as of 08-Sep-99		69,179	267				
Free Cash Flow Assumptions							
Risk Free Interest Rate	5.75%	Current No. of Shares in Issue		258.696			
Risk Premium	3.75%	Cost of Equity		9.5%			
Beta	1.00	Post-Tax Cost of Net IB Debt		4.5%			
Adjustment for Illiquidity	0.0%	WACC		9.0%			
Spread - Risk Free Rate vs. Cost of IB Debt	0.5%						
Free Cash Flow Summary		5Y Hist. Avg.	1999e	2000e	2001e	2002e-2005e	TP
Adjusted EBIT Margin	12.8%	11.3%	13.4%	14.6%	14.2%	14.0%	
ROCI	15.7%	12.5%	16.1%	18.4%	20.2%	19.8%	
Sales Growth (CAGR)	19.8%	-5.0%	1.8%	5.5%	5.9%	3.0%	
Change in NWC (CAGR)	14.3%	-8.6%	-1.5%	5.2%	1.3%	3.0%	
Change in Tangible Fixed Assets (CAGR)	14.6%	-11.8%	2.9%	3.1%	1.9%	3.0%	

Example of a typical valuation using a FCF approach (Carnegie 9 Sep 1999). Notice how (at the bottom) the forecast of the company's future free cash flows is derived using the estimation of a few selected value drivers including adjusted EBIT margin, sales growth, change in NWC, and change in fixed asset (capex) – in addition to a careful calculation of the cost of capital. The adjusted EBIT margin includes adjustments for non-cash items.

These new calculative devices, in particular EVA and the FCF model, became increasingly central in the financial market in the late 1990s, starting in 1996/1997, and they gradually came to replace EPS and P/E-ratios as the central metrics of value. This did not mean that EPS and P/E-ratios disappeared completely; rather, there were often several calculative devices used in the analyst reports.⁵⁴ However, EVA or FCF became increasingly enacted as the most important calculative devices in the financial market (see Hägglund 2001).⁵⁵

In sum, the addition of these new calculative devices contributed to change the financial market frame. Following the addition of these calculative devices, the focus shifted from profits to value creation, as measured in terms of the cost of capital and the value drivers of the company's free cash flows. The introduction of these new calculative devices thus contributed to enact a situation in which value creation became the main metric of value in the financial market. In the financial market, activities and strategies were now valuable only in so far as they improved the company's value creation. This was also coupled with the efforts made by different agencies, such as academic scholars (see Fama and Jensen 1983a; 1983b; Jensen and Murphy 1990a; 1990b), consultancy firms (see Froud et al. 2000; Jönsson 2006) and, after they had been equipped with and formatted, analysts and investors (see Barker 1998; Hellman and Lind 2004; Roberts et al. 2006; Ho 2009; Kraus and Lind 2010), to promote the concept of shareholder value more generally. As a result, as one commentator noted, a growing number of corporate managers were now also "professing that everything they do, they do in order to create shareholder value" (Finanstidningen 30 Dec 1997).

4.3.2 The cost of capital: Optimising the capital structure

In the case of Sandvik, the concept of shareholder value creation became central in the spring of 1996, when Clas Åke Hedström publicly affirmed that the company's principal objective was to create value for its shareholders:

The basic financial objective of the Sandvik Group is to ensure an attractive return and growth in value for those who invest in the Group's shares. The objective is that Sandvik shares should provide a yield and growth in value which, taken together, are above the average for our industry and well above the rate of interest on "risk free" long-term financial investments. (Annual Report 1995)⁵⁶

The company was thus qualified as a 'shareholder value-oriented' company. But what did it mean to be a shareholder value-oriented company? How should the company create shareholder value and what precise script

should it follow? From the outset, the company's efforts to create shareholder value largely focused on the question of the balance sheet, which, as we have seen, had been a long-standing topic of discussion. In the following years, the management took several actions to optimise the company's capital structure. To begin with, the company's commitment to shareholder value creation was backed by a substantially increased dividend and the adoption of a new, "aggressive" dividend policy (Annual Report 1995; 1996).

In 1996, the company also initiated two major acquisitions: the Swedish steel manufacturer Kanthal and the Finnish industrial conglomerate Tampella, both of which were completed in two phases during 1996 and 1997. During 1997, the company also acquired the American tool-manufacturer Precision Twist Drills. For the management, these acquisitions were primarily seen as "examples of Sandvik's new growth strategy" (see SvD 15 Apr 1996). Yet, they were also valuable because they would improve the company's capital structure, as Clas Åke Hedström noted in the Annual Report (1996): "Eventually, the effects of our [growth] strategy on Sandvik's capital structure will be reflected in the conversion of a net cash position to a net liability position, which will increase the return on equity capital". In the financial market, these acquisitions were also valuable because they improved the company's capital structure. The head of the company's second largest owner (Robur Funds), Anders Lannebo, for instance, praised the acquisitions during the company's capital market's day, noting that he was "happy that Sandvik finally has started to spend its money" (Dagens Nyheter 21 Aug 1996). Similarly, a report by Morgan Stanley (11 Nov 1997) concluded that the conclusion of the Tampella acquisition was valuable both because it "should provide the basis of the creation of a dominant position in its market segment" and because it "raises Sandvik's financial gearing [i.e. its debt-level] further in an environment of low interest rates".

In 1997, the company also conducted a large share redemption program of four billion SEK. The dividend was also increased, resulting in another 1.8 billion SEK being distributed to the shareholders. Clas Åke Hedström explained that the main reason behind these actions was that the management "felt the need to improve the company's capital structure"

(Dagens industri 25 Feb 1997). The ‘strong’ balance sheet was now qualified as “overcapitalised”, as Clas Åke Hedström noted in the Annual Report (1997).⁵⁷

Following these actions – the completion of three large acquisitions, increased dividends, and the share redemption – the balance sheet had been significantly restructured. The company’s cash position had changed from a net cash holding of four billion SEK in the beginning of 1996 to a net debt of seven billion SEK at the end of 1997 (Annual Report 1996; 1997). As a result, the equity-to-assets ratio had changed from 64 percent in the beginning of 1996 to 47 percent at the end of 1997 (ibid.). There had been “a dramatic change in the balance sheet”, as a report by Morgan Stanley (13 Aug 1997) put it.⁵⁸

Thus, the addition of new calculative devices in the broader socio-material arrangements had changed the script for how the corporate activities and strategies should be valued. This was, for instance, illustrated by the comments from Sandvik’s Vice President Leif Sunnermalm. Commenting on the actions that the management had taken in order to restructure the balance sheet, he explained that the management had taken these actions because they had learned that “borrowed money is cheaper than equity”, and that it was therefore “better to have a net debt position than a net cash position” (Dagens industri 4 Aug 1997). Equity now had a cost, and it could reduce value creation.

4.3.3 From profit to profitability: Divesting an non-valuable business area

The emerging value creation frame also affected the way in which the performance of particular business units was valued in the company. One example was the divestment of one of the company’s business areas, Saws and Tools, in the beginning of 1999. Saws and Tools manufactured hand-held tools such as saws, screwdrivers, and wrenches for both the professional and the consumer markets. For the general public, it was probably the most well-known part of the company.

When Clas Åke Hedström presented the divestment of this business area, he explained that this decision had been the result of a systematic

“shareholder value analysis” that the management had conducted a couple of years earlier (Dagens industri 17 July 1999). In this analysis, every business unit in the company had been evaluated in terms of how it contributed to the company’s value creation and a strategic plan had been formulated for how to improve shareholder value (ibid.). Thus, through this analysis the management had constructed a precise script for how the company was to create shareholder value. This plan included the completion of the Kantal and the Tampella acquisitions described above as well as the share redemption and the other actions taken in order to restructure the balance sheet in 1997 (Veckans Affärer 17 May 1999). Now, Hedström explained that this plan also entailed the divestment of non-valuable business units.⁵⁹

Saws and Tools was a non-valuable business area primarily because its “profitability has not measured up to Group’s requirements”, as Clas Åke Hedström explained in the Annual Report (1999). Thus, there had been a shift here in how the performance of particular business units was valued: from *profit* to *profitability*. This shift is easily overlooked, but it was important because it enabled different valuations to be performed of the company’s different business units. In the company, profitability was measured in terms of profit margin and return on capital employed (RoCE).⁶⁰ While both these performance measures had long been reported in the company’s annual reports, they had now become increasingly important in practice as a result of the increased importance of value creation. Importantly, in contrast with profit, both profit margin and RoCE were relative measures, i.e. they were expressed in percentages rather than absolute numbers. The performance of any business unit could therefore be compared with the performance of the company’s other business units.⁶¹ Hence, the central question was no longer whether a business unit made a profit, but whether it contributed to improve the company’s profitability. As a result of this change in the calculative practice, Saws and Tools had now become qualified as an ‘underachiever’, which did not improve the company’s profitability. The problem was not that Saws and Tools did not make a profit – because it did – but that the “profitability has been inferior to the average of the Sandvik group for a number of years” (Paribas 23 April 1999) and that Saws and Tools thus did not contribute to the company’s value creation.

The management also saw few possibilities for improving the profitability. They had conducted several large cost cutting and rationalisation programs in this business area in recent years, and saw little scope for further improvement; “through all these programs we got the result up a bit, to a certain point, but what more could we do?”, as Clas Åke Hedström explained (Dagens industri 17 June 1999). The main problem, Hedström further explained, was that “Saws and Tools was only the sixth largest company in a market where one needed to be the market leader to be profitable”, and since it would take substantial investments to consolidate the market and become the market leader from this position, the management had concluded that this “would not have been a good deal for the shareholders” (Dagens industri 23 April 1999).

Thus, the management’s calculations had been re-formatted by the introduction of the new calculative devices in the broader calculative landscape in which the company operated. Although the management had not been directly equipped by these new calculative devices, value creation had now become a central metric of value also in the company, and profitability had become a value driver. In the financial market, the decision to divest Saws and Tools was thus generally described as a good initiative by the management (see HSBC 14 Jul 1999), which would allow for a higher valuation, as a report by Carnegie (9 Sep 1999) concluded:

We like the divestment for several reasons. First, among Sandvik’s business areas, Saws and Tools was an underachiever with an average EBIT margin of 7.3 % over the past five years, compared with the group average of 13.6 %. Second, the synergies with other business areas were limited. Third, the sale means that Sandvik’s conglomerate profile has declined, allowing for greater focus on core activities and a higher valuation.

In sum, we have seen in the preceding sections how a new economic frame emerged in the late 1990s. Corporate activities and strategies were now increasingly valued in terms of whether they contributed to increase the company’s value creation, both in the financial market and in the company. Value creation was enacted in terms of the cost of capital and the value drivers of the free cash flow. This made different activities valuable, at least to some extent, compared with the early 1990s. In the company, it was now

more valuable to have a net debt rather than a net cash position, and there was a greater focus on profitability rather than profits. In the remainder of this chapter, we will follow how agencies enacted this new economic frame in the first decade of the 2000s.

4.4 The first decade of the 2000s: Enacting the value creation frame, part 1

In the remainder of this chapter, we follow how the new economic frame that emerged in the late 1990s affected the valuations of corporate activities and strategies during the first decade of the 2000s. In particular, we see how the precise script for how the company should create value kept changing over time, although value creation had now been firmly established as the central metric of value. In order to achieve clarity in discussion of this development, I organise following two sections thematically rather than strictly chronologically. That is, both sections follow events that occurred during the same time period, but with a different focus. This section (4.4) follows episodes related to the company's business strategy, and the question of what is a 'good business performance', over time. The next section (4.5) then focuses on episodes related to the company's financial strategy during the same time period.

4.4.1 A new growth strategy: Value creation as "profitable growth"

As discussed above, the company had adopted a new growth strategy in 1994. In the beginning of the 2000s, the company modified this strategy and adopted a new strategy focusing on "profitable growth" (Annual Report 2001). Profitability had, as discussed above, come to replace profit as the central measure of the company's business performance in the late 1990s. However, management had not accepted this renewed focus on profitability unquestioningly. The company's CEO, Clas Åke Hedström, had repeatedly argued that the company's profitability targets might not be "optimal for the development of the share price" since they were set "so

high that the company would have to abstain from business opportunities that it would otherwise pursue” (Finanstidningen 26 Feb 1998). He had also initiated a review to see if the targets could be lowered (ibid.). In addition, he had also questioned the common practice in the financial market of comparing the profitability of particular business units with the company’s average profitability, arguing in particular that Tooling’s superior profitability made it “difficult to compare the other business units to the group average” (Dagens industri 17 Jul 1999). However, these comments had little effect on how the financial market valued the company.

Instead, the management introduced a new set of financial targets in the year 2000. Rather than lowering the targets, however, management described these new targets as “more ambitious” than before (Annual Report 2000). In particular, it raised the company’s growth target from 6 percent annual growth including acquisitions to 6 percent organic growth with acquisitions on top (ibid.).⁶² Crucially, at the same time, the management also introduced new targets for the company’s different business areas. Following the divestment of Saws and Tools in 1999, management reorganised the company’s remaining business units into three business areas: Sandvik Tooling (Tooling), which manufactured tools and tooling system for industrial metal cutting; Sandvik Mining and Construction (SMC), which manufactured tools and equipment for the mining and construction industries; and Sandvik Materials Technology (SMT), which manufactured steel and stainless steel products.⁶³ This was the first time that the management had publicly defined individual targets for the company’s different business areas. Thus, we could see these new targets, in part, as an attempt by the management to change the practice of comparing the performance of the different business areas with the company’s average performance, by setting specific standards for each of these different business areas.

However, these new targets also expressed a new strategic direction. In particular, management defined these new targets in terms of the growth rate, profit margins and RoCE (Annual Report 2000). Crucially, they set these targets differently for each of the company’s three business areas, thus making different activities and strategies valuable in each of these different business areas. For Tooling, which was the company’s most profitable business area, the target was to grow at a pace that “clearly exceeded”

the company's average growth rate with a "sustained high profitability" (Annual Report 2000). The purpose was that Tooling, by growing faster than the rest of the company, would "come to constitute a larger proportion of the company", as Clas Åke Hedström explained (Dagens industri 17 Jul 1999). For SMT, in contrast, the main target was to bring the profitability up to "a satisfactory level", with growth only in "specially selected customer and product areas" (ibid.). Thus, the focus was still on growth, but growth was no longer equally valuable in the company's different business areas. The focus was now on a more selective form of growth.⁶⁴ Growth was no longer valuable because it would lead to higher profits, but only if it would also improve the company's profitability.

As a consequence of this new calculative script, management valued activities differently in the company's different business areas. For example, almost all of the strategic priorities for Tooling outlined in the Annual Report (2000) focused on growth, including expansion of sales organisation, new and complementary sales channels, continued geographic expansion, development of new products in attractive growth areas, and acquisitions. Accordingly, Tooling made several acquisitions in the coming years, and made substantial investments in things such as product development and marketing. SMT, in contrast, launched an extensive restructuring program, called the "Program of Change", in order to improve profitability (ibid.). This program focused on headcount reductions, increased outsourcing, and the re-positioning of the product portfolio towards high margin niches (ibid.). Thus, the value of growth now depended upon the profitability of the company's different business areas, and on how these business areas contributed to the company's value creation.

Analysts and investors in the financial market performed similar calculations. However, the focus on profitability in these calculations was even stronger, and growth was thus even more valuable in the company's most profitable business area, which at the time was Tooling, while the financial market considered growth in both SMT and SMC to "dilute the company's profit margins" (Carnegie 6 Nov 2004). Thus, the financial market valued the subsequent acquisitions in Tooling of Walter (in 2001) and Valenite (in 2002) (see UBS 10 Sep 2001; Morgan Stanley 9 Aug 2002). A report by Credit Suisse First Boston (7 Aug 2002) concluded, for instance, that these

acquisitions had “negated concerns that Sandvik was re-allocating too much capital towards the lower ROIC SMC and [SMT] divisions”. Similarly, subsequent growth in SMC was qualified as having “an unfavourable impact on group margins” since “SMC margins are only half those of the Tooling business” (Bear Sterns 19 Jul 2005).

In sum, there was now a focus on *profitable growth* both in the company and in the financial market. The value of growth depended upon the profitability of the company’s different business units, although the company and the financial market calculated this somewhat differently. Profitable growth would remain the company’s main strategy for creating value in the following years.

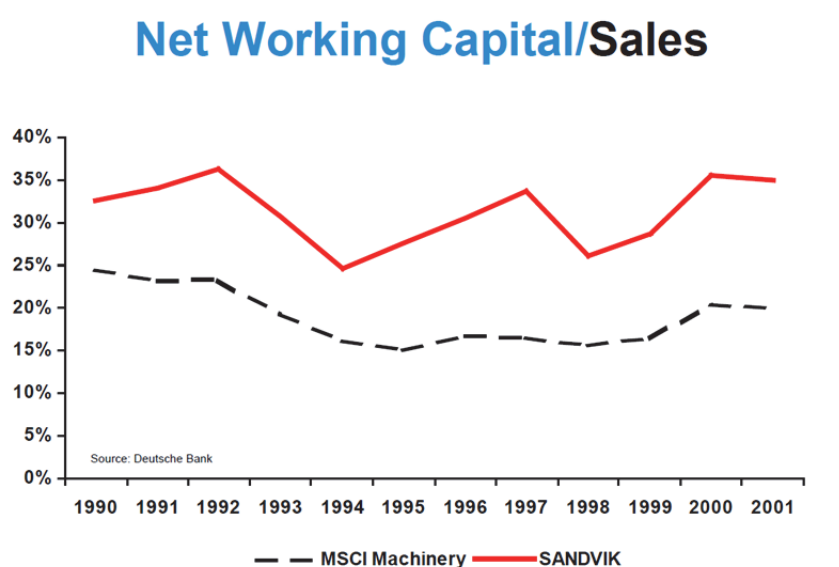
4.4.2 The company as a “relentless self-improver”: Value creation as capital efficiency

A couple of years later, in 2002, the management introduced another financial target for the company’s capital structure, which modified the script for how the company was to create value. The introduction of this new financial target was widely attributed to the company’s new CEO, Lars Pettersson, who had replaced Clas Åke Hedström in the beginning of the year (see Deutsche 7 May 2002; Carnegie 7 Aug 2002). The new management team argued that the company had been so focused on growth and profit margins in the past that it had somewhat forgotten about another important component of value creation, namely, capital efficiency; “we have our homework to do when it comes to capital efficiency and capital rationalisation”, as Lars Pettersson put it (Dagens Nyheter 6 May 2002). Therefore, the management had introduced a new capital efficiency target.

In particular, the new capital efficiency target was a consequence of a benchmarking that the management had conducted with peer companies on the financial market according to a range of performance measures considered to be important for shareholder value creation. This review showed that while the company’s performance was clearly “better than average” in terms of profit margins, RoCE and EBIT/employee, and “reasonable” in terms of growth and fixed asset efficiency, it was “worse than average” in terms of Net Working Capital/Sales (NWC/Sales) (Capital Markets Day

presentation 2002). The management had therefore introduced a new target in terms of the NWC/Sales-ratio (see Credit Suisse First Boston 30 Aug 2002). Specifically, the target was that the company should reach the industry average of 25 percent, compared to the company's current level of 35 percent (see exhibit 4.3).

Exhibit 4.3. Net Working Capital/Sales.



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Sandvik's net working capital performance compared to the industry average (Capital Markets Day presentation 2002). This calculative device qualified the company's net working capital efficiency as substandard and non-valuable. MSCI Machinery was an index of large listed European engineering companies.

Management had calculated that if the company could reach this target level, this would have significant positive effects on the company's value creation. In particular, it would free at least 4-5 billion SEK in additional capital, which would also correspond to a RoCE improvement of at least 2 percentage points (see UBS 19 Aug 2002). Sandvik was to achieve this tar-

get by reducing “the capital tied-up in inventories, accounts receivable and fixed assets” throughout the company (Annual Report 2002). Hence, following the introduction of this new target, new organisational activities became valuable.

Notably, this new financial target was not a response to any interventions from the financial market. The financial market considered that peer companies, such as Atlas Copco and SKF, which had recently conducted similar working capital programs with positive effects on their share price, had inspired the Sandvik management (see Morgan Stanley 15 Jan 2003). However, the financial market considered this new target to increase the company’s value. A report by Morgan Stanley (19 Aug 2002) concluded, for instance, that the targeted working capital reduction would “alone boost the group’s RoCE immediately to over 20%”, which would result in a “25% potential upside” for the share price, using an EVA-type of calculation. Thus, the financial market described the company as a “relentless self-improver” (WestLB 8 May 2002), that kept making the right decisions in order to improve its market value:

In strategic terms, Sandvik appears to be doing everything right: it was early to restructure, it is acquiring industrial assets inexpensively in the downturn and it is targeting a reduction of SEK4-5bn from working capital in the next few years. (Deutsche Bank 28 Oct 2002)

To a certain extent, the way in which the company was valued in the financial market was also changed by the introduction of this new financial target. While there had previously been only limited references to capital efficiency in the analyst reports, after the introduction of this new target capital efficiency moved to the front of the analysis. It was argued that the financial market had somewhat overlooked capital efficiency in the past (see Credit Suisse First Boston 30 Aug 2002). Analysts started to calculate the value of particular organisational activities in relation to this new target (see Morgan Stanley 15 Jan 2003), and they started to follow the company’s performance in relation to this target (see UBS 16 Apr 2004; Citigroup 21 mar 2005). Hence, there was now a new script for the company was to create value, in the company and the financial market: in addition to profitable growth, the company was now also going to be capital efficient. These two

activities were now seen, as the company's CFO Peter Larsson explained at the capital markets day in 2002, as the two "keys to success" for the company (Capital Markets Day presentation 2002).

4.4.3 Different versions of value creation: Value creation as value added

This script was also inscribed in the company's new steering model, which was first presented at the company's capital markets day four years later, in 2006. The company's CFO, Per Nordberg, began his presentation at the capital markets day by noting that "of course the main objective here is to create shareholder value", "both regarding how well we can perform in our business, and how we distribute excess liquidity and how efficient our capital structure is" (Capital Markets Day presentation 2006).⁶⁵ He then presented the new steering model that was to be introduced in the company. The purpose of this new steering model, he said, was "to align the management control within the company with the corporate objective of shareholder value creation". In particular, the new steering model was built around the three "value drivers" of the company's value creation – growth, profitability, and capital efficiency (*ibid.*; see section 5.3 below for a detailed description of the new steering model). Hence, this new steering model aimed to align the management practices in the organisation with the corporate objective of shareholder value creation. In a sense, it thus aimed to re-construct the script for how the company was to create value, which had been established at the corporate level, in the organisation.

The new steering model also included the introduction of a new measure of the company's value creation, called Sandvik Value Added (SVA), which resembled the EVA calculation described in section 4.3.1:⁶⁶

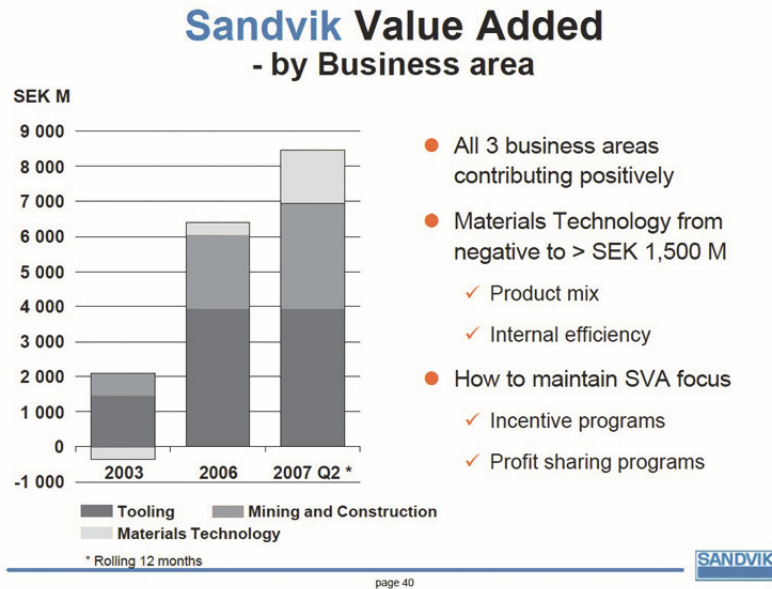
$$\text{SVA} = \text{EBIT} - \text{WACC} * \text{Capital Employed or as (RoCE} - \text{WACC)} \\ * \text{Capital Employed}$$

According to this measure, value was created only if the company's operating profit exceeded the cost of capital. This new measure was thus presented as a more accurate measure of value creation. The purpose of this new

calculative device was “to create transparency in the organisation” and “to be able to see who is actually building shareholder value for us”, as Per Nordberg explained.⁶⁷ However, this measure was also intended to be used to communicate the company’s value creation to the financial market.

Importantly, this new measure produced a different version of value creation compared to the profitability calculation. In particular, with this new calculative device, the company’s business units could now contribute to improve the company’s value creation even if their profitability was below the company’s average profitability and the company’s profitability targets, providing that it was above the cost of capital. This enabled in particular a different valuation of the SMT business area. SMT had been seen as a problem in recent years as its profitability had continued to remain below the company’s average profitability. Hence, the financial market had often qualified SMT as “a lower quality franchise” (see Credit Suisse 15 Nov 2006). However, this new calculative device qualified SMT as a value creating business area as long as its profitability, although it remained below the group average, exceeded the company’s cost of capital, which it did. This new valuation was illustrated, for example, by the following graph (exhibit 4.4) which the management presented at the company’s capital markets day in 2007:

Exhibit 4.4. Sandvik Value Added.



Value creation by Sandvik's different business areas according to the SVA calculation (Capital Markets Day presentation 2007).

As illustrated by this graph, the SVA calculation showed that all of the company's three business areas were "contributing positively" to the company's value creation. Hence, they were all valuable. Yet, although the intent of this new performance measure was to align the calculative practice in the company with the calculative practices in the financial market, it did not receive any attention in the financial market. In the financial market, the focus remained on profitability and growth, and SMT was still largely qualified as an inferior business area as its profitability remained below the company's other two business areas (although it had now reached the lower end of the target interval set in the year 2000). These different performance measures did not automatically align, but rather they produced different versions of value creation.

4.4.4 Value creation as continued and accelerated profitable growth

In the beginning of 2007, the management revised the company's financial targets. The profitability target (RoCE) was increased from 20 to 25 percent and the growth target from 6 percent organic growth (plus acquisitions) to 8 percent organic growth (plus acquisitions) (Annual Report 2006). In addition, these targets were no longer to be reached 'over a business cycle', but they should be achieved yearly (see Société Générale 2 Feb 2007). Hence, the company was geared towards the pursuit of continued and accelerated profitable growth.

There were two main reasons why the management had revised these targets. Firstly, the company had been highly successful in recent years and had "exceeded our financial targets 13 quarters in a row and it is not an end in itself to have the bar set too low", as Lars Pettersson explained (SvD 2 Feb 2007). Secondly, the management predicted the strong demand for the company's products would continue in the coming years. In particular, the company would benefit from structural drivers, such as the exposure to the mining and the oil and gas industries (Credit Suisse 5 Sep 2007). In addition, the world was only "in the beginning of the beginning" of the investment cycle in countries such as China, India, and Russia (Lars Pettersson, quoted in JP Morgan 5 Sep 2007). Thus, the management had calculated that the company, as a result of these structural changes, had now become less cyclical, as Lars Pettersson explained:

The demand is very strong and the development, which we consider to be structural rather than cyclical, continues. [...] The breadth that we have both geographically and in terms of applications makes it no longer relevant to talk about a cyclical [target]. (Dagens industri 2 Feb 2007)

Hence, the management had decided that there was a possibility to create greater value by maximising the profitable growth.

In sum, we have seen in these sections how investments had been made by different agencies in order to configure the precise script for how the company was to create shareholder value. A precisely defined script for how the company should create value had emerged – through capital effi-

ciency and, in particular, profitable growth. Value creation could have been enacted differently – through cost cutting and rationalisations, for example – but in the case of Sandvik, the focus primarily came to be on profitable growth. We have followed here the gradual process through which this particular script emerged.

4.5 The first decade of the 2000s: Enacting the value creation frame, part 2

In contrast with the previous section, which focused on the valuations of the company's business strategy, this section focuses on the valuations of the company's financial strategy during the first decade of the 2000s. As discussed above, in 1997, following the actions management took in order to optimise the company's capital structure, the company had a capital structure that was "well-balanced" between debt and equity (Annual Report 1997). In the year 2000, however, the question of what was an optimal balance of the balance sheet came to the fore again.

4.5.1 Making debt valuable: The addition of a new financial target

As described in section 4.4.1, the management introduced a new set of financial targets in the year 2000. These targets included a new target for the company's capital structure, which was the first time that the company had publicly communicated a balance sheet target. Specifically, this new target was articulated in terms of the debt-to-equity ratio. Hence, this new target marked a shift in how the balance sheet was valued. As discussed, the balance sheet had previously primarily been discussed in terms of the equity-to-assets ratio. In contrast with the equity-to-assets ratio, which compared the company's equity to the total assets (i.e. both interest-bearing and non-interest bearing liabilities), the debt-to-equity ratio focused specifically on the company's debt (i.e. interest-bearing liabilities).⁶⁸ This new target thus promoted a focus on different things. Whereas the equity-to-assets ratio had often been linked to the question of 'solidity', i.e. the company's ability

to withstand a downturn in the economy, the debt-to-equity ratio was more often linked to the question of ‘financial gearing’, i.e. the leverage that the company could get from its debt financing. In practice, the debt-to-equity ratio was also often known as the gearing ratio. Following the introduction of this new target, the company’s capital structure, and in particular the level of the company’s debt, thus came to be in the focus.

In particular, the new target was that the company should have a debt-to-equity ratio of 0.6 – 0.8, i.e. that the debt should be 60 to 80 percent of the equity (Annual Report 2000). At the time when this target was introduced, the company’s debt-to-equity ratio was 0.3, i.e. the debt was 30 percent of the equity (ibid.). This new target thus entailed a significant rebalancing of the balance sheet: the company needed to take on substantially more debt to reach the target. The management explained that this new target was intended “to achieve a better balance between equity capital and debt”, and to create a more valuable capital structure (ibid.). Thus, debt had now become more valuable than before.

This new target was primarily intended to facilitate the company’s growth strategy by enabling the company to make large acquisitions which could be financed through the raising of new debt capital (see Carnegie 2 Oct 2000). However, the management had also secured the shareholders’ approval at the annual general meeting to repurchase up to 5 percent (later increased to 10 percent) of the company’s shares. Yet, share buybacks remained “at the bottom of the action list” for the management (Carnegie 2 Oct 2000).

Following the introduction of this new target, analysts and investors immediately started to calculate what the company could do with the ‘new’ capital inscribed into this target. A report by Carnegie (2 Oct 2000), for instance, calculated that the company could now take on an additional 10-15 billion SEK in debt. This meant that there would be substantial opportunities both for acquisitions and share repurchases going forward, both of which qualified as valuable strategic options. Some analysts also concluded that this new target meant that the management was going to have to take substantial actions in order to increase the company’s gearing. A report by Deutsche Bank (2 Nov 2000) concluded, for instance, that:

Given this rate of cash generation, Sandvik could be almost totally de-gearred by the end of the forecast period, unless measures are taken (buyback and/or acquisition) to absorb the flow. It is worth noting that one of the objectives to which management has committed itself to is a balance sheet gearing ratio of 60-80 %.

Thus, this new target had modified the script for how the company was going to create value, and how the company's balance sheet would be valued.

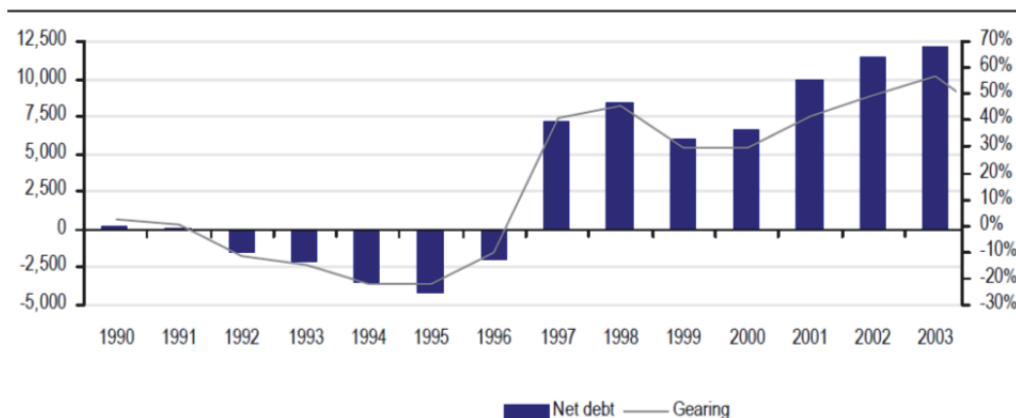
4.5.2 The problem of having too much cash revisited

During the next couple of years, the company made several large acquisitions. In addition, it substantially increased the dividend, and repurchased shares for nearly two billion SEK in 2001, representing four percent of the total outstanding shares (Annual Report 2001). Yet, the company's gearing ratio still remained well below the target level as a result of the company's strong cash flow generation from its operations. As a consequence, the company's lack of financial gearing was increasingly qualified as a problem in the financial market, which argued that this gap between the targeted and the actual gearing ratio meant that the management would have to, sooner rather than later, make further share repurchases in order to reach the target. A report by UBS (17 Sep 2002) concluded, for instance, that it was only a matter of time before the company was going to have to make further share repurchases:

We estimate the year-end gearing to be only 48 %. This is below Sandvik's own balance sheet gearing target of 60-80 %. [...] Despite the aggressive dividend pay-out, we estimate that Sandvik's gearing will fall to only 22 % by 2004 [due to Sandvik's strong cash flow generation]. We think that there will likely be some more bolt-on acquisitions during the next couple of years, but there should still be plenty of room for more share buy-backs. If we were to assume that there were no acquisitions at all, Sandvik would have financial room to buy-back up to 15 % of its shares, or 38 million shares (which is equal to 10 % of the annual volume traded). [...] We expect Sandvik to start buying back shares in late 2002 or early 2003.

The company, however, only repurchased a small number of shares during 2002 and no shares at all during 2003. Yet, the debt-to-equity ratio still climbed to 0.57 at the end of 2003, as the dividend pay-out ratio remained high (Annual Report 2003).⁶⁹ As a consequence, the company now had its highest gearing in well over a decade (see exhibit 4.6):

Exhibit 4.5. Net debt and gearing.



The development of the company's balance sheet as shown in terms of net debt and financial gearing, i.e. the debt-to-equity ratio (adapted from UBS 16 Apr 2004). In this graph, we can see the change in the company's balance sheet that occurred in 1996 and 1997, as discussed in section 4.3.2. The gearing (the right scale) was the highest in had been in well over a decade at the end of 2003. Notice also how the scales mathematically qualify a net cash position as negative, and, conversely, net debt and a higher financial gearing as positive.

For the analysts, however, the gearing was still not high enough. In particular, they argued that the gearing ratio was still far below the upper end of the target interval – meaning that there was a possibility for higher gearing inscribed into this target (see Credit Suisse First Boston 15 Mar 2004). As discussed in section 4.3.1, financial gearing had become a “value driver” in the financial market; the higher the financial gearing that the company could take on, the more value could it create for its shareholders by lowering the cost of capital and distributing the additional cash to the shareholders (see HSBC 20 Nov 2001). Indeed, as illustrated by exhibit 4.6, the debt-

to-equity mathematically qualified a higher gearing as a positive quality, and a net cash position as a negative quality. All things being equal, a higher gearing was thus more valuable.

Accordingly, the management received criticism when it revised the gearing target from 0.6 – 0.8 to 0.5 – 0.7 in the spring of 2004, arguing that the previous target had been “too ambitious” (see UBS 6 May 2004). This was considered to send “a negative signal to the market as we fail to see the financial logic behind it, unless the company is considering preserving cash for a larger acquisition”, as a report by UBS (16 Apr 2004) argued. In particular, the report argued that the company’s strong financial performance permitted the company to have an even higher financial gearing; “Sandvik would have a healthy interest cover of 6.5x at a 70 % gearing level”, which was “hardly a worrying level for a company with double-digit EBIT margins and strong operational cash flow”.

Despite this lowered target level, the company’s gearing ratio continued to remain below the target level during 2004. This prompted further speculation as to when the company was going to make further share repurchases (see Société Générale 1 July 2004). It was argued that the company’s strong operational cash flow would make the gearing become too low – in relation to the target – if nothing was done:

With accelerating earnings and strong cash flow generation Sandvik’s net debt/equity ratio is set to fall below 50 % in 2004, versus the company’s target level of 50-70 %, and with no significant acquisitions on the horizon we expect a continued high rate of cash return to the shareholders via both dividends and the ongoing share buy-back programme. (Citigroup 3 Sep 2004)

Sandvik started to make substantial share repurchases again in the fall of 2004. The management explained that these share repurchases were done with respect to the company’s policy of “not sitting on more capital than necessary” (Dagens industri 21 Feb 2004). Other commentators noted that this decision seemed to be driven primarily by the company’s gearing target. A report by Credit Suisse First Boston (25 Nov 2004) concluded, for instance, that it seemed like “the decision to undertake share buybacks was not really driven by the share price but rather the gearing ratio”. Similarly, an editorial in SvD (9 Nov 2004) concluded that “the problem the man-

agement faced was that Sandvik's financial gearing was too low in relation to the company's target", and that "the company therefore was overcapitalised". Thus, it was argued that the management had felt the need to enact the script that it had set for itself through the new financial target.

The company continued to distribute cash to shareholders during the spring of 2005, as it conducted a large share redemption program (of four billion SEK) and increased the dividend (Annual Report 2005). These actions resulted in the company's debt-to-equity ratio being at 0.7 at the end of 2005, i.e. right at the upper limit of the target interval (Annual Report 2005). Thus, the company's balance sheet had now finally taken on the more aggressive capital structure inscribed into the gearing target urged by analysts and investors. The balance sheet was thus highly valued in the financial market. However, as we have seen, such valuations are precarious achievements, and while financial market initially applauded the company's increased financial gearing, the balance sheet was soon qualified as a problem again.

4.5.3 The lack of a 'defensive spice', value creation, and new financial targets

The problem this time was not that the company had not reached its gearing target – rather, the problem was that the company had already reached the target level. Analysts and investors argued that the company's high gearing ratio relative the target meant that there would be fewer possibilities for valuable activities, such as acquisitions and share repurchases. A report by Carnegie (9 Feb 2005), for instance, concluded that the gearing ratio had become so high (relative to the target) that it would "probably rule out larger acquisitions in the coming year". Similarly, a report by Credit Suisse First Boston (15 Nov 2005) concluded that the gearing was now so high (relative to the target) that the company would have "limited scope to surprise with further cash returns to shareholders" in the coming years. A report by Morgan Stanley (15 Nov 2005) summarised the general argument:

Because of the 1H05 cash distribution and preceding Tooling acquisitions, Sandvik's net debt/equity ratio is at its highest level for more than a decade.

We expect net gearing to come in around 75% at year-end. Admittedly, this is by no means an alarmingly high level and we would not be surprised to see the company acquiring and paying generous dividends (as always). [...] Nevertheless, we do not expect anything beyond the ordinary dividend to be distributed to shareholders over the coming years, meaning that the company lacks the defensive spice that we identify in, for instance, Atlas Copco and SKF.

Thus, the problem was not that the balance sheet was weak in itself but that the balance sheet had become ‘less strong’ compared to the peer companies, since Sandvik had already reached its gearing target. A stronger balance sheet was valuable not because it shielded the company’s operations from financial concerns, as had been the case in the early 1990s, but because it provided the opportunity to surprise the shareholders with ‘extraordinary’ dividends.

For management, however, the company still had a “very strong financial position” when calculated in terms of its strong cash flows and its credit facilities, as Sandvik’s CFO, Per Nordberg, explained in reply to a question at a conference call concerning whether the gearing would “preclude the company from doing big deals” (Thompson conference call 8 Feb 2006):

No. It is very simple. Sandvik has an excellent credit rating. We can certainly borrow more. We have an excellent credit line if we would like to use our credit line that we already have. We have an extremely strong cash flow. I think we have one of the best credit ratings for all European industrials. And if we were to make a very big acquisition, quite frankly, I think the best thing is always to take it to the shareholders. If we can't substantiate it in front of the shareholders, we shouldn't do it. [...] I think it is important also to recognise that the 70% gearing target that we have will not jeopardise our possibilities, as Lars [Pettersson] is saying, to do smaller or medium-sized acquisitions.

Thus, there were different versions of the balance sheet in the company and in the financial market – it was simultaneously ‘strong’ and ‘weak’. It became ‘weak’ through the calculative practices in the financial market, when calculated in relation to the gearing target and the peer companies’ balance sheets. In the financial market, the balance sheet remained a problem during 2006, as the company’s gearing ratio continued to hover around

the upper limit of the target interval, following several acquisitions in the SMC business area:

Sandvik's less strong balance sheet vs. peers leaves little room for cash returns. This reaffirms our view that there should be better opportunities elsewhere in the sector. [...] With a net debt to equity ratio and net debt/EBITDA of around 0.7 and 1.2 times, respectively, Sandvik does not have a weak balance sheet, but there is significantly less re-leveraging potential compared to some peers that are expected to return cash to the shareholders imminently. (Morgan Stanley 30 Oct 2006)

It was around this time, in the beginning of 2007, that the board revised the company's financial targets (see section 4.4.4). This included increasing the company's debt-to-equity target from 0.5 – 0.7 to 0.7 – 1.0. At the same time, the company also announced a new extra-ordinary dividend. These actions were described “an expression of Sandvik's continuous efforts to create value for its shareholders” (Annual Report 2006). As a result of these actions, the company's debt-to-equity ratio was once again pushed towards the upper end of the (new) target interval. At the end of 2007 the debt-to-equity ratio was at 1.0, i.e. right at the upper limit of the new target interval (Annual Report 2007).

Following this revision of the gearing target, the company's balance also became valuable again in the financial market. This new gearing target was now valuable both because it “accommodates the special dividend and leaves room for potential acquisitions” (Morgan Stanley 7 Feb 2007). The balance sheet also remained ‘strong’ in the calculative practices in the company since the company both had “short-term and long-term credit facilities on very good terms” and “could finance its investments through the cash flow”, as Lars Pettersson explained (Dagens industri 5 Sep 2007). Hence, the company's balance sheet was now widely enacted as both ‘strong’ and ‘valuable’ again, as in the beginning of the 1990s (see section 4.2.2). However, the balance sheet was different compared to the early 1990s. The company's equity-to-asset ratio had now changed from 64 percent at its peak in the beginning of 1996 to 35 percent at the end of 2007 (Annual Report 1995; 2007).

In sum, at the end of 2007, Sandvik was a valuable company according to the precise script provided by the value creation frame: it had maximised growth, high profitability, and an optimised capital structure. Different activities were now valuable compared to the early 1990s. We have followed in this chapter the slow process through which these valuations had changed. We have followed the distributed investments through which a new script had been constituted for how corporate activities and strategies should be valued. However, in a final twist of this tale, a year later the market conditions had changed dramatically, with the result that the valuations of activities and strategies in the company also needed to change.

4.6 A sudden blow: New valuations in the wake of the financial crisis

During the last quarter in 2008, the market demand deteriorated sharply in the wake of the financial crisis. The decline in the demand in the fourth quarter was “one of the most dramatic experienced by Sandvik” (Annual Report 2008). The downturn affected all the company’s business areas. The company’s sales dropped by 40 percent and in some areas even more (Lars Pettersson in Thompson conference call 17 July 2009). The crisis continued in 2009 and the company reported a loss in the income statement for 2009, for the first time since 1983 and for only the third time in the company’s history.

Hence, ‘profitable growth’ was, for the time being, not possible. To adapt to the new market situation, a number of actions were taken instead to adjust costs and production capacity to the lower demand. These actions included substantial workforce reductions and a renewed focus on working capital efficiency to strengthen the cash flow (Annual Report 2008). In particular, the management had made a decision to increase the cash flow by improving the working capital efficiency, rather than improving the short-term profit margin:

In parallel with a deepening of the dramatic decline in the global economy, the company implemented robust savings and rationalisation programs aimed at once again returning to a favourable level of profitability. The immediate

measures focused on reducing the cost base and capital utilisation to meet the low level of demand. Capital efficiency was prioritised over short-term profitability. (Annual Report 2009)

Sandvik management had decided to cut production sharply, even below the level of actual sales and incoming orders, in order to reduce the inventories (see JP Morgan 5 Feb 2009). While this improved the working capital and the cash flow, it also led to the depressing of profit margins due to what the management called “fixed cost under-absorption” (see HSBC 13 Feb 2009), i.e. the effect that fixed costs had to be defrayed across fewer products sold when the sales volume dropped, so that the average cost per goods sold increased and the margins were squeezed (ibid.).

For management, improving the cash flow was primarily important because it would enable the company to maintain its marketing and R & D activities and thus position the company for the future (Annual Report 2009). The financial market considered this focus on cash flow to be “the best [alternative] for shareholders” (HSBC 13 Feb 2009). However, in the financial market, the focus on cash flows was valuable primarily because it would improve the company’s ability to perform acquisitions and pay out dividends. The financial market argued that the company’s high financial gearing relative the gearing target meant that there were fewer possibilities for acquisitions and a risk for dividend cuts as the company needed to preserve cash (see Royal Bank of Scotland 19 Nov 2008; JP Morgan 2 Feb 2009). A report by Royal Bank of Scotland (15 Apr 2009), for instance, concluded, regarding acquisitions, that:

There are no immediate funding issues, but we see stretched gearing as a clear negative compared with Sandvik’s peers, such as Atlas. We expect the organic growth environment to have changed structurally following the fall-out of the super-cycle and thus we favour companies that are able to make acquisitions. At our forecast FY09 net debt/EBITDA of 4.0x, we are unsure if Sandvik fits that bill.

And the report continued:

Sandvik could release SKr4.7bn in cash this year, on our forecasts, if it scraps its dividend and moves capex into maintenance mode (of SKr3.0bn-3.5bn). However, although capex could be cut, we do not expect Sandvik to do away with the dividend because that could create severe adverse sentiment about Sandvik's ability to generate shareholder value, in our view.

Thus, the balance sheet had now become 'weak' again. There was a concern that the gearing was "so stretched" that the company would have to cancel the dividend for 2009 altogether and perhaps even make a new issue of shares to reduce the financial gearing (see Société Générale 18 Jun 2009). Indeed, the company did reduce the dividend in absolute terms both for 2008 (from 4 SEK per share to 3.15 SEK per share) and for 2009 (to 1 SEK per share). However, it did not have to cancel the dividends completely, and the dividends were still in line with, or even above, the company's established policy of having a dividend pay-out ratio of at least 50 percent of the earnings (Annual Report 2009). Nor did the company have to conduct a new share issue, thanks to the strong cash flow generation.

Indeed, "the cash flow was impressive", as a report by Société Générale (1 Nov 2009) noted. Due to the strong focus on cash flow and working capital efficiency, the operating cash flow actually improved from 9.7 billion SEK in 2008 to 12.3 billion SEK in 2009, despite the fact that the result after financial items had plummeted from 10.6 billion SEK in 2008 to -3.5 billion SEK in 2009 (Annual Report 2009).⁷⁰ Thus, the company would now enact value creation in terms of cash flow generation, which was to be achieved through activities such as cost cutting, reduced investments, and working capital improvements. This was, as discussed, in line with the script that the management had already set for itself through the new steering model, according to which value creation was to be achieved through profitability, growth, and capital efficiency.

Chapter 5

At the cutting edge: What is valuable product development?

This chapter analyses the changing and conflicting versions of ‘good product development’ in one market area, Coromant, within the Tooling business area in Sandvik. In particular, it follows two product development projects called Alpha and Beta. The chapter begins in 2001 when project Alpha was initiated and then follows this project and the subsequent project Beta until both projects were completed at the end of the first decade of the 2000s. We will follow a series of episodes in which particular product development activities were valued and decisions were made about concrete issues such as product design or whether a project should continue. The story begins with an account of the socio-material arrangements that framed the product development practices in the early 2000s. The remainder of the chapter then focuses on how there were different versions of valuable product development activities at particular points. We will also see how the product development frame changed over time. This chapter illustrates how, while product development is generally ascribed a great deal of good things, including positive financial results, it is arguably more difficult to determine what are good product development activities in practice.

As a background, we should note that product development had long been a central part of both Sandvik’s and Coromant’s business strategies. As discussed in chapter four, product development had been a key part of Sandvik’s business strategy since the beginning of the company. The focus

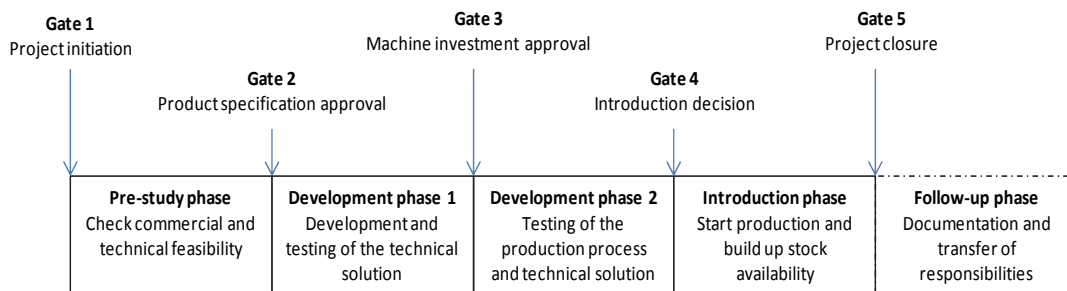
on product development was then accentuated as a result of the company's new growth strategy in 1994, as discussed in section 4.2.4. The company has long invested around four percent of the annual turnover in research and development. The focus on product development was perhaps particularly strong in Coromant, which was the largest market area in the Tooling business area.⁷¹ Coromant was a market leader in the market for tools and tooling systems for automated metal cutting, with a market share of 15-20 percent of the global market (see UBS 7 May 2002). The main customer segments included automotive and aerospace manufacturers, but also a wide range of manufacturing companies from other industries. Coromant's products were positioned at the high-end of the market; that is, while they were typically more expensive than the competitors, they were also considered to have a superior technical performance. Product development was a key strategic priority to maintain the market leadership. It was often pointed out that more than 50 percent of Coromant's sales came from products that had been introduced in the market during the last five years (see Capital Markets Day presentation 2005).

5.1 The beginning of project Alpha, part 1: The socio-material arrangements framing the product development practice

There was a range of organisational arrangements that framed how product development projects should be conducted in the beginning of the 2000s. To begin with, the management had introduced a new product development manual (the Manual) in the early 1990s to ensure a more efficient and effective product development process. The Manual set the formal guidelines for how product development should be conducted in Coromant. According to the Manual, each product development project should follow a stage-gate model with five main stages (see exhibit 5.1 below). To pass a gate and move on to the next stage, the project needed to get authorisation by a steering-committee that had been given the mandate to allocate resources (in terms of money and personnel) to the various development projects and to decide whether the projects should continue at the gates. The

steering committee consisted of senior line managers from the Product Development Department, the Production Department and the Market Department, as well as managers from a centralised controlling unit, called the Pricing and Profitability Unit, and a centralised planning unit in the Production Department.

Exhibit 5.1. The stage-gate model.



The stage-gate model in the early 2000s (adapted from the product development manual).

To pass a stage-gate, each project needed to fulfil a number of technical and financial requirements, as specified by the Manual. In addition to the technical requirements, each project needed to have a budget, a time plan and a profitability target, which were to be examined at each gate before the project could be authorised to continue. These measures were intended to install attentiveness to economic and commercial considerations in the product development process, which was considered to, historically, have been overly focused on technical issues. Thus, the stage-gate model attempted to make the development process more structured and controllable, with the intention of developing more, and more profitable, products.

However, the Manual was not always followed in practice; “it wasn’t followed by the letter, things were less structured”, as one steering committee member recalled. It was, for instance, not unusual for new development projects to be initiated from within the Product Development Department, rather than being started in response to the identification of a market need by the Market Department – which was the order of things prescribed by

the Manual. This was how project Alpha started. In particular, Alpha started in 2001 when a group of engineers in the Product Development Department studied some of the competitors' product portfolios. Benchmarking was a routine part of the product development practice, both in the Product Development Department and in the Market Department; "we have to keep track of what the competitors are doing because if they develop a product with better performance we have to come up with something new to stay ahead", the product management manager for Alpha explained. Studying the competitors' product catalogues, the engineers discovered that some of the competitors had a new type of technical solution for a particular type of cutting tool.

Generally speaking, there are two types of cutting tools: solid tools, which are made completely out of cemented carbide, and insert-based tools, which have a wider holding body of steel onto which small cemented carbide inserts are fastened. Cemented carbide is a super-hard material that is widely considered to be the best material for metal-cutting, partly due to its ability to withstand the extreme temperatures at work in the metal-cutting process, which allows for faster machining, and partly due to its ability to produce a smooth finish on the material that it is being applied to.⁷² On the downside, however, cemented carbide is an expensive material that is susceptible to chipping or breaking. Therefore, the advantage of insert-based solutions is that less cemented carbide is needed to generate the cutting interface, and that only the insert and not the entire tool needs to be replaced if it breaks.⁷³ Due to the high cost of cemented carbide, in combination with other technical reasons, these two types of cutting tools are typically used in different types of operations. In general, solid tools are smaller (in terms of their width) and insert-based tools are larger. The new technical solution that the engineers had discovered resembled a solid tool and it was designed to be used in a type of operation in which solid tools was usually used. However, in contrast with traditional solid tools, this technical solution had two parts: a holding shank in steel and an exchangeable head in cemented carbide. Thus, this technical solution also had some of the advantages of an insert-based solution. Intrigued by this solution, the engineers set out to develop a similar type of product.

During the first years Alpha was not organised as a formal product development project. Contrary to the prescriptions made by the product development manual, there was no project group, no dedicated budget and no time plan. While the aim was to develop a new product, Alpha was set up more as a semi-official “development exercise” than a formal project, as one of the engineers described it. The actual development work was carried out by a couple of engineers, who had been sanctioned by the Product Development Department to work on Alpha part-time, in between other projects. The project focused from the start on finding a workable technical solution with good technical performance. However, while no formal investigations of the project’s commercial and financial properties had been conducted, economic calculations still guided the early development work. In designing the product, the engineers made specific calculations regarding the commercial potential of different design alternatives. In particular, Alpha was from the outset viewed as a new version of a specific type of solid tool that Coromant had in its existing portfolio. Compared to this type of tool, the main advantage with Alpha was that it would be cheaper for the customers to use a solution with an exchangeable head since the cost for cemented carbide would decrease, as one of the engineers explained:

The downside of making the entire tool out of cemented carbide was that if you chip or break the cutting edge you have to throw the whole tool away. With Alpha only the exchangeable head would be made of cemented carbide and you could reuse the shank up to 50 times. So it becomes cheaper for the customer. [...] The whole idea was that it should be cheaper than a solid tool.

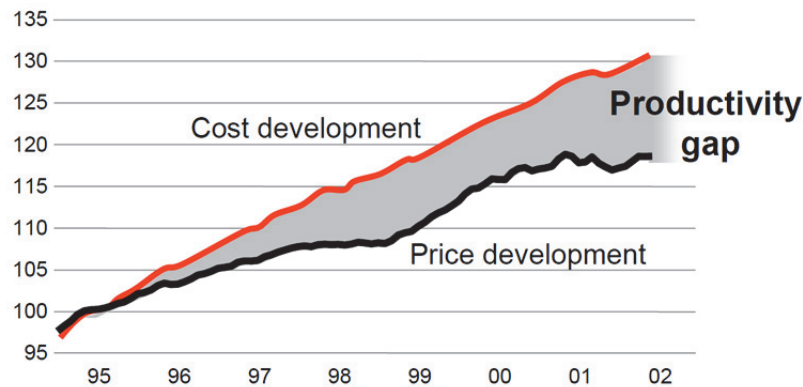
Thus, the idea was that if the engineers could develop a tool with comparable technical performance as this type of solid tool, Alpha would have commercial potential. Technical performance was here primarily defined in terms of customer productivity, which was measured in the product development practice in terms how rapidly a cutting tool could displace material (i.e. as the volume of material displacement per minute, see section 5.3 below).

Customer productivity was a central measure in the product development practice in the early 2000s. Productivity was specified as one of the key technical properties in the Manual. However, there were also other ar-

rangements that enacted customer productivity as an important metric of value. The concept of ‘customer productivity’ had, for instance, long lain at the heart of Sandvik’s business strategy. In the beginning of the 2000s, the company’s mission statement was “to help the customers to close the productivity gap” (see exhibit 5.2). This phrase referred to the widening gap between the decreasing market prices and the rising costs of production. According to Sandvik, manufacturing companies around the world were being pressured by intensified global competition. The company should therefore develop products and services that helped the customers to improve their productivity (see *The Power of Sandvik 2003*). As opposed to just selling products, the company was to sell the promise of improved productivity – and improved profitability – to its customers.

Exhibit 5.2. The productivity gap.

Business idea - Increased productivity



Source: VI
CMD 2003, 14 August, page 3



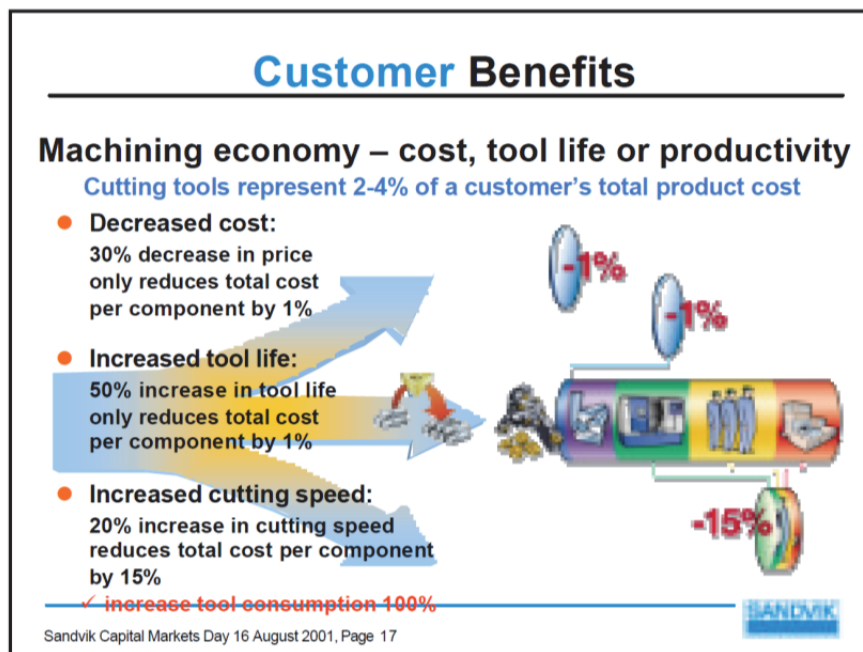
The productivity graph, which showed the perceived widening gap between the general cost increase and price decrease that manufacturing companies around the world were facing. This graph was widely circulated both within and beyond the company (Capital Markets Day presentation 2003).

The development of products that improved the customer productivity was also considered to have economic benefits for the company. In Coromant, in particular, it was argued that customers were willing to pay a price premium for products with superior productivity. One reason for this was that the direct cost for the cutting tools was small in comparison to other production costs such as raw material, machinery and equipment, labour costs and general overhead. Coromant had calculated that the direct costs for cutting tools in general accounted for only 2-4 percent of the customers' total production costs (see Meet Sandvik 1996). However, while the cost for cutting tools accounted for only a small proportion of the total production costs, these tools were centrally placed in the customers' production processes. The 'right' cutting tool thus could have a significant impact on the efficiency of the entire production process and the total production costs (*ibid.*). It was argued that if the cutting tools could displace material faster, this would free up more machining capacity, which meant that fewer machines were needed to produce the same amount of products; and if fewer machines were needed, fewer operators would also be needed, and so on (see Capital Markets Day presentation 2001). Thus, cutting tools with superior productivity were attributed several positive follow-on effects; there was a virtuous cycle through which the technical performance of the cutting tools affected every aspects of the production process.

In Tooling, this relationship between the cutting tools' productivity and the total production costs was known as 'the productivity leverage effect' (see Annual Report 2001). The productivity leverage effect modelled the perceived relationship between the technical performance of the cutting tools and the economic benefits for the customers. Equipped with this calculative device, the company had performed a series of calculations that showed how customer value was created not by lowering the prices, as this would only have marginal impact on the total production costs, but by developing cutting tools with superior productivity. For instance, Coromant

argued that while a price decrease of 30 percent (or an increased tool life of 50 percent) only reduced the total production cost (per component) by 1 percent, a 20 percent increase in the cutting speed would reduce the total production costs by 15 percent (see exhibit 5.3).

Exhibit 5.3. The productivity leverage effect.



The productivity leverage effect, which modelled the relationship between the productivity of the cutting tools and the customers' total production costs (Capital Markets Day Presentation 2001). This particular graph shows that whereas a decreased price or an increased tool life (affecting the direct cost for the cutting tools) would only have a small effect on the customers' total production cost, increased productivity would have a significantly higher impact on the total production cost by freeing up machining capacity.

Such calculations were frequently used by Coromant to promote its products to the customers. They were also frequently used to calculate the economic value for the company of developing products with superior productivity. It was argued that the development of products with superior productivity would lead to both higher profit margins and higher market

share. The development of technically superior products was, for instance, considered to have been a key factor in Coromant's strong financial development in the 1990's (see Meet Sandvik 1996). Hence, through these calculations, the productivity of the cutting tools was directly linked to the economy of the company.

In sum, a range of socio-material arrangements framed the product development practices in the early 2000s. These included the product development manual, but there were also other arrangements that contributed to making customer productivity a central metric of value in the product development practice. Through these arrangements, the productivity was critically linked to the strategy and economy of the company. The development of products with superior productivity became a strategic and economic imperative.

As a consequence, the early development work in Alpha focused on designing a technical solution that had comparable productivity to a certain type of Coromant's standard solid tools. The key to this was considered to lay in the design of the interface between the holding shank and the exchangeable head. This interface needed to be robust enough to generate a stable and efficient performance, but still not so complex that it would become too expensive to manufacture. This was a complex technical assignment since the product needed to be able to operate with micrometrical precision – meaning that the interface needed to be extremely robust and reliable.⁷⁴ After three years of development, the engineers deemed that they had found a design that would generate an adequate technical performance. The continued testing of this solution required more resources and more money, which in turn required that Alpha first became a formal product development project. Hence, in 2004, Alpha was re-organised into a formal product development project, with a project group and a budget.⁷⁵

5.2 The beginning of project Alpha, part 2: Choosing a valuable design

Following the re-organisation of Alpha into a formal project, the first task for the newly appointed project manager was to write a product specifica-

tion report; the purpose of which was to evaluate the project's commercial potential and technical requirements. Since Alpha had started with the development of a technical solution, the work on the product specification report focused on the question of Alpha's market potential.

In order to determine how Alpha should be positioned on the market, the project group first attempted to gather information about customer needs from Coromant's selling units around the world. However, it was difficult to get any substantial feedback. For the selling units, Alpha was a new type of product that they had no experience of selling and exhibited little interest in. It was clear that Alpha was, as one steering committee member described, a product "that had been driven more from the inside-out", where a technical solution had been developed before there was an expressed market need.

Lacking any substantial feedback from the selling units, the project group instead used the concepts of *market leadership* and *customer productivity*, which were prescribed, as discussed above, by the broader organisational frame as important devices for valuing new products. Knowing that Coromant's strategy prescribed that any new product should be the market leader, the project group evaluated the competing products on the market. If Alpha was to be the market leader, its technical performance should be at least as good as these products, as the project manager explained:

What we had to do instead [since we didn't get any feedback from the selling units] was...well, we knew that the product had to be better than the competitors, so we simply bought a lot of their products and ran a lot of tests. We built the product specification on, well, the minimal feedback we got from the selling units but mainly by looking at our competitors, which we considered to be the minimum requirement.

By comparing Alpha to the competing products in this manner, there was a shift in the enactment of what type of product Alpha was. Alpha was no longer compared to a certain type of solid tools in Coromant, as it had been in the early development work. Instead, Alpha was now compared to the competing products with similar technical solutions on the market.

This benchmarking with the competitors also raised new questions about the product's design. In particular, it raised questions about how cus-

customer productivity should be defined. As mentioned, customer productivity was usually defined as the volume of material displacements per minute. However, the project group had discovered that one of the main competitors' products were not designed to maximise the productivity measured in this way but rather as more flexible products, which had the advantage that the customers' could use them in different applications. Thus, the question was whether it was more valuable to design the product to maximise productivity or to design it as a more flexible product:

Coromant was at that time really pushing productivity as the guiding principle. By productivity we mean how much material you can cut away in a minute. Now, if you want productivity you have to design the product in a certain way. But, customer value could also be that the product has some other functionality, or that it can be used in certain operations, and so on. That will put other demands on the design of the product. [...] For instance, if you want productivity, you want to have a large cutting depth. However, there could be another customer, say an airplane manufacturer, who want to use this tool in an operation where he needs a very long holding shank. Then, he may only need a very small cutting depth. In fact, it may be better for him to have a small cutting depth because it will make things more stable. That may be customer productivity for him. [...] This was the trade-off we had to make. (Project manager, Alpha)⁷⁶

The issue here was not whether the productivity, as measured by the volume of material displacements, needed to be better than the competitors' products, but rather how much better it needed to be and what other properties the product also needed to have to be commercially successful and valuable.

Having evaluated the competitors' product catalogues, talked to industry experts and estimated the sales volume of different potential market segments, the project group opted for a more flexible product that could be used in many different operations. To make this decision, the project group again used the competitors' products as a benchmark:

It was very difficult to make these trade-offs if you don't get any feedback from the market. [...] What we did was that we did a careful analysis of our competitors' products again. And we realised that our main competitor was

leaning more towards flexibility with shorter cutting depths and more variety. [...] Then we talked to our sales units again and got the feeling that flexibility would probably be more important for the market, for how this product was going to be used, rather than [maximising] productivity. (Project manager, Alpha)

Alpha was thus enacted as a new type of product, which was different from anything that Coromant had in its portfolio. The main advantage of Alpha was no longer that it was cheaper compared to solid tools, but rather that it was more flexible and could be used in different ways. As a member of the steering committee explained:

We have all these products for different types of operations. But Alpha is a completely different type of product – it cuts the matrix in the other direction so to speak. With Alpha the advantage is that you can use it for all these different types of operations. The productivity probably won't be any better compared to a product specifically designed for anyone of these types of operations, but there is a lot more flexibility.

After this decision had been made, work began to develop a prototype for Alpha. This work continued within the Product Development Department during 2004 and 2005. However, by the end of 2005, the project team had reached an impasse and a new decision needed to be made about whether and how the project should continue.

5.3 The lunch meeting: Conflicting versions of the value of Alpha part 1

In the end of 2005, after more than a year of extensive testing, there was “a growing feeling” in the project group that the current technical solution “would not take them the whole way”, as one engineer put it. In particular, the project group had run a series of tests in the Product Development Department's testing facility. The results of these tests showed that the current technical solution had not reached the right levels of productivity.

In the testing practice, productivity was a precisely defined quality measured by a technical formula, called ‘the Q-formula’:

$$Q = A_p * A_e * r$$

According to this formula, there were three parameters which could increase the productivity (Q) of a cutting tool, i.e. the volume of material displaced per minute (cm³/min):⁷⁷

- Cutting depth (A_p), the depth of the cutting interface
- Cutting width (A_e), the width of the cutting interface
- Feed rate (r): the speed at which material could be cut away

Data was calculated and compiled for each of these parameters and the products' performance was compared and evaluated against certain standards. In Alpha, the productivity was compared to the performance of the competitors' products, which was the valuing principle specified in the product specification report. These tests showed that while the productivity was better compared to most of the competitors, it was inferior compared to one of the main competitors. This result prompted the project group to question the value of the current technical solution:

We realised that we had to come up with something better than this to beat [competitor one]. When we realised that...well, we knew we could not introduce a product in the market that wasn't better than our fiercest competitor, and we saw no possibilities to improve the existing solution any further. (Project manager, Alpha)

In light of these test results, the project group felt that there was a need to explore alternative technical solutions. However, as this would entail changing the scope of the project radically, the decision could not be made by the project group. Thus, with support from the head of the Product Development Department, the project group summoned a number of managers to a lunch meeting in the end of 2005. The purpose of this meeting was to decide how the project should continue. The managers that participated in the lunch meeting included the project's steering committee, which had the formal mandate to make decisions about the continuation of the project. In addition, the project group had invited other managers from the Product

Development Department and the Market Department that were “somehow affected by the project” or had “useful experiences”, as the project manager explained.

At the meeting, the message from the project group was clear: the current technical solution was not working. “We basically told them that we are at the end of the road, we cannot develop this further and it is still not working well enough”, one engineer recalled. The results from the productivity tests were presented at the meeting in a series of graphs and tables that qualified Alpha as underperforming compared to the main competitor. In addition, several prototypes had been placed on the table in the conference room where the meeting was held for the managers to fiddle around with. Having played around with the prototypes, many managers noted that the technical solution – in particular the interface between the two parts – was “clumsy and difficult to handle”, as one steering committee member put it. This was a negative quality since the product’s value proposal was based on that it should be easy to change the head between different applications; “that would not be good for our sales”, the same steering committee member continued. Taken together, these devices and the project group’s presentation qualified Alpha as a non-valuable project – if it continued with the current solution.

At the time of the meeting, there was no tested alternative solution. Instead, the project group’s idea for an alternative solution was presented at the meeting through a series of drawings and verbal descriptions. While there was not any workable and tested solution yet, this new conceptual idea was attributed the promise of better productivity. Yet, pursuing this alternative solution meant that the project would be severely delayed; it would result in a “de facto restart” of the project, as one steering committee member noted. Hence, the managers were presented with the choice of “keeping the time plan or delaying the project to search for an alternative solution”, as the project manager described it. Pursuing this alternative solution also meant that additional resources (in terms of money and personnel) would have to be committed to the project over the next few years and the project would not keep its budget. Hence, this alternative was a not valuable according to the product development manual. At the meeting, there were thus two different versions of the value of Alpha, both prescribed by

the different socio-material arrangements framing the product development practice: Alpha was a valuable project if it explored the alternative technical solution, as this could result in a product with higher productivity. At the same time, Alpha was also a valuable project – in terms of the time plan and the budget – only if it *did not* explore this alternative solution but continued with the current solution.

However, for the project to continue, a decision needed to be made: the project could not simultaneously be timely and have a superior productivity. In the lunch meeting, the managers decided that the project should explore the alternative technical solution; “we all agreed that we could not introduce a product that was not better than our competitors”, as a steering committee member explained, “and they convincingly showed us how difficult that would have been with the old technical solution”. There was, as one engineer recalled it, “never any talk about cancelling the project”, although this could have been an option according to the product development manual. Thus, after the lunch meeting, Alpha was enacted as a technically superior project – but not a project on time or on budget.

We should interpret this not as a choice of technical performance over economic performance. Customer productivity, as measured by the Q-formula, had been critically linked to the strategy and the economy of the company. Thus, the Q-formula had been enacted in the product development practice as a device through which the economic value of particular product development activities could be calculated. Hence, the decision here was rather a choice between two different versions of the economic value of Alpha – the economy as time plans and budgets or the economy as productivity, which would lead to high margins and high market shares. In the lunch meeting, the strategic and economic importance of a product with superior productivity weighted more than the importance of keeping the deadline and the budget.

After this decision, the project was restarted. The development continued for almost two years before a new decision needed to be made about the value of Alpha. In particular, when the project reached stage-gate three in the autumn of 2007 a decision needed to be made about whether the project should be allowed to make investments in production machinery. In the meantime, however, the broader calculative arrangements in the com-

pany had started to change in ways which affected the product development practices.

5.4 Re-configuring the broader socio-material arrangements: Value creation, time plans and financial accountability

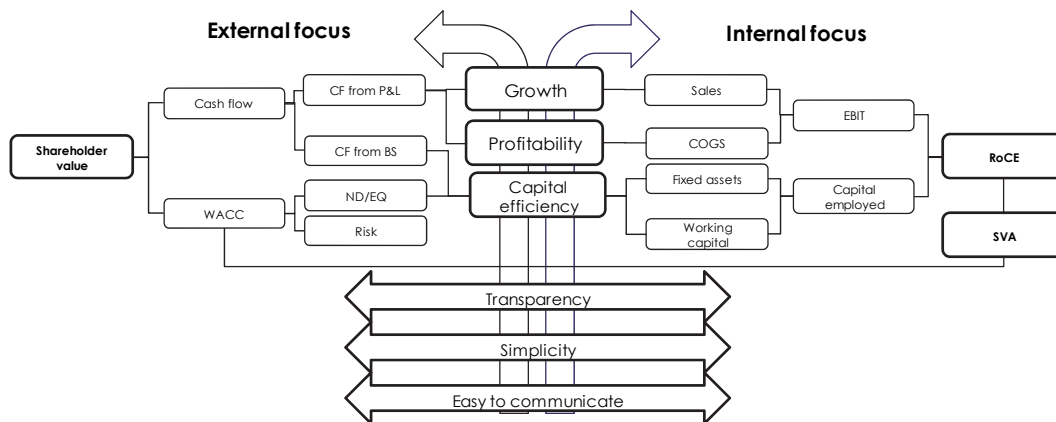
As discussed in chapter four, shareholder value creation had become a central corporate objective in Sandvik in the late-1990s. In the following years, substantial investments had been made in the company to align the managerial practices with this corporate objective. The focus in the internal management control had “increasingly shifted” towards the key metrics of value creation, which were, as discussed in section 4.4, related to growth, profitability and capital efficiency (Sandvik’s CFO, interviewed in 2004). In particular, for Tooling, the managerial focus in the mid-2000s had come to be on “sales growth, the EBIT-margin, and capital efficiency [in that order]” (ibid.).

In the mid-2000s, the management made further efforts to install a focus on value creation in the organisation. For example, in 2005, the management, led by the company’s new CFO, launched a global change program called First Class Finance that aimed to enhance the standing of the finance organisation in the company and increase its involvement in business decisions. The stated aim was that the finance organisation should be “a more obvious contributor to the shareholder value than we have been before” (CFO, internal information letter 2006). To this end, this program aimed, through a variety of activities, to make the business controllers “more visible, proactive and take a much more active part in business direction” (ibid.). In particular, the controllers should educate the operating managers in “what will make them succeed or fail in reaching the company’s financial targets”, and they should help them to “see the financial implications of different business decisions” and be “active in giving suggestions for improvement” (ibid.). The controllers should also be a “stone in the shoe” of the operating managers and incessantly impress upon them the importance of financial calculations (Internal document 2007).

To achieve these aims, a series of training programs was launched, directed at controllers and managers at all levels of the organisation. These training programs included things such as the company's financial targets, basic cost accounting, investment analysis, and a session on the relationship between the company's business performance and the share price, which included a rundown of Free Cash Flow model and its value drivers (see section 4.3.1).⁷⁸ Thus, partly through these training programs, the First Class Finance program attempted to re-format the calculations of the managers and controllers in the organisation and to make these more attentive to the company's financial performance and the corporate objective of shareholder value creation.

In 2006 the management also presented a new steering model, as discussed in section 4.4.3, that aimed to further align the management control practices in the organisation with the corporate objective of shareholder value creation. In particular, this new steering model focused on "the metrics that the shareholders use to evaluate [the company's] performance", as the CFO explained (Internal memo 2006). It built on the three value drivers in terms of which the management had defined value creation: growth, profitability and capital efficiency (see exhibit 5.4 below). Specific performance measures were defined for each of these value drivers at the business area level, which could then be broken down into other measures at the operating level. Thus, the new steering model provided a detailed and comprehensive script for how the company was going to create shareholder value; it aimed to make it "very clear what each manager was responsible for", as the head of group business control explained.

Exhibit 5.4. The new steering model.



The New Steering Model (adapted from Capital Markets Day presentation 2006). The model had three main value drivers: growth, profitability and capital efficiency. A series of internal and external measures were linked to each value driver. The model thus provided a comprehensive script for how the company should create shareholder value.

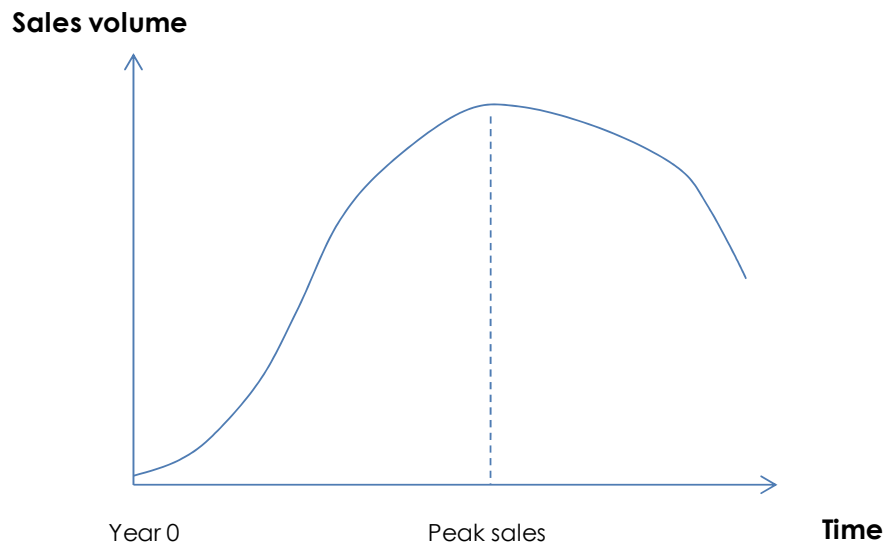
As discussed in section 4.4.3, the new steering model also included a new performance measure called Sandvik Value Added (SVA).⁷⁹ The aim of the new steering model was, as the CFO noted in an internal letter to the finance community (2007), to achieve a “higher focus on KPIs related to growth, profitability and capital efficiency in order to measure and communicate the importance of SVA and cash flow throughout the organisation”. In particular, this model aimed to increase the focus on capital efficiency in the organisation; “capital efficiency was a bit forgotten, so this was a way of getting a more balanced control”, as the head of group business control explained, “this model has three parts that you need to manage – it’s not good enough to ignore capital efficiency anymore”.

The implementation of the new steering model involved more than a year of extensive information campaigns and training programs during 2006 and 2007. The training programs were, as the head of group business control explained, also seen as “an opportunity to put finance and financial issues on the map, since we talked to basically everyone in the entire company”. As a consequence, there was, as one controller noted, “quite a big hype about the new steering model” in the organisation. In connection

to this the management also introduced a new incentive program for 300-400 of the company's top managers and specialists (Annual Report 2006). The incentive program focused on measures related to growth, profitability and capital efficiency. The stated purpose was that this program should create "a common perception" between managers and shareholders and form a link to the "long-term value enhancement of the company" (ibid.). Taken together, substantial socio-material investments were made in the mid-2000s to change the broader organisational frame more towards a value creation frame.

In the product development practice, these efforts to make financial calculations and value creation more important provided a new impetus for longstanding concerns about the product development projects' financial performance. In particular, there was a growing ambition to reduce the throughput time in the product development. Reducing the throughput time was considered to be important for several reasons: Firstly, it was "important to reach the peak sales as quickly as possible after there was a market need", as one steering committee member explained. According to the product life cycle model, which was influential in the product development practice, 'the peak sales' was the highest point in the product's life cycle, after which the sales would eventually start to drop off (see exhibit 5.5). Reducing the throughput time, and improving the time to market, was thus important since it would lead to increased "sales and profits", as another steering committee member explained; "we have to be quick in the beginning because that is where the money is", he continued. Thus, reducing the throughput time was considered to generate 'profitable growth'. Secondly, reducing the throughput time was also important because it improved the capital efficiency. Reduced throughput time in product development was, for instance, singled out by the new steering model project group as one of the key areas for reducing the capital efficiency and improving the cash flow (Internal document 2007).

Exhibit 5.5. The product life cycle model.



The product life cycle model (reconstructed from notes). The product life cycle model illustrates the assumed development of the sales volume for a product over its life cycle, from the time the product is developed and brought to market until it's eventually removed from market. The peak sales is the high point in terms of sales volume before the sales start to decline.

Given this ambition to improve the throughput time, the product development manual was revised and updated and a new version of the stage-gate model was introduced. The new manual clearly prescribed that the development process should take no more than two years. This was to be coupled with a more structured planning process, so that more complex research activities could be conducted in separate research projects prior to the actual product development projects. It was argued that to meet the new two year deadline, the product development projects needed to focus on things which the company already knew a lot about, as a member of the steering committee explained:

We need to be fast because if you look at our sales over the life-cycle of a product from the market request until it is dead we have to be quick in the beginning – that is where the money is. [...] This means that you need a more structured process. If you're going to finish the development process in two

years, you need to be structured and develop something you already know a lot about.

Meeting the new deadline was thus set out as a main objective for product development projects in the Manual. However, the Manual was not the only device that put more emphasis on time plans. The importance of time plans was also reinforced by the actions of the Market Department. In particular, in the mid-2000s, the Market Department had started to organise a series of global marketing campaigns for Coromant's various product areas, with the aim of increasing the sales and profitability. The idea was that each campaign should be headlined by a number of new and exciting products within each product area. For the Market Department, the aim was that these new products should be introduced in a "predictable cycle", so that the marketing efforts could be co-ordinated, which would lead to increased sales, as one manager explained. These global marketing campaigns involved substantial investments in things such as marketing and training of sales personnel. Hence, for the product development projects, if they had been selected to be a part of them, these campaigns meant that there was an increased pressure to meet the deadline. These new marketing campaigns thus also contributed to increase the focus on time plans in the product development practice.

In addition to the ambition to reduce the throughput time, there had been growing concerns in recent years about the costs of aborted or severely delayed product development projects. These problems were largely attributed to the lack of sufficient control over these projects, as a senior manager in the Production Department explained:

I have been involved in projects that we have allowed to continue all the way to the end before we have realised that we cannot do this, or that this is not profitable. In one project we had shipped the production equipment to the US, and we were one month away from starting production, before we realised that this would not work. We had invested 10 million EUR in equipment that we sold on e-bay for 50 000 USD. [...] There was not enough control.

Hence, there was an ambition to tighten the control of the product development projects and increase the financial accountability. Therefore, the

updated product development manual more clearly specified the requirements for passing through each stage-gate. Things became, as a steering committee member described it, “more structured and formalised”.

Taken together, substantial efforts were made by various agencies in the mid-2000s to re-configure the script for how organisational activities were to be valued. As we shall see in the remainder of this chapter, these investments contributed to change the script for how product development activities should be valued. Things such as timeliness and financial control became more important qualities. In Alpha, the renewed significance of these measures first became apparent in the spring of 2007. The project was re-organised in the spring of 2007; a new project manager was appointed and the project was given a new, tougher deadline. This deadline became even tougher a few months later when the project was selected by the Market Department to be included in one of the new global marketing campaigns, which was to start in less than two years. Hence, there was suddenly a considerable need to speed things up in the project. In particular, to meet this new deadline the project group needed to start performing large scale tests of the production process already in the autumn of 2007, and to do that they first needed the approval by the steering committee to make new investments in production machinery at the stage-gate three meeting.

5.5 The stage-gate meeting: Conflicting versions of the value of Alpha part 2

Stage-gate three was, in the words of one project group member, “a wee bit magical” since once a project had cleared this step, it was allowed to make machine investments and other preparations for the market introduction. The requirement for passing stage-gate three was, according to the product development manual, that the project had a viable technical solution that could be produced efficiently enough to meet the business area’s profitability requirements. In the stage-gate meeting, the discussion came to focus on the question of the project’s profitability. Profitability was – like productivity – a precisely defined quality in the product development practice. As discussed in section 4.4.1, the profitability requirements were articulated in

terms of profit margin and RoCE at the business area level. In the product development practice, the profitability requirement was articulated in terms of the expected profit margin of the new product, which was calculated by subtracting the estimated production costs from the product's estimated sales and expressing the result as a percentage of the sales. That is, for each 100 SEK that a product was expected to sell for, the company should be able to retain a certain percentage in profit.

Prior to the stage-gate three meeting there had not been any complete investigation of the production costs and the profitability in the project. At the lunch meeting, for example, there had only been rough estimates of the potential sales and production costs of Alpha, and after the lunch meeting there had only been partial investigations of the production costs in the three production units involved in the project.⁸⁰ Part of the reason for this had been, as discussed, the focus on getting the productivity right. The calculations that had been conducted, however, indicated that the profitability risked being below the required level. These indications had provoked some discussion about the value of the project in the company. In particular, the Pricing and Profitability Unit, a centralised controlling unit that was responsible for overseeing the products' price level and profitability, and which was represented in the steering committee, had voiced concerns about these indications and asked the project group to perform more careful investigations. Yet, the project had continued unchanged.

Leading up to the stage-gate three meeting in September 2007, however, partly as a result of the increased importance of the formal requirements for passing through the gates, the project group needed to perform a more comprehensive investigation of the project's profitability. While this was the most comprehensive calculation of the project's profitability to date, it was still not complete since the cost estimates from one of the production units were still missing at the time of the stage-gate meeting, as a consequence in part of the need to speed up the project.⁸¹ Nevertheless, these calculations clearly indicated that Alpha's profit margin would be far below the profitability target. This result qualified Alpha as a non-valuable project:

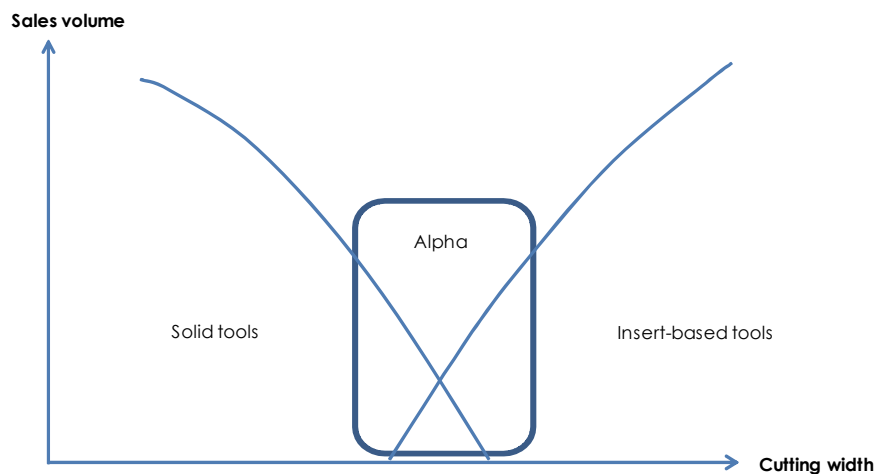
We hadn't quite reached our targets. We were on [confidential] percent. Most other companies would think that was really good, but this is Coromant, and here it simply wasn't good enough. (Project manager, Alpha)⁸²

Specifically, the project's profitability was about 30 percent below the target level. This prompted serious questions about the continuation of the project. The Pricing and Profitability Unit again questioned the project's value and strongly recommended the steering committee to cancel it so that the resources committed to Alpha could be "put to better use in other projects with higher margins and better prospects to make more money" (Project manager, Alpha). There were, in particular, two arguments levelled against Alpha: Firstly, it was argued by the controllers in the Pricing and Profitability Unit among others that the project should not be allowed to continue because it was outside the company's financial guidelines, which should be followed; "some people wanted to shut down the project because this was a business and you shouldn't just be nice", as the project manager recalled. Secondly, these profitability calculations also raised the question of "cannibalism", i.e. the perceived tendency of new products to take sales from existing products. Hence, the question was whether Alpha would take sales from existing products with higher profitability.

In response to these concerns, the project group, and the project's backers in the Market Department, attempted to make the project valuable again. Firstly, they argued that Alpha was valuable because it was a "technically innovative and strategically important" project, as the project manager explained. They also argued that since Alpha was a technical innovative project, which involved new production methods, the steering committee should accept a lower profitability in the beginning. Finally, and perhaps most importantly, the project group also performed a new series of calculations that aimed to shield the project from the question of cannibalism. These calculations hinged upon a re-classification of the potential market for the company's products; instead of classifying the market in terms of product areas or application areas, which was the standard practice, the project group introduced a new graph that classified the market in terms of the cutting widths of the company's different products (see exhibit 5.6 below). The aim of this graph was to show that there was a gap in terms of

cutting widths that Coromant currently did not serve. Solid tools were too expensive to manufacture in this particular range and insert-based tools needed, for technical reasons, to be manufactured in larger dimensions. Alpha could, however, thanks to its specific technical solution be manufactured in this particular range of cutting widths. Hence, when the market was classified in this way, it became possible to show that “the lion share of Alpha’s sales would be new sales volume”, as the project manager explained. Thus, Alpha was qualified by this calculative device as ‘a generator of new sales volume’. The value of this potential new sales volume was then calculated by estimating the sales figures of the competitors that had similar types of products already on the market.

Exhibit 5.6. The market classification graph.



The market classification graph (reconstructed from notes). This graph illustrated the market potential of Alpha by re-classifying the market in terms of the cutting widths of the company's different products. This re-classification showed that there was a gap that Alpha could target.

Equipped with this new calculative device, it became possible for the project group to qualify Alpha as a valuable project again. Alpha was now a valuable project not because it had an ‘acceptable’ profit margin, but because it generated new sales volume that contributed to increase the com-

pany's profits. This new calculative device also affected the steering committee's decision, as one steering committee member explained:

Alpha didn't meet Coromant's profitability requirements. It didn't contribute to increase our profitability, quite to the contrary. However, it contributed by taking new volumes, which would increase our total sales. Then we said: 'Is it absolute numbers or percentages we should be looking at? Is it better to make some money but drop a little bit in our profitability level or should we forgo the money and keep the theoretical level. What would the shareholders be happiest with?'

Thus, the steering committee decided to allow the project to continue and to authorise the necessary machine investments. Alpha was valuable again. It was a technically innovative and strategically important project – and it was profitable, in terms of new sales volume and absolute profit. However, while Alpha was enacted as a valuable project by the steering committee, the value of Alpha became a matter serious debate again shortly after the stage-gate meeting. The issue this time was whether the new machine investments, which the steering committee now had approved, would also be approved in one of the production units involved in the project.

5.6 The machine investment meeting: Conflicting versions of the value of Alpha part 3

Although the steering committee had cleared the project to make machine investments at the stage-gate meeting, this did not automatically provide the project with the funds needed to make these machine investments. Like it was the production units who were responsible for deciding on the production methods, it was also the production units who would be held accountable for the production costs once Alpha was in production. Hence, the final approval of machine investments fell under the remit of the individual production units in which the machines were going to be used. The machine investments needed the formal approval of the senior managers and controllers in each production unit. In one of the three production units involved in the project this became a problem.

In particular, a couple of months after the stage-gate meeting, Alpha's project manager met with managers and controllers in this production unit to discuss the proposal for the new machine investments. This proposal described an investment in four new machines for executing a particular production step, an outlay of tens of millions SEK. As a result of the production unit's choice of an automated production process, these machines were central to the production. They were also exceptional machines in two respects: Firstly, the machines involved a new technology that the production unit was unfamiliar with. Secondly, the machines had to be specifically tailored to undertake this particular complex operation, which meant that they could not be used to produce any other product.

In the machine investment meeting, the discussion focused on the qualification of Alpha using a specific calculative device: the investment analysis. This was conducted according to a standardised Tooling format that, in addition to a short qualitative motivation for why the investment was necessary, built on a cash-flow based model for financial evaluation. In this model, the cash flow consequences of the new machines had to be estimated for their useful life. These cash-flows were then discounted by the cost of capital to calculate the net present value. However, there was also a pay-back target tied to this cash-flow analysis. This target was prescribed as an important metric of value by the business area's management manual, which stated that "the standard request is a pay-off time not exceeding three years".

The pay-back target was highly influential in the investment practices within the Production Department. Informants described how the outcome of investment decisions could be precisely foreseen based on the outcome of the pay-back calculation. Controllers in the production units would routinely screen out the investment proposals that failed to meet the pay-back target. Such proposals were never relayed to the senior managers for further consideration and, even if such proposals would have been relayed, "neither [the head of the Production Department] nor [the head of the Tooling] would ever sign off on any investment that had not been calculated and approved according to our investment model", as the head of control in the Production Department explained. Conversely, the same informant described how the senior managers had "never stopped an in-

vestment that had a pay-back within the requirements of the model, or made any further prioritisations among such investments”. In other words, in the Production Department, if an investment proposal was qualified as valuable by the pay-back calculation, it was given a green light and was cleared for take-off.

The standard procedure was for the actual calculation of the pay-back time to be undertaken by the production unit controllers together with the production managers responsible for the investment. This involved plugging in the cash amounts of the investment and the annual inflows and outflow into a preformatted excel-model. The estimates of sales volume and production costs were central in this calculation. When the controllers in the production unit went through this calculation in the case of Alpha, the resulting pay-back time for the new machines proposed by the project group far exceeded the three-year target. This result qualified Alpha as a non-valuable project again:

It was when people saw that the pay-back time would be 10 years that the discussions in the organisation really started. [...] I will never forget the meeting when the production people saw that the investment wasn't paid back before 2018. They started to get really disturbed. They said things like: 'I will be retired before this project is paid back'. Is one thing that the profit margin wasn't good but the pay-back time, when they saw 2018, that was when the real problems started. (Project manager, Alpha)

The 10 year calculated pay-back time led the production unit controllers to reject the investment proposal. Alpha was simply not a valuable project to pursue. In response to this critical valuation – which could effectively end the project – the project group and the project's proponents in the Market Department attempted to find new arguments that could persuade the controllers to change their mind. For instance, they undertook new and more detailed investigations of Alpha's potential sales volume, including sending out a survey to the salespeople to obtain an updated, and hopefully more promising, estimation of the sales volume. However, it turned out that the real problem with the sales volume, in relation to the pay-back calculation, was not the estimates as such but how the estimated revenues were allocated to the different production units involved in the project. In particular, in

the pay-back calculation, the estimated revenues for Alpha were allocated to the different production units according to the proportion of the total production cost that each unit accounted for. This was in accordance with the standard protocol and consistent with Sandvik's cost allocation and transfer pricing policies.

When analysing the Alpha investment, the production unit controllers had determined that their unit's share of the total production cost was only 15 percent.⁸³ Hence, only 15 percent of the total revenues could be included in the pay-back calculation.⁸⁴ Compared to the large cash outlays for the new machines – which were by far the largest investment in any of the production units for this project – this made it significantly more difficult to get the machine investments approved, as a member of the steering committee explained:

The main problem was that each production unit had to calculate their own profitability, when it came to machine investments. We were only allowed to calculate revenues according to the share of the total production cost that came from [the Production Unit] for the investment. [...] But, these machines are very expensive. They cost a lot of money. This system made it very difficult for us to make such large investments... When they calculated it in this way, it pushed the pay-back time towards 10 years.

Since the pay-back calculation could not be re-calculated, the project's proponents argued that an exception should be made due to Alpha's strategic importance. As in the stage-gate meeting, the project group also argued that the value of the project should be calculated in terms of the profit for the company as a whole: "the project was profitable for Sandvik as a whole – it was only in one production unit that it was not profitable", as one steering committee member recalled. However, these attempts to convince them that Alpha was valuable did not sway the controllers in the production unit, who remained adamant that the investment analysis made Alpha a non-valuable project, as the project manager recalled:

It was one thing that the steering committee knew that the profitability was not really good, but they are still sort of involved in the project. And it is one thing that our profitability targets are rather rigid, but the investment requirements are much more rigid. It is three years and that is it, not a day more.

Thus, this conflict over the value of Alpha could not easily be resolved. There were two robustly different versions of the value of Alpha, each produced by different socio-material arrangements. In the Production Department, the pay-back calculation, investment guidelines, the company's cost allocation and transfer pricing policies, and the substantial managerial commitment that had been invested in the pay-back target combined to enact a robust version of Alpha that could not be easily modified, renegotiated or disregarded. This was not a conflict between people with diverging interests or interpretations that could be reconciled or negotiated; it is better understood as a conflict between two different economic frames – a product development frame and a production frame – that were each maintained by robust arrangements, built up through substantial investments over time. Due to the resilience of these arrangements, Alpha remained both valuable and non-valuable for a period of more than six months. Since this conflict could not be resolved in the production unit, it was escalated through the organisation. In the meantime, the project was stalled – no substantial development work could be conducted before the machine investment had been approved.

The question of whether to proceed with the machine investment was gradually moved from the project group and the production unit controllers to the senior managers of the Product Development Department, the Market Department and the Production Department, respectively. However, the senior managers in the Production Department still refused to accept the investment: “what is the point of having rules if these are not followed?”, as a member of the steering committee summarised the gist of the Production Department's argument. This stance was partly fuelled by a perception among the production managers that the production often ended up with ‘the short end of the stick’. Like the controllers in the production unit, the production managers felt that they often had to assume the role of being guardians of the company's financial interests, since it was the production that in the end would be held accountable for the profitability of the products, as a senior manager in the Production Department explained:

If [a product] doesn't make our profitability targets the project should not continue – but that isn't always the case. There is always some product management person saying this project is so important, it will generate indirect sales and so on, so we don't have to keep the profitability targets. Then you reach the final stage and the profitability is too low, at which point the only way to solve this is to reduce the production costs. We always end up with the worst hand. Hence, I always say that production needs to be the police.

Thus, this conflict between the two versions of the value of Alpha could not be settled through negotiations between the senior managers in the Market Department and the Production Department. Over a period of six months “every person that this kind of investment normally would have to pass through said that this is not ok but I'll pass it along with my recommendation to cancel the project”, one project group member recalled. Ultimately, the decision to move forward with the project was taken at a board meeting at the business area level. The board of the business area, which besides senior Tooling managers also included corporate managers, such as Sandvik's CEO and the group business controller, decided to allow the machine investments. However, this decision was made only after the head of Coromant had “personally vouched for the project”; “he stuck his neck out”, as the project manager described it. In addition, only two of the originally proposed four new machines were approved. Thus, the project could continue.

Notably, just as this conflict was located in conflicting socio-material arrangements, its resolution depended on socio-material ordering. This conflict could only be resolved once it had reached an agency (the board of the business area) that had been enacted – through such devices as organisational charts and contracts – as an able decision-maker in this matter. That is, the board of Tooling's possibility for action was not constrained by the economic frames enacting these two conflicting versions of the value of Alpha, but it was enacted as a strategic actor capable of modifying these frames.

Once Alpha was restarted after the approval at the board meeting, the project needed to move forward rapidly to meet its deadline. Because of the six months of lost development time, several compromises had to be made to meet this deadline; planned tests were postponed or skipped and not all

planned variants of the product could be launched on time. Thus, this conflict had an effect on the design and development of product. Once Alpha was introduced in the market, however, it was an immediate success with the customers. In the otherwise gloomy 2009, as discussed in section 4.6, Alpha's sales far exceeded even the most optimistic expectations. Certain versions of the product sold more than 1000 percent of the yearly budget within just a couple of months. This feat was so remarkable that Alpha was held up by the corporate management as an example of the business area's superior competence in product development. Thus, Alpha was a valuable project again.

5.7 The beginning of project Beta

In the preceding sections we have followed the changing valuations of product development activities in project Alpha. In the following sections, this account is complemented and contrasted with an account of the valuations of product development activities in project Beta. Project Beta started much later than project Alpha, in the beginning of 2007, and there was thus a partly different script for how product development activities should be valued already from the start of this project. In particular, Beta first started in 2006, but due to the lack of development engineers and project managers, which were often scarce resources in the Product Development Department, Beta was postponed while other projects were prioritised. When Beta was re-started in the spring of 2007, the product development practices had become more structured and formalised and Beta was given a strict deadline two years away. The importance of this deadline was reinforced by the fact that Beta was, like Alpha, selected by the Market Department to be part of a new global marketing campaign. Beta was thus, as Alpha, an important project in the Product Development Department.

Whereas Alpha had been conceived as a similar product as a specific type of product that certain competitors had in their product portfolio, Beta was intended to be developed as a similar type of product as one that Coromant already had in its product portfolio. Beta had first started, in 2006, in response to a routine audit conducted by the Market Department of the sales figures for different types of products. Seeing that Coromant

had started to lose market shares in one of the core product areas – as the sales did not grow at the same pace as the market – the idea was to develop a product that could complement the existing products in this area.

The first thing the Market Department did, in 2006, after having seen this decreasing market share, was to organise a conference on the future of this product area. Salespeople from the company's different market areas around the world, who were specialised in this particular product area, were invited to the Market Department's headquarter. The question for the participants at this conference to answer was what kind of product that was needed to improve the sales in this product area. The general conclusion was that the new product should be a broad product that could be used in different types of operations, up to a certain cutting-depth that would exclude heavy duty operations (product management manager, Beta). The conference also provided some information about the perceived customer preferences, such as that the inserts should have more cutting sides so that the customers could use them longer and that the tools needed to be able to cut more effectively at lower energy levels, as the customers' machines seemed to get cheaper and smaller. This information was compiled and edited into a first draft of the product specification report, which listed the important properties of the new product and specified the target level for each property. Setting the target levels was, however, a complex task that involved certain decisions to be made. For instance, the ability to generate a smooth surface was highlighted by the conference as important feature of the new product, but how do you know when a surface is smooth enough? Here again, as in Alpha, the concept of 'market leadership', and benchmarking with the competing products on the market, became the guiding principle for what counted as a good product, as the product management manager explained:

That is an extremely difficult question. Some customers know precisely what they want and measure a lot. Automotive customers, for instance, when they manufacture engine blocks, they know precisely when a surface is working and when it is not working. But other customers want a surface that just looks good visually. They often check the surface by feeling it with their nails or just looking at it. [...] You would prefer to have one target value that you can measure but sometimes you can't. It is rather that you know that a competi-

tor's product, or one of your own products, is performing well in some technical dimension, then you list that as a reference and do comparative tests against that product. That's what we did.

After the product specification document had been written, the project was put on hold for more than six months while other projects were prioritised. After a new project manager had been appointed in the beginning of 2007, the project was re-started. As mentioned, the project was now given a strict time plan. Once restarted, the first thing that the new project group did was to go through the product specification report and rank the different requirements in their order of importance. The first step in this valuation was that the project group visited a number of customers – selected for being representative of the broad customer spectrum that the product aimed for, and for being located nearby – in order to get a better understanding of what the customers' valued and how this type of product was going to be used in practice. This practice was called Quality Function Deployment (QFD) and was prescribed by the new stage-gate model as one of the central parts of the development process, which aimed to reduce the time to market. Beta was one of the first projects that used this new device. Having completed the QFD, the project group sat down in a couple of meetings to value the different requirements, comparing them against each other until a complete ranking list had emerged:

We found that not all functionalities were equally valued. [...] A good sound, for instance, wasn't as important as the number of inserts. I have the feeling that the product requirements are often kind of wish lists. Then you have to ask question, what is the demand and what is only a strong wish? Otherwise you end up with a project were you work and work, and then you reach the deadline and have to settle for whatever you have got. (Project manager, Beta)

Customer economy and customer productivity was enacted as the two most important technical requirements by this practice. Customer productivity was as before measured by the Q-formula, whereas customer economy was taken to mean that the customers could use the product longer than competing products, without having to pay (much) more for it. This meant the

new inserts should have more cutting sides, so that customers could use them longer.

5.8 Trade-offs between time and productivity in project Beta: Enacting a multivalent frame

From the beginning, and throughout the development process, the project group had to make trade-offs between time and technical performance. Both these metrics of value were now prescribed as equally important by the socio-material arrangements framing the product development practice: a good project should both meet the deadline and develop a product with superior technical performance. At times, however, these metrics were in conflict with each other.

In order to meet the deadline, the project group needed to find new ways of working with the design and the testing of different alternative solutions. In particular, they used computer simulations and technical calculations to test and evaluate as many alternative technical solutions as possible in as little time as possible. Later in the project, they also used a project planning software to visualise and calculate the trade-offs between time and technical performance. This software produced a diagram listing the technical properties, and the different variants of the product on one axis, and the timeline on the other. By estimating how long time it would take to develop certain features, the project group could see how many features that they could complete before the deadline:

Look, I have drawn the line here and there you see which features I can get inside the line. Everything that is outside this line falls outside our deadline. Then I have to go to product management and the steering committee and tell them that you can't get these features before the deadline – unless you re-prioritise.
(Project manager, Beta)

Once this device had made visible a conflict between these two metrics of value, a decision needed to be made about how the project should continue, and which of these metrics that should be prioritised. Faced with this

multivalent script, the project group often referred this type of decisions to the steering committee:

[The product manager] has taken almost every decision to the steering committee. He would say: 'I have 3 or 4 alternatives here, I cannot explore all of them, or even more than one, with the resources I have if I am to make the deadline'. This makes it very concrete for the product management and the steering committee. 'It doesn't matter for me', he would say, 'I can explore three alternatives simultaneously, but if time and resources are important you have to choose one'. Then we had to choose whether time was important or whether we should explore alternatives that could give us a better performance. (Steering committee member)

As mentioned, the steering committee had been given the mandate by the product development manual to make decision about the continuation of the project. Thus, it was configured as an able decision-maker that had greater possibilities for action than the project group.

Given importance now attributed to time, the steering committee often valued a timely version of the project higher than one that could potentially optimise the technical performance but risked taking longer time. One example was when computer simulations early in the project showed that a three-sided insert was the optimal technical solution in terms of customer productivity. However, the steering committee decided that the project should pursue another solution since the company did not have the knowledge to produce this three-sided solution and it therefore risked taking too long; "you could argue that we could have developed that knowledge during the development process, but that would have been a new assignment and we shouldn't do that, the solution should build on existing knowledge", the project manager explained. Another example was when the project experienced problems with camming, a form of oscillation that could reduce the product's ability to generate a smooth surface.⁸⁵ To reduce camming, the product needed to be extremely stable. However, the production unit had suddenly reported that they could not get as good results as expected in regards to stability. "Either we had to develop a new production process, but we didn't have time for that, or we had to take whatever result they could get, but then we didn't get the tolerances that we

were looking for and no improved performance with regards to the surface finishing”, the project manager recalled. In this case, the steering committee decided that it was more important to keep the deadline than delaying the project to fix the problem. Thus, timeliness was now enacted as an important quality of a ‘good product development project’. Several Product Development Department managers noted that the ways in which the development projects were valued had changed in recent years:

It works a bit different with timetables, nowadays, it is a different rhythm. [...] It used to be that you worked on a product until it was ready, until it was good, and then you introduced it. Now you have to ask yourself ‘is this good enough?’, then you can continue. If it is not good enough then you work on it a bit more or you stop working on it. (Steering committee member)

Yet, time was not always prioritised over technical performance. For example, at an early stage, the project group wanted to pursue the development of a special component to improve the product’s productivity. Tests using some of the competitors’ products had highlighted a potential problem with the stability of the interface between the insert and the holding body, which could cause the product to become less reliable and effective. Computer simulations showed that this problem could be mitigated by a new protective component. Initially, however, the steering committee did not want to include this new component in the project since it would take “time to develop” and “make the production costs higher” (product management manager). The decision to go-forward was made only after the project group had performed a series of calculations that related the development of this component to the customers’ willingness to pay a price premium for the product:

We looked at the increased production cost and compared that with what we thought we could get for a more predictable solution. Production will always say that it will be more expensive, so I called them and asked how much more expensive. They did some calculations and it is only thereafter that you can make a decision in the steering committee. Then you can tell them that, ‘it will cost this much more but we believe that we will be able to increase the price by this much, and we will satisfy these customer requirements’. (Project manager)

This new component took significant time to develop, which was not accounted for in the project's original time plan. Yet, the project's deadline remained unchanged. The firmness of the deadline and the sudden lack of time meant that there was a need to increase the speed.⁸⁶ To speed up the project, the testing practices were modified; the project group used more computer simulations and technical calculations to speed things up, and physical prototypes were tested only in the most critical dimensions and applications. In practice, this meant that prototypes were tested only in those applications that were to be released in the first introduction package and the results for other application were inferred from these tests, until these applications could be tested later. In most cases this worked without a problem. However, in one case subsequent tests revealed that the new component did not operate as it was supposed to in a particular application area. This resulted in that the product's productivity was "well below the product requirements" in this application area, as one steering committee member noted. The project group therefore had to develop another component for this particular type of application, which would complicate things for the customers:

We felt that the deadline was breathing down our necks. It did affect us. This product still has some flaws after all. [...] It does not work completely satisfactory in stainless steel operations. We have developed an alternative component now that works better in stainless steel, but our product for steel operations is already introduced. This will complicate things for our customers. They will have a lot of trouble having to handle two different components in the same product and that is not good. [...] In retrospect it would have felt real good if we could have had time to test more materials earlier. Then we could perhaps have discovered this earlier and delayed the introduction a bit to get a product out that is even broader and better. Time had an effect on that. (Product management manager, Beta)

In the end, project Beta did meet the deadline. Unlike Alpha, Beta also met the company's profitability requirements. In addition, a series of tests conducted at the time of Beta's market introduction showed that the productivity (in steel operations, as measured in terms of the Q-formula) was an improvement of 55 percent compared to Coromant's existing products in this particular product area, and with "40-50 percent compared to [Com-

petitor 1] and [Competitor 2], 51 percent compared to the fiercest Japanese competitor [Competitor 3], 66 percent to [Competitor 4] and 100 percent compared to the main American competitor.”⁸⁷ Thus, Beta was also a valuable project.

In sum, we have seen in this chapter how the valuations of product development activities changed over time; activities were valued differently in the end of Alpha and in Beta compared to in the beginning of Alpha. The product development frame was multivalent; technical performance, in particular in terms of productivity, was still important but there was also an increased emphasis on the project’s time plans. These changing valuations were partly the result of the re-configuration of the broader socio-material arrangements in the company and the distributed investments that contributed to make timeliness more important. Furthermore, we have seen in this chapter how there were multiple versions of the value of particular product development activities at particular points, often related to the co-presence of multiple calculative devices, such as the co-presence of different devices in the machine investment meeting in Alpha or the co-presence of the Q-formula and time-tables in Beta. These changing and conflicting valuations affected the product development processes and the design of the new products.

Chapter 6

World class manufacturing: Valuing activities in a production unit

This chapter analyses how production activities were valued in a production unit at different points over a period of more than 20 years. The production unit in focus in this study is a large production unit within the Coromant market area, within the Tooling business area in Sandvik.⁸⁸ This production unit produces tools for industrial metal cutting (see section 5.1 for a rundown of the technical aspects of different cutting tools) and is thus called here the Tool Production Unit.

The chapter begins by examining the substantial investments that were made in the late-1980s in order to re-configure the economic frame of this production unit. The chapter will thereafter follow how this new economic frame, which I call the flow group frame, was enacted at different points in time. The discussion begins in 1994, mainly to provide a background, before focusing in more detail on how the frame was enacted in the years 2000 and 2008/2009, respectively. We will see that this new economic frame was a multivalent frame, which enabled different, and at times conflicting, valuations of different production activities to be performed. Furthermore, we will see how the valuation of particular production activities changed over time, despite the fact that the formal performance measurement system in the Tool Production Unit remained largely unchanged during this time period. I will locate these changing valuations both in the continuous efforts made by managers and operators of the Tool Produc-

tion Unit to maintain, but also to modify, this particular economic frame and in changes in the broader organisational arrangements.

6.1 Re-framing the Tool Production Unit in the 1980s⁸⁹

In the early 1980s, the Tool Production Unit was organised according to a functional production model. However, in the mid-1980s this functional model became increasingly questioned and in the late 1980s substantial efforts were made to change the economic behaviour in the Tool Production Unit.

6.1.1 The Tool Production Unit in the early 1980s: A problem with throughput time and production cost in the functional frame

The functional production model was based on the principles of specialisation and economies of scale. The idea was that the more specialised the unit's operators were, the more efficient the production would be. Accordingly, the different production machines were arranged into functional groups on the factory floor, each group performing a specific type of operation for a wide variety of different products (see exhibit 6.1, below). The batches with work-in-progress products were relayed from one functional group to the next until the production process was complete; all the while, the operators were, as one production manager later recalled in 1994, "standing at their machine all day waiting for the next order to come to them". Lind (2001) notes that this specialisation had in fact been driven so far that the operators often did not know what type of products they produced – despite using these very products in their own machines. Other aspects of the production process were also specialised. Production planning, for instance, was the responsibility of specific planning units: a centralised planning unit determined how many pieces the Tool Production Unit should produce, and this production volume was then allocated to each operator by a local planning unit. Similarly, the quality control was

production practice. The production plan was also the basis of the compensation scheme used in the Tool Production Unit, which remunerated operators according to an individual piece-rate system. Thus, the operators' salary was directly linked to the number of pieces they had produced during a period, compared to the standard set by the production plan. The idea was that this would make the operators work "harder and more efficiently", as one flow group manager noted in 1994. These arrangements configured a stable economic frame in the tool-production in the early 1980s.

In the mid-1980s, however, this way of doing things came increasingly under question. Lind (1996) traced the origins of this problematisation to Sandvik's financial problems in the beginning of the 1980s. In particular, as discussed in section 4.1., Sandvik had posted red figures in the annual report in 1983, for only the second time in the company's history. This had resulted in a comprehensive strategic review and the implementation of a new corporate strategy. The previously highly centralised organisational structure was replaced by a decentralised organisational structure, with the purpose of increasing the attentiveness to costs and results throughout the organisation (Fagerfjäll 2012). As a result of these broader changes, a strategic review was also conducted in the Coromant business area in 1984. This review singled out the production as a key to improving the business area's competitiveness and profitability (The Strategy Report 1984). The production was described as inefficient and outdated, which had both resulted in high production costs and made Coromant lose its competitive edge. This conclusion was most clearly expressed in a report about the future of production, written by the vice president of production of the Coromant business area in 1984 (henceforth the Production Strategy Report). The report highlighted three key areas in which the production needed to improve – flexibility, productivity and quality – and outlined specific measures and targets for these key areas.

Of the three key areas identified in the Production Strategy Report, flexibility was initially qualified as the most pressing problem and received the most attention by the organisation (see Lind 2001). The Production Strategy Report measured flexibility in terms of throughput time, i.e. the time it took the production to go from the start of a new order until the order was finished and ready for delivery. It was argued that the length of

the throughput time was problematic for several reasons: Firstly, given the long throughput time, it could take several weeks for a customer to get its order if a product was out of stock. This was highly problematic from a sales and marketing perspective, in particular considering the company's customer-focused strategy (see Lind 1996). Reduced throughput time was considered necessary in order to increase flexibility in the production, which would make it possible to change the production mix if there was a sudden spike in demand, or to push through priority orders if a customer needed a product that was out of stock. Secondly, reduced throughput time would also have positive economic effects, such as less capital tied up in work-in-progress, raw materials and other inventories, which would increase the capital turnover and the RoCE.⁹⁰

The problem with throughput time was considered particularly pressing in the Tool Production Unit, where the average throughput time in the mid-1980s was 50 days. The Production Strategy Report argued that this needed to be reduced substantially and set the target of an 80 percent reduction from the current level – from 50 days to 10 days. Improving the throughput time thus became a central managerial priority, and substantial efforts were made in the following years to reduce the throughput time of the Tool Production Unit. The production planning was re-organised from one factory with one planning system, to two factories with two planning systems (Lind 2001). The management also made investments in new, more automated production machines in order to speed up the production process (ibid). Finally, substantial managerial attention was devoted to the throughput time target and the management made it clear that the economic behaviour in the Tool Production Unit had to change.

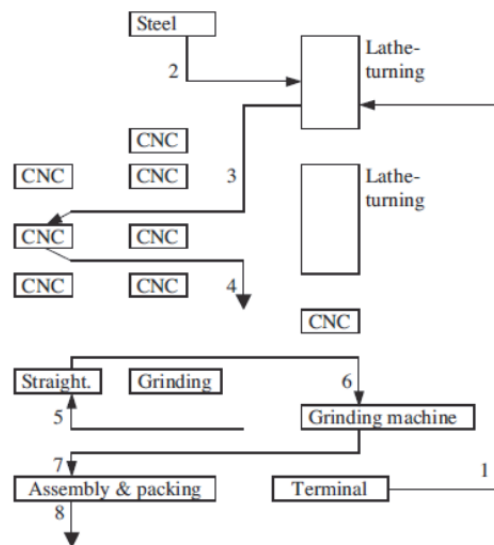
However, these actions did not yield any significant results and by 1987 the throughput time had only been reduced to 40 days, which was still far from the 10 days target. As a consequence, it was soon argued that more radical actions were needed to change the economic behaviour in the Tool Production Unit. This view was, for instance, expressed in two reports written by the central accounting unit of Coromant in 1986. These reports described the Tool Production Unit as having “urgent problems” in certain areas and argued that immediate action was needed in order to reduce the production costs (see Report on the Production Unit's Financial Result

1986). It was against this background that the idea of re-organising the Tool Production Unit from a functional model to a flow group-based model was proposed by the business area management.

6.1.2 Constituting a new economic frame: Spatial re-organisation and new calculative devices

In contrast to the functional model, the flow group model was based on the idea that the production process should be organised according to the different products, rather than the different types of operations.⁹¹ Hence, instead of one operator being responsible for one machine, a group of operators would now be responsible for the entire production process – “from the farm to the fork,” as one manager put it – for a specific group of products (see exhibit 6.2). The flow group model was considered to have several advantages, according to the managers interviewed in 1994: Firstly, it would simplify the production process and thereby make it more transparent and easier to manage. Secondly, it would facilitate production planning and make it easier to keep track of issues such as inventory and throughput times. Thirdly, this would, in turn, make it easier to push through priority orders. Finally, the re-organisation of the factory was seen as a way of changing the operators’ behaviour and breaking up established practices. That is, the flow group model required the operators and the production managers to take joint responsibility for the entire production process. Instead of focusing on individual operations, the operators were now made responsible for everything from production planning to quality checking (Lind 1996). The first flow group was introduced in the Tool Production Unit in 1987.

Exhibit 6.2. Production layout in the early 1990s.



Schematic illustration of the production flow in a flow group in 1994 (from Lind 2001).

Crucially, the spatial re-organisation of the factory into a flow group-based layout was complemented by the introduction of a new set of performance measures. These new performance measures focused on the key areas specified in the Production Strategy Report – flexibility, productivity and quality. Flexibility was measured in terms of throughput time, from the start of an order until it was finished (see Report about Compensation Scheme for Flow Groups 1987). Productivity, in turn, was measured both in terms of total cost productivity, defined as added value/total production costs, and in terms of labour productivity, defined as added value/man-hours (ibid). Quality, finally, was measured in terms of the scrap rate, defined as the percentage of rejections of the total number of produced products, or the yield, which was measured as the percentage of accepted products out of the total number of produced products (ibid). Each of these new performance measures aimed to correct one or more perceived deficiencies of the existing ‘functional frame’. Yield, for instance, was presented as a remedy for the quality problems (in terms of a high scrap rate), and the associated costs, which were connected with the functional model (see Report about

Development of the Accounting Function in the Production 1988). These problems had been attributed to the fact that the operators were not responsible for quality control according to the functional model, and thus were not aware of the cost of substandard products (Flow group manager, interviewed in 1994). This was in part a result of the configuration of the piece-rate compensation scheme, which compensated the operators for everything they produced, including pieces that were later rejected as scrap by the quality control unit (Lind 2001). The introduction of yield thus aimed to re-configure the operators' calculations so that they could, and needed to, take the costs of producing substandard products into consideration.

Taken together, these new performance measures configured a new calculative script for how production activities should be valued. This new script was also inscribed into the new compensation scheme that was introduced together with the flow groups, which linked the variable part of the operators' remuneration to the flow groups' performance in terms of throughput time, yield and labour productivity (Compensation Scheme for Flow Groups Report 1987). Notably, by basing the individual compensation on each flow group's total performance, rather than the individual performances of the operators, this new compensation scheme also aimed to change the focus from individual operations to the performance of the entire production process (*ibid*). There was no order of priority inscribed into the compensation scheme. Instead, all of the new performance measures were "considered to be equally important", as the Vice President of Production stated in a report about Development of the Accounting Function in the Production in 1988, "although the emphasis could shift a bit depending on the current situation". Several production managers argued in retrospect, in 1994, that this new compensation scheme was critical for getting the operators to change their behaviour.

Taken together, these investments – the spatial re-organisation of the factory into a flow group-based layout, the introduction of the new performance measures, and the new compensation scheme – contributed to constitute a new economic frame, which I call 'the flow group frame'. The establishment of this new frame was also supported by other socio-material arrangements, such as the introduction of a new accounting system, which

made it possible for the management to delegate the operational decision-making to the flow groups and still be able to monitor their performance from a distance (see Lind 1996). There was also a new computerised production planning system, which enabled the flow groups to plan and start orders themselves without a centralised planning unit (*ibid*). In addition, the flow group frame was supported by investments in new, automated, multi-functional production machines (*ibid*). Substantial efforts were also made in order to get the buy-in from the operators for this new organisation. In particular, the management made significant investments in a series of training programs, which sought to educate the operators and production managers about the flow group-model and the new calculative script which they were expected to follow. The management also selected the operators for the first flow group carefully, choosing only skilled operators which had expressed a positive attitude to the change (The head of the Tool Production Unit, interviewed in 1994). In addition, the first flow group focused on a group of products that had a simple production process (Section manager, interviewed in 1994). While there was some initial resistance among the local unions, who worried that the re-organisation would result in lower salaries, the unions also came to support the re-organisation after the management had guaranteed that the operators' salaries would not decrease (*ibid.*). Hence, there were substantial socio-material investments made in the late-1980s in order to change the economic frame in the Tool Production Unit. As we have seen, such substantial investments, resulting in a more or less complete re-configuration of the socio-material arrangements framing the production practice, were necessary to change the economic behaviour in the Tool Production Unit. The initial attempts to change the economic behaviour within the functional frame yielded little result, despite the management's directives and considerable focus on this issue.

By 1990, the entire tool-production unit had been re-organised into flow groups.⁹² Each of the arrangements which constituted the new economic frame were now firmly established: the machines on the factory floor had been re-organised, the new compensation scheme had been introduced, and the new performance measures had been incorporate into the calculative infrastructure. In addition to the new performance measures described here, other measures that had been used in the functional frame

were used also in the flow group frame, such as production volume, delivery reliability, and production cost variances. In the remainder of this chapter, we will follow how this economic frame was enacted in the Tool Production Unit over time. In particular, we will see how certain production activities were valued differently in the production practice at different points, although the flow group frame was now well-established in the Tool Production Unit. We begin by discussing how production activities were valued in the early 1990s, mainly as a background, before focusing in more detail on how particular production activities were valued in the production practice at subsequent points in time.

6.1.3 Enacting the flow group frame in the early 1990s

Following the re-framing of the Tool Production Unit, the production practices changed. The operators were now, as a group, responsible for things previously managed by specialist units. Production planning and quality control, for instance, were now both managed by the flows groups. The operators' role had also changed as a result of the more automated production machines. As a consequence, the operators were now increasingly supervising the machines, rather than directly operating them. The flow group managers' role had changed as well; rather than supervising and directing the production, they had become more of a "coach," as one flow group manager put it. This entailed, among other things, communicating the group's key performance measures and targets to the operators.

During the first years after the Tool Production Unit was re-organised, the main focus was on the throughput time, as several managers recalled in 1994. It did not take long before the focus on the throughput time had generated discernible result and the average throughput time was reduced from 40 days in 1987 to around 5 days in 1994 – a reduction of more than 80 percent. As a consequence, the throughput time was no longer at the top of the managerial agenda in 1994, as there was "not much to be gained by reducing them further", one flow group manager explained. The throughput time was, however, still followed closely by the flow groups, as the operators' compensation depended in part on keeping the throughput time below the target level. Apart from the throughput time, labour

productivity was now a central metric of value in the production practice. Other performance measures were also regarded as important, such as production volume, yield and standard cost variances. One section manager noted that labour productivity seemed to be the most important performance measure in some flow groups, while production volume was the most important measure in other flow groups.

In general, the most important means for achieving a good performance were considered to be “a good production planning” and “a high machine utilisation”. A good production planning entailed making sure not to start too many orders at the same time, as this would clog up the production process and increase the throughput time. In addition, a good production planning entailed managing the production mix – for instance by not starting too many low volume orders at the same time since this would result in higher set-up times. It was also important to make sure that you had the right number of operators in relation to the production volume, as this had an impact on the productivity. A high machine utilisation was, in turn, achieved by planning the production so that the set-up times were reduced.

6.2 Enacting the flow group frame in 2000

Half a decade later, in 2000, somewhat different production activities had become valuable. Labour productivity had now, even more clearly than in 1994, become the central metric of value in the production practice.

6.2.1 Labour Productivity as a central metric of value

Productivity and productivity. I mean, the focus is on productivity. (Flow group manager, responding to a question about his most important objectives in 2000).

As this quote indicates, productivity – and in particular labour productivity – was a central metric of value in the Tool Production Unit in 2000. As mentioned, productivity had been one of the focus areas in the Production Strategy Report from 1984. The report had argued that a focus on continu-

ous productivity improvements was necessary to reduce the production costs and maintain the company's profit margins. The report had therefore suggested two productivity measures: total cost productivity and labour productivity. Of these two measures, labour productivity had become the most important in practice.

When this measure was introduced, labour productivity was seen as a way of making the costs of employing new operators calculable, in a way they had not been in the functional frame. In the functional frame, it had "always been good", as one flow group manager recalled in 1994, to increase the number of operators in order to ensure that the factory could meet the production plan. As a consequence, if the production volume increased by ten percent, the number of operators had also been increased by ten percent (see Lind 2001). The labour productivity measure aimed to change this behaviour. Specifically, this measure was calculated by dividing the added value of the output volume by the man-hours used during a specified time period:

$$\text{Labour productivity} = \text{added value} / \text{man-hours}$$

The added value was defined as the standard production cost, less the cost of direct material and subcontracting, multiplied by the number of products. The standard production cost was, in turn, determined by the budget process before each fiscal year, during which the estimated production costs for the year were negotiated and agreed upon by the managers.⁹³ The budgeted costs were then allocated to the different products: the direct costs were allocated based on the products' use of resources and the indirect costs were allocated based on the direct costs, according to a full costing method.⁹⁴ Crucially, this practice meant that each product had a different standard cost – and thus a different added value. Generally speaking, larger (in terms of cutting widths) and more complicated products had a higher standard cost, compared to smaller and simpler products. Once the added value had been calculated, it could be compared to the man-hours used during the time period. The calculation made a difference between blue-collar workers, who were included in the measurement, and

white-collar staff, who were not included. The standard target for labour productivity was defined as:

$$\text{Productivity improvement} = (\text{change in production volume (in \%)} / 2) + 3 \%$$

Defined this way, the target was related to the expected volume growth (or decrease) for the time period. The idea was that there should always be a requirement to improve the productivity, no matter how the production volume developed. In 2000, the standard productivity target was one per cent for the Tool Production Unit as a whole. This general target was then allocated among the different flow groups according to their perceived potential for productivity improvements, which meant that some flow groups could have a higher target and other groups a lower target.

Thus, certain programs of action had been inscribed into this calculative device. For example, the use of added value in the nominator prescribed a focus on the economic value of the different products, rather than solely on the production volume, as one senior manager recalled in 1994. That is, each product now had an individual value. Furthermore, the use of man-hours in the denominator, coupled with the configuration of the standard target, promoted a focus on the level of automation in the production. The more automated the production process, the better it was according to this measure.

The total cost productivity measure, which used total production costs rather than man-hours in the denominator, was originally intended by the management as a counter-weight to the labour productivity measure's focus on automation. Thus, the total cost productivity was initially seen as a necessary complement to, and perhaps more important than, labour productivity (see the Production Strategy Report 1984). By 2000, however, the total cost productivity had become subordinate to labour productivity in production practice.

Other measures were also seen as subordinate to labour productivity. The throughput time, for instance, were no longer at the top of the managerial agenda since, as the head of the Tool Production Unit explained, "once you have reached the levels we are at [three days' throughput time by

2000] there is not much you can do, unless you take radical action”. Similarly, yield was now considered “a second rate factor” that was interesting only insofar as it affected the labour productivity. Instead, the managerial focus was mainly on labour productivity. In the daily production practice, this meant that the managers and the operators were engaged in a practice of “chasing hours”, as one flow group manager had described it in 1994.

6.2.2 Chasing hours: Enacting labour productivity on the factory floor

On the factory floor, labour productivity was primarily enacted through two managerial practices: the management of man-hours and the production planning. The management of man-hours started already in the budgeting process. It was considered important for the flow group managers to negotiate the productivity target for the coming year in such a way that they did not put the group in a difficult position; “I can promise anything that I can’t deliver”, as one flow group manager explained.

Once the productivity target had been set, the managers needed to carefully calculate the implications of this target in terms of what it meant for how many operators they could bring in. It was essential that the group did not employ more operators than it needed, as this would reduce productivity. In order to make this decision, the flow group managers typically re-calculated the productivity target into an allowance of man-hours (and thus operators), to be used in the group. This calculation was based on the added value for each different product, which, given the expected production volume, was taken to represent a certain number of man-hours that the unit could use. Some managers also included a risk buffer in this calculation, in case that the production volumes would turn out to be lower than expected, which could cause problems, as one flow group manager explained:

Our most important goal is to keep the productivity up. To do this we have to calculate very carefully how many people we need, given the production plan. If we bring in too many people, the productivity will go down. Or if we get lower volumes than we planned when we made the budget, then the productiv-

ity will go down, and then you would have to do something about those extra operators to get rid of the hours.

Once the budget had been set for the year, the main focus of the flow group managers was to ensure that the added value always matched (or exceeded) the man-hours. This entailed keeping track of and managing both the man-hours and production planning carefully. For example, the flow group managers were constantly managing the number of operators in their groups. If, for instance, the production volume increased, the managers might have to borrow some operators from another group to meet the demand. Conversely, if the production volume decreased, they might have to remove some operators from their group. This could be done either by lending these operators to another group, which might have a bigger need at the time, or by sending them on training programs – in either case, these hours would be off their books.

Labour productivity was also enacted through the production planning. As mentioned, production planning was now the responsibility of the flow groups. Usually, it was the operators manning the first station in each flow group who were responsible for starting new orders from an order queue generated by the computerised information system. This order queue was based on a calculation of the order inflow and the stock availability levels at the company's warehouses, according to a particular algorithm. Crucially, however, the operators did not have to follow this order queue directly, but had some discretion over which orders to start and when to start them. In terms of the labour productivity calculation, it was important for the operators to consider the production mix when starting new orders. That is, it was important that the total added value of the orders would match the man-hours used during the period (usually a week or a month). In other words, a flow group could not “only make small products in a week [even though this might be good for the production volume, for instance] because you don't get paid enough for them”, as one manager explained.

In addition to managing the production mix, it was also important to make sure that there were as few stoppages as possible in the production process and that the automated production machines were utilised as much as possible. In 2000, the Tool Production Unit had a mix of automated ro-

bot cells and older production machines, which required more manual labour. By using the automated robot cells as much as possible, fewer operators (and thus fewer man-hours) were needed. One way to achieve this was to make sure that the machines did not break down, by scheduling regular maintenance, and to see to it that they were quickly repaired if they did. Several flow group managers noted that this was one of their most important tasks, because if “all the machines were up and running, with as few stops as possible,” the productivity would be ok, as one flow group manager noted. Another way of using the automated robot cells more was by organising the production flow so that the largest and most complicated products, which took the longest to manufacture in the machines, were produced during nights or weekends when there were fewer operators working. The day shifts could then focus on products and operations which required more manual labour. In general, the managers attempted to organise the production flow so that the most automated production machines were utilised as much as possible:

We set the targets in the beginning of the year. If the production volume drops, it is almost impossible to meet the targets. [...] What I have to do in that case is to move production from the less automated machines to the Niigata-cell in order to utilise it as much as possible. You see, it is cheaper to manufacture things in the Niigata-cell because it is more automated. That is the way we have to work. (Flow group manager)

In sum, we have seen how labour productivity was enacted in the production practice through the management of man-hours, which included the careful calculation of how many operators a group could afford to have on the factory floor at any particular point, as well as through production planning, which focused on getting the production mix right and on utilising the automated production machines as much as possible.

6.2.3 Making labour productivity a central metric of value in the daily production practice

Crucially, labour productivity had not become the central metric of value in the production practice simply because it was being measured, i.e. as a re-

sult of the investments made in order to establish the flow group frame in the first place. There were also continuous investments made by different agencies to configure the importance of labour productivity. To begin with, the managers in the Tool Production Unit were constantly reminded of the calculative script they were expected to follow. For example, each flow group's performance was measured and reported each month by the factory accounting unit. If the performance was qualified as substandard by these accounting reports, the managers "would be sure to hear about it", as one flow group manager explained. The performance measures were also followed up and discussed during the weekly management meetings of the Tool Production Unit. Thus, the managers were constantly reminded of the importance of managing the productivity.

As a consequence, the flow group managers had also developed various calculative devices to keep track of the productivity on a daily basis. In particular, they had constructed home-made excel models to be able to continuously calculate the productivity at the end of each day or each week, without having to wait for the accounting reports. They did not "have time to wait for [the accounting] reports" as they "couldn't afford to lose even a day of two", as one flow group manager explained. These models were based on the added value for each product coupled with the reported output for each product and the reported man-hours for the period, which could be copied from the computerised information system and plugged into the pre-formatted excel models. Thus, through such calculative devices, it became possible for the managers to see for themselves if they needed to take corrective actions during the upcoming week in order to meet their target.

However, the managers also needed the co-operation of the operators in order to manage these targets, as the operators were, as mentioned previously, now responsible for tasks such as production planning. Accordingly, the flow group managers made substantial efforts to format the operators' calculative capacities so that they would continuously calculate how particular operational choices would affect the targets, and in particular the labour productivity. Several managers noted that informing the operators about the groups' targets, and making them aware of the economic consequences of certain decisions in relation to these targets, was one of

the most important parts of their job. Thus, the operators were constantly informed and educated about the script they were expected to follow. The managers had, for instance, printed out diagrams (or tables) with their group's key performance targets and the group's recent performance in relation to these targets, and posted these on the walls of the factory floor or in the break rooms. These diagrams included measures such as the production volume, labour productivity, yield, throughput time, stock availability, and a quality index.⁹⁵ Thus, these material devices served as a constant reminder of the script that the operators were expected to follow – like stage directions in a theatre, placed where the actors would read them just before they entered the stage (see Goffman 1974). In addition, the operators were reminded of the importance of these performance measures during the weekly meetings in the flow groups.

Furthermore, the managers also attempted to format the operators' behaviour by reminding them that it was in their own self-interest to make sure that they reached the targets. In particular, they reminded the operators of the configuration of their compensation scheme, which made labour productivity a significant part of their variable salary.⁹⁶ Notably, it was not self-evident to the operators that it was in their own self-interest to maximise the productivity. Instead, this was something which required continuous efforts on the part of the managers to make clear, as one flow group manager explained:

If I ask the group how many people they need, they will always say that they need five more. Then I have to explain to them that if we bring in one more person, then we have to make so and so many more pieces in order to maintain our productivity. [...] I have made a diagram that shows how much lower their salary will be if we bring in one extra person, given the same volume. This should end the discussion about the need for more people. If they want us to have 2-3 more operators, then they just are not seeing the consequences right. It is really important to educate them about this. [...] You need to keep informing them about this. To raise their awareness and make them interested. To explain how their salary moves up if [the productivity] increases or goes down if [the productivity] drops – everybody can relate to that.

The managers thus attempted to control the daily valuations performed by the operators on the factory floor. This was a form of control that did not

rely so much on direct supervision and order-giving, but rather on the configuration of how the operators valued particular activities – and how they should calculate their own self-interest.

Once the operators had been appropriately formatted and equipped in this manner, they contributed to maintaining this particular script in the production practice. In general, several managers noted both in 1994 and 2000 that the flow group-organisation had resulted in a ‘strong peer pressure’ within flow groups. That is, each operator was expected to work hard and contribute to the group’s performance. New operators were also socialised into this way of working. As a consequence, the operators were usually willing to work overtime in order to manage productivity, for instance if there was an increase in production volume, rather than hiring new people.

In sum, these continuous efforts contributed to make labour productivity a central metric of value on the factory floor. However, while labour productivity was enacted as the most important metric of value, it was not the only performance measure that needed to be managed in the production practice. The economic frame was multivalent, and the managers and operators still needed to pay attention to the other metrics of values prescribed by this frame. Throughput time, for example, still remained important on the factory floor, at least to a certain extent, and actions were taken in order to ensure that the throughput time did not stray too high.

6.2.4 A multivalent frame: The relationship between throughput time and labour productivity

The importance of throughput time was, in part, a consequence of the configuration of the operators’ compensation scheme, which made the operators invested in keeping the throughput time below the target level; “they can see a clear link to their salary, which makes them interested”, as one flow group manager explained. Thus, the throughput time was still followed closely in the production practice, although the average throughput time was below the target level.

The throughput times for each flow group were reported by the accounting unit at the end of each week.⁹⁷ However, in order to be able to manage the throughput time in the daily production practice, the flow

group managers also developed specific calculative practices. For example, some managers had re-calculated the throughput time target into a target for how many pieces (i.e. work-in-progress products) there could be on the factory floor at any given time. By making sure that the number of pieces did not become too large, they knew that the throughput time would not become too long, as one flow group manager explained:

I can see how many pieces we have on the floor and I know that is a good indication of how many days the throughput time will be. I can see that on the screen. I can see how many orders and pieces are started in the flow group each day. [...] We have this rule of thumb that we should only have about twice as many pieces as we are going to produce in a week on the factory floor at any time if we are to make this target. That means that if we are going to produce 3500 pieces, then there should only be 7000 pieces on the floor. Today we have 9000 pieces on the floor, which means that the throughput time will be a couple of days too long.

The key to having the right number of pieces on the factory floor was considered to lie with the production planning. In terms of the throughput time calculation, this meant that the size of each order (i.e. how many pieces that would have to be produced) needed to be taken into account. This was not done automatically by the computerised information system. It was therefore the responsibility of the operators to make sure that the right number of orders, with the right number of pieces, were started at the right time. This was a delicate task that required constant calculations, since just a couple of orders too many, or a couple of orders started at the wrong time, could result in the throughput time becoming too long, as the same flow group manager continued:

Our standard order size is about 500 pieces, which means that 2000 extra pieces are only four orders too many. So it's very sensitive, one extra order has a large impact on us. [...] Now, let say that I have four machines and that they are all busy. The next orders in the queue are four 500-piece-orders. If we started producing these orders right now, in accordance with the queue, they would only end up waiting at the machines and then you'd immediately have an additional 2000 pieces on the factory floor. We have to keep that down.

Another practice with the aim of keeping the throughput time down was to limit the batch size, i.e. the maximum size of an individual order. The rationale was that larger batches would take longer time to manufacture, especially if it was a complicated product with a time-consuming production process. Another flow group manager, who had problems with the throughput time, explained:

[It is crucial] that we have the right timing when we start the orders and that we have the right batch sizes. [...] We have figured out that we can't work with more than 48 pieces per order, because otherwise the throughput time becomes too long. So we set a maximum of 48, which could mean that one order actually becomes two orders instead. [...] We also analysed our throughput times and found that most of our orders took 6-7 days, but some took 8-10 days. Then, we checked if it was always the same type of product that was the problem. And yes, it turned out that it was these products with big cutting widths, 50-60 mm. This means that we will have to reduce those order sizes further, because they will take too long to process otherwise.

The throughput time were thus managed through production planning and management of batch sizes. In terms of this performance measure, it was valuable to have the smallest batch sizes possible and not to have too many pieces on the factory floor at the same time.

However, these valuations were sometimes in conflict with the valuations made by the labour productivity calculation. The production planning, for example, was calculated differently depending on which of these two calculative devices was used, and different orders were valuable. From the perspective of the labour productivity calculation, the key to the production planning was to make sure that the added value was sufficiently high. In terms of the throughput time calculation, however, the key was to make sure that too many orders, or too large orders, were not started at the same time. These two calculations did not automatically align: In terms of the labour productivity calculation, it was good to have a few extra pieces on the factory floor, since it saved the machines from having to stop to wait for new orders. Likewise, in terms of labour productivity, larger batches were better as they required less set-up time; smaller batches would result in more time spent “re-calibrating the machine and measuring the pieces [i.e.

quality checking] between each batch”, as one flow group manager noted. Thus, there were multiple versions of valuable production activities prescribed by the economic frame that needed to be included in the managers’ calculations:

It is always a balancing act. We can’t have the machines stopping, but at the same time I can’t have too many pieces on the production floor. For me, it is actually useful to have a lot of pieces on the floor, because then we can always run similar pieces in the machines and there will be less set-up times. But that won’t be good for the profitability, because then we will get a higher WIP and longer throughput time. (Flow group manager)

The script provided by the flow group frame was multivalent. The actual enactment of this frame thus depended on the daily production practices. In contrast to the functional frame of the early 1980s, in which the behaviour of the managers and operators was tightly regulated, the managers and operators were constituted as comparatively autonomous decision-makers who could (within certain limits) make different decisions about how to enact this frame.

6.3 The pursuit of profitable growth: Enacting the flow group frame in 2008

In the preceding section we saw how labour productivity had become a central, albeit not the only, metric of value in the Tool Production Unit in 2000. However, when we return to the Tool Production Unit eight years later, in 2008, another performance measure – stock availability – had become the central metric of value in the production practice. The importance of stock availability depended, in part, on the substantial investments made by the company in the intervening years to make value creation and profitable growth key managerial concerns throughout the organization.

6.3.1 Re-configuring the broader organisational frame: The pursuit of profitable growth

The last couple of years, it has been all about producing, producing, producing. (Controller talking about the managerial focus in the Tool Production Unit in 2008)

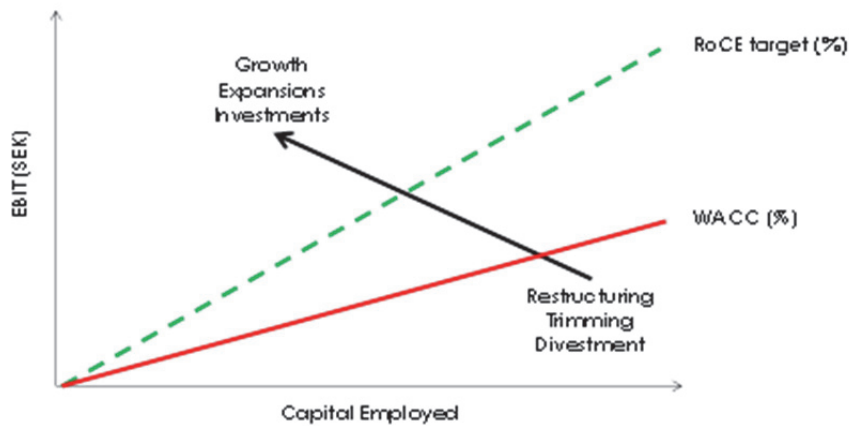
As this quote indicates, the focus in the Tool Production Unit in 2008 was on the production output. This meant that two performance measures were particularly important in the production practice in 2008: production volumes and, in particular, stock availability. The stock availability was measured as the percentage of customer orders (for standard products) that could be delivered from the company's warehouses the same day as an order was made. Stock availability had been introduced in the 1980s (although it was then measured in terms of delivery reliability). Several managers noted in 2000 that there had been an increased managerial attention on stock availability in the end of the 1990s and that a new target had been introduced. However, in 2008 stock availability had become a more important measure in the production practice. The importance of this measure was in part a consequence of the strong demand for the company's products. However, it was also a result of the systematic investments made in recent years in the corporate objectives of value creation and profitable growth.

As discussed in section 4.4.1, profitable growth had become the main corporate strategy for creating shareholder value in the beginning of the 2000s. This strategy called for an intensified focus on growth in the company's most profitable business units, such as Tooling and Coromant. For example, as discussed in section 4.4.1, the main target for Tooling under this new strategy had been to grow at a pace which "clearly exceeded" the company's average growth rate (Annual Report 2000). To this end, the strategic priorities for Tooling had focused on increased growth (*ibid*). The focus on growth had become even stronger in early 2007, when the board had updated the company's financial targets, as discussed in section 4.4.4. The company's organic growth target had been increased from six percent to eight percent, reflecting the company's commitment to achieve sustained profitable growth (Annual Report 2006). To this end, increased investments

had also been made in areas such as marketing and production capacity, which would support the growth. Hence, the company had been geared for the continued and accelerated pursuit of profitable growth.

The strategic importance of growth had also been inscribed into the company's new steering model (see sections 4.4.3 and 5.4). As discussed in section 5.4, the new steering model focused on three value drivers: growth, profitability and capital efficiency. While these value drivers were seen as complementary, it was also noted that the emphasis on the respective value drivers could shift between the company's different business units. In more profitable business units, there could be "more emphasis on growth in order to maximise the value creation", as a member of the group business control unit explained. This valuing principle had also been inscribed into another calculative device, which was introduced in connection to the new steering model: the so-called 'value added-graph' (see exhibit 6.3 below). This device qualified the company's different business units in terms of their Sandvik Value Added (SVA)⁹⁸ and RoCE performance, and prescribed different strategies for each business unit depending on its performance. Business units with a RoCE below the company's cost of capital – meaning that the SVA was negative – should take action to restore its profitability to an acceptable level. In contrast, business units that had a RoCE above the target level should focus on increasing the growth rate in order to increase the company's value creation. Thus, according to this graph, the value of different activities and strategies depended on the business units' RoCE performance.

Exhibit 6.3. The Value Added graph.



The Value Added-graph (Adapted from an internal presentation). This graph showed the various strategic options for different organisational units, depending on their RoCE and SVA performance.

When Tooling was evaluated using this calculative device, it was qualified as a profitable business area which had “earned the right to grow”, as one member of the group’s business control unit put it. Hence, continued and accelerated growth became the main strategic objective of Tooling – it was not an option not to grow – and this enabled the business area to make further investments for continued expansion. Growth thus became the overriding managerial concern in Tooling, and in Coromant. The central managerial priorities were “to increase the sales and to take advantage of the strong market demand”, as the head of Tooling wrote in an internal newsletter in 2007. As a consequence, Tooling made record investments in new production machines to increase its production capacity and to be able to pursue continued growth in 2007 and 2008. This was encouraged by the corporate management, as the head of control of the Production Department in Tooling explained in 2008: “there has been a really strong focus on cash flows and capital efficiency in Sandvik this year, but we have never invested this much [in new production machines] before – and the corporate management is encouraging us”. Similarly, substantial machine investments were made in the Tool Production Unit these years in order to

increase the production capacity. The company had been arranged to pursue profitable growth, and the role prescribed for the Tool Production Unit according to this new organisational script was to ensure that the customers would always get their products, so that no potential sales would be lost.

6.3.2 Making stock availability a central metric of value in the production practice

In the Tool Production Unit, the increased organisational focus on growth had, as mentioned above, resulted in a greater focus on stock availability. The stock availability had become increasingly important, in part, because the strong demand in recent years had resulted in a situation where the production plans set during the budgeting process quickly became outdated. The production unit was struggling to keep up with the demand and to maintain the right level of stock availability. This problem had been aggravated by short-term disruptions caused by the influx of new production machines. Over time, substantial investments had also been made by the organisation in the corporate strategies of ‘customer focus’ and ‘profitable growth’ and there had been continuous efforts to remind managers and operators in the Tool Production Unit of the importance of stock availability. As a result, the managers and operators felt a general “responsibility” towards the customers, and towards the company’s sales organisation, as one operator noted. The stock availability was also considered to be important, since it was “up to us [in the production] to make sure that there were always enough products to fill the demand”, as the company “could not turn any business away”, one flow group manager explained.

Hence, there was a significant managerial focus on stock availability at this point. In general, the management style in the production department, and the Tool Production Unit, was often described as ‘decentralised’. That is, “things would be dead quiet” as long as you were meeting your targets, but if you did not meet the targets there would be “all kinds of pressure” to get the numbers back up to an acceptable level, as one flow group manager described it. In 2008, stock availability was the most important target to meet. One of the section managers recalled:

Our stock availability became worse and worse and eventually the management was really screaming at us. I remember once when I was [at the Coromant headquarters]. I had senior Coromant managers literally dragging me away from there to the elevator. All the while screaming: ‘What are you doing here!?! Why aren’t you [in the Tool Production Unit] fixing our stock availability!?!’ We had this huge pressure on us...

Or as a flow group manager explained:

We had a bit of a problem with our stock availability after the summer holiday. Then we had to make all these action plans for how we were going to get back on target. Well, I simply wrote that I was going to do my job. That wasn’t good enough for some people, though. [...] It went up and up in the organisation and soon I had both my boss’s boss and his boss breathing down my neck, calling me on the phone every day.

These efforts contributed to fix the stock availability at the top of mind of the managers in the Tool Production Unit. The stock availability could not easily be ignored or overlooked.

Likewise, continuous efforts were made by the managers in the Tool Production Unit to remind the operators of the script which they were expected to follow, and particularly of the importance of stock availability. Like in 2000, there were diagrams (or tables) with each groups’ targets prominently placed on the factory walls. These diagrams showed the group’s targets and its recent performance in relation to these target; thereby serving as a reminder of how particular production activities should be valued. The diagrams included the production volume, productivity, throughput time, stock availability, yield and the quality index. Furthermore, the importance of these targets was also discussed during the weekly meetings in the flow groups, which in 2008 often focused on stock availability. These efforts also contributed to make stock availability a central metric of value in the production practice.

As stock availability had become an increasingly important metric of value, other performance measures had become less central in the production practice. Labour productivity was still considered important and was followed closely by the managers. However, several managers also noted that the labour productivity would follow “automatically” as long as they

succeeded in getting the production volume and the stock availability right, given the strong demand and the now highly automated production process in the Tool Production Unit, following the substantial investment in machines in recent years. Since the managers did not need to take any specific action to get the labour productivity right, the metric was considered less important than stock availability. Similarly, the throughput time was no longer at the top of the managerial agenda or followed carefully in the production practice. As a consequence, the average throughput time had drifted upwards 7-10 days in several of the flow groups, a significant increase compared to eight years earlier. However, this was not a pressing problem, as one flow group manager noted: “my throughput times are almost 11 days right now, which may be a bit too high, but it is not the most important target”.

It should be noted here that the operators’ compensation scheme had been re-calibrated in the mid-2000s. The variable component now made up a smaller part of the total salary and the formula for calculating the variable part had changed as well. The operators’ variable compensation now depended partly on key performance measures and partly on the operators’ individual performance in certain qualitative dimensions (such as teamwork and skills development). The operators’ salary had thus become less directly connected to the throughput time and the labour productivity.

Furthermore, there was a strong focus on cash flows and capital efficiency in Sandvik in 2008. This was driven, in part, by the new steering model and, in part, by a company-wide change program called Time-Is-Capital (TIC), which had been introduced together with the new steering model. This program focused, in particular, on capital efficiency improvements in the production, through activities such as inventory management. However, while this program received significant attention throughout the company, it did not have any significant impact on the Tool Production Unit. In Coromant, the pursuit of profitable growth was enacted as more important than following the prescriptions of the TIC-program, as a section manager explained:

Well, cash flows are really in focus at Sandvik, but we have met our cash flow requirements by increasing the volumes, so we have not had to restrict our-

selves [to meet the targets]. If you look at the Group's total result, Coromant is a very large part of the cash flow improvement, so we have not been forced to make any changes. Actually, they put it like this: forget capital efficiency, just go!

'Just go', in this context, meant producing as many products as possible, to keep up with the demand; "in the end, it is all about getting the product to the customers to get in the cash – that is what it is always about", as one flow group manager commented.

In sum, through the investments and practices described here, stock availability had become the central metric of value in the Tool Production Unit. This, in turn, meant that certain activities had become more valuable than others in the production practice.

6.3.3 Enacting stock availability on the factory floor: Machine maintenance and red plastic folders

Two things were particularly important for managing the stock availability in the production practice: machine utilisation and the management of priority orders. A central part of managing stock availability was making certain that the production machines were used as much as possible. This entailed organising the production flow – and the operators' work schedule – so that the production machines could be utilised 24 hours a day, seven days a week. To this end, the operators had been organised into three shifts, which covered every hour of the week.

Another key to maximising the machine utilisation was to make sure that the machines did not break down, and that they were fixed quickly if they did. Several managers and operators noted that this was now one of the most important parts of their job. The importance of machine maintenance was, in part, a consequence of the substantial investments which had been made in new production machines in recent years. In 2008, most of the production machines were automated robot cells. These robot cells were, in the words of one operator, "almost a flow group in themselves", as each robot cell could perform a series of operations previously performed by several machines. These new robot cells had increasingly changed the work of the operators. Rather than physically manufacturing the products,

the operators' main tasks were now to program and calibrate the robot cell before it started working, to supervise it while it was running, to fix it if there was a problem, and to measure the quality of the output and push the tray containing the finished output to the next cell in the production process. Given the high degree of automation, it had become critical that the machines did not break down:

Nowadays, the most importance skill that the operators need to have is that they can fix the machine when it stops. Before, if one machine was out of order we still had other [similar] machines, and we only lost maybe 10 percent of our capacity. Now, if one machine is down, we'll lose 40 percent of our capacity and there is no room for that. This has become much more important since we got the robot cells. (Flow group manager)

Machine maintenance was thus a central topic in the weekly meetings in the flow groups, and the flow group managers tried to stay on top of any machine issues by moving around in the factory and talking to the operators. Machine maintenance was also a standing topic in the daily meetings that the section managers had started to have with the flow group managers, in order to keep track of the production volume and the stock availability. Given the importance of machine maintenance, some managers had even delegated the responsibility to call in assistance from the factory's maintenance support unit to the operators, although this was formally the responsibility of the flow group managers since it involved incurring costs through the internal transfer pricing system. The purpose of the delegation was to get the machining stoppages fixed as quickly as possible, so that the production machines could be utilised to their full capacity.

In addition to machine utilisation, another central part for managing stock availability was the management of priority orders. To manage the priority orders, it was important to have a good production planning and to start the right orders at the right time, similar to in 2000. However, to a certain extent, 'the right orders' meant something different in 2008 compared to 2000. In 2008, it meant products which had a low stock availability. These priority orders were highlighted by the computerised information system, which made a distinction between priority orders and standard orders when it generated the order queue from which the operators chose

new orders. More specifically, the system drew a line across the middle of the computer screen: orders above the line were qualified as priority orders, whereas orders below the line were standard orders. A priority order, in turn, was an order for a product with a low stock availability or for which there was already a customer waiting, according to the particular algorithm. Thus, the valuing principle inscribed into this particular calculative device was that orders above the line should be started first and that they should be pushed as quickly as possible through the production process.

However, in addition to this computer-generated order queue, some flow groups had also developed their own calculative devices in order to manage stock availability. The reason was that the computerised information system did not generate new orders fast enough to cover the increasing demand, meaning that the stock availability dropped below the target level even though the flow groups had followed the order queue. Thus, these groups had started to develop separate order queues to make sure that they prioritised the right orders. Their calculations used data from the warehouses' registers and the customer order books, which were manually inputted into a pre-formatted excel-model, as one of the section managers explained:

We had this problem that the stock availability got worse and worse, and we couldn't understand it because we following [the order queue]. [...] Eventually we started to go into the [customer order] system and warehouse system ourselves. We looked at each individual product: how much is in stock right now? How much do our various customers buy on a week? And so on and so on. [...] Then we crunched the numbers for some time, before we eventually developed this formula for how many days there were left before each product would fall below the stock availability target [given the current stock level]. To our surprise, it turned out that it could be only one day left, but the [computerised information system] still had not generated any new orders.

Thus, certain operators' most important task had now become to manually re-calculate the order queue every day, using these excel-models, in order to keep track of the 'real' stock availability and make sure that the right orders were started.

The management of priority orders also involved keeping track of the progress of the priority orders on the factory floor. Several flow group managers commented that one of the first things they did every morning was to check on the progress of the priority orders. Usually, they would start by checking the order queue, or the home-made excel models, to see if there were any new priority orders which needed to be started, or if any standard orders that were already in production had become priority orders overnight and thus needed to be pushed through the production process faster. If there were any such standard orders that had become priority orders, they had to track them down on the factory floor and mark them as priority orders. This was done by changing the colour of the plastic folder in which the order specification sheet was placed. In the production practice, the quality of an order thus depended on the colour of these plastic folders: a transparent folder meant that it was a standard order, whereas a red folder made it a priority order, as one flow group manager explained:⁹⁹

The first thing I do in the morning is to check if there are any new prioritised orders in the computer, or if any on-going orders have become prioritised. If that is the case, then I have to change them into red plastic folders. I have to do that, because they are prioritised and should be pushed through. [...] I always keep track of all the red plastic folders on the floor – and check several times each day that they are moving forward. That’s a key part of my job.

The colour of the plastic folders in which the order specification was placed thus changed how these orders should be valued. Placing an order in a red plastic folder meant that this order was qualified, by all the arrangements described above, as strategically and economically important. The order should thus be pushed through the production process as quickly as possible, and other economic considerations had to temporarily subside. As discussed, the production of standard orders should still take issues such as set-up times and inventory levels into consideration, in order to manage the throughput time and labour productivity. It was, for example, better from the perspective of the labour productivity calculation to work with large batch sizes to reduce the set-up times. However, it was now more important to push through priority orders, even if they were small, “than to wait for (other) similar orders to come through and be able to form a larger

batch”, as one operator explained. This did not mean that issues like set-up time and inventory levels were not taken into consideration, but simply that priority orders took precedence if there was a conflict. Thus, the colour of these plastic folders changed how the operators should value certain production activities.

In sum, we have seen how stock availability became a central metric of value in the production practice in 2008, and how this metric of value was enacted on the factory floor. As a result, partially different activities were valuable in 2008 compared to in 2000. However, while stock availability was a central metric of value in the Tool Production Unit during the main part of 2008, the script for how production activities should be valued changed towards the end of the year.

6.4 A sudden blow: Re-enacting the economic frame in the wake of the financial crisis in 2008/2009

The script for how production activities should be valued changed in just a couple of weeks in the fall of 2008. Up until the end of October 2008, the focus remained on profitable growth in Tooling and on stock availability in the Tool Production Unit. In a matter of weeks, however, the focus shifted to cash flows and capital efficiency in the company, and to costs and labour productivity in the Tool Production Unit. This sudden shift was triggered by the financial crisis (see section 4.6). However, it was also influenced by the investments made by different organisational agencies in order to pre-configure an organisational response, in line with the general value creation frame, to a potential decline in demand.

6.4.1 Focusing on growth, preparing for the storm: Pre-configuring the organisational response to a possible decline in demand

During the summer of 2008, there were widespread discussions about the development of the global economy. Sandvik was part of these discussions since the company was often considered to have first-hand knowledge of

the global economic climate, given that its products were used by manufacturing companies around the world. In particular, the order inflow in Tooling was often taken as an indicator of the market conditions, both in the financial market and within the company, as Sandvik's CEO explained:

We are following the products that we know have a strong relationship to the global economic climate. Our hard metal inserts for instance. They are used in all types of metal cutting all over the world. In that area we are following the order inflow hour by hour. We have no inventory and neither do our customers. What is ordered in the morning is in production in the afternoon. (Dagens industri 18 Mar 2005)

Thus, the company primarily measured the economic climate in terms of the order inflow in Tooling. The company “[did] not see any tendency for a weakening demand” in the beginning of the autumn of 2008, as the CEO wrote in an internal letter in September; “our business is strong and we have not seen any indications of a weakening order inflow”, he continued. Since the business conditions remained favourable, the organisational focus remained on continued growth.

However, while the general organisational focus on growth continued, different agencies within the organisation had also started to make plans in the event that the demand would decrease. For example, the controllers in the Production Department of Tooling travelled to production units around the world in the summer and early autumn of 2008 to organise workshops about what to do in case of a weakening demand. In the early autumn, the controllers had also been asked by the business area management to calculate the possible financial consequences of a drop in sales volume; “that seems to be everything we do right now, just calculating a lot of scenarios”, as one controller said. In these scenarios, the controllers calculated the financial consequences of certain percentage drops in sales volume (e.g. 10 percent), and identified what actions would be needed to mitigate the impact of the drop. In the budgeting process that started in September, the production units were also asked to prepare contingency plans in case the volumes would start to drop. Thus, the organisation had started to prepare itself for a potential slowdown of demand. There was a

series of scripts for how the organisation should act if the external business conditions changed, as indicated by the order inflow in Tooling.

One of these scripts was, for instance, presented in an internal newsletter written by the head of Tooling at the end of September 2008. This newsletter had the title “prepare for the storm” and listed the actions that managers should focus on in case the sales volumes started to drop: “Utilise the market conditions to gain market share; Improve the new sales ratio (NSR); Be more aggressive in pricing activities; Keep capacity in production and improve productivity; Be more cautious and restrictive in managing headcounts; Keep tight control of spendings; Improve net working capital and capital efficiency; Manage the holiday season in December without losing business and productivity.”

In sum, substantial investments had been made in order to pre-configure an organisational response to a possible weakening of demand. However, while the demand, as indicated by the order inflow, was strong, it was still valuable to pursue growth according to the script provided by the organisational frame. As the head of control of the Production Department in Tooling reflected in September 2008: “Personally, I think we are heading for a big crash, but, then again, the demand is strong, so we keep producing.”

6.4.2 Changing economic conditions: Reactions to the financial crisis and the shifting frame

In late October 2008, the economic conditions suddenly changed. The order inflow had started to slow down in the last couple of weeks of October and the company’s share price dropped rapidly.¹⁰⁰ In the Tool Production Unit, the changing economic conditions prompted many discussions about how the company, as well as the Tool Production Unit, should act. For example, during a lunch in the end of October where I participated together with several flow group managers from the Tool Production Unit, the potential impact of the financial crisis was the only topic of discussion. After the lunch, one of the flow group managers noted that:

It is really scary when the share price drops like this. I mean, it was at 150 and now it is at 58. When people see that, they will consider it cheap to acquire us right now, if they've got the money. It is scary that the share price has this effect on companies. Tooling and SMC have had the strategy to grow through acquisitions in the last few years. Tooling has bought a lot of companies, such as Walter, Titex, and Diamond, and SMC has almost had growing pains. It will be hard to continue [growing through acquisitions] if the share price goes down and you don't have any capital.

The share price was thus connected to the company's strategy on the factory floor, and it was argued that it would be difficult to continue following the growth strategy going forward. Hence, many questions were raised about how the Tool Production Unit should behave in this new situation. The old script, which focused on growth, was questioned.

I also participated in a weekly meeting in one of the flow groups towards the end of October 2008, in which the question of how the company would be affected by the order inflow and the financial crisis played a central part. The meeting was set in the flow group's lunch room: a fairly small room with a small kitchen, some posters on the walls, and a number of tables with a few magazines and newspapers. There was also a whiteboard, on which a diagram of the group's targets had been fastened and a table of targets and results for the production volume and stock availability of each product within the group had been drawn up. The flow group manager opened the meeting by going through the results for the various performance measures on the whiteboard. In particular, he focused on the stock availability:

So, you see that our trend in stock availability is very good. Well done! You've done an excellent job with [175] in the last couple of weeks, almost too well. The stock availability has become almost too high for [175] now. We're going to have to focus more on producing [128] and [142] now. As you can see we're only at 84 % in [128]. That is far too low.¹⁰¹

The discussion moved to the question of the economic climate and one of the operators asked the manager how the financial crisis was going to impact the order inflow.

Manager: Well, our order inflow was 8 percent above the production plan for the first two weeks, but last week it was clearly below. So we have to wait and see, we don't know what will happen yet. [...] While we're talking about the economic climate: I looked around a bit for information on the [internal] homepage just now. Apparently, they cannot make any comments before the quarterly report – it has to do with stock exchange regulations – but there is this short interview with [the CEO], where he makes some comments. So if you haven't seen that, you could look it up.

Operator: We tried to, but it didn't work on our computer.

Manager: [...] If you can't get it started I'll arrange it so that we can watch it here together. In any case, the message was that we have to get more cash into the company. We invested so much during the year that we need to get money in now. It is called liquidity. You need to have money to run the business.

The room went quiet for a little bit, and then a different operator asked another question:

Operator: What will happen to our volumes now that [car manufacturer 1] is slowing down and all the other car operators' volumes are going down as well?

Manager: Well, we don't know. It might be that the volume will drop a little bit yes, but we haven't seen that yet. As for [car manufacturer 1], I read that they are going to start making smaller, more environmentally friendly cars now. That means they are going to have to make new investments, which is good for us. It's not going to go away, there will still be business for us. [...] I'm going to try to find some more information from those who know, [senior managers], and then I'll get back to you. But for now, we don't know if it's going to affect us, so we keep working. That is all that we can do – make sure that we get the products out.

The discussion shifted back to more immediate practical concerns, such as production planning, staffing and machine maintenance. Similar discussions were happening throughout the Tool Production Unit. However, for the time being, the script remained. Until there was a definitive “cue” (see Goffman 1974) to enact a different script, like the drop of a curtain to signal the change between acts in a theatre play, all one could do was to “keep

working”, as the manager said in the meeting. Consequently, the focus on production volumes and stock availability remained.

A couple of weeks later, however, there was a clear signal that it was time to enact a different script. In connection with the quarterly report in late October, the management announced that the focus was henceforth going to be on costs and cash flows, in response to the significant drop in order inflow (see Öhman 3 Nov 2008). Thus, the organisation should now start to enact the various scripts that had been prepared in case the demand would slow down, as the head of Tooling wrote in another internal newsletter in November:

The financial turbulence in the world is resulting in a downturn in the real economy. We are strong and well prepared with efficient action plans to handle a slowdown in the demand. Please drive these actions efficiently, we need to manage this situation and focus on gaining market share. [...] Focus on: Gain market shares; Adjust capacity to demand, maintaining volume expansion capacity and improving productivity; Cash flow focus; Improve NWC, inventories; Reduce investments; Very restrictive recruitment policy; Tight cost control; Managing the holiday season in December without losing business.

Things should now to be valued differently. There was an increased focus on costs and capital efficiency in the company. In the Tool Production Unit, this resulted in a focus on cash flows and labour productivity.

6.4.3 Re-enacting the economic frame in the Tool Production Unit: A focus on cash flow and productivity

This new focus on costs and capital efficiency was in accordance with the well-established value creation frame in the organisation. As discussed in section 4.4.3, value creation, according to the script articulated by the company’s new steering model, should be achieved through a combination of three different value drivers: growth, profitability and capital efficiency. Now that growth was no longer possible, at least not for the time being, only two options for creating value remained: through profitability and, in particular, through capital efficiency. As the head of group business control explained:

To compensate for that we are losing in sales, we have to work on our profitability. We need to adapt our costs by decreasing the number of employees, by traveling less, by not holding meetings abroad, and cutting back on some development projects, and so on. [...] And cash flow [from the balance sheet] is extremely important. We need to have money to pay our employees, suppliers, and to pay dividends to our shareholders.

Hence, the new scripts that were being enacted in the company did not come from outside the value creation frame, but emerged from within the frame and the possibilities of action it specified. That is, the company was now going to primarily create value through increased cash flows, as the head of group business control unit continued:

Right now, cash flow is extremely important to us. [...] The SVA performance this year [2009] has been horrible, but there is another important dimension to our value creation – our cash flow. And we have performed really well in that dimension this year. Usually, the SVA should cover our cash flow, but since our profit has gone down so dramatically this year... [...] Our cash flow for this year is not driven by the EBIT, but by what we have done with our balance sheet and our working capital. In fact, in Q3 [2009] we had our strongest cash flow ever. We had a negative net profit – 3.5 billion [SEK] worse than the year before – but our cash flow was much better. That says something!

This focus on costs and cash flows was communicated throughout the organisation. Activities that could reduce costs or increase the cash flows were now valuable. One effect of this shift was that machine investments were no longer valuable, as they had a negative effect on the cash flow.¹⁰² Indeed, the management made substantial efforts to cancel or postpone planned machine investments, as a senior production manager explained in 2009:

It seems like all we have done in the last few months is to try to cancel machine investment orders. [...] It usually takes about 8 months from when we make an order until we get the delivery. Now, we ordered the last machines in September, and at that point we had [confidential] million SEK in outstanding orders. Then we got told from higher up: ‘make sure that we don’t have to bring home a single one of these machines’. That was all about the cash flow.

In the Tool Production Unit, the new calculative script led to a resurgence of performance measures such as throughput time and labour productivity. In particular, the focus on cash flow meant that the throughput time and inventory management now became “some of the most important issues”, as the head of the Tool Production Unit explained. There was also a strong focus on keeping the costs down in order to improve the cash flow. “I can’t even buy new pencils right now”, as one of the flow group managers noted.

Furthermore, labour productivity once again became the central metric of value in the Tool Production Unit. When asked in April 2009 about the most important performance measure in the production, the head of the Tool Production Unit replied: “it is the same as always – productivity. The same as it has been for the last 20 years”. Hence, it was once again important to make sure that orders with the right number of pieces and the right production mix were started at the right time in order to get the added value right; and it was critical to manage the man-hours. The managers needed to take specific actions in order to manage the productivity, as one flow group manager explained in November 2008:

Now the focus is on productivity. And on the production plans. We have to make sure that we only produce the number of pieces we are supposed to, now. [...] We used to only focus on producing as much as possible, because we could not meet demand. We knew that we would still make our productivity targets. But now we need to do other things to meet the productivity targets. For example, I have to send operators away on training programs and similar activities to remove their hours from the group, now that the demand is lower.

Hence, the organisational focus on cost and cash flow became enacted in the Tool Production Unit in terms of labour productivity, which had been robustly prescribed by all investments made over the years as the central measure of production costs.

In sum, we have seen that the new economic frame, which was established in the late 1980s, still remained to a certain extent in the late 2000s. However, the frame had also changed over time: certain performance measures, such as yield, total cost productivity and throughput time, were not as important in practice as they had originally been, whereas other

measures, such as labour productivity and stock-availability, had become more important at different points. The material arrangements had also changed, with an increasingly automated production process that changed the roles of the operators and managers. All told, we have seen how, while the arrangements that formally controlled the Tool Production Unit remained largely the same during this period, different production activities were valuable at different points in time. I have located these changing enactments of the economic frame both in the continuous efforts made by managers and operators in the Tool Production Unit to maintain and re-configure this economic frame and in the investments made by other organisational agencies. The valuations performed at each point were the result of a historically contingent process, which depended on the investments made by both past and present agencies.

Chapter 7

Discussion: The valuable organisation

This book has examined how organisational activities become valuable in practice. In this chapter, the observations from each of three studies presented herein are drawn together and discussed in relation to the general research issues put forth at the beginning of this thesis. In particular, I noted in chapter two that the social studies of accounting literature primarily discussed the question of how organisational activities become valuable as a question of ‘action at a distance’, through which a centre was able to act upon the valuations performed at an organisational periphery. This thesis suggests an alternative understanding of how things become valuable, and of accounting and control, than that normally expressed in the accounting literature.

I organise the following discussion into three inter-related parts: The first focuses on the question of how organisational activities become valuable. Here I argue that the value of particular organisational activities is the result of processes of configuration that constitute particular economic frames and calculative agencies. These processes are best described as being continuous and historically contingent processes of change. They are also ‘de-centred’ processes in the sense that there were multiple centres that attempted to control these processes over time and influenced the valuations performed in organisational practice. Building on these conclusions, the second part then focuses specifically on the question of how we should understand the role of accounting calculations, or economic calculation more generally, in these processes of valuation. Here I argue that we should

broaden our understanding of what counts as accounting; for, as we have seen, there could be many different calculative devices, some of which may not ostensibly have been defined as accounting, that are involved in calculating the economic value of organisational activities. I also argue that the role and significance of any such device depends upon the arrangements framing this device, in particular its relation to other calculative devices. The third part focuses on the question of how we should understand control in contemporary organisations, such as the one studied in this thesis. I argue that a new conception of control could be useful. In particular, by considering two alternative conceptions of control – a ‘neoliberal’ form of control suggested by Foucault (2008 [1978/1979]) and the understanding of control which emerges out of the recent writing in economic sociology from which the conceptual vocabulary in this thesis is drawn – I argue that organisational control means working through the constitution of the calculative capacities of autonomous agencies, i.e. control resides in the calculative arrangements. This is therefore a form of control that is de-centred and minimalistic.

7.1 Making things valuable: On the configuration of economic frames and calculative agencies

7.1.1 The value of things depends upon the establishment of economic frames

As discussed in the beginning, the idea that accounting can capture and reflect the underlying ‘true’ economic values of organisational activities has arguably been predominant in both accounting research and accounting practice. In the mainstream literature, a central question has, for instance, been the question of which performance measures companies should choose that would most accurately capture the organisational activities and provide managers with relevant decision-making information (see Solomons 1991a; 1991b). In ‘the residual income-debate’ in the 1960s and 1970s, for instance, the central question was which measure – of residual income and more traditional performance measures such as profit and

RoCE – was the best measure of divisional performance (see Anthony 1965; Solomons 1965; Amey 1969; 1975; Flower 1971; Bromwich 1973; Tomkins 1975a; 1975b; Emmanuel and Otley 1976; Scapens 1978; 1979). More recently, proponents of performance measurement systems such as EVA and BSC have debated how the value of organisational activities should be measured, and, in particular, whether a single performance measure could accurately capture organisational performance (see Kaplan and Norton 1992; 1996; 2001; Stewart 1991; Stern et al. 1995; 2001; Ehrbar 1998; Jensen 2001). Likewise, in accounting history, researchers have often seen the introduction of new accounting calculations as a progressive development of ever more accurate tools for uncovering the ‘real’ value of organisational activities (see Chandler 1977; Chandler and Daems 1979; Kaplan 1984; Johnson and Kaplan 1987).

The underlying assumption in these writings is that the truth is ‘out there’ (see Robson 1992). However, this is not the view taken in this thesis. While we have seen how the valuations of particular organisational activities were changing, often, at least in part, as a consequence of the introduction of new calculative devices, I have argued that these changing valuations were not the result of a progressive discovery of the ‘true’ qualities of these organisational activities. Instead, I have shown how each valuation depended upon the establishment of particular economic frames and calculative agencies. That is, neither the qualities nor the values of these organisational activities existed outside the socio-material arrangements through which they were enacted.

Consider, for instance, the balance sheet in chapter four. In the early 1990s, the company’s balance sheet had the quality of being a ‘strong’ balance sheet, which was valuable because it, directly and indirectly, contributed to increase the company’s profit. However, as the calculative arrangements changed, and the focus shifted from profit generation to value creation, so also did the qualities of the balance sheet change. As the balance sheet was related to the concept of cost of capital, it became ‘overcapitalised’. Equity was now something that had a cost, and debt had become more valuable. As a consequence, the focus shifted from ‘solidity’ to ‘financial gearing’ and to the measurement of the value of the balance sheet in terms of whether its gearing improved the company’s value creation. The

story does not end there, however, for we then saw how the discussion about what level of gearing constituted a valuable balance sheet continued: first, the balance sheet was ‘too strong’ (as the gearing ratio remained below the gearing target); then, it was simultaneously ‘weak’ (as the gearing ratio remained in line with the gearing target, and in relation to the peer companies’ balance sheets) and ‘strong’ (in relation to the company’s credit lines and strong cash flow); and finally, it was ‘weak’ as the gearing ratio had become so high that there was a risk, in the wake of the financial crisis, that the company would have to scrap its dividend pay-outs.

The point is that these qualities and values did not precede the calculative practices through which the balance sheet was measured, but they were rather a result of these practices – and of the socio-material arrangements that produced them. In particular, we followed in this chapter how concrete changes in the socio-material arrangements precisely produced the ways in which the balance sheet could be measured and valued, and thus also produced a particular form of balance sheet. The balance sheet had changed. It was remarkably different towards the end of the first decade of the 2000s compared to in the early 1990s. This is, I argue, an instantiation of Poon’s (2012) comment that “when systems of value get established, value and order become indistinguishable”.

This conclusion – that things are made valuable by the socio-material arrangements through which they are enacted – puts us in the realm of what Mol (1999) called “ontological politics”. By this term Mol (2002, p. viii) referred to a politics that was concerned with the “way in which problems are framed, [entities] are shaped, and lives are pushed and pulled into one shape or another”.¹⁰³ This is different from an epistemological question, which, as Mol (2002, p. vii) notes, is concerned with “whether representations of reality are accurate” (see also Sjögren 2006 on this point). Ontological politics rather suggests that objects and entities are made, or *enacted*, in practice, and that because they are being made we should attend to how particular versions of reality come into being (see Mol 2002; Callon 2007). Accordingly, we should not understand the process described above as a simple matter of changing, and differing, perspectives on the qualities and values of the balance sheet, but rather as the continuous production of different versions of the balance sheet. That is, what we saw was not the

accumulation of an ever better knowledge of how the balance sheet should be valued, but rather the continuous production of ‘valuable’ balance sheets.

We can illustrate this point by considering the story of project Alpha in chapter five. Alpha was, as we saw, ascribed many different qualities and values during its existence, often at the same time. For example, in the beginning, Alpha was a standard project, which was compared with Coromant’s existing solid tools; it was only later that it became, through changing calculative practices, enacted as an innovative project. We saw, for instance, how Alpha as a result of the introduction of new calculative practices, such as the market classification diagram, went from serving a standard market to being a ‘generator of new sales volume’. The point is that this distinction between whether Alpha was a standard or an innovative project – which was of considerable practical consequence – did not precede these calculative practices. This was clearly an open and contested question in practice. Furthermore, we saw how the question of whether Alpha was a profitable project was highly debated in the organisation. Alpha went from being ‘not profitable’ (in terms of the expected profit margins) to being ‘profitable’ (in terms of absolute sales volume and profit) to being ‘not profitable’ (in terms of the pay back calculation), and so on. This was a political question, which had much riding on it, not only in terms of this particular project but also in terms of the relations between production and product development more generally. Indeed, as Quattrone (2004a), with reference to Robson (1991), argues, “nothing is more political than the process of finding at least a temporary agreement of what a number means”. Yet, this was a political question of a particular kind. It was a question of ontological politics. The central question in these debates was not so much whether Alpha was valuable, but rather which version of Alpha that should be enacted as the ‘real’ version of Alpha. If the version of Alpha as a ‘generator of new sales volume’ was the real version of Alpha (as produced by the market classification diagram and the project group), then Alpha was valuable; if, however, the version of Alpha as having ‘substandard profit margins’ was the real version of Alpha (produced by the product development manual and the Pricing and Profitability unit), then Alpha was not valuable. This was an ontological question: Alpha was either profitable

– and then it was a project – or not-profitable – and then it was not a project (see Christner and Sjögren 2012 on this point).

The consequences of seeing these changing and conflicting valuations from an ontological perspective is perhaps best illustrated by considering the protracted conflict about the ‘real’ value of Alpha between the Market Department on the one hand and the Production Department on the other hand – which resulted in a six month deadlock in the project. As discussed above, this conflict did not arise from a difference in the interpretations in the value of Alpha. It was more complicated than that. This was rather a conflict between two different economic frames (a product development frame and a production frame), each enacting a particular version of the project. As discussed, robust and distinct socio-material arrangements supported each of these two different versions of Alpha. The Production Department’s version of Alpha, for instance, depended upon the investment analysis, the longstanding investments which had been made in order to make the pay-back target important in the department’s investment practices, and in other arrangements, such as the company’s transfer pricing and cost allocation policies. Taken together, all these arrangements produced a robust script for how the managers and controllers in the Production department should behave, a script that could not easily be ignored or modified. Thus, the issue at stake was not so much if these managers could be convinced or persuaded to change their mind (as an epistemological perspective would suggest), but whether the socio-material arrangements that enacted this particular calculative agency could be re-configured (or in this case overridden, in a socio-material sense). This shows the issues at stake from the theoretical perspective adopted in this thesis. For, as a consequence of these robustly conflicting economic frames, there was a period of six months during which the project was essentially in limbo – it was simultaneously ‘valuable’ and ‘not valuable’ and thus both ‘a project’ and ‘not a project’ – and no organised action (either to continue the project or to cancel it) could therefore be taken.

In sum, I have argued that the changing valuations which we have observed in the empirical material were not the result of a progressive discovery of the ‘real’ value of these organisational activities – indeed, the activities in themselves often seemed to have little to do with whether they

were valuable or not. Nor did these different valuations solely depend on the different perspectives of different people. Instead, I have argued that the qualities and values of particular entities were constituted by the socio-material arrangements through which these entities were enacted. The strong claim, which I believe to be substantiated by the empirical material, is thus that it was through the establishment of particular *economic frames*, and the associated calculative agencies, that particular organisational activities – be they particular versions of the balance sheet or particular versions of a product development project – became valuable.

7.1.2 Valuation as a continuous process of economisation

The conclusion that the value of things depends on the establishment of particular economic frames highlights the processes that constitute such economic frames. In each of the three studies, we have seen how the changing valuations of particular organisational activities depend upon changing economic frames. As Quattrone and Hopper (2001) and Andon et al. (2007) note, the accounting literature has often described such change as an “engineered” change, which is conceived and controlled by a strategic centre and which moves sequentially from one well-defined state (before the change) to another (after the change). However, as Quattrone and Hopper (2001) also point out, this might result in a naive understanding of such change processes, as it assumes that change happens as a linear, segmented passage between two separate and readily identifiable states of being. In particular, this view leaves little room for further changes once the organisation has settled into its new state of being. That is, once the organisation has become ‘new’ (as in the new organisation) or ‘after’ (as in the organisation-after-change), there is little interest in whether the organisation continues to change; instead, the focus is usually directed towards comparisons between this ‘new’ organisation and the ‘old’ organisation.

This understanding of change as a sequential passage between separate and stabilised states of being is, however, not supported by the findings in this thesis. Indeed, we have seen changes from one distinguishable economic frame to another distinguishable economic frame, such as the change from a profit frame to a value creation frame in chapter four and

the change from a functional frame to a flow group frame in chapter six. However, we have also seen how these changes were part of a continuous process. That is, this passage was neither a matter of a shift between two already stabilised economic frames as much as a gradual construction of a new frame, nor did the establishment of a new economic frame mark the end of the change process. On the contrary, we saw in each of the three studies how the socio-material arrangements resulted through continuous re-configuration and how each frame remained “perpetually under construction, controversy and maintenance” (Poon 2009).

Consider for instance the change from a profit frame to a value creation frame in chapter four. Researchers have often described the development in the financial market in recent decades in terms of a broad cultural shift that has had profound consequences for the behaviour of listed companies (see Useem 1996; Lazonick and O’Sullivan 2000; Ho 2009). These developments have been described as the result of a programmatic ‘shareholder value discourse’, in the Foucauldian sense, which has made shareholder value creation the principal objective of listed companies (see Roberts et al. 2006; Ezzamel et al. 2008). Alternatively, this has also been described as a process of “financialisation” (see Froud et al. 2000; 2006; Haslam 2010). The result of which, it is argued, has been a shift from a ‘business’ mode of valuation to a ‘financial’ mode of valuation (see Fligstein 1990; Lazonick and O’Sullivan 2000; Williams 2000) – or, stated more strongly, the “capture of business by finance” (Vollmer 2003). As a consequence, a number of studies have focused on the effects of this shift from business to finance, either on an aggregate level (see Lazonick and O’Sullivan 2000; Fligstein 2001; Zorn et al. 2005; Fligstein and Shin 2007) or on the level of individual companies (see Froud et al. 2004; 2012; Ezzamel et al. 2008; Gleadle and Cornelius 2008; Gleadle and Haslam 2010; Cushen 2013; Gleadle et al. 2014).

However, the findings in this thesis stand largely in contrast with this view of change. Firstly, whereas the notion of financialisation implies the introduction of a new ‘financial’ mode of valuation in a setting where this was previously absent, we saw in chapter four how corporate activities and strategies were continuously valued in financial terms, even before the company’s public commitment to shareholder value creation. Indeed, the

company's shareholder value creation was calculated and debated also in the beginning of the 1990s, albeit in terms of EPS as opposed to EVA, MVA and FCF as in the late 1990s. Thus, what had happened was not so much an introduction of financial calculations in a situation where there previously were none (or few), but rather a re-configuration of the calculative arrangements through which the economic/financial value of particular organisational activities could be calculated. Secondly, we also saw how this change from a profit frame to a value creation frame – while ultimately radical in its consequences on the corporate strategy – was not the result of a radical, episodic shift, but rather the outcome of a gradual and historically contingent process (see Callon 2007; Muniesa et al. 2007), which followed from a series of small scale changes to existing socio-material arrangements: the addition of new calculative devices, the formatting of both analysts and managers, and, more generally, the inscription of new behavioural scripts in a whole range of people and devices. There was no stable, homogeneous version of shareholder value that was to be implemented in the company; rather, the precise meaning of shareholder value creation was a practical, negotiated achievement that emerged out of this process. Thirdly, the change process did not stop when the company had made shareholder value creation its principal objective; rather the shareholder value frame remained contested and continuously negotiated throughout the studied time period. That is, shareholder value creation was no invariant object but it was enacted differently over time as the socio-material arrangements kept changing. A 'value creating balance sheet', for example, meant one thing in the late 1990s and something quite different a decade later.

The conclusion of these observations is that rather than seeing this development as an instance of episodic change, and to try to analyse the difference between two states of being, it is more useful to see this development as a continuous "process of economisation" (see Caliskan and Callon 2010), and to analyse the processes through which the modes of valuation kept changing. Indeed, notions such as 'shareholder value movement' and 'financialisation' might obscure the possible variations of such versions of 'the economy' in practice. Furthermore, it follows that rather than seeing this development as a change from a business frame to an economic frame, this should be seen as a change *within* the economic frame. It

was, as we saw, not a matter of substituting one stabilised mode of valuation for another stabilised mode of valuation, of moving from state A to state B, but rather a matter of a continuous re-configuration of the socio-material arrangements such that different modes of valuation kept emerging.

Similar tendencies could also be observed in the other chapters. In chapter six, for instance, we saw a change from a functional frame to a flow group-frame. Firstly, we noted that this change took several years and included a great deal of socio-material investments. Secondly, we also saw how even after the new flow group-frame had been firmly established, the valuations in the production practice kept changing. New activities became valuable as the socio-material arrangements kept changing. There was, to some extent, a different script for what were valuable production activities in 2008 compared to the early 1990s. Some measures, such as throughput time and total cost productivity, were no longer as important in the daily production practice, whereas other measures, such as stock availability, had become more important. Similarly, in chapter five we saw how the product development frame changed over time, with an increased emphasis on timeliness and financial accountability. This change was more a result of the re-configuration of the existing socio-material arrangements in the product development department and the company in general than a shift between separate economic frames. These observations point again to the importance of analysing such changes as a continuous process of economisation rather than a sequential change between different states of being, and of attending to the *how* rather than the *what* of such change processes. For it seems, as Quattrone and Hopper (2001) point out, that organisations are in “a continuous state of flux”. Stability, at any rate, requires substantial maintenance.

7.1.3 Valuation as a de-centred process

A related observation is that these change processes that we have studied in this thesis, through which the economic frames and the valuations of particular organisational activities were changing, were not under the control of any single strategic centre. This was, in part, a consequence of the histor-

ically contingent nature of the processes. By seeing the changing valuations as a result of continuous processes of economisation, we become more attentive to the various, past and present, agencies and devices involved in these processes over time, each attempting to push the world in a certain direction, to inscribe particular scripts into people and devices, and to establish new modes of valuation.

We saw, for instance, how different agencies affected how corporate activities were valued in chapter four; these included the corporate management and financial market analysts and investors, but also other agencies such as journalists, academic scholars, consultancy firms, competition authorities, and the company's peer companies. Like Skærbæk and Tryggestad (2010), with reference to Briers and Chua (2001), I do not see the changing valuations described in this chapter as a result of "ideas or concepts from wider discursive regimes that 'diffused' into the minds of local participants and turned them into mindless objects"; rather these changing valuations were the result of the continuous reconfiguration of the socio-material arrangements in which these agencies participated (see Caliskan and Callon 2010). Yet, while there were different agencies that affected how corporate activities were valued, not one of these agencies was able to centre this process in itself persistently. There was no unique and enduring centre – neither in the form of a discursive program or as a single strategic actor – that was able to control completely how things were to be valued. The corporate management, for instance, which is often assumed to act as a strategic centre on the basis of its formal authority, was certainly an important agency, but it was not alone in valuing the company's activities and strategies. Indeed, its calculative agency was also the result of a process of configuration (Callon 1998b). Analysts and investors – who have typically been accorded a dominant position in the 'financialisation' literature discussed above – were certainly also important, but their calculative agency was also the result of a process of configuration, often involving the actions of the corporate management. Thus, rather than saying that the changing valuations emanated from a single strategic centre, I argue that these were the result of a mutually constitutive arrangement of various agencies and devices, much like in the study of the strawberry market by Garcia-Parpet (2007[1986]). To paraphrase Law's (2008) comment on the strawberry

study, we might say here, “The corporate management, analysts, investors, academic scholars, journalists, consultants, peer companies, the income statement, the balance sheet, economic theories, EVA, FCF, financial targets, and rules of conduct, all these assemble and together enact a set of practices that make a more or less precarious reality.”

Similar observations could be made in the other studies as well. We saw in chapter five, for instance, how a range of agencies – the project groups, the steering committee, the Pricing and Profitability Unit, the Product Development Department, the Market Department, the Production Department, the business area management, the corporate management – were attempting to centre these product development processes in themselves. Each of these was calculating the value of particular product development activities. That is, there was not any single “centre of calculation”, but action and calculation were distributed across the organisation (see Czarniawska 2004; Callon and Muniesa 2005). As a consequence, no single centre could persistently control the process of valuing the product development activities. The corporate management, for instance, while being an important agency, certainly did not have any form of “totalitarian” control over the process of valuing these activities (Quattrone and Hopper 2005). As we saw, the valuations of particular product development activities depended both on historical arrangements and on the continuous practices of different agencies. Hence, the corporate management could not simply order the organisation to ‘produce shareholder value’; rather, any change in the product development practice depended upon the distributed re-configuration of the socio-material arrangements. In effect, control was never more than “minimalistic”, in the sense that it was contested and appeared only temporarily (see Law 1997; Quattrone and Hopper 2001). While certain agencies were occasionally able to centre the development process in themselves, such as when the project group in Alpha was able to convince the steering committee to approve the continuation of the project in the stage-gate meeting, they were rarely allowed to rest as centres for any extended periods of time, as exemplified by the fact that the steering committee’s valuation of Alpha was questioned by the Production Department shortly after the stage-gate meeting.

Likewise, we saw in chapter six how the valuations of particular production activities at different points depended in part on the well-established socio-material arrangements put in place in the 1980s, but also on the continuous efforts made by managers and operators in the Tool Production Unit and the investments made by different agencies to re-configure the broader organisational frame. Again, the corporate management was certainly an important agency as it devised plans and strategies, but it was not the only agency calculating and scripting how production activities should be valued. Hence, the management did not necessarily have any influence over the actions on the factory floor, illustrated, for instance, by the management's unsuccessful attempts to change the economic behaviour in the Tool Production Unit prior to the flow group re-organisation, or, later, by the continuous efforts that the production managers had to make in order to make the operators understand that it was in their self-interest to maximise the labour productivity by suppressing their impulse to request more operators. The findings in this study thus also suggest that the valuations of particular production activities changed as a result of a de-centred process and the distributed investments made by different agencies, past and present.

In sum, we have seen in this book how the value of organisational activities at each particular point was the result of a continuous process of economisation through which the socio-material arrangements framing each particular situation were gradually re-configured. This process involved the investments made by different agencies over time. It was impossible to identify a single strategic centre that conceived of and had control over all of these change processes. Hence, these processes were de-centred. That is, while there were certainly different centres in each of these studies, none of these were able to establish itself as the centre persistently. This was perhaps most clearly illustrated in the case of the corporate management, a usual suspect in the search for a strategic centre. Thus, the findings in this thesis lead me to concur with Skærbæk and Tryggestad's (2010, p. 121) point that we cannot assume that "the key strategic actor and its' rationale are confined to the CEO or the top management team", but that it may often "transgress such formal (hierarchical) boundaries". Indeed, we have seen here how the top management, while certainly being an im-

portant agency, also both lacked any direct influence at times and was a (partially) peripheral actor at other times. This could be seen as an illustration of Law's (2008) remark that "we are no longer dealing with construction, social or otherwise: there is no stable prime-mover, social or individual, to construct anything, no builder, no puppeteer". This conclusion arguably poses a challenge to the accounting literature, which has been primarily concerned with the formation of particular centres (see Jones et al. 2004), and the abilities of such stabilised centres to act upon the valuations performed in an organisational periphery. Here, we have seen that the valuations of organisational activities were rather characterised by the co-presence of multiple, and changing, centres and multiple, and at times conflicting, forms of calculation.

7.1.4 Making things valuable: Organisational order as a result of multiple framing processes

The fundamental question that emerges out of these observations is whether the establishment of stable centres is necessary for the appearance of ordered and coordinated organisational action? As Law (1994, p. 4-5) argues, we have been trained (framed) to feel the need for order:

Many of us have learned to want to cleave to an order. This is a modernist dream. In one way or another, we are attached to the idea that if our lives, our organisations, our social theories or our societies, were 'properly ordered' then all would be well. And we take it that such ordering is possible, at least some of the time. So when we encounter complexity we tend to treat it as distraction. We treat it as a sign of the limits of order. Or we think of it as evidence of failure.

However, Law (*ibid.*) argues that there is no single order in organisations, but that organisations are rather characterised by multiple ordering attempts, resembling what we have seen in this thesis. Although there was certainly order at times, this order was not implemented from any single source. There was no single order, originating from any single centre, which could explain the valuations performed in all of three studies; rather, due in part to the longitudinal and multilayered design of this study, it has been

possible to see how the relations between centres and peripheries kept changing. There were multiple centres each of which attempted to order the organisation. Instead of seeing some of these ordering attempts as ‘resistance’ to the will of a strategic centre, or as examples of ‘disorder’ in relation to a particular program, I have argued that these should be understood as ordering attempts in their own right, i.e. as attempts to re-configure some particular economic frame. This is notably a less centralistic understanding of organisational control than the ones normally held in the accounting literature.

However, this is not to say that stability and order are not possible. Indeed, we have seen several examples throughout this thesis of stabilised economic frames, which were durable for some time at least. Yet, this was a different form of stability, a form that did not depend so much on the ability of any one centre to manage the scepticism and resistance of peripheral actors, but depended rather on the build-up, through distributed investments, of collective socio-material arrangements. In addition, this was, as we have seen, at all times a precarious and contested stability that depended on the continuous efforts and investments of different agencies in order to be maintained.¹⁰⁴ We could say that towards the end of the studied time period a ‘value creation’ mode of valuation had become established throughout the company, although it was enacted differently in each of the three studies. However, as in the studies by MacKenzie and Millo (2003) and Poon (2009), this mode of valuation was not simply a “self-fulfilling prophecy” (Callon 2007), which followed from the formation of a particular program or a particular centre, but it depended rather upon the continuous investments made by a range of agencies.

Thus, the image I am trying to invoke here is that of a continuous ordering process, which has many different organisers. In so far as there is a singular organisational order, which was not always the case, this was not an order homogeneously implemented from a particular centre, but rather one emerging from different attempts to frame organisational action. Quatrone (2004a), in his analysis of the operation of action at a distance in the Jesuit Order in the sixteenth and seventeenth centuries, concludes that while there was a particular organisational order, organised around a single

'bottom line' in terms of "accounting for God", this order had not been implemented from the top of the organisation:

What makes accounting work in the Jesuit case is the convergence of various instances and interests around a powerful and absolutist 'heading' – the idea of God... [...] This is an idea that became absolutist, not because it was imposed homogeneously from the top of the hierarchy, but because of the continuous and heterogeneous work of maintenance around it: the continuous attempts of ordering...

This is similar to the observations made in this book of organisational order resulting from de-centred and continuous processes.

Perhaps the most fundamental conclusion to emerge from these observations is the need for a different perspective. If we want to understand how things become valuable, and organisational order arises, we might need to ask new questions: rather than following any particular centre's attempt to control the valuations in an organisational periphery, we need to investigate the different ordering attempts that influence the valuations performed in the organisational practice. Hence, this book has argued that things do not have value, but that they are made to be valuable. If we want to understand organisational action, and how these actions come to take on a particular direction, we thus need to study the production of valuable things. That means studying the socio-material arrangements framing particular situations, and the continuous and heterogeneous attempts to re-configure these arrangements. Order in this case is not implemented 'from above', but rather emerges, in the case that it does emerge, as a result of multiple and continuously ongoing ordering (or framing) attempts, conducted from different, and changing, centres.

7.2 Calculating organisations: On the nature and role of calculative devices

One of the main conclusions that follows from this analysis of how things become valuable is the central role of calculative devices. We have seen numerous examples of Callon's (1998b) observation that "the existence of

calculative agencies correlates closely with that of accounting tools [or calculative devices more generally].” In particular, we have seen how a variety of calculative devices – such as the income statement, the FCF model, corporate financial targets, project profitability calculations, the payback calculation, throughput time, and the labour productivity calculation – affected how organisational activities were valued in each of the three studies. As discussed above, these calculative devices were not important because they captured an underlying reality, but because they participated in the configuration of particular economic frames and calculative agencies, and thus enabled particular valuations of the organisational activities. This observed central role of calculative devices relates to questions such as ‘what is the relationship between multiple calculative devices?’ and ‘how can certain devices come to have a central role in accounting for the economic value of organisational activities?’

7.2.1 The changing role and significance of particular calculative devices: On the relations between multiple devices

The significance of particular accounting calculations has been a topic of longstanding concern in the social studies of accounting literature. As discussed in chapter two, accounting has not been considered to be ‘powerful’ or ‘influential’ because of its technical properties or its ability to provide ever more accurate representations of the ‘real’ values of organisational activities (see Robson 1992; Chapman et al. 2009). Instead, it has been argued that “accounting has no essence” (Miller and Napier 1993). It has been shown that the shape and form of what counts as accounting may change over time (see Hopwood 1987; Miller 1998), that accounting calculations may be used for different organisational and political purposes (see Burchell et al. 1980), and that the practical effects of accounting in action may be unpredictable (see Mouritsen et al. 2001; Quattrone and Hopper 2005). Instead of theoretical or representational accuracy, accounting calculations (or calculative devices) have been understood to become significant either in relation to the programmatic aspirations and ideals that inspire and call for their use (see Miller 2008) or as “a set of resources that may be used in different ways as components of political strategies to build episodic

networks of power relations in order to change the world” (Skærbæk and Melander 2004).

We have seen numerous examples throughout this thesis of how the role and significance of particular calculative devices changed over time and across different settings. We saw, for instance, how the role of the income statement changed in chapter four, and how the role of the throughput-time calculation changed in chapter six. This thesis has suggested the explanation that the changing roles of these calculative devices were a result of the configuration of the socio-material arrangements in which these calculative devices were embedded. This is akin to Mouritsen et al.’s (2009, p. 751) conclusion that “it is useful to substitute concerns about [the representational] completeness [of a calculation] with the relational qualities of the whole network which constitutes the power of the calculation” in that it emphasises the broader relations through which any individual calculative device is given a role and significance.

This view draws particular attention to the relations between multiple calculative devices, which we might call for the *calculative arrangements* in each setting. As we saw, there were in each particular setting multiple calculative devices used to value particular organisational activities: such as the income statement, P/E-ratios, EPS, the growth target, profit margins, EVA, FCF, the equity-to-assets ratio, and the debt-to-equity ratio in chapter four; productivity, budget, time plans, profit margins, sales volume, pay-back time, and so on in chapter five; and throughput time, productivity, yield, stock availability, cash flows, and so on in chapter six. These different calculative devices did not form a coherent calculative system. I could not find in any study, or in the thesis as a whole, that these different calculative devices were an expression of a “deeper consistency” (Law and Akrich 1994) or were automatically aligned to any single ‘bottom line’ (see Law 1994; Quattrone and Hopper 2005). Indeed, these different devices did not necessarily express any form of universal economic rationale, but were all part of enacting different versions of ‘the economic’. At times, certain calculative devices coincided (see Mol 2002; Sjögren 2006) or even actively reinforced and supported a particular mode of valuation (see Skærbæk and Tryggestad 2010). However, the co-presence of multiple calculative devices

also often produced conflicting versions of the ‘real’ value of organisational activities, which gave rise to heated debates in the organisation.

For examples, the discussions about the company’s need to use its cash holdings for acquisitions in the beginning of the 1990s, or the later discussions between analysts and the corporate management about the strength of the balance sheet, were in part fuelled by the use of different calculative devices. Likewise, as discussed above, we saw how the co-presence of different calculative devices produced different versions of the value of particular product development activities in chapter five, which resulted in heated conflicts in the organisation. Thus, as discussed above, the co-presence of multiple calculative devices might produce different economic frames, different calculative agencies, and different versions of the ‘real’ value of organisational activities, which might have substantial effects on how organisational activities are ordered.

Such observations support Mouritsen et al.’s (2009) and Skærbæk and Tryggestad’s (2010) conclusions that the co-presence of multiple calculative devices might provoke discussions about the method of organising a particular activity and lead to broader discussions about which strategies the organisation should pursue. However, the findings in this thesis also differ in one important respect from these conclusions. In particular, the findings here leads me to question Mouritsen et al.’s (2009) general analytical distinction between situations characterised by the presence of one calculative device (short translations) and situations characterised by the co-presence of multiple calculative devices (long translations).¹⁰⁵ In contrast, we have seen throughout this thesis that the continuous presence of multiple calculative devices characterises organisational practices. To paraphrase a line from a well-known poem: “No calculative device is an island.”¹⁰⁶ Thus, the different roles and effects of particular calculative devices does not depend so much on whether these devices are related to other devices, but rather how these relations are arranged, or framed, as part of the broader socio-material arrangements.

We have seen several examples of how the role and significance of particular calculative devices were affected by the ongoing re-configuration of the broader socio-material arrangements in which they were embedded. Profit margins, for instance, in chapter four, formed a peripheral perfor-

mance measure in the beginning of the 1990s, having been reported in the annual report but not featuring prominently in the discussion about corporate strategy. However, profit margins later became a central measure of value, and the organisation was arranged in accordance with this calculative device, as exemplified by the corporate strategy of “profitable growth”. This change did not depend on the technical properties of this calculative device, although the definition of profit margins was partially re-calibrated as a result of the changes in the broader calculative arrangements; nor was this change a direct consequence of any programmatic appeals to ‘shareholder value’, although such appeals certainly participated in making profit margins important. Instead, we can better understand this change as a result of a re-configuration of the calculative arrangements through which the introduction of new calculative devices, such as EVA and FCF, and changed calculative practices in the financial markets, in combination with the existing calculative arrangements in the organisation, in which profit margins had been a peripheral part, arranged a situation in which profit margins emerged as a central metric of value.

In another example, we saw in chapter five how time plans became an increasingly important measure of the performance of product development project and of the value of particular product development activities. This did not depend on any change in the time plans themselves, as these had long been prescribed as an important performance measure by the product development manual. In contrast, we saw how the renewed salience of timeliness and time plans depended on the dispersed re-configuration of the broader calculative arrangements in the organisation. This included the addition of new calculative devices such as the new steering model, the product life-cycle model, and the marketing campaign time plans.

In sum, these observations point to an important conclusion: calculative devices are arranged. What any calculative device does depends upon the configuration of the socio-material arrangements, and, in particular, how this device is related to other calculative devices. Thus, if accounting research aims to investigate calculative practices (see Chapman et al. 2009; Vollmer et al. 2009), more attention should be awarded to the interrelations between different calculative devices. Instead of focusing on the

effects of particular calculative devices, we should attempt to investigate the effects of the multiple calculative devices circulating in organisational practice. As we have seen in this thesis, the central question is not which effects particular calculative devices have, but how they are made to have these effects.

7.2.2 Red plastic folders as calculative devices: On the question of what counts as accounting

The discussion of calculative devices in section 7.2.1 is also related to the philosophical and practical question of what counts as accounting (or as a calculative device in this case). In particular, by refraining from making any a priori assumptions about what devices are used to calculate and account for the economic value of organisational activities, we have been able to see how several material and technical devices that would not ostensibly have been classified as accounting played central roles in calculating the economic value of particular activities.

In chapter five, for example, we saw how a technical formula – the Q-formula, as a measure of the product’s productivity and technical performance – was enacted as a central calculative device. The Q-formula was, for instance, important in the lunch meeting in project Alpha, where a decision was made to “de facto restart” the project in search of a technical solution with a better productivity. The Q-formula was undoubtedly a technical device: it had been adapted from metal cutting theory into the product development practice and it was defined as a measure of technical performance by the product development manual. However, the Q-formula was also enacted in practice as a measure of economic performance and it was also used to calculate the economic value of particular activities and projects in the product development practice. Activities that would increase a product’s productivity, as measured by the Q-formula, were valuable not only (or even primarily) because they would improve the product’s technical performance, but also (and perhaps primarily) because this would also improve the product’s economic performance. In the lunch meeting, it was because of the Q-formula, which qualified the current version of Alpha as non-valuable, that the managers decided to “de facto restart” the project –

although this meant that the project was delayed and the budget overrun. However, as we saw in the chapter, this was not a choice of technical performance (in terms of the Q-formula) over economic performance (in terms of the budget and the time plan), but a choice between two different versions of economic performance.

The Q-formula had become enacted as a measure of economic performance due to the calculative arrangements which had made it strategically and economically imperative that new products-under-development could demonstrate a better productivity than the competitors. In the chapter, we followed the arrangements that enacted the Q-formula as a central calculative device, which the agencies could (needed to) use to measure the economic value of particular product development activities. These included firstly the investments that the company had made in the corporate strategy of “closing the productivity gap” and “helping the customers to improve their productivity.” Secondly, there was also the substantial set of investments which had been made in order to make the strategic ambition of “market leadership” consequential throughout the organisation. Thirdly, there was the “productivity leverage-formula,” which linked the productivity of the company’s products to the customers’ total production costs. Finally, there were all the calculations that linked the company’s products’ impact on the customers’ production costs to the company’s sales and profitability. It was through all of these well-established arrangements, which had been built up by substantial investments over many years, that the Q-formula had linked the economy and strategy of the company and thus had become a representation of the economic value of particular products. As a result, new products that did not have superior (as in ‘market leading’) productivity (as measured by the Q-formula) were not valuable, since they would not improve the company’s sales and profitability.

In a similar example in chapter six, we saw how a mundane administrative device in the form of plastic folders – ordinarily used to store and sort papers in an office – became a central calculative device on the factory floor in 2008 and defined the economic and strategic value of particular production activities. A plastic folder is usually nothing more than an administrative device – useful for holding a set of papers together but typically not intended for measuring the value of things. However, in the Tool

Production Unit in 2008, these plastic folders had become central for how the production practice was organised. In particular, the value of particular orders (as in batches of products-under-production), and of other considerations in the production planning, changed as the colour of the plastic folders in which the order specification sheet was placed changed. If the order specification sheet was placed in a red plastic folder, this meant that this order was qualified as a priority order that should be pushed through the production process as quickly as possible, while other considerations would, at least partially and temporarily, subside. Thus, in the production practice, these plastic folders (with their different colours) constituted a calculative space through which different production activities could be ranked and ordered.

As before, it was not any inherent qualities of these plastic folders that had turned them into central calculative devices on the factory floor, but rather, they had become enacted as such through broader organisational arrangements. These arrangements included the investments that the company had made in the corporate strategy of shareholder value creation through profitable growth, and all the arrangements that had been made in order to engineer the organisation towards the pursuit of continued and accelerated growth in recent years. Coupled with the strategic focus on customer value, this had resulted in that stock availability had become a central economic and strategic concern in the organisation. Stock availability was no longer a measure only of the efficiency of the production practice, but it had become centrally linked to the economy and strategy of the entire company. Ensuring the stock availability was a way of ensuring the production of profitable growth, which would lead to value creation. Thus, it was through these specific arrangements that the colour of the plastic folders – which was used to manage the stock availability in the production practice – had become a central measure of economic value.

The central conclusion to emerge out of these observations is that whether something is enacted as a calculative device – and to what effect – is contingent upon the socio-material arrangements in which it is embedded. This is similar to the discussion about “market devices” in Muniesa et al. (2007). Discussing what counts as a market device, Muniesa et al. (*ibid.*)

conclude that the important thing is not what something has ostensibly been designed for, but rather how it is used in practice:

A shopping cart is a material device for sure. But it is also enacted, in particular, as a ‘market’ device because it reconfigures what shopping is (and what shoppers are and can do), as shown by Grandclément and Cochoy (2006). The same happens to the stock ticker analysed by Preda (2006): it is a telecommunication device that reconfigures what trading is (and what traders are) in financial markets.

Here we see how the same distinction would hold for accounting. The important thing is not whether something has ostensibly been defined as accounting (or non-accounting) but whether it is used in practice to configure how the economic value of particular organisational activities (or objects for that matter) can be calculated and accounted for.

In sum, the findings in this thesis support the general claim in the social studies of accounting literature that “accounting has no essence” (Miller and Napier 1993). I have argued that the notion of *calculative device*, which this thesis employs, is useful in this regard as it frees us from the well-established connotations of the word accounting. In chapter two, I defined a calculative device as any material or technical device that participates in the constitution of calculative agencies and the economic valuation of organisational activities. By using this definition, we do not have to make a priori distinctions between what devices will participate in economic calculations (and those that do not), and we do not have to make a priori assumptions about the precise nature and role of particular accounting calculations.

7.3 Action at a distance’ revisited: On conceptions of control in contemporary organisations

Having come thus far, we are left with one final question, namely, the question that was in focus in the literature review in chapter two: What does all this mean for our understanding of control in the case company? Or, how

can we conceptualise control in contemporary organisations, such as the one studied here? In the social studies of accounting literature, and in particular in the constructivist approaches to accounting research that this study builds upon, it has long been acknowledged that control is a contingent and situated practice that does not automatically follow from the formal organisational hierarchy (see Delbridge and Ezzamel 2005). While constructivist research does not deny that asymmetries exist, i.e. that some centre can be able to control the valuations performed in an organisational periphery, the focus has been on explaining how such asymmetries can emerge and become stabilised, e.g. how particular centres are formed and how these are able to control the periphery. In other words, control has not been seen as a starting point, but as a result of organisational action. As Latour (2005, p. 63-64) writes:

...it is just because we want to explain these asymmetries that we don't want to simply *repeat* them – and even less to *transport* them further unmodified. Once again, we don't want to confuse the cause and the effect... [...] This is why it's so important to maintain that power, like society, is the final result of a process and not a reservoir, a stock, or a capital that will automatically provide an explanation. Power and domination have to be produced, made up, composed. Asymmetries exist, yes, but where do they come from and what are they made of? [emphasis in original]

This thesis has aimed to build further on this stream of research. In line with the previous literature, we have seen here that control is a complex organisational practice. As discussed herein, there was no economic order homogeneously and uncomplicatedly implemented from the top of the organisation. Rather, organisational order, and the value of particular activities, emerged through a continuous, contingent, and heterogeneous process of framing and re-framing the organisational arrangements.

However, the findings in this thesis also differ from the conception of control in much of the previous literature, which has arguably focused on control from the perspective of a single centre, either in the form of 'discipline' or in the form of 'intressement'. In particular, I have emphasised the presence of multiple forms of calculation and multiple 'centres of calculation', each attempting to order (frame) the organisation, as a central charac-

teristic of organisational practice in the case company. This is in line with the recent studies that have argued that organisational life is characterised by multiple circulating numbers and forms of calculation (Law and Akrich 1994; Czarniawska and Mouritsen 2009; Hopwood 2009; Mouritsen et al. 2009; Vollmer et al. 2009; Skærbæk and Tryggestad 2010) and multiple centres (Quattrone and Hopper 2001; 2005; Czarniawska 2004; Andon et al. 2007), and that have argued that these relations should be brought to the centre of the analysis.

The question is: where do these findings leave us in terms of our understanding of organisational control? I argue here that a different conceptualisation of control could be useful. For, while it is possible to analyse parts of the empirical material in terms of either of the two conceptualisations of control outlined in chapter two – e.g. through ‘the disciplinary power of numbers’, perhaps most clearly expressed in the beginning of chapter six, or through ‘the intressement and mobilisation of others’, such as the trials and tribulations of the project group in chapter five – these could not adequately explain the full complexity of the empirical material.

A possible starting point for such a discussion is Foucault’s (2008 [1978/1979]) analysis of neoliberal government, which has been presented as an apposite image of contemporary organisational control (see Munro 2012; Weiskopf and Munro 2012).¹⁰⁷ In this analysis, Foucault’s philosophy changes, in part due to its application to a more contemporary phenomenon compared to the distant phenomena he had studied in the past, and it is possible to discern a new understanding of control which is different from the disciplinary form of control (see Lemke 2001; Collier 2009).¹⁰⁸ In the following section, this new conception of control is considered in relation to the present study. It is argued that while this conception of control would highlight some important aspects of the organisational practice, it also fails to address other important aspects.

Therefore, I suggest a different conception of control, building on the Callonian-inspired conceptual framework in this thesis. I argue that this in some ways can be seen as an extension of the ‘neoliberal’ conception of control, but with important differences. In particular, while both these conceptualisations of contemporary control highlight the calculations performed by autonomous agencies as the central object of control, the

Callonian-approach offers a richer conceptual vocabulary for understanding the variability of these calculations and the heterogeneous processes through which the calculative capacities of particular agencies are configured.

7.3.1 Neoliberal governing: Control through the organisation of competition and the fostering of entrepreneurial selves

There has been a longstanding recognition of the need for alternative conceptualisations of control in contemporary organisations. Miller and O’Leary (1987), for instance, in a section called “a gesture towards the present,” suggest that control practices, or at least the discussion about how control should be practiced, had changed during the twentieth century and that an idea of control that focused on the management of interests had replaced the disciplinary form of control embodied in standard costing. In particular, building on work in organisational theory and psychology, a new image of people and organisations had started to emerge in the accounting literature. As a consequence, the individual person, Miller and O’Leary argue, was increasingly seen as a person who had particular interests and who was therefore motivationally complex, which made the acceptance of particular behavioural standards a complicated proposal. “The individual is seen to be free to decide for or against acceptance of norms, instructions and standards; at the very least they are no longer viewed as uncomplicatedly internalised.”

Similarly, Foucault (2008 [1978/1979]) suggests an alternative description of control in contemporary societies. In his analysis of neoliberal forms of government, Foucault argues that control in contemporary societies – or what Knights (2002) called “post-modern” societies – should be understood in terms of organised competition and the construction of the self as an enterprise. For Foucault, neoliberalism amounts to the constitution of a particular form of agency, *homo economicus*, which is to behave as an individual enterprise, or “an entrepreneur of himself,” that makes decisions based on the calculation of the costs and benefits of different alternatives.

A central notion here is the notion of freedom, which is seen as a central part of this contemporary form of control. The governing principle in neoliberal regimes, Foucault (2008 [1978/1979]) argues, is that the government (or any other form of centre such as the corporate management) should not interfere with the interests of the different subjects, but each subject should be free to choose particular actions according to a calculation of their own self-interest.¹⁰⁹ Foucault thus sees interests as irreducible and inalienable to the individual subjects, and each subject must therefore be allowed a great deal of freedom to act and to choose between competing strategies.¹¹⁰ Accordingly, this form of control does not operate through the constraining of the actions of individual agencies, as disciplinary power would suggest, but rather by acting on the interests, desires, and aspirations of each individual agency. The government (or any other centre) can do this, as Read (2009) points out, by channeling “flows of interest and desire by making desirable activities inexpensive and undesirable activities costly, counting on the fact that subjects calculate their interests.”

Thus, in this form of control the decision-making is highly delegated. There is no strategic centre that stipulates a precise and unambiguous behavioural script for each individual agency; rather, this form of control works, as McNay (2009) points out, primarily through “a principle of active self-regulation,” through which individual agents are expected to take responsibility for making the right investments, and to make the right choices in terms of the costs and benefits of different alternatives, in order to maximisation their own happiness.¹¹¹ As Miller and Rose (2008) note, “[in this form of government,] the regulation of conduct becomes a matter of each individual’s desire to govern their own conduct freely in the service of the maximization of a version of their happiness and fulfillment that they take to be their own.” This form of control thus construes individuals (or companies or organisational units) as entrepreneurs of their own lives, who, by making the right investments, can obtain certain benefits.¹¹²

This is arguably a different conceptualisation of control compared to the ones presented in chapter two (if not necessarily in its effects, then at least in its methods). Compared to disciplinary control, with its emphasis on hierarchical observation, norms and standards, and the examination, this is a more delegated understanding of control. We see action here, even

more clearly, as being “brought to bear on the rules of the game rather than on the players” (Foucault 2008 [1978/1979]). Compared to control through the ‘intressement’ and ‘mobilisation’ of others, the focus here is also on interests, but in a rather different way. In neoliberal control, people are assumed to have particular interests that need to be fostered and harnessed through the organisation of competition and individuals as entrepreneurial selves. The human being is seen, as Read (2009) notes, as “a creature whose tendency to compete must be fostered”. Thus, the neoliberal form of control “present the brashest rivalry as a healthy form of emulation, an excellent motivational force that opposes individuals against one another” (Deleuze 1992).

It is possible to see several aspects of this conception of control in the empirical material. In chapter four, for instance, we could see an increasing reference to the financial performance of the company’s peer companies as a motivation for particular organisational actions. Indeed, the development in the financial market in recent decades has often been described as a shift from a competition only on the product markets to a competition also on the financial markets (see Thompson 1998 for instance). While we should note that the company’s financial performance was compared against the peer companies’ performance also in the beginning of the 1990s – when it was primarily calculated in terms of the P/E-ratio and judgments were made about whether the company was overvalued or undervalued – the findings in this study still seem to lend some support to this description of the change in the financial market in terms of increased references in practice to the competition with peer companies in terms of financial performance. We saw this illustrated perhaps most clearly in section 4.4.2, where a new financial target and new strategic objectives were introduced by the management in direct reference to a comparison with the peer companies’ financial performance, an initiative that made an analyst refer to the company as a “relentless self-improver.”

The operation of control through completion and self-regulation was also evident in the notion of “market leadership”, which was a guiding principle in the product development practice in chapter five. The engineers and managers in the product development department had been given extensive freedom, at least in the beginning of the studied time period,

to organise the product development practice as they saw fit, as long as they could deliver products that had a superior technical performance compared to the competitors. Furthermore, and perhaps most clearly, there was a great shift in the control practices in the Tool Production Unit in chapter six, from an enclosed, disciplinary form of control in the functional model to a form of control largely based on freedom and the fostering of a competitive spirit through the flow-groups. This was a form of control which did not rely so much on constraining behaviour through the setting of norms and standards, but rather operated by delegating a substantial decision-making authority to the flow-groups in expectation that these would organise themselves as enterprises-in-themselves, which would foster a self-regulatory control.

Thus, this conception of control highlights certain aspects of control that are interesting in this case. Firstly, control is highly delegated; rather than emphasising the action of a centre, this conception of control emphasises the ‘autonomy’ of individual entities. Autonomy is not seen here as a resistance to the action of some centre, but as a precondition for how society (or organisations) can hold together. Secondly, this conception emphasises that control is exercised on “the rules of the game” rather than directly on individual people and devices, which is akin to the many investments that we have seen throughout this thesis made in the attempt to establish particular economic frames. Thirdly, this conception sees control as conducted by acting on the calculations performed of individual entities. Control is primarily conducted by acting on the instruments through which people calculate their self-interests, i.e. the cost and benefits of particular options.

However, there are also problems with this conception of control in relation to the empirical material: Firstly, this is still arguably a centred conception of control in that it imagines a neoliberal hegemony, e.g. that all actions can ultimately be referred to the neoliberal program. As we have seen throughout this thesis, I have wished to avoid explaining all the actions taken in reference to a broad program as this would collapse the distinctiveness of each particular situation and each particular part of the ongoing process of economisation that we have followed. Secondly, while this approach stresses the importance of controlling the instruments

through which people perform economic calculations and calculate their self-interests, these are only considered in general terms. This approach argues that neoliberalism amounts to the production of a particular form of agency, *homo economicus*, as a calculating entrepreneurial self, but this is explained only in general terms. As a consequence, this conception of control gives the impression that interests are generic and that there is only a universal form of economic rationality. That is, it does not provide any conceptual tools for analysing the variability of economic calculation and interests; e.g. it makes little difference between one form of calculating costs and benefits and other forms of calculating costs and benefits.

This is, I argue, where Callon's contribution is so distinctive, for it allows us to analyse the variability of economic calculations and interests that is found in organisational practice. Much like the 'neoliberal' conception of control, the conception of control that emerges out of Callon's (and his associates) work also emphasises the autonomy of dispersed agencies to perform economic calculations and to act according to a calculation of their self-interest. Accordingly, this is also construed as a form of control that is directed at the 'rules of the game' and that operates through the configuration of how such calculations could be conceived.

7.3.2 Control through the constitution of calculative agencies: On the configuration of calculative arrangements and minimalistic control

As discussed in chapter two, the image of control in the material sociology of markets focuses on controlling how agencies can calculate the value of things. Control, in so far as it is possible, is effectuated by formatting and equipping calculative agencies, i.e. framing them in ways that make them prone to perform particular calculations. This is in part a consequence of the assumption that economic behaviour does not reside in individual human beings, but in assemblages of people and devices, which mutually define the nature and content of the calculations made and the actions taken (see Callon 2007; MacKenzie 2009). As Callon (1998b) writes, "The crucial point is not that of the intrinsic competencies of the agents but that of the

equipment and devices (material, metrological, procedural) which give his or her action shape.”

Thus, this is a form of control that rather than imposing itself on individual agents, attempts to act through the configuration of the calculative arrangements in which these agents are embedded and in such ways attempts to produce particular calculative agencies. Much like the ‘neoliberal’ conception of control, this is a form of control that couples highly delegated decision-making with attempts to control the ‘rules’ for how such decisions should be calculated. As Callon (1998b) writes, “Imposing the rules of the game, that is to say, the rules used to calculate decisions, by imposing the tools in which those rules are incorporated, is the starting point of relationships of domination, which allow certain calculating agencies to decide on the location and distribution of surplus.”

As discussed in chapter two, Callon and Muniesa (2005) use the example of a supermarket to illustrate this conception of control. In a supermarket, they argue, an individual consumer’s calculative capacity is to a large extent framed by the calculative arrangements that the supermarket management and a whole range of marketing professionals put into place; “by walking down the supermarket aisles, inspecting selves and reading labels, consumers continue a calculations that was started and framed by qualified professionals,” as they write. This invokes an image of control as conducted through the establishment of particular calculative arrangements.

We have seen several examples of this form of control throughout this thesis. In the beginning of chapter five, for instance, we saw how the calculations of the engineers and the managers in the Product Development department was framed by a series of organisational arrangements, which produced a script for how particular product development activities could or should be valued. Notably, these arrangements exceeded the formal rules and requirements for how such activities should be valued as set out in the product development manual, but these were also constituted by the investments that various agencies had made in the corporate strategy of “closing the productivity gap”, the strategic ambition of “market leadership”, the “productivity leverage-formula”, and all the other calculative devices that linked each new product’s impact on the customers’ total production costs to the economy of the company. As we saw, for example,

in the lunch meeting, these arrangements made it imperative that any new products would be ‘market leading’ and have a ‘superior productivity’, as the managers in the product development department were to value different options. These managers thus continued a calculation that had been started and framed elsewhere.

Furthermore, the top management’s subsequent attempt to align the management practices in the organisation with the corporate objective of shareholder value creation should be read as an attempt to control organisational behaviour by re-configuring the calculative arrangements. This was not an attempt to constrain the behaviour of individual organisational units and to get them to comply with a prescribed standard of behaviour. Indeed, if anything, the New Steering Model entailed a proliferation of calculative standards (see Callon and Law 2005). Rather, this should be understood as an attempt to act on the autonomous calculations that dispersed organisational units performed. As mentioned, this organisation exhibited highly decentralised decision-making, which seems to be a central characteristic in contemporary organisations, perhaps as a result of (as well as a condition for) certain forms of control such as the ones discussed here, as Willmott (2005) perceptively notes:

One way to think about contemporary control strategies is to contemplate the possibility that modern subjects have been constructed in ways which render them/us resistant to forms of control which are perceived to undermine dignity or are experienced as patronizing. Overtly close supervision in the ‘contemporary’ workplace is probably less acceptable as it is perceived to imply a lack of trust and/or confidence in a person’s capability and competence.

Notably, these control attempts did not necessarily work by directly equipping those units and managers with new calculative devices, but rather by re-configuring the broader arrangements in which these calculations were performed. This was much like the alteration of the corporate management’s calculative capacity in chapter four through the introduction of new calculative devices such as EVA and FCF, without their being directly equipped by these calculative devices.

Similarly, we saw in chapter six how the form of control in the Tool Production Unit shifted from an enclosed, disciplinary form of control to a

highly delegated, autonomous form of control. This new form of control rested upon the establishment of a particular set of socio-material arrangements – the re-organisation of the Tool Production Unit, the introduction of new calculative devices, and the introduction of a new compensation scheme – that guided how calculations could be performed in the production practice, both in terms of the economic value of particular activities and in terms of the self-interest of the operators and managers. As we saw, the decision-making could be delegated only because these operators and managers at the same time were enmeshed in a calculative arrangement that constituted them as a particular form of economic beings. In the same chapter, we also saw how the re-configuration of the broader socio-material arrangements in the company affected how the value of particular production activities could be calculated, as in the case of stock availability.

In sum, the conception of control suggested here construes control as being exercised through the configuration of calculative arrangements and the constitution of particular calculative agencies. This raises questions about which agencies can configure calculative arrangements, i.e. who is in control, and for how long? As discussed in chapter two, for Callon, the answer to this question primarily depends upon the calculative power of the different agencies, i.e. the power of the calculative devices with which they are equipped. The more powerful devices are those that are able to perform more complicated calculations, and which therefore afford these calculative agencies greater possibilities for action. Thus, agencies with weak calculative equipment, such as perhaps the operators in the Tool Production Unit in the functional frame, are reduced only to enact a pre-specified program of action, whereas agencies which are socio-materially equipped with greater calculative power, such as the board of the Tooling business area in chapter five, have greater possibilities to act and to change the socio-material arrangements framing particular situations. The crucial point in this case was that this power did not necessarily follow the formal structure, or the bureaucratic hierarchy if you will (see Weber 1978), but was a matter of socio-material ordering.¹¹³ In other words, as we have seen throughout this thesis, certain agencies were not powerful, or in control, simply because the organisational chart proclaimed this authority, although the organisational chart was certainly a calculative device that could contribute to mak-

ing certain agencies powerful.¹¹⁴ That is, power did not follow from the formal rules, but was configured by the totality of the socio-material arrangements.

There are two important points that follow from this understanding of control. Firstly, this conception of control stresses that power, and the identity of the controllers and the controlled, could be changing with the configuration of the socio-material arrangements. As control is not a property of individual people, or an automatic consequence of an organisational position, we become attentive to how the power of different agencies, and the locus of control, might be shifting. In particular, certain agencies might become more ‘powerful’ by being equipped with (or equipping themselves with) new calculative devices, which increase their calculative power. In some case, Callon and Muniesa (2005) write, “an agency initially in a weak position gradually acquires tools enabling it to change the balance of power and to become more active...” This is, in part, an explanation for the a-centred nature of the processes that we have followed in this thesis.

We have seen several examples throughout this thesis of how the power and role of particular agencies changed as they were equipped with new calculative devices. One example is that of the financial market agencies, e.g. analysts and investors, in chapter four, whose position vis-à-vis the corporate management became stronger after they became equipped with new calculative devices such as EVA and the FCF model, as exemplified by the longstanding discussion of the company’s cash holdings. Another example is the project group in chapter five, whose position in the stage-gate meeting grew stronger as it equipped itself with a new calculative device, the market classification diagram, and was thus able to reconfigure how the project was valued.

Secondly, this conception of control makes us attentive that there could be different agencies that are ‘powerful’ at the same time. If, as discussed, power and control does not depend only on organisational roles and hierarchies, but on the calculative devices and the configuration of the broader socio-material arrangements, it is possible to see how the locus of control is both changing and multiple. Indeed, we have seen throughout this thesis how there were both multiple calculative devices and multiple centres of calculation. Thus, this organisation was ‘de-centred’, in the sense that dif-

ferent centres participated in defining what were valuable activities and ‘good’ and ‘bad’ performance without a centralised or cumulative process. The crucial point is this: if control resides in the totality of the socio-material arrangements rather than in any identifiable centre, then the most any implied centre can ever hope for is a form of “minimalistic” control (see Law 1997; Quattrone and Hopper 2001), which is necessarily temporary and uncertain. For Law (1997), minimalism referred to a form of ordering rather than the establishment of a particular order. In particular, this was a form of ordering which recognised that it would be an incomplete and continuously ongoing process:

Yes, I make use of a verb rather than a noun. Minimalism is ordering. Minimalism is an effort at patterning that has some kind of shape, a shape that can, in one way or another, be discerned. That can, in one way or another, be performed. But it is an ordering that comes with a series of built-in qualifications and restrictions... [...] Minimalism is an ordering which exists in tension... [...] Which means that it is a process. And (very important this) that it is a process that acknowledges that it is a process. Indeed an endless process. [Furthermore] minimalism is an ordering which...does not demand (let me put it negatively) a bottom line. That desire is not something which needs to be fulfilled... [...] Which means that minimalism accepts or recognises, embraces its own incompleteness, not simply as a technical matter to be remedied, but as a part of being. (Law 1997, p. 3)

Thus, this is an understanding of control that sees control not as the result of the design of a control system, or even as the stabilisation of a particular network of resources and alliances, with the implied assumption that this will remain enacted once it has been stabilised. Instead, our understanding sees control as a continuous process that is necessarily incomplete and changing. This thesis has revealed several examples of how control is a continuous process, an ongoing series of framing attempts, and how the maintenance of any particular form of order requires continuous investments. This is perhaps best illustrated by the ongoing efforts in chapter six, through which the managers and the operators were constantly reminded of the calculative script that they were expected to follow.

However, this is an incomplete process since no potential centre is in complete control over the calculative arrangements. As we have seen time

and time again, there were different centres that participated in configuring these arrangements, and, as we have seen, each agency that participated in configuring these arrangements was at the same time also being configured by them. Thus, as discussed above, control is perhaps best described as a series of multiple, ongoing ordering (or framing) attempts. As Law (1997, p. 5) notes:

It is not simply that we have different...images of organisation. It is also that we have ...different organisations. A series of them. Alongside one another. So to speak a multiple reality, not one that is singular. Which means, yes, that we have what Annemarie Mol calls 'the body multiple'. Or, no doubt, in organisation theory, what we talk of as 'the organisation multiple'. [...] these different organisation do not inhabit separate worlds. They do-not happily co-exist in parallel universes. Instead they support, undermine, and in general interfere with one another in complex and uncertain ways.

In conclusion, the understanding of control suggested here is a form of control that focuses on 'the rules of the game' and that resides in the calculative arrangements and the establishment of particular economic frames. Although certain agencies may be able to become powerful and influence the configuration of these economic frames, no single centre can be expected to continually remain in control over these processes of configuration. From the perspective of any implied centre, control can thus only be 'minimalistic' in that it is temporary and uncertain.

As a consequence of this understanding of control, we should firstly consider control as an ongoing process rather than in terms of the design, or the stabilisation, of any particular strategic centre or any particular control system or mode of valuation. Secondly, we should take the proliferation of calculative devices and centres of calculation seriously and consider each of them as potential centres in their own right, where each may be central to the configuration of particular frames as opposed to as peripheral resistance to the ordering attempts of an implied centre. Finally, and on this we can only speculate, we should recognise the possibility that this proliferation of different forms of calculation and different centres, and the ensuing incompleteness of control, is perhaps a necessary condition for control in contemporary organisations, as they are configured. That is, a form of

control that is based on distributed, autonomous calculations, such as the form of control discussed here, cannot function if the control is too centralised and the calculative script is unambiguous. In other words, we speculate that it is the incompleteness of control that makes any form of control possible; rather than the mediations of any stable centre, it is the multiplicity of centres and forms of calculation that makes organisational action possible

Chapter 8

Conclusions: On calculation, control and value

This book has examined the question of how organisational activities become valuable. The starting point has been that value is not an inherent quality of particular objects, or a consequence of people's preferences. This book has rather seen valuation as a foundational social process, through which things are made valuable. To investigate this research issue, I have conducted a three-part case-study. I have studied how organisational activities were valued in three different settings within the context of a single case company. In each of these studies, I have shown how particular organisational activities became valuable at different points. In chapter four, we followed the changing valuations of the company's business and financial strategies, and we saw how different strategies become valuable at different points. In chapter five, we saw how there were different valuations of particular product development activities, both over time and at the same time. In chapter six, we followed how the valuations of particular production activities changed at different points in a production unit.

The main conclusion that emerged out of these studies is that the value of things is the result of framing processes, through which particular economic frames, and the associated calculative agencies, are constituted. That is, the value of things is not 'out there', but is arranged and produced through complex processes of organising and managing. Furthermore, I have characterised these framing processes as de-centred and historically

contingent, which involve distributed investments made by different agencies over time. This is a different understanding of how things become valuable than the ones normally held in previous research. It has therefore been argued that the findings in this thesis could have further implications for our understanding of the role of accounting, control, and valuation in organisational practice. These implications are summarised below.

Implications for the social studies of accounting literature: We need to study de-centredness

To begin with, in relation to the social studies of accounting literature, a main argument in this book has been that we need to re-think how we understand accounting and control in contemporary organisations. In particular, this book has argued that we need to study the question of value in more detail. The question of value is a central concern in organisational practice. Organisations are, as Stark (2009, p. 6) notes, fundamentally engaged “in a search for what is valuable”. Thus, the question of how organisational activities become valuable should also be central for those who wish to understand organisational practice. This book has therefore argued that we need to bring the question of value back to the centre of discussion in accounting research, without reducing this to a narrow focus on particular accounting techniques or valuation models, as has often been the case in the mainstream accounting literature. We have seen throughout this book how the value of particular organisational activities was a matter of broader processes of organising and managing. We need more studies that seek to understand the complexities of these broader processes of valuation, and the role of accounting and control therein.

Furthermore, this book has argued that the valuations performed in organisational practice have often in previous research (explicitly or implicitly) been studied in relation to the actions of a specific centre. In mainstream research, accounting is often seen as a tool for rational decision-making (see Chandler 1977; Chandler and Daems 1978; Kaplan 1984; Johnson and Kaplan 1987), or as a means for implementing the strategies of the central management in the organisation (see Anthony 1965; Kaplan and Norton 1996; 2001; Simons 1990; 1995; Anthony et al. 2014). In the social studies

of accounting, although this literature differs from mainstream research in many ways, there has also been a focus on the question of how things become centred, and studies within this literature have often taken the perspective of an implied centre as the starting point in the analysis. However, I argue here that if we shift the focus from the actions of ‘the centre’ to the valuations performed in the organisational periphery, we might see things differently.

In particular, if we focus more directly on the valuations performed in organisational practice, we might see, as Helgesson and Kjellberg (2005, p. 161) point out, how “the notion of a centre may be less than clear-cut in a peripheral site”. That is, we might see how there are different attempts to control the valuations performed in each peripheral site, as we have seen throughout this book. These observations point to the need for recognising the limits of particular centres. As Law (1996, p. 300) notes, to allow for the effects of multiple centres is also to allow for the possibility that each of these may “experience their limits” and “that things escape them”. We have seen several examples in this book how particular centres experienced their limits, i.e. that they were unable to establish themselves as ‘the centre’ and control the valuations performed in the periphery. We have also seen how the relations between centres and peripheries kept changing over time; agencies that were at one point able to act as centres, were at other times, or in other settings, reduced to peripheral elements. While it has often been acknowledged in previous research that the establishment of any particular centre is in principle a temporary achievement, empirical studies that have documented the dynamic aspects of the relationship between centres and peripheries have been scarce. A noteworthy exception is the study by Mouritsen et al. (2001) that hinted at the changing dynamics between centres and peripheries, albeit as an example of unintended consequences of the actions of a particular centre. Most studies, however, have been concerned with the question of how things get centred (see Jones et al. 2004). Yet, the studies herein have shown how this is not a finite process.

Taken together, these observations indicate the importance of studying the limits of ‘centeredness’. More importantly, they point to the importance of studying this not only from the perspective of ‘the centre’, e.g. when it faces overbearing “resistance” (see Preston et al. 1992) or “competition”

(see Hansen and Mouritsen 1999) that make the centre fail to impose its modes of valuation on the periphery, but to study this as a case of de-centredness, e.g. as case of the co-existence of multiple centres that may all be equally influential. Thus, in this view, centres are not limited because they are unsuccessful in mobilising the periphery, but because the organisation is “multiple” (Law 1997), i.e. that there are parallel and overlapping organising attempts. We have seen how there were, in each study, multiple centres that attempted to control the valuations performed in the organisational practice over time. There was no unique and enduring centre, and no singular form of control, in practice. Thus, in this view, things become valuable not as a result of the more or less successful interventions on the part of a particular centre, but as a consequence of multiple organising attempts.

In sum, in addition to studying the strategies devised by particular centres, and the corresponding interventions made by these centres, we also need to study the effects of the clashes, collusions, and conflicts between different attempts to organise and control the valuations performed in organisational practice. We need to study the existence of multiple centres and multiple forms of calculation, the effects of this multiplicity, and the oscillations and movements that occur over time. Instead of only studying how things get centred, we need to study how things get both centred and de-centred. This is a main conclusion of this thesis in relation to accounting research: *we need to study de-centredness*.

This conclusion has several implications for how we should approach the study of accounting and control. A first implication is that in order to study de-centredness we need to study the operation of accounting and control in practice. This point is, in part, a repetition of the longstanding calls for the need to study accounting in practice (see Hopwood 1978; 1983; Ahrens and Chapman 2007; Chua 2007). However, we need to add a new wrinkle to these calls: we need to consider carefully what type of practices we are studying, and we need to shift our attention from the practice of implied centres to the practice in the periphery. This is, in part, related to how and where we collect the empirical material. However, it is also related to perspective taken in the analysis. In particular, this book has argued that the question of how organisational activities become valuable could be a useful way of shifting the perspective taken in the analysis. Addressing this

question is also a way of asking how the organisation takes on a particular direction, without referring only to the strategies and actions of a particular centre, and the resistance from the periphery.

Likewise, I have argued that the word ‘control’ may in itself be problematic because it carries certain connotations. The notion of control may perhaps draw too much attention to the asymmetry “between controllers (the centre) and the controlled (the periphery)” (Quattrone and Hopper 2005) and to the actions of the former. It may even invoke the image of a managerialist top-down understanding of control (see Townley 2005). Hence, if we want to take de-centredness seriously, we need to consider carefully how we approach the matter of organisational control; rather than asking about control directly, it might be better to begin with a question such as: ‘how does the organisation hold together and take on a particular direction?’ The fact that an organisation holds together, and can be recognised as a single organisation, is not inevitable or natural (see Law 1997; Alcandipani and Hassard 2010). If one takes the perspective that organisations are characterised by multiple parallel and overlapping organising attempts, then the question of how the organisation holds together becomes critical. As I have illustrated herein, the organisation in focus here did not hold together simply because *it was* an organisation, but only in so far as it had been appropriately arranged and organised as ‘an organisation’. The organisation was a result and not a cause of action. Indeed, there were times when the organisation did not hold together. Thus, to begin with these questions, instead of the standard ones, could be one way to help us study de-centredness. This could be a promising avenue for future research.

Another implication if we want to study de-centredness is that we need to think about how we write up case analyses. Here, I have attempted to write a story about de-centred valuation practices. One way to do this has been to structure this book into three independent, but interrelated stories, about different processes of valuations. In doing so, I have attempted to follow, to a certain extent, the practices of “rhizomatic” writing (see Deleuze and Guattari 1988; Law 2002). That is to say, I have attempted to avoid bringing these three studies together into a single continuous story, “a grand narrative” (Law 2002, p. 164), but instead have kept them as fractional stories, as branches on the same tree that touch each other but are

not necessarily drawn together. This could be one way to bring the issue of de-centredness more to the foreground in future research.

A final implication if we want to study de-centredness is that we also need to consider how we study change. This treatise has attempted to describe the slow processes through which the modes of valuation changed in each study. It has argued that change is continuous rather than moving between different readily identifiable states. It has shown how the relations between centres and peripheries change over time. It has also shown how these processes were historically contingent. These observations point to the need for more longitudinal studies that follow a series of events over time. These observations also point to the need for more studies that examine change as a continuous process.

In sum, in relation to the accounting literature, this book has argued that we need to study de-centredness, and that this could have several implications for the way in which we should conduct our empirical studies, what questions we should ask and how we should analyse and write about the empirical material. Furthermore, it has argued that the findings have consequences for our understanding of the role of accounting and control organisational practice. These consequences are summarised below.

Alternative conceptions of accounting and control: On calculative devices and control through the distributed configuration of calculative arrangements

Building on work within the recent ‘technological turn in economic sociology’ (see Callon 1998a; Callon et al. 2007; MacKenzie 2009), this book has developed a conceptual framework for addressing the question of how organisational activities become valuable. This conceptual framework focused on the concepts of calculative agencies, economic frames, and framing processes. It directed the attention, in particular, to the socio-material arrangements framing particular situations, and the processes and distributed investments through which these arrangements were (re-)configured. It has been argued that this conceptual approach could provide alternative explanations regarding the role of accounting and control in relation to previous

research. This conceptual approach thus complements previous conceptual approaches in accounting research.

Firstly, building on this conceptual vocabulary, this thesis has suggested the notion of *calculative devices* as a useful way to refine our understanding the role of accounting, and economic calculations more generally in organisational practice. It has long been argued that “accounting has no essence” (Miller and Napier 1993). This thesis has argued that the concept of calculative devices is a useful way for taking this line of inquiry further. In particular, I have argued that the notion of calculative devices is useful because it frees us from the connotations of the word accounting, which our education has so heavily inscribed into us. Calculative devices are the material or technical devices that participate in the constitution of calculative agencies and the performance of economic valuations. Thus, by using this concept, we do not have to make a priori distinctions between what is accounting and what is not, or between the devices that participate in economic calculations and those that do not.

Using this concept, we have been able to see how certain material and technical devices, which were not ostensibly designed to perform economic valuations, became central to the calculations of the economic value of particular activities. This was the case both with the Q-formula in chapter five, which was a technical formula that had been made into a calculative device that could be used to value new products-under-development, and with the red plastic folders in chapter six, which were administrative devices that had been made into calculative devices that could be used to value particular production activities. In both of these cases, we saw how the role of these devices had been configured by particular socio-material arrangements. That is, these material and technical devices had been arranged as calculative devices by the socio-material arrangements framing these particular situations. In a similar manner, we have also seen how the significance of particular calculative devices changed as a consequence of changes in the broader socio-material arrangements in which these devices were embedded. In particular, these changes were often a result of the addition of new calculative devices to these arrangements. This was the case, for example, with profit margins in chapter four, which became more important following the introduction of new calculative devices in the broader calculative

landscape, or with the time plans in chapter five, which became more important in the product development practice following the introduction of new calculative devices in the broader organisation.

In sum, these observations point to the need for paying more attention to the variety of material and technical devices that may be involved in calculating the economic value of things. We thus need to broaden our understanding of what is accounting. Furthermore, these observations also point to the need for recognising how the role and significance of particular calculative devices depend on the configuration of broader socio-material arrangements. Thus, rather than taking particular accounting calculations as the starting point, we should recognise that no calculative device stands alone. The central question is therefore not *which* effects certain calculative devices may have, but *how* they are made to have these effects. This conclusion is an extension of the recent studies that have begun to examine the interrelations between different accounting calculations (see Law and Akrich 1994; Mouritsen et al. 2009; Skærbæk and Tryggstad 2010).

Secondly, in relation to the theoretical discussions about control in the accounting literature, and in particular in relation to the conceptions of control at a distance as ‘the disciplinary power of numbers’ or ‘the mobilisation of networks of alliances’ reviewed in chapter two, this book has suggested an alternative conception of control. Building on the recent work in economic sociology from which the conceptual vocabulary in this thesis is drawn, we see control as residing in the economic frames that make particular calculative agencies possible. It is through such frames that organisational activities become valuable, and the organisation comes to take on a certain direction. Some further comments can be made about this alternative conception of control.

To begin with, we have seen in this book how the constitution of economic frames was the result of distributed investments made by different agencies. These processes were also historically contingent, meaning that the constitution of a particular frame did not only depend on the investments made by present agencies, but also on the investments made by past agencies. As a consequence, there was no stable and unique centre that was able to control the valuations performed in the organisational practice in the company. The practices of calculation were dispersed across different

sites and agencies, and there were different centres that attempted to control the valuations performed in each of the three settings studied here. Hence, rather than taking the perspective of any particular centre as the starting point in the analysis, we view control as being borne out of multiple organising attempts. If we want to analyse control, the central question is not so much the question of who is in control, but rather the question of how different organising attempts combine to influence the valuations performed in practice. The focus should be on the distributed investments that are made in order to influence the valuations performed in a particular situation.

From the perspective of any particular agency, this form of control may be experienced as “minimalistic” (Law 1997; Quattrone and Hopper 2005). It is ‘minimalistic’ because it is incomplete. Control in this view does not depend on the prescriptions of a particular centre and the corresponding interventions to make the peripheral agencies comply with these prescriptions. Nor does it assume that everything can be seen and regulated in detail from the centre. Furthermore, as opposed to seeing agencies as moving between enclosed systems of control, or confined networks, this view recognises that there may be different systems of control that are continuous and overlapping. As shown throughout this book, instead of a single standard of value, they are multiple and changing standards. Thus, the findings in this book have elaborated on the notions of “distributed calculation” (see Czarniawska 2004), and “minimalistic control” (see Quattrone and Hopper 2005) suggested in previous research.

Furthermore, rather than discipline or the building of alliances, the view in this thesis emphasises calculation. In this view, control works through the configuration of the calculative capacities of autonomous agencies. This is a form of control that operates on “the rules of the game” (Callon 1998b) rather than on the conduct of individual agencies. In particular, control operates through the configurations of the calculative arrangements, i.e. through the configuration of the calculative devices that enable particular forms of calculations. While previous research has often emphasised a centre’s attempts to constrain the behaviour in the periphery, and make this comply with its strategies, this view of control rather emphasises the ‘autonomy’ of these individual agencies. Agencies are autonomous because the

economic frames are multivalent as a result of these being borne out of multiple organising attempts. Hence, control does not reduce these agencies to docile bodies, or tightly confine their room to manoeuvre, but rather acts on the calculations that they perform. However, autonomy is not an indication of the absence of control, but rather a condition that is inherent in this form of control. We may argue that economic agencies in contemporary organisations may have been constituted in such ways that they would reject any attempts of control that undermine their autonomy. Autonomy is thus not a natural quality, but a result of how agencies have been configured, and it is a condition for making this form of control operable.

The view taken here also emphasises the dynamic aspects of control. Control is not a result, but as an ongoing process. For the cases presented herein, control was not implemented from a single centre, but was the result of multiple organising attempts over time, and, of note, the relations between centres and peripheries kept changing. Furthermore, economic agencies are in this view not assumed to be naturally calculative, or to be made calculative according to a specific model, but they were constantly made and re-made. Thus, rather than stabilisation, this view emphasises the dynamic and continuous aspects of control; and rather than centredness, this view emphasises how things are both centred and de-centred, with movements in between.

In sum, this book suggests that control resides in the continuous production of calculative agencies, which is a result of the distributed investments made to configure particular economic frames. This conception of control may not directly answer the question of domination, but it could provide a useful way of analysing how organisational activities become valuable and how the organisation thus comes to take on a particular direction. I have argued that this conception of control might be relevant for understanding the operation of control in contemporary organisations, such as the case company in this book. Future research could investigate the relevance of this conception of control in different settings.

Implications for the theoretical discussions about valuation in the social science literature

In addition to the contributions to the accounting literature discussed above, the findings in this book could have certain implications for the discussion about the concept of valuation in the broader social science literature (see Lamont 2012; Helgesson and Muniesa 2013; Kjellberg et al. 2013), and, in particular, for the recent work in economic sociology from which the conceptual approach of this book is drawn (see Callon 1998a; Callon et al. 2007; MacKenzie 2009). There are, in particular, two areas in which this book could make a contribution to this literature.

Firstly, this book has sought to provide a nuanced and detailed understanding of the roles and capacities of various forms of economic calculation. Several studies have suggested that research conducted within the accounting tradition could make a contribution to the research in economic sociology by “developing a more nuanced understanding of the capacities and roles of the various calculative practices that populate the socio-economic domain” (Mennicken et al. 2008; see also Miller 2008; Chapman et al. 2009; Vollmer et al. 2009). In particular, Mennicken et al. (2008, p. 4) argue that economic sociology needs to “stop looking at economic calculation as mainly derivative of, or secondary to, the discipline of economics”, and, moreover, that this literature should be “careful not to treat practices of economic calculation in an undifferentiated manner”. This thesis has shown how there were different forms of calculation in the organisational practice. I have traced the relations between these different calculations, and the effects that they had on the valuations performed in practice. As a result of these different forms of calculation, we have seen how there were also different forms of economic behaviour. ‘The economic’ was not singular, but it was manifold and changing depending on the configuration of the calculative devices (see Christner and Strömsten forthcoming on this point).

These observations point to the need for economic sociology to study empirically the existence of different forms of calculation in practice and, in particular, to focus more in detail on the interrelations between different forms of calculation. Attending more to these details of economic calcula-

tion could be one way to delve further into the complexities of the constitution of economic agencies. In particular, a greater attention to the co-presence of different forms of calculation could provide an entry point for understanding better the specificity of different versions of certain agencies, such as ‘consumers’, ‘analysts’, and ‘homo economicus’, and how these change over time. Furthermore, this thesis has further developed the notion of calculative devices. In particular, as discussed, by using this concept we have seen how different material and technical devices that were not ostensibly defined as either economic or financial, were centrally implicated in the performance of economic valuations and the constitution of calculative agencies. Thus, I argue that this concept could be helpful in investigating the variability of economic calculations and economic behaviour in practice beyond the market setting.

Secondly, this book has also sought to take another step towards adapting the conceptual vocabulary developed in the technological turn in economic sociology to the study of formal organisations. As noted, while this conceptual vocabulary in principle has been extended to different forms of economic behaviour (see Caliskan and Callon 2009; 2010), most of the empirical studies in this line of research have focused on economic behaviour in financial or consumer markets (see Callon et al. 2002; Knorr Cetina and Preda 2005; Callon et al. 2007; MacKenzie et al. 2007). Although this book is not the first study to use concepts from this line of research in organisational and accounting research (see Roberts and Jones 2009; Woolgar et al. 2009; Skærbæk and Tryggestad 2010; Vinnari and Skærbæk 2014), it has taken this line of inquiry further by focusing specifically on the question of how organisational activities become valuable. Part of the aim of this book has thus been to elaborate on the relevance of this conceptual vocabulary also for valuations performed in formal organisations.

In relation to organisational research, this conceptual vocabulary has been useful because it “de-naturalises organisations” (Alcandipani and Hassard 2010). This thesis understands organisations to be a result of framing, i.e. they do not behave in a particular way simply because they are organisations, but only in so far as they have been formatted as such. This thesis has characterised the organisation in focus by the existence of multiple economic frames, which sometimes, but not always, formed a coherent or-

organisational frame. However, we have also seen how there were pre-existing arrangements that participated in constructing formal organisations in a particular way. These pre-arrangements, for instance, contributed to make things such as organisational rules and charts significant calculative devices in organisational practice, although these were not necessarily important at all times. These findings thus draw attention to pre-arrangements that participate in configuring the ‘formal’ character of formal organisations. As Cooper and Burrell (1988) point out, if the subject of organisational analysis is formal organisations, it is not organisation as much as its ‘formal’ character that needs analysis. This is the first point regarding the use of this conceptual vocabulary for organisational analysis: if we want to study organisations, we need pay particular attention to the different pre-arrangements that have gone into constituting formal organisations in a particular way. This does not mean that we should expect every organisation to behave in a particular way, but that we should consider these pre-arrangements as a potential explanation for why a particular organisation behaves in the way it does.

The second point that emerges in relation to the study of organisational practice is that this thesis emphasises the question of organisational control, i.e. how does an organisation hold together and take on a certain direction. Markets do not need to hold together and different market agencies do not need to have a common direction for them to be recognised as a market. One might even argue that a main characteristic of markets is that there is no common direction. Organisations, however, need to hold together. Thus, to study organisations means in some way to study centredness, in a way in that the study of markets does not. However, this book has argued that the questions of centredness and control are complicated, perhaps more complicated than commonly acknowledged. Thus, to study centredness does not mean to study particular centres’ “will to power” (Nietzsche 1968), but to study the centredness that emerges out of multiple, continuous organising attempts. It means to study how things become valuable, and how an organisational order emerges out of the valuations performed. It means to study the different attempts to calculate and control organisational activities and how these influence how activities are made valuable. It means to study how things are both centred and de-centred. This book has

attempted to take one step further in discussing this understanding of organisational control. This appears to be an important area for future research.

Concluding comments

In conclusion, this book has discussed how organisational activities are calculated, controlled, and become valuable. It has argued that value is something that is organised, arranged, and that we need to study these processes of organising that makes an organisation valuable. What I wanted to do in this book, to borrow the words from Foucault (2002, quoted in Townley 2005), “is not to solve a problem but to suggest a way to approach a problem”. Hence, the conclusions presented here do not claim to be an end point, but perhaps a starting point for continued discussions. There are, as have been highlighted throughout this chapter, several promising areas for future research. This book has suggested several questions and concepts that could be developed further. I have argued that these questions and concepts could be valuable starting points for future research.

Notes

Chapter 1: Introduction

¹ The term ‘social studies of accounting’ is borrowed from Vollmer et al. (2009). Here, I am primarily discussing a prominent sub-set of this research stream, which can be called constructivist approaches to accounting, i.e. studies that primarily build on the work of Michel Foucault (see 1977) or Actor-Network Theory (see Latour 1987). This group of studies has also been known in other places for “material-semiotic” studies (Law 2008) or “post-structuralist” studies (Cooper and Hopper 2007).

² To begin with, I will define accounting as any form of financial or economic calculation. This definition will be further developed in chapter two.

³ Valuation is a special case of calculation (see Callon and Muniesa 2005) which entails a specific form of relational ordering such as ‘good’/’bad’, ‘better’/’worse’, and ‘valuable’/’non-valuable’. The term valuation can refer both to a verb and a noun. Indeed, this dual character could be seen as one of the most interesting aspects of this term (see Kjellberg et al. 2013). I will use valuation both as a verb and as a noun. The focus is on the processes of valuation (the verb, the process of making objects valuable); when valuation is used as a noun (a valuation performed, an object with an ascribed value), it denotes the (temporary) end point of such processes of valuation.

⁴ The Bessemer-method is a method for producing steel from molten iron through oxidation.

⁵ The company has since been re-organised into different business areas with different names.

Chapter 2: Previous research and conceptual framework

⁶ Distance should be understood here as a theoretical concept, rather than an empirical phenomenon (see Harman 2009, p. 47 et seq.). For example, while it is commonly acknowledged that geographical distances poses a control problem (see Chandler 1977; Johnson and Kaplan 1987), the notion of action at a distance goes beyond a concern with spatial distances. As Dambrin and Robson (2009, p. 8) point out: “...in the organisational context, it is clear that this distance equally concerns a difference in terms of power and interests”. Furthermore, accounting does not only facilitate action at a

distance but can also, as Quattrone and Hopper (2005) show, create distances. Hence, distance is here conceived of in a broad sense, encompassing different forms of dichotomies such as here and there, before and after, or us and them.

⁷ Hierarchical observation, Foucault (1977, p. 170-177) argues, is in the archetypical disciplinary model conducted by a single centre: “The perfect disciplinary apparatus would make it possible for a single gaze to see everything constantly. A central point would be both the source of light illuminating everything, and a locus of convergence for everything that must be known: a perfect eye that nothing would escape...” However, as such singular vantage points could be rare, discipline more often built on a hierarchical, or ‘pyramidal’ network of observations: “The pyramid was able to fulfil...two requirements: to be complete enough to form an uninterrupted network... over the entire surface to be supervised; and yet to be discreet enough not to weigh down with an inert mass on the activity to be disciplined”. It is thus, Foucault argues, in construction of such hierarchical networks of observation that disciplinary power resides. Normalising judgement, in turn, Foucault (1977, p. 177-184) defines as a form of “infra-penalty”. In particular, “it was a question of making the slightest departures from correct behaviour subject to punishment”. Thus, the focus was on correcting behaviour in relation to some pre-specified norm or standard, which was “explicitly laid down by a law, a programme, a set of regulations”. Hence, norms and standards were made to have an important disciplinary power on behaviour: “like surveillance and with it, normalization becomes one of the great instruments of power at the end of the classical age”. The examination, finally, Foucault (1977, p. 184-192) argues, is at the heart of the disciplinary system as it combines “the deployment of power and the establishment of truth” and manifests “the subjection of those who are perceived as objects and the objectification of those who are subjected”. Thus, it was through the ceremony of examination that “the ‘subjects’ were presented as ‘objects’ to the observation of a power that was manifested only by its gaze”. As Foucault writes, “In discipline... it is the fact of being constantly seen, of being able to always to be seen, that maintains the disciplined individual in his subjection. And the examination is the technique by which power, instead of emitting the signs of its potency, instead of imposing its mark on its subjects, holds them in a mechanism of objectification.”

⁸ During “problematization,” the network-constructors attempt to render themselves “indispensable in the network” (Callon 1986, p. 204). This entails determining a set of actors and defining their identities “in such a way as to establish themselves as an obligatory passage point in the network of relationships they [are] building” (ibid.). During “intressement,” the network-constructors then attempt to “impose and stabilise the identity of the other actors” they have defined through their “problematization” (ibid., p. 207). This involves disassociating the actors that the network-constructors want to enroll in the network from competing enrolment attempts. If the intressement is successful, it will lead to enrolment. “Enrolment” is about the “multilateral negotiations, trails of strength and tricks that accompany the intressements and enable them to succeed” (ibid., p. 211). Enrolment could happen in different ways, including “physical violence, seduction, transaction, and consent without discussion” (ibid., p. 214).

Finally, if enrolment is successful, the network-constructors have now become “the ‘head’ of several population” (*ibid.*, p. 216). That is, they have become “influential” because they have become “spokespersons” for and able to “mobilize” a network of different entities, whose “margins of manoeuvre” are now “tightly delimited” (*ibid.*, pp. 217-218).

⁹ In the words of Andon et al. (2007), “‘translation’ refers to the work through which actors attempt to modify, displace and/or channel various interests in the pursuit of certain ends.” Indeed, there is, as Law (1992) notes, “more than a hint of Machiavelli in the method”.

¹⁰ These central actors are not necessarily central because they represent the formal central management. Indeed, ANT is well-known for the assumption of a ‘flat ontology’, according to which the management is a priori no more powerful than any other organisational actor (see Ahrens and Chapman 2007; Cooper and Hopper 2007). Furthermore, these central actors are not considered to have any particularly power. Briers and Chua (2001), for instance, are careful to note that their account, although it follows the attempts of a particular group of actors to introduce a new accounting technology, is “an anti-heroic account of change”; as they write, “Harry [the main protagonist], on his own, did not achieve much. [...] But the network, in the end, did much – new accounting technologies were adopted while old ones were shut down and an entire product line was removed.” Hence, these central actors are rather central in the sense that they have been taken as the starting point in the analysis in these studies. That is, they have been seen as “the *primum movens*” (Callon 1986, p. 203), whose attempts to centre the organisation in themselves are making things happen, and in relation to which the actions of other agencies are analysed. As a consequence, the central analytical question in these studies can thus be said to have been, to a certain extent, whether these prime movers are ‘successful’ in getting the other actors to comply with their strategies.

¹¹ Following Callon (2005, p. 4), agency is here defined “as a capacity to act and to give meaning to action”.

¹² ‘Frame’ is an often used concept in social science research. Usually, the concept of frame is taken to denote a cognitive structure through which actors interpret the world, as in Goffman’s case. A frame is thus considered to provide an interpretative schemata, which affects people’s behaviour. In organisation studies, the concept of ‘sense-making’ can be said to employ the notion of frame in this sense (see Weick et al. 2005). Weick et al. (2005, p. 409), for instance, note, “...people will first look for reasons that will enable them to resume the interrupted activity and stay in action. These ‘reasons’ are pulled from frameworks such as institutional constraints, organizational premises, plans, expectations, acceptable justifications, and traditions inherited from predecessors.” Similar definitions of frame have also been used in accounting research. Jönsson (1987), for instance, talks about “Frame Shifting, Sense-making and Accounting”. Bloomfield and Vurbudakis (1997), drawing on Bateson (1973), use the notion of frame to analyse the introduction of a new ERP system, which they understood as “entailing attempts to institute particular versions of the object while excluding others,

and thus control the nature of individual consciousness". Vollmer (2007) used Goffman's concept of frame to analyse the consumptive and reproductive utilisations of numbers. Other examples include van der Steen (2009), Englund et al. (2013), and Solomon et al. (2013). However, neither of these uses of the term frame corresponds to the concept of frame which is used in this thesis. In particular, in the standard view, people are considered to acquire frames through social experiences such as upbringing, education or socialisation. This view thus assumes that there are material differences between humans and non-humans in regards to how frames are held and articulated. This is not the view taken in this thesis, in which the world is considered to be made up of socio-material arrangements, and all action is thus rooted in the totality of these socio-material arrangements.

¹³ If these arrangements constituting a frame, such as 'the theatrical frame' above, were to change (the performance would be held not in a theatre building but on a street corner, the actors did not have any long hours of rehearsal, or the audience did not have any prior experiences), the frame, and the particular script it provides, would also change (at least to some degree).

¹⁴ It also follows from this that the socio-material arrangements constituting a particular frame are at least as large as the socio-material arrangements making up a particular agency or object, but they are usually larger, containing the multiple different agencies and objects which the frame produces.

¹⁵ Recent work in this tradition has sometimes preferred the term *agencements* instead of *arrangements* (see Callon 2005; Hardie and MacKenzie 2007; Caliskan and Callon 2010). Callon (2005; 2007b; 2007c) proposed the notion of *socio-material* (or socio-technical) *agencements* as a shorthand for all the socio-material assemblages or arrangements that constitute and enact calculative agencies. The term *agencement* is adopted from Deleuze and Guattari (1988) and is intended to convey the idea of assemblage or arrangement from which action springs. Caliskan and Callon (2010) point out that the meaning of the French word *agencement* is very close to that of arrangement or assemblage; it conveys, as they write, "the idea of a combination of heterogeneous elements that have been mutually adjusted to one another". They argue that, while arrangement could imply a divide between human agents, who do the arranging, and things that are arranged, *agencement* – which has the same root as agency – captures the idea that action is mutually constituted by all the elements that is part of the arrangement. However, in the interest of not unnecessarily burdening the presentation with another complicated concept, I have chosen to retain the concept of socio-material arrangements in this thesis, which still directs the attention to the specific arrangements that, in their totality, constitute and enact particular frames and agencies. The idea that there is not one agency doing the arranging but that the arrangements are mutually constitutive – i.e. that they assemble and configure themselves, so to speak – is retained.

¹⁶ Garcia-Parpet (2007, p. 51) notes that perfect market competition implies the following assumptions: "each economic agent acts as if prices are given, as if goods were

homogeneous, as if resources were perfectly mobile, as if firms could enter and exit the market freely, and as if economic agents had complete and perfect knowledge.”

- ¹⁷ On this point, Caliskan and Callon (2010, p. 2), for instance, note that: “the study of markets would be altogether too difficult if it were not for an agreement in contemporary societies on the characteristics of markets, this particular organisational form for economic activities. Notwithstanding their variety, because of active and deliberate intervention, the markets surrounding us actually do share what Wittengenstein would have called a ‘family resemblance’.”

Chapter 3: Methodological considerations

- ¹⁸ This builds on this research approach’s inheritance from actor-network theory, ANT (see Callon 1999). Law (1994, p. 10) notes that a generalised symmetry means that “everything you seek to explain or describe should be approached in the same way”. This is important because: “You don’t want to start any investigation by privileging anything or anyone. And, in particular, you don’t want to start by assuming that there are certain classes or phenomena that don’t need to be explained at all” (ibid.)
- ¹⁹ Indeed, the researcher was hardly old enough to read in the mid-1980s, when the re-organisation of the Tool Production Unit described in chapter six occurred.
- ²⁰ See also Quattrone and Hopper (2005) on this point.
- ²¹ The same can perhaps be said about Latour’s (1987) well-known adage to “follow the actors”. As Lukka and Vinnari (2014) point out, despite occasional claims to the contrary, ANT provides a theoretical lens through which different settings can be analysed. Hence, the advice to follow the actors should be taken more as an analytical advice (to foreground practices) rather than an insistence on contemporary ethnographic studies. Indeed, Latour’s own studies often concerns events that are remote in time and space (see for example Latour 1988).
- ²² In a standard view, theory has, for instance, been defined as “an ordered set of assertions about a generic behaviour or structure assumed to hold throughout a significantly broad range of instances” (Sutherland 1975, quoted in Weick 1989, quoted in Quattrone and Hopper 2005).
- ²³ As Lukka (2014, p. 560) points out, explanation has often been understood traditionally as result of statistical generalisation, based on the “regular coincidence of phenomena” and the “ability to fit a phenomenon under a general law”.
- ²⁴ However, in arguing for the importance of making a full description, it is not my intention to argue that there is no need for analytical conceptualization and theoretical explanation. According to traditional ANT, no distinction should be made between a description of the actors and their definitions and an explanation of the phenomena under study (see Akrich and Latour 1992; Latour 2005). The description of the case events is in itself an explanation. A good description is one where all the relevant elements have been taken into account so that no further explanation is needed (Latour 1987, 2005). This thesis retains the idea that a detailed description of the agencies and socio-material arrangements framing a situation is an important part of a ‘good ac-

count'. However, it also recognises that the empirical description suggests certain relations of dependency between different things in the empirical material (see Kakkuri-Knuutila et al. 2008). This dependency is not a matter of generalized causality; in line with the overarching position of the study, any dependency is rather contextually situated. Writing up the empirical chapters meant identifying and narrating which agencies and activities "made a difference" (Lukka 2014, p. 560). Furthermore, theoretical concepts have been used throughout the empirical chapters. As discussed below, the research process can be described as a constant going back and forth between the empirical material and the prior literature in order to provide a plausible explanation. Taken together, what I have aimed for can be said to be a form of "thick explanation" (Lukka and Modell 2010; Lukka 2014) that is deeply rooted in practices. However, as discussed previously in section 2.2, the rich accounts of practice that make up these thick explanations are not limited to the sense-making of human actors (compare Lukka and Modell 2010, p. 466).

²⁵ The primary search word was Sandvik, i.e. the case company's name. Additional searches were also performed for key words which appeared to be significant in the case, such as 'shareholder value' (and its local translation 'aktieägarvärde') and 'economic value added'.

²⁶ The quotes from the interviews have been translated from Swedish to English by the researcher.

²⁷ The Tool Production Unit was re-organised in the late 1980s from a functional production model to flow group-based model (see Lind 1996). As a result, the production was organized into several flow groups, each responsible for the production of a particular group of product from the start to finish (see chapter six). These were in turn organised into two different production sections, depending on the type of products manufactured. The flow group managers thus reported to the production section managers, who in turn reported to the head of the Tool Production Unit, who reported to the head of the production unit in which the Tool Production Unit was located.

²⁸ Here I am talking about 'ANT-1990', as Law 2008 would have said, or what is often referred to as "the sociology of translation".

²⁹ On this point, it should be noted that previous research has shown that conflicting versions of the qualities and values of a particular object are often drawn together and made observable only in relation to concrete decisions (see Mol 2002; Sjögren 2006).

Chapter 4: From a profit frame to a value creation frame

³⁰ This section builds on annual reports, sandvik.com (the 'a brief history of Sandvik' section), Hedebrant et al. 1987, Sjöholm 1994, Lind 1996, and Fagerfjäll 2012.

³¹ Specifically, the names of these business areas were: Steel, Rock Tools, Coromant, Hard Materials, Saws and Tools, Process Systems, and Electronics (Annual Report 1989).

³² The profit was a mere 68 million SEK in 1982.

- ³³ Following this raid, Skanska became the main owner with approximately 25 percent of the voting rights.
- ³⁴ Sandvik, “1970-1989,” accessed Feb 2015, <http://sandvik.com/en/about-us/our-company/history/history-years/1970-1989/>.
- ³⁵ Ibid.
- ³⁶ The equity-to-assets ratio is a key ratio used to evaluate a company’s financial strength. It is measured as equity/total assets.
- ³⁷ In the term profit, I have here also included the term ‘earnings’, which was often used interchangeably with profits, as in earnings before interest and tax or earnings per share. Furthermore, I have translated the Swedish terms ‘årets resultat’ and ‘rörelseresultat’, which literally translate as ‘this year’s result’ and ‘operating result’, with the more conventional English accounting terms ‘net profit’ and ‘operating profit’ (see White et al. 2003; Thomasson 2008).
- ³⁸ In particular, in his study of management accounting practices in several large Swedish companies at the end of the 1980s, Sjöholm (1994, p. 104) found that “it was a profit measure in absolute terms that was presented as the absolutely most important measure [of performance]” for the top management level in Sandvik. This measure was the “earnings after financial income and expenses,” i.e. the pre-tax profit.
- ³⁹ See Hellman (1996; 2001) for several examples of how the P/E-ratios and EPS calculations were used in the investment practices of Swedish institutional investors in the beginning of the 1990s.
- ⁴⁰ Since the profit had to be divided by the total number of outstanding shares to get the scale right, there was a direct relation between EPS and the P/E-ratio.
- ⁴¹ Hellman (2005) observed, for instance, in a study of the analytical practice among Swedish institutional investors between 1993 and 1995, that a central part of these institutional investors’ practices focused on predicting the near-term development of the company’s profit level. He concluded that “EPS was clearly the key forecast variable” in these practices, although other forecast variables such as the balance sheet, return on equity, return on net assets, and the company’s liquidity were also used. These forecasts of the income statement and the balance sheet were “usually looking 2–5 years ahead”.
- ⁴² The management had calculated that of the company’s nearly 6 billion SEK in cash holdings at the time, only 2 billion were needed for the daily operations and the rest could be used for investments “in the core businesses or in other things that could be useful for us”, as Per-Olof Eriksson explained (Dagens industri 31 May 1990). However, while the management had calculated that the company had more cash than it needed for the daily operations, they had also concluded that it was valuable to keep this cash in the company due to the financial income.
- ⁴³ In 1992, for instance, the financial income accounted for more than one-third of the pre-tax profit (Annual Report 1992).
- ⁴⁴ Sandvik had made an offer for the German cutting tool manufacturer Krupp Widia earlier in 1994. At the time of the capital markets day, this acquisition was still pending

approval from the German competition authorities. Later in the year, however, this acquisition fell through due to competition/anti-trust reasons.

⁴⁵ This was in part considered to be a problem because the resulting goodwill amortisations would hit the income statement and thus affect the profit negatively (see VA 26 Aug 1992).

⁴⁶ That is, the company would still be trading at the same P/E-ratio, based on the next year's profit, with this new strategy, and the only question was whether this P/E-ratio was now more or less justified.

⁴⁷ In particular, EVA (and the associated MVA) was promoted by Stern-Stewart, CFROI (and the associated TSR) by Boston Consulting Group, and FCF (and the associated measure Economic Profit) by McKinsey & Co and SVA by LEK/Alcar consulting (see Froud et al. 2000).

⁴⁸ Several adjustments were also suggested in order to make the company's operating profit more similar to the underlying operating cash flows, which were considered to be more interesting from the point of view of the shareholders. These included adjustments in order to correct for accounting conservatism and thus make the profit number more close to the underlying free cash flows, and the book values closer to the underlying economic values of the assets. Stern-Stewart suggested up to 160 adjustments that could be made in order to correct the accounting numbers (see Stewart 1991). Some of the most common adjustments were to deduct the tax paid from the operating profit, and to add back the goodwill amortisation, the R&D expenses, and the market building expenses (e.g. the cost of marketing and the value of brands) to the balance sheet, and make the corresponding adjustment in the income statement.

⁴⁹ This could also be expressed as $EVA = (ROIC - WACC) * (\text{Adjusted}) \text{ Capital}$, where ROIC stood for the adjusted return on invested capital.

⁵⁰ E = Equity capital; D = Debt capital; K_e = cost of equity; K_d = cost of debt; t = tax rate

⁵¹ MVA stands for Market Value Added. It is measured as the sum of the dividends and the share price development during a specified time period (see Stewart 1991).

⁵² EVA was also used as a discounted cash flow approach in the financial market, by which the future stream of EVA was discounted to a present value using the WACC (see Warburg 8 Mar 1999; Credit Suisse First Boston 2 May 2000).

⁵³ Notably, the EBIT is slightly different compared to the pre-tax profit that was in focus in the earlier 1990s. The difference is that while the pre-tax profit includes financial income and expenses, these are usually not included in the EBIT.

⁵⁴ On this point, a Swedish analyst interviewed in 1998, quoted in Hägglund (2001) in his study of analyst and institutional investor practices in Sweden in the late 1990s, explained, "To me there are three groups of performance metrics: The relative metrics of value, by which for instance the share price of [the company] dividend by the equity is compared to the competitors. The fundamental, such as Discounted Cash Flow, is the second group and these models are useful for cyclical companies because you can easily make an estimation of a normal year, in contrast to the high growth companies. And finally the profit margin, which can be used for comparing companies which are oth-

erwise almost identical to see which makes the most money.” Besides EPS and P/E-ratios, other measures used by the analysts to calculate the value of Sandvik in my study included EV/FCF, EV/EBIT, and Price-to-book calculations. In particular, one calculative device was frequently used in the financial market in the late 1990s, often as a complement to EVA or FCF calculations, was the EV/EBITDA multiple (see Warburg 6 Nov 1997; Morgan Stanley 11 Nov 1997). This calculative device was originally promoted by Boston Consulting Group as part of their CFROI/TSR approach to value creation (see Jönsson 2006; Viebig et al. 2008). It uses the EBITDA (i.e. the Earnings Before Interest, Taxes, Depreciation, and Amortisation) as a proxy for the company’s free cash flows. EV stands for Enterprise Value, which is measured as the market value of equity and debt. According to BCG, growth in EBITDA – which could be achieved through growth in sales and/or improvement in the operating margin – would be an indication of a company’s improvement in fundamental value. A change in the EV/EBITDA multiple was, in turn, seen as an indicator of how a change in investor expectations would affect the total shareholder return (i.e. the combination of dividends and share price appreciation). Hence, this device also promoted a focus on the value drivers of the company’s free cash flow, such as the operating profit margin and sales growth. However, unlike the FCF model, this calculative device did not focus on the company’s long-term future cash flows, but on the next year’s (or next couple of years) estimated EBITDA level.

⁵⁵ In particular, Hägglund (2001) concluded that, although there were many different measures used in practice, the Free Cash Flow model was probably the most important calculative device because it structured – or framed, as I would say – how the analysts approached and thought about the investment objects. On this point, see also Imam et al. (2008), who conclude, based on study of analysts in the UK in the beginning of the 2000s, that, although several different performance measure were used in order to value companies in the analytical practice, the “cash-flow-based valuation models [such as the FCF model] play a significantly greater role than accrual based models as the primary model used by analysts”.

⁵⁶ This was the first time during the 1990s that management had addressed the shareholders in this way in the letter from the president in the annual report. However, ten years earlier P-O Eriksson had also talked about the relation to the shareholders in the Annual Report (1985), although using different metrics and with a different message: “Our goal is to earn, as an average over the business cycle, an after-tax return on our equity that would be substantially higher than the concurrent rate of bank interest. [...] With the sharp improvement in our results, Sandvik’s shareholders have been rewarded for their faith in us. The 1985 return after estimated tax was 20 % calculated on our adjusted equity capital. The share value nearly doubled during 1985 and can now be used as a means of payment if a major company acquisition should require more capital.”

⁵⁷ In connection with the share redemption program, there was also a change in the company’s ownership structure. Sandvik’s main owner, Skanska, sold its 25 percent share of the company, and Industrivärden, a public listed investment company, be-

came a new main owner with 10 percent of the voting rights. Industrivärden's CEO, Clas Reuterskiöld, explained that he was particularly attracted by the "strategic changes that have been made in Sandvik with a new focus on growth and the active work that is being undertaken to optimize the company's capital structure" (Dagens Nyheter 15 Apr 1997).

⁵⁸ See also diagram 4.5 in section 4.5.2 below for an illustration of these changes.

⁵⁹ In addition to Saws and Tools, the majority of the smaller business area Process Systems was also divested in the beginning of 1999. In particular, the Sorting System business, which accounted for approximately 65 percent of the sales in the Process System division (or 1.4 billion SEK in sales), was sold. However, the buyer later reneged on the deal and the sale was cancelled. The Sorting System business was discontinued instead.

⁶⁰ The profit margin was usually measured as EBIT/sales, and RoCE as EBIT/capital employed (or as [EBIT + financial income]/Capital Employed). Notably, of these two measures, profit margin was the most important measure in practice, as Clas Åke Hedström noted in the Annual Report for 2000, in which he stated that the company aimed to achieve a sustained "high profitability – that is, operating margin".

⁶¹ On this point, the management also communicated that three business units in the Rock Tools business area – Voest-Alpine, Driltech and Roxon – "would be next in line to be divested if they could not reach the company's profitability requirements soon" (Affärsvärlden 16 Jun 1999).

⁶² In addition, a new target for the company's capital structure was introduced (see section 4.5 below), and both the profitability target (RoCE > 20 % over the business cycle) and the target for shareholder value creation (yield and growth in value higher than the industry level) were maintained (ibid).

⁶³ SMT was called Specialty Steel in 1999. It changed its name to Sandvik Materials Technology in 2002. However, to avoid confusion, I use the name Sandvik Materials Technology (SMT) consistently.

⁶⁴ Specifically, the targets for each business area were (Annual Report 2000): For Tooling: a growth rate clearly exceeding 6 percent, sustained profitability (about 20 percent operating profit margin), and a RoCE exceeding 20 percent by a broad margin. For SMC: growth amounting to about 6 percent, operating profit margin of 10-15 percent, and RoCE of 20 percent. For SMT: growth amounting to 4-5 percent, higher profitability with a goal of having an operating profit margin of 12-15 percent at year-end 2003, and RoCE of 15-20 percent at year-end 2003.

⁶⁵ The quotes are taken from a video of Per Nordberg, "Capital Market Day 2006 Presentation," accessed May 2010, <http://sandvik.com/en/investors/presentations/capital-markets-days/2006/>

⁶⁶ The difference was that this new measure did not include the various adjustments to the accounting numbers suggested by Stern-Stewart. Hence, this new measure more resembled a residual income measure (see Bromwich and Walker 1998).

⁶⁷ The quote is taken from a video of Per Nordberg, “Capital Market Day 2006 Presentation,” accessed May 2010, <http://sandvik.com/en/investors/presentations/capital-markets-days/2006/>

⁶⁸ In particular, this new target was measured in terms of the net debt/equity ratio. The net debt/equity ratio, in turn, was measured as the company’s net debt, i.e. interest-bearing liabilities less liquid assets, divided by the total equity (Annual Report 2000). I will use the term debt-to-equity ratio, or the gearing ratio, here.

⁶⁹ In 2003, for instance, the paid-out ratio was 97 percent of the profits (Annual Report 2003).

⁷⁰ The change is even more marked compared to 2007, when the pre-tax profit was 13 billion SEK and the operating cash flow was 5.5 billion SEK (Annual Report 2009).

Chapter 5: At the cutting edge

⁷¹ Each market area within the business area was responsible for independently developing and marketing their products.

⁷² Chemically speaking cemented carbide is a metal composite consisting of tungsten carbide and metallic cobalt (see Coromant 1994).

⁷³ The cutting interface is the foremost part of the cutting tool that operates directly on the material being shaped.

⁷⁴ A micrometre = 1/1.000 millimetre.

⁷⁵ In the product development practice, the project groups typically consists of only a small number of people; typically the project manager, the lead engineers and a few other key persons. Most of the participants in the projects are only involved on a temporary basis, working with specific tasks/problems at specific stages of the development process. The project managers typically have a technical background as development engineers within the Product Development Department and they are responsible both for the management of the process and for the technical development of the product.

⁷⁶ For an explanation of cutting depth, see section 5.3.

⁷⁷ This formula had been adopted from standard metal cutting theory (see Coromant 1994).

⁷⁸ This session concluded that “the stock market loves”: “high and growing profits, low investments in NWC and fixed assets, low operating risk, and adequate financial leverage” (Internal training material).

⁷⁹ The company had traditionally used an internal management control model based on calculated interest and calculated depreciation (kalkylmässigt resultat in Swedish), although the focus in practice had “drifted towards EBIT [as measured according to the external accounting]”, as the group controller (interviewed in 2002) noted. As a result of this model using of calculate interests and depreciation, the company’s business areas often had two different profitability targets – one external and one internal – which made it difficult to measure their performance. This was, the head of group business control explained (in 2009), one of the reasons for the new steering model (which was

based on the external accounting): “It was very difficult because you didn’t speak the same language, in particular there was no connection to this external world; internally we had results that were not at all in sync with our external results.[...] We communicated very clearly externally that our target is 25 %, but internally, with the calculated cost model, our target became perhaps 27 %. So we felt that we needed one measure, one target, one goal.”

⁸⁰ There were three production units involved in project Alpha, each producing a different part of the product.

⁸¹ At the stage-gate meeting, this unit’s production costs were instead inferred from an earlier estimate.

⁸² Henceforth, the project manager refers to the new project manager.

⁸³ The production costs were calculated using a full cost calculation, with multiple cost centre, in which the machines were depreciated over their useful life (which was significantly longer than three years). See more in section 6.2.1.

⁸⁴ The production unit’s comparatively low share of the total production costs for Alpha stemmed partly from the labour-intensive production model of one of the other two production units involved in the project. Though highly technically skilled, the traditional production process in this other unit involved a high degree of manual labour, which translated into significantly longer throughput time (more than three times longer) and higher production costs.

⁸⁵ Camming is the oscillation of a rotor during one rotation as measured in a plane perpendicular to the rotor’s attachment.

⁸⁶ This was aggravated by a fire in Coromant’s testing facility that set the development work back another couple of months.

⁸⁷ Project manager, Beta.

Chapter 6: World class manufacturing

⁸⁸ In the beginning of the studied time period, Coromant was a business area. Later on, however, it became a market area within the Tooling business area, as discussed in chapter four.

⁸⁹ For a more detailed description of the practice of this tool-production unit in the 1980s and early 1990s, and of the re-organisation in the late 1980s, see Lind (1996; 2001).

⁹⁰ If the 80 percent targeted reduction in the throughput times was achieved, the Production Strategy Report calculated that Coromant’s capital turnover would increase from 1.8 to 3.5, and that the RoCE would improve from 14.5 % to 18 % as a result.

⁹¹ Notably, this is sometimes also known as ‘world class manufacturing’ (see Lind 2001).

⁹² Following the re-organisation in the mid-1980s, the Tool Production Unit was organised into several flow groups (10 in 1994, 8 in 2008), which were organised into two production sections. A flow-group manager was responsible for each flow group. These managers reported to one of the two section managers, who in turn reported to the head of the Tool Production Unit.

⁹³ The budget process was described as a “top-down-bottom-up process”, meaning that it was negotiated between the central management and the individual production units, and between the individual production units and the flow groups. Once the production plan for the year had been decided for a production unit, it was the flow group managers’ responsibility to make a budget for the number of operators and indirect production costs they would need during the year to meet the plan. Notably, the budget process was described as being more delegated in 2000 than in 1994, and even more so in 2008.

⁹⁴ The standard production cost included all material and processing costs related to a product. It also included the production overhead and administrative costs (including a mark-up for R & D, downtime and profits) related to the production.

⁹⁵ Stock availability had replaced delivery reliability (see section 6.3.1 for a definition). The quality index was a centralised quality control based on spot-checks entailing visual inspection of the finished products, focusing on that everything that should be included in the product package, i.e. manual, was included.

⁹⁶ In 2000, the operators’ variable compensation was primarily determined by the productivity development, since the throughput times were already below the target.

⁹⁷ It was also possible to see the throughput time of each individual order in the computerised information system.

⁹⁸ For a definition of SVA, see section 4.4.3.

⁹⁹ Different flow groups used different colours to mark the priority orders, such as blue plastic folders. The principle was the same, however.

¹⁰⁰ In particular, the share price dropped from about 80 SEK/share to about 40 (43) SEK/share in just a matter of weeks in October. This drop was even more significant compared to the company’s all time high valuation of 150 SEK/share set just the year before, in the autumn of 2007.

¹⁰¹ These excerpts are based on notes taken during the meeting and expanded on directly after the meeting. The numbers (175, 128 and 142) refer to different products, which were referred to as numbers in the production practice. The numbers have been changed – these are only illustrations.

¹⁰² The project manager of project Alpha (see chapter 5) noted that when the project needed to investment in new machines in 2009, this proved difficult due to the cash flow focus in Tooling: ”This time [when we needed to buy new machines], we had this problem that there was an extreme cash flow focus in Tooling. The production people really, really did not want to buy any new machines. So the volumes were endlessly questioned when we made the proposal this time. Are these really the correct volumes? Do these calculations really hold? Do you really need these machines; can’t you just use the machines you have more efficiently? And so on, and so on...”

Chapter 7: Discussion

¹⁰³ On this point Mol (1999, p. 75) further notes, “Ontological politics is a composite term. It talks of ontology – which in standard philosophical parlance defines what be-

longs to the real, the conditions of possibility we live with. If the term ‘ontology’ is combined with that of ‘politics’ then this suggests that the conditions of possibility are not given. That reality does not precede the mundane practices in which we interact with it, but is rather shaped within these practices. So the term politics works to underline the active mode, this process of shaping, and the fact that its character is both open and contested.”

¹⁰⁴ I.e. it did not become “black-boxed” (Latour 1987).

¹⁰⁵ See further discussion in Christner and Sjögren 2012.

¹⁰⁶ With a nod to John Donne and Håkansson and Snehota (1989).

¹⁰⁷ Admittedly, I am taking a circuitous route here to get to the point. Hopefully it is a scenic route and not a detour.

¹⁰⁸ On this point, Lemke (2001), for instance, notes that Foucault’s later work did not mean that he gave up his analysis up power, but “instead he took this analysis further and corrected the earlier studies in which he had investigated subjectivity primarily with a view to ‘docile bodies’ and had too strongly stresses processes of discipline.”

¹⁰⁹ On this point Foucault (2008 [1978/1979], p. 63) noted, for instance, that: “The new governmental reason needs freedom; therefore, the new art of government consumes freedom. It must produce it, it must organize it. The new art of management therefore appears as the management of freedom, not in the sense of the imperative: ‘be free’, with the immediate contradiction that this implication may contain. The formula of liberalism is not ‘be free’. Liberalism formulates simply the following: I am going to produce what you need to be free. I am going to see to it that you are free to be free. And so, if this liberalism is not so much the imperative of freedom as the management and organization of the conditions in which one can be free...”

¹¹⁰ On this point, McNay (2009) argues, “Neoliberal government involves the shaping of individual lives in a way that does not violate their ‘formally autonomous’ character. It operates not through the delimitation of individual freedoms but through their multiplication in the context of a notion of responsible self-management. Key to this reconfiguration of the self as enterprise is an ontology that absolutizes a certain notion of economic interest or choice. An individual notion of economic interest is fetishized as a ‘non-substitutable and irreducible’ social element to such degree that it marginalizes other competing conceptions of the citizen-subject (Foucault, 2008 [1978/1979], p. 291).”

¹¹¹ As McNay (2009) writes, “Self as enterprise operates according to a principle of active self-regulation rather than one of passive submission that eliminates the capacity for autonomous thought and critique. [...] Governance through enterprise construes the individual as an entrepreneur of his own life, who relates to other as competitors and his own being as a form of human capital. In this organized self-regulation, individual autonomy is not an obstacle or limit to social control but one of its central technologies.”

¹¹² On this point, one can note that neoliberalism for Foucault (see in particular p. 216 ff. and p. 240 ff.) entailed a massive expansion of the field of economics. Common social activities such as marriage, crime, and child care and education could (should) now

be analysed economically, according to a calculation of costs and benefits. People are thus encouraged to think of themselves in terms of “human capital” that could be built up by making investments; as Foucault (2008 [1978/1979], p. 230) writes, “He is an entrepreneur of himself who incurs expenses by investing to obtain some kind of improvement.” Foucault takes education and migration as two examples of such investments that people make in order to improve their standing, but also other things, such as plastic surgery, could be construed as such investments. He notes, for instance, on the relationship between a mother and a child, “[E]verything comprising what could be called, if you like, the formative or educational relationship, in the widest sense of the term, between mother and child, can be analysed in terms of investment, capital costs, and profit – both economic and psychological profit – on the capital invested.” This also has implications for how the factory workers are construed and controlled, rather than being disciplined, the workers are now “encouraged to see themselves as ‘companies of one’,” which can make investments on their “human capital” (Read 2009). As Read (*ibid.*) notes, “salary and wages become revenue that is earned on an initial investment, an investment in one’s skill and abilities;” and “[as companies of one] they become individuals for which every action, from taking courses on a new computer software application, to having their teeth whitened, can be considered an investment in human capital.”

¹¹³ In the bureaucratic conception of control suggested by Weber (1978), organisational behaviour is considered to follow from the formal structure of the organization and control is thus considered to follow from formal rules and policies. As Jaffee (2001, p. 91) summarises Weber’s position: “Each position in the organisational chart has pre-defined duties. These formal rules and duties determine the behaviour of those who occupy the positions. When we say that ‘the role makes the person’, we are speaking of the power of the formal structure.” While I agree with the sentence that “the role makes the person” in the sense that calculative agencies are different from the individual capacities of human beings, the understanding here is also different from this position. In particular, we have seen throughout this thesis how the formal rules and policies of an organization are only part of the total socio-material arrangements which frames any particular situation and constitutes particular calculative agencies. Thus, we cannot reduce any agency, its identity and power, simply to the formal organisational structure. Furthermore, while Weber emphasised that the bureaucratic form of control was stable, we have seen throughout this thesis how control was a much more uncertain prospect. Perhaps the key to this lies in not seeing formal rules as the only source of power and control, but as part of a broader, heterogeneous assemblage. As Jaffee (*ibid.*) summarises Weber’s understanding of control: “Weber emphasised repeatedly that the bureaucratic form of authority is stable, unambiguous and clearly defined. However, if more than one basis for legitimate authority exists, instability and ambiguity could be generated.” Thus, in the approach taken in here it is clear that multiplicity becomes the norm (see Law 1997).

¹¹⁴ To exemplify the variability of the concept of calculative devices, see section 2.2.3 and section 7.2, Callon and Muniesa (2005) use the example of algorithmic configura-

tions in financial market, which they argue are calculative devices because they organize the meeting between different agencies in markets. Analogously, one could say that devices that organize the meeting between agencies in organizations – such as organisational charts and rules – are calculative devices. To paraphrase Callon and Muniesa (ibid.): “[Organisational charts] are calculative devices in the sense which we have given to this term: They (a) circumscribe the group of calculative agencies that are going to be met, by making them identifiable and enumerable; (b) organize their encounter, that is, their connection; and (c) establish rules and conventions that set the order in which these connections must be treated and taken into account.”

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