Management Accounting Above and Under Ground

Field Studies of Operations Managers’ Everyday Work

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Accounting and Control

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Abstract
This thesis concerns operations managers who are required to adhere to both management accounting and operational concerns in their everyday operational work. The question addressed in this thesis is how management accounting is implicated in the everyday operational work of operations managers and their team members in production environments. The purpose is to explore management accounting practices in the everyday work of operations managers and their team members in production environments, and to theorize about their practices at the intersection of management accounting and operations. The research process drew upon ethnographic ideas and included travels back and forth between theory and practice at a mining company. This thesis shows that operations managers use management accounting in an analytical manner when they draw upon management accounting frames of reference to organize and mobilize action in their everyday operational work. An analytical use of management accounting suggests that management accounting extends beyond accounting departments and meeting rooms at operational levels and reaches out to the shop-floor and the mines. In such settings, operations managers are found doing accounting when they alternate between management accounting and operational frames of reference to interpret, construct and talk accounting in their everyday operational work. Management accounting enables operations managers to make sense of operational situations, and to gain and exert agency in their operational work. The results indicate that management accounting becomes a ‘way of doing things’ in everyday operational work via mimetic mechanisms. At times, operations managers are required to abide by management accounting in their everyday operational work via coercive mechanisms. The first conclusion is that management accounting is implicated in the everyday operational work of operations managers and their team members through its presence as a frame of reference. Operations managers do not always need to rely on accounting artefacts to mobilize action. Rather, they can rely on their developed management accounting knowledge. The second conclusion is that management accounting is implicated in the everyday work of operations managers and their team members through its presence as a practice. Management accounting influences operational routines and activities, which enables operations managers and their team members to handle the intersection between management accounting and operations by developing ways of practicing management accounting in everyday operational work. One contribution to the accounting practice literature is presenting how operations managers are shown to engage in management accounting, thereby making it a practice in their everyday work. Another contribution to the literature on the intersection between management accounting and operations is showing that operations managers gain agency via management accounting in their everyday work, which helps them navigate between management accounting and operational concerns.
Sammanfattning
Preface
Before I can end my work on this thesis, there are some people I would like to acknowledge. Anders, I appreciate that you bring structure to my chaos. I appreciate that your door always is open and that I can come to you and discuss unpolished thoughts. I appreciate that you make me write when I get caught up in my ‘readitis’ diagnosis. The only cure for such a disorder, you tell me, is not to read another article, but to write, re-write, and then write again. Thank you. Kent, I appreciate that you ask me all these annoying questions that no one wants to hear, but that we all should reflect upon. Thank you for your insightful comments and for keeping my feet on the ground and along the path. I would like to thank Bino Catasús for all his enabling comments during my internal seminar. To all my ‘ROSes’, thank you for all the laughter, support and ideas. Finally, I wish to thank my family because your mere presence forced me to escape my own research bubble from time to time.

My PhD studies have been educational, yet it is easy to forget that doing research for a PhD is an education. As I traveled back and forth between theory and practice, I found myself questioning my own reasonings a plurality of times. New insights have constantly been present in this metaphorical journey in time and space. This research journey has taken me ‘back in time’, to some classic work and their early insights, and all the way back in time to ancient Egypt. The research journey has taken me across the world, to a Bangladeshi steel mill, to an African gold mine, to a German brewery, to Norwegian hospitals, and to a Spanish tobacco factory. Nonetheless, all journeys come to an end. So does this one. Yet, it feels more like a beginning. As I approached the end of this journey, I realized that there are so many questions left to address, and unreflected truths to question. I cannot wait to start.

This dissertation and the research behind it were enabled by the LKAB Excellence Research Center Foundation. I had free hands to form the research project and the research question. All choices and flaws made are thereby completely my own.
List of papers


III. Curry, A., & Hersinger, A. When spaces collide: exploring the dual responsibilities of operations managers, Revise and resubmit to Qualitative Research in Accounting and Management.

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1 Introduction

This thesis has its point of departure in the longstanding debate concerning management accounting and operations management. In this debate, management accounting and the operational work of actors are often presented as conflicting and have been the concern of several studies representing various standpoints. Often, attempts have been made to eliminate of tensions or to bridge tensions between the two. Rather than questioning the assumptions of the two as conflicting, management accounting is often emphasized as in need of adaptation to suit operations. Less focus has been on how the intersection between management accounting and operations plays out in practice. With the debate as a starting point, this thesis aims to contribute to the literature on management accounting in practice by addressing the question of how management accounting is implicated in everyday operational work via field studies in a mining production environment.

1.1 Tensions, irrelevance, and the quest of redemption

Although the major purpose of both management accounting and operations management is to improve company performance (Hansen & Mouritsen, 2007a), there seems to be diverse perceptions of how such performance enhancement is to be reached. Management accounting rests upon ideas based on vertical structures, whereas operations management tends to focus on lateral flows. Researchers from both fields have however criticized management accounting for being bureaucratic, hierarchical, and financially oriented. With such traits, these researchers have for a long time claimed that management accounting has not remained relevant to operations in new and changing production environments (e.g. Johnson & Kaplan, 1987; Chen, 2008). In this thesis production environments are industrial production environment characterized as heavy industry with lateral production processes that can easily be automated, such as mining and manufacturing. From an operations management perspective, it has been argued that organizations within production environments increasingly need to compete through responsiveness, punctuality, quality, and flexibility to respond to customer demand ‘just in time’ (Schonberger, 1986; Blackburn, 1991). For decades it has been posited that the lateral orientation of continuous production flow which characterizes such environments does not seem to correspond well with the vertical management accounting rhetoric of standards and hierarchical control (Hansen & Mouritsen, 2007a). Seemingly, there are tensions between management accounting and operations management, where they are portrayed as contradictory to each other.

As a consequence, researchers have started to question the assumptions upon which management accounting rests. In particular, the operations management literature often presents problems related to management accounting as a technique in their efforts to contribute to the optimization of operations management models. Relevant costs are considered difficult to identify, and there are difficulties involved in including such costs
in operations management models. Consequently, some researchers assume a critical stance towards the simplified accounting numbers on which such models rest (e.g. Kirche & Srivastava, 2005). Bhimani (1994) observes that these arguments suggest that management accounting should be dictated by production structures and is destined to support operations management models. According to this reasoning, if management accounting cannot support operations that take place in organizations, then management accounting would provide little value to a firm. In a similar vein, Maskell and Kennedy (2007) argue that management accounting may be not only excessive but also harmful to activities characterizing operations because of late and aggregated information. From this instrumental perspective there follows little, if any, use for management accounting in firm operations in production environments.

Although researchers from both fields point to difficulties in establishing links between management accounting and operations management in production environments, its intersection is nonetheless acknowledged as potentially significant for organizational outcomes as it is included among the parameters in research models (e.g. Bendoly, Rosenzweig, & Stratman, 2007; Chen, 2008). As a result, criticism of management accounting’s shortcomings in production environments has triggered several responses. Some research responding to this criticism aims to fulfill the needs of operations management in production environments by providing new models and ‘best practices’. The reasoning in such studies seems to target the lack of ‘fit’ between management accounting and operations management practices. Thus, researchers in the operations management field often present the need for management accounting to be adapted to operations (e.g. Ghalayini, Noble, & Crowe, 1997; Spedding & Sun, 1999; Chen, 2008). One might wonder if the assumed tensions between management accounting and operations management has led to perceptions of management accounting as irrelevant to operations.

The criticism of management accounting vis-à-vis operations has triggered research addressing the design of management accounting techniques and systems (e.g. Johnson & Kaplan, 1987; Otley, 2001; Melnyk, Stewart, & Swink, 2004; Melnyk, Bütüce, Platts, Tobias, & Andersen, 2014), their implementation (e.g. Bourne, Neely, Mills, & Platts, 2003; Abernethy & Bouwens, 2005), and the organizational consequences of such systems (Tayles & Walley, 1997; Mia, 2000). Melnyk et al. (2004) argue for the need to proactively design and manage measurements in production environments, although measurements without management have also received criticism (Lebas, 1995; Otley, 2001). In production environments especially, managing performance is regarded as essential (Neely, Gregory, & Platts, 1995; 2005; de Leeuw & Van Den Berg, 2011). Both management accounting and operations management research focus on performance management and measurement systems that increase firm value (e.g. Neely et al. 1995; 2005; Otley, 1999; 2001; Broadbent & Laughlin, 2009). Yet, an emphasis on the design of management accounting systems can implicate issues of alignment. For instance, despite changes in strategy, researchers find
that strategy and management accounting systems do not necessarily synchronize (Melnyk et al. 2014).

Interestingly, the attempt to design management accounting in accordance with changing production environments sometimes results in difficulties in implementation (e.g. Bourne et al. 2003). Abernethy and Bouwens (2005) argue that one obstacle making it difficult for newly implemented systems to improve an organization’s performance is tensions between competing needs at the various management levels. One solution to failures in the implementation of management accounting, they argue, is to involve lower management in the design of such systems. Another suggested solution to the failure of implementation is the need to make organizational objectives tangible (Melnyk et al. 2004) and adapt management accounting after its context to provide local information needed at operational levels (Maskell 2000). It seems as if redesigned management accounting techniques do not discourage criticism of management accounting vis-à-vis operations, especially when the organizational implementation of such techniques fails.

If management accounting is insufficiently adapted to operations, it is thought to have devastating consequences for organizations in terms of loss of competitive advantage (Tayles & Walley, 1997), failure to provide feedback (Ghalayini et al. 1997), and sending wrong signals and thereby retaining outdated production strategies/techniques (Datar, Kekre, Mukhopadyay, & Svaan, 1991). Research emphasizes dysfunctional behaviors caused by management accounting practices, where operational actors may maximize their own performance (Philipoom & Fry, 1999; Neely et al. 1995; 2005). Management accounting is also often seen as a technique that supports decision-making (Bakke & Hellberg, 1991; Datar et al. 1991; Corbey, 1994; Ghalayini et al. 1997; Spedding & Sun, 1999). To base decisions on techniques that provide these types of dysfunctional behaviors would certainly be problematic, although some researchers suggest that management accounting can enhance decision-making quality at operational levels (Gupta & Galloway, 2003).

From a perspective whereby intended outcomes stem from rational decisions ensured via properly designed management accounting systems, the claimed solutions to management accounting’s irrelevance to operations often deal with assumptions that underpin management accounting designs. As researchers from the management accounting field have reported (e.g. Bromwich & Bhimani, 1989; Bhimani, 1994; Hansen & Mouritsen, 2007b), some of the problems with management accounting seem to involve assumptions of short-termism, lack of strategic focus, and hierarchical control. Ezzamel, Hoskin and Macve (1990) and Macintosh (1994, p. 199) suggest that such assumptions often are considered irrelevant to the production process. Such assumptions would then be in need of elimination or at least containment.
Surely, the credibility of management accounting could be lost among operations managers if management accounting fails at implementation (e.g. Ahrens & Chapman, 2002) and dysfunctional behaviors could come from poorly designed management accounting systems. As shown by Hansen and Mouritsen (2005), the actual outcomes of management accounting techniques might not be equal to the intended outcomes. Yet, an overly instrumental view of management accounting in production environments neglects human involvement and action in the intersection between management accounting and operations management. The idea seems to be that when management accounting is properly designed to suit operational needs and properly implemented at all organizational levels, organizational performance will improve. In other words, it seems as if rational decisions in operations will be achievable via ‘best’ management accounting techniques, and that this would lead to increased firm value.

It is peculiar that production environments, which perhaps are the source of the shortcomings that are ascribed to management accounting (e.g. Schonberger, 1986; Johnson & Kaplan, 1987), have been neglected in favor of research addressing strategy, innovation, supply chains and entrepreneurship. Yet, organizations operating in production environments seemingly still tend to rely on management accounting systems and models. In production environments, operations managers are central actors that conduct everyday operational work. With the term ‘operational work’, I wish to emphasize actors and their actions, whereas operations refer to the aggregated processes and procedures of industrial activity. Everyday operational work is typically characterized by lateral processes, activities, and actors’ practices that are central to the continuous production of output. Everyday operational work can be regulated by rules, but it can also rely on norms and heuristics. Yet, operations managers and their everyday practices seem to be overlooked in research addressing the intersection between management accounting and operations in favor of techniques that eliminate dysfunctional behavior. It is less clear, however, if behavioral aspects are at the root of the relevance problem with management accounting techniques that contain elements that can ‘design away’ such behavior. Rather, the relevance of management accounting may be related to the actors’ use of management accounting in their operational work.

1.2 Management accounting practices in everyday operational work
In contrast to studies that address improved design and new techniques that render management accounting suitable for rational decision-making, this thesis sets out to join the limited research on management accounting in practice by addressing those operations managers in their everyday work who are supposed to use management accounting in their everyday work. The actors involved in management accounting have not received sufficient attention in research addressing the intersection between management accounting and operations (Jönsson, 1998; Hall, 2010; Gerdin, Messner, & Mouritsen, 2014). Although some attention has been directed towards management accounting practices and
management accountants, actors such as operations managers who are involved in both management accounting practices and operations are less extensively researched. The extensive focus on management accounting techniques have been favored in research and operations managers’ conceptions and understandings of management accounting in their everyday operational work have seemingly not been favored.

In approaching the research problem addressed in this thesis, there is a need to come to grips with what management accounting is, and perhaps is not. Management accounting practices often seem to be associated with, among other things, calculations of decision alternatives, typifications of work and production processes, internal reports extracted as outputs from extensive management accounting (and control) systems, and communication with various stakeholders. This view suggests that management accounting is constrained in space and time to function only in certain situations. It denotes a practice that is performed by management accountants at the accounting department, at specific points in time, such as monthly reporting and closure of the books. Such a view offers little benefit for including operations managers’ use of management accounting, as they would not be included in management accounting practices. The thesis, however, draws on existing research that acknowledges that management accounting has broader roles to play in organizational practices (Chapman, Cooper, & Miller, 2009; Miller & Power, 2013; Gerdin et al. 2014; Ahrens, 2018).

Researchers who conceptualize management accounting as part of the environment in which it operates (Burchell, Clubb, Hopwood, Hughes, & Nahapiet, 1980; Hopwood, 1983; Chapman et al. 2009) suggest that management accounting is subjective (Baxter & Chua, 2003) and constructed (Preston, Cooper, & Coombs, 1992), and therefore shapes its own context (Miller & Power, 2013). From this point of view, management accounting is thus not merely a representation of an ‘out-there’ reality but is also shaped by the actors involved and contributes to shaping everyday operational work. Such a perspective implies that management accounting is experienced, interpreted and perceived by a wide range of actors not limited to accountants and executives.

Boland and Pondy (1986) argued early that management accounting has implications for how actors shape their understanding of the reality in which they operate. They further argue that management accounting has a role to play in carrying typifications among actors, which shapes order and meaning in complex organizational activities. This perspective that emphasizes organizational practices has received attention among management accounting researchers (e.g. Ahrens & Chapman, 2007b; Maier, 2017). Such a perspective includes organizational actors and focuses on how these actors make use of management accounting and how their use might have implications for how management accounting will be carried out in an organization (Ahrens & Chapman, 2007c). The involved actors and how they come to understand and use management accounting are thus central to practices (e.g.
Jönsson, 1998; Hall, 2010). This puts emphasis on organizational actors, their local understandings, and the actions that they carry out, and less emphasis on the appropriateness of management accounting systems.

Ahrens (1997) suggests that management accounting is implicated in organizational practices, as actors can draw upon management accounting information and discuss organizational matters with others. The term implicated denotes that management accounting is intertwined in organizations and the practices therein in broader terms that go beyond its functional properties (Ahrens & Chapman, 2007c) that include, for instance, conveying objective or neutral information into a decision-making process (Macintosh & Scapens, 1990). Management accounting is from this perspective considered implicated in wider societal processes (Modell, 2014) and various organizational processes (Busco, Riccaboni, & Scapens, 2006).

This thesis is inspired by literature addressing how management accounting is implicated in organizational practices that take place in the local context (e.g. Ahrens, 1997; Ahrens & Chapman, 2007b; Maier, 2017). For example, Maier (2017) shows how a budget is implicated in processes that are not traditionally associated with accounting, i.e. the production of a television series. She shows how management accounting practices are intertwined within the key processes of a project. In other words, for this thesis, the verb ‘implicated’ has relevance because management accounting is seen as intertwined with its operational context where there is interplay between how management accounting shapes, and is shaped by, its operational context.

Previous research has reported that management accounting makes sense via its context and can be understood via discussions or ‘accounting talk’ (Jönsson & Solli, 1993). ‘Managers work with words’ and discussions could generate alterative actions (Jönsson, 1998, p. 411). Qu and Cooper (2011) show how actors strive to make management accounting information interpretable, yet there is uncertainty in the interpretation process. Building on such ideas, Busco and Quattrone (2015) show how management accounting is open to varying interpretations. Yet, an ambiguity in management accounting may not be all bad as it can spark change among actors (Englund, Gerdin, & Abrahamsson, 2013). In other words, management accounting is heterogeneous and malleable, that is, it is possible to shape it according to one’s needs (Ahrens, 2009). It does not necessarily mean the same for all actors in varying situations. Management accounting, therefore, does not automatically lead either to action (Catasús, Ersson, Gröjer, & Yang Wallentin, 2007) or to ‘good’ performance. Yet, there seems to be a strong reliance on just numbers in calculations (Maier, 2017), which often is associated with management accounting. The objectivity permeating such numbers may cause a belief in management accounting as the ‘truth’ (Porter, 2009).
One perspective seems to be that management accounting embodies this reliance on numbers and the search for objectivity. Management accounting measures guide members seeking to set management accounting targets since the knowledge of being measured arguably provides scripts for action to the actors involved (Andon, Baxter, & Chua, 2003). Management accounting carries definitions of operational activities throughout an organization and orders the complexity that often characterizes production environments. Bay (2018) argues, however, that the direct impact of management accounting information cannot be taken for granted. The understandings of management accounting might differ among actors in a less rational way than one might think. For instance, certain measures may be perceived as suitable for management but not for everyday work (Andon et al. 2003). In everyday operational work, some actors are doing their ‘best with what they have’ (Whittington, 2011, p. 184). In other words, practices are situated. Actors may then find their own ways of working to meet management directives and, in this process, establishing practices (Ahrens & Chapman, 2002).

A focus on actors’ practices contrasts with perceptions of management accounting as objective and as a stable basis for operational measures. A practice point of view would open the way for embracing the multiplicity inherent to management accounting instead of attempting to ‘design away’ dysfunctional behavior. In other words, varying interpretations of management accounting among actors, and thus varying ways of using management accounting, may take place (Mouritsen, Hansen, & Hansen, 2009). A perspective that embraces management accounting as subjective with temporal and spatial dimensions also problematizes the view of management accounting and operations as inherently conflicting. That is, we cannot design ‘better’ management accounting systems or models to match operations if we do not understand how management accounting is implicated in operational practices. It may just be that the multiplicity prevailing in management accounting shapes discussions and interaction between operations managers and their team members which make them open to shared definitions and interpretations in localized settings.¹ In other words, management accounting is conceptualized as a situated social practice where actors are central (Chua, 2007; Ahrens & Chapman, 2007b).

In this thesis, I take a broad stance in defining management accounting. By management accounting I mean all spatially and historically varying accounting practices and structures that allow accountants and others to act upon people, processes and practices (Chapman et al. 2009, p. 1). With this definition, focus shifts partly to the ways in which practices and structures within organizations are involved in other organizational practices. Focus also shifts to those actors who are subject to management accounting and how management accounting is implicated in their varying everyday work (Tomkins & Groves, 1983; Ahrens, 2009). This definition makes the everyday operational work of operations managers

¹ In this thesis I refer to team members as operational employees, such as shift workers and engineers.
important in the intersection of management accounting and operations management in production environments, as operations managers are subject to varying practices of both management accounting and operations management. The roles of operations managers are increasingly cross-functional (Sundtoft Hald & Mouritsen, 2013), from being typically characterized by activities that are central to maintaining stable production flows to including accounting knowledge. This does not imply, though, that operations managers and their team members produce calculations on a daily basis upon which they base decisions and actions. Rather, research suggests that operations managers have a tendency to use experience, judgment, and non-financial information in addition to management accounting (Chapman, 1997; Nilsson, 1998; van der Veeken & Wouters, 2002; Nilsson, 2008).

With few exceptions, there is a limited number of empirical studies concerning operational actors, such as operations managers, who experience management accounting in practice. Given that management accounting is ‘meaningful [only] in relation to other objects and processes of organizational life’ (Boland & Pondy, 1983, p. 233), we need to address the intersection between management accounting and operations in practice, involving actors with one foot in each ‘realm’. If we are to gain such insights in the intersection of management accounting and operations in production environments, management accounting is perhaps not solely in need of new techniques, but is also in need of practical and local anchoring in everyday operational work (Jönsson, 1998; Hall, 2010). Otherwise, there is a risk that assumptions that see management accounting as conflicting with operations will remain unquestioned and that our knowledge of management accounting practices for everyday operational work will be left unadvanced (Gerdin et al. 2014). However, management accounting involvement in operational work in production environments is less clear, and ‘yet to come’ (Hansen & Mouritsen, 2007b, p. 746). There is more to be known about the ways in which management accounting is interpreted, handled, talked about, negotiated, and acted upon in relation to operational work in practice, and the reasons for drawing upon management accounting for operational work.

In the above reasoning lies the motivation behind the research problem that triggered my curiosity. Management accounting can from one perspective be considered implicated in organizational practices by human actors, and from another perspective be regarded as an instrument that can be designed to enhance operational performance. The research problem addressed in this thesis is that, even though management accounting and operations often are presented in the literature as contradictory, there are actors who are subject to management accounting and operations in practice and who need to consider both rationales in their everyday work. Yet, there is a scarcity of empirical research addressing this ‘fact’ by approaching practice and studying those who are subject to management accounting in operations while observing how management accounting is implicated in everyday operational work. The ways in which management accounting is intertwined in
the everyday work of operations managers can teach us about the nature of management accounting practices among those outside the accounting function (i.e. non-accountants), and how management accounting is practiced and becomes part of their everyday operational work. To gain such insights requires research that also goes outside contexts ‘traditionally’ associated with management accounting, such as accounting departments, offices and meeting rooms.

There is a need to emphasize the local level in the context of industrial production to a greater extent in relation to this research problem because the operational perspective appears to be half-heartedly treated, especially in combination with industrial companies. In an industrial setting, however, Jönsson and Grönlund (1988) noted early that improvements and changes in operations are made by operations managers and their team members. The team members connected and analyzed local information with management accounting. Since Jönsson and Grönlund, there has been little progress in research addressing the actors involved in practice at the intersection between management accounting and operations. Thus, the research question addressed in this thesis is formulated as follows:

How is management accounting implicated in the everyday operational work of operations managers and their team members in production environments?

1.3 Research purpose
The aim of this thesis is to explore management accounting practices in the everyday work of operations managers and their team members in production environments, and to theorize about their practices at the intersection of management accounting and operations. That is, this thesis concerns how management accounting is implicated in the everyday operational work of operations managers and their team members in a production setting.

1.4 Outline of the thesis
The remainder of the thesis is as follows. Chapter two presents an institutional framework that influenced this thesis and presents previous research embracing a naturalistic perspective on management accounting in local settings. Chapter three presents the epistemology underpinning the thesis, together with methodical choices. Chapter four presents the organization chosen for studying practices at the intersection between management accounting and operations. Chapter five provides a recap of the four appended papers. Based on the thesis’s results, chapter six discusses the use of management accounting in everyday operational work, and analyzes the settings in which operations managers and their team members use management accounting. I further discuss the ways in which management accounting is implicated in everyday operational work, management accounting’s consequences for operational work, and why management accounting is implicated in this particular way. The seventh and final chapter of the thesis presents two
interrelated conclusions regarding management accounting and everyday operational work. The chapter ends with theoretical and practical contributions and provides paths for future research.
2 Theoretical lenses
To answer the question at issue, this thesis is influenced by an institutional perspective on management accounting in the everyday work of operations managers and their team members. It builds upon literature on how management accounting shapes and is shaped by organizational actors and their actions, becoming part of the environment in which it operates. Thereafter this chapter deals with literature that embraces the importance of the actors who use management accounting in their local settings in the sense that actors and their actions are ‘knitted together’. Lastly, it focuses on previous literature concerning management accounting as a practice, situated in time and space.

2.1 Accounting, organizations and institutions
Institutional theory is concerned with how institutions are maintained and how institutions evolve over time via regulative, normative and cultural-cognitive systems. In particular, this thesis is influenced by cultural-cognitive elements in institutional theory, and how microprocesses are shaping institutions. In other words, this thesis is concerned with how processes of frequently repeated human action establish patterns of taken-for-grantedness (Berger & Luckmann, 1966, p. 70; Powell & Rerup, 2017). My perception derived from reading institutional literature is that such patterns influence forthcoming actions in similar situations since actors can relate to previously established ‘ways of doing things’. I have therefore focused on how institutions are an outcome of organizational action. When these actions become legitimized, they institutionalize the ways of doing things at operational levels of organizations and give solidity across time and space (Chapman et al. 2009).

Once patterns of action become institutionalized, institutions restrain and regulate behavior, provide norms and values for social life, and provide shared conceptions that constitute social realities and create frames through which meaning is shaped (Scott, 2014, pp. 59-67). In this thesis, taken-for-grantedness is not conceptualized ‘as routine in the sense of (unthinking) repetition’ (Ahrens, 2009, p. 31). Rather, there are meanings behind norms and taken-for-granted ‘ways of doing things’. Elements of institutional theory therefore influence this thesis in terms of understanding processes and structures in everyday work that are shaped by, and that shape human action in, the context of production environments.

Already in the early 1980s, institutional, social and political forces were highlighted as important dimensions to include in management accounting research (Burchell et al. 1980; Cooper, 1980; Tinker, 1980). Social contexts are thought to be integrated with organizations and therefore shape management accounting (Hopwood, 1983; Burchell, Clubb, & Hopwood, 1985; Chapman et al. 2009). Although it is not new, this social approach to management accounting is not always acknowledged (e.g. Merchant, 2010). Instead, management accounting is often treated as decoupled from its context. Even though it has gone nearly 40 years since researchers started to argue that management accounting needs to be studied in its context (Cooper 1980; Burchell et al. 1985), more
recent studies still emphasize the need to study management accounting’s relationship with other organizational practices (Baxter & Chua, 2009). Otherwise, management accounting faces the risk of becoming decoupled from organizational processes.

Interestingly, actors may order and interpret their experience via management accounting as it can be used to bring structure and significance and categorize activities to provide coherence on organizational processes (Boland & Pondy, 1983). Actors who use management accounting may reach understanding and reinforcement for shared interpretative schemas in their everyday work. Another way that is emphasized to reach understanding of the structures and processes surrounding actors involves interaction (Weick, 1995, p. 40). However, this does not imply that understanding becomes unitary across and within organizations. Ahrens and Chapman (2002) show how organizational sub-groups develop their own understandings which differ from those of other organizational groups. One way of interpreting such studies is that the actors involved in management accounting may therefore have different perspectives or frames of reference. For example, the perspectives of management accountants may differ from the perspectives of other organizational members such as those involved in everyday production. If institutions are reproduced by repeated actions of operational actors, then varying settings would provide actors with their own localized understanding of management accounting. This implies that organizational groups may construct and reinforce multiple frames of reference. Drawing upon such findings, I rely on a theoretical lens that focuses on how operational actors and their actions have bearing on the social order.

Boland (1987) suggested that management accounting too often may be mistaken for the complex world it attempts to describe (in Dechow, Granlund, & Mouritsen, 2007, p. 629). Management accounting is not a representation of a specific reality. Rather, management accounting has early been found to be just as heterogeneous as the settings in which it operates (Hopwood, 1983). My perception is that management accounting is heterogeneous because of the actors that are involved in shaping management accounting. Similarly, espoused practices might differ from how practices are performed (Powell & Rerup, 2017). In other words, the articulated use of management accounting could differ from how ‘ordinary people’ in an organization actually use it.

Studies of management accounting techniques show that different organizational logics can cause management accounting techniques to vary across organizations (Hansen & Mouritsen, 2005). This implies that there are differences between the (often) rational intentions of management accounting as a technique, and management accounting as practiced. Building upon such insights, I reason that management accounting as practiced needs greater emphasis. My thesis is based on the idea that we need to focus on the everyday actions of ‘ordinary people’ that take place in local settings which allow actors to carry out their operational work (Powell & Rerup, 2017). Such a perspective may be particularly
fruitful in researching how management accounting is implicated in everyday operational work in production environments.

2.2 Ethnographies of accounting

This thesis is also related to a stream of research that Baxter and Chua (2003) argue is ‘naturalistic’ in its approach. Such research seeks to investigate the meanings of the actors who practice management accounting in localized settings (Chapman et al. 2009). What is said, done and understood may be shaped by actors’ interaction with others, rather than by rational intentions as mentioned in the previous section. In this light, ethnographic accounting can be of particular interest as this type of research focuses on the actor and their everyday work in their natural context. In this case, I focus on the everyday work of operations managers and their team members to address the intersection between management accounting and operations in practice. Management accounting is theorized to structure the thinking and the ‘ways of doing things’ of organizational groups (Ahrens & Chapman, 2007b; 2007c), yet, shape diverse understandings among these (Ahrens & Chapman, 2004). Throughout its existence, management accounting shapes, and is shaped by, human actions. Local situated ‘ways of doing things’ produce some type of social order (Powell & Rerup, 2017). Actors’ management accounting use may be a part of this.

Ahrens and Chapman (2007c) suggest that management accounting is implicated in shaping its own setting. Actors who use management accounting reinforce or disrupt its structures, and thus shape it. Management accounting practices may be ‘transmitted’ to other actors, which makes them grow stronger and become ‘habitualized’ (Berger & Luckmann, 1967, p. 72). Management accounting would thus continuously be changing as interaction is ongoing (Tomkins & Groves, 1983; Chua, 2007; Chapman et al. 2009). Management accounting, therefore, ‘allows accountants and others to describe and act upon entities, processes and persons’ (Chapman et al. 2009, p. 1). With this view of management accounting, actors even outside the accounting function play an active role in shaping management accounting into what it becomes. This is an interesting take on the debate over management accounting’s being or non-being in production environments that underscores the involvement of operational actors and their activities.

Management accounting structures are potentially powerful and may constitute operational codes of conduct, or scripts for action with operational actors. These rules and norms provided by management accounting (Burns & Scapens, 2000) can be contrasted with operational ways of doing things. Operational work may be characterized by lateral perspectives where the protection of the core operations is in focus (Thompson, 1967). Operations managers, however, may often have some sort of financial responsibility that they need to consider in their everyday operational work. Herein lies the interest in operations managers as they metaphorically are standing with one foot in operations and one foot in management accounting. They are therefore subject to encountering the alleged
contradictions between management accounting and operations, and simultaneously expected to conduct their operational work ‘everyday’. A naturalistic or ethnographic approach implies that I have not based this study on a research model that needs to be tested. Rather, I view the management accounting literature as fragmented. Baxter and Chua (2003) suggest that the fragmented nature of the literature is attributable mainly to difficulties in accessing theoretically interesting cases. Therefore, I used the literature to assist my research interpretations of local values, meanings and nuances of management accounting for everyday operational work.

2.3 Management accounting as a situated practice

In the following sections I discuss the literature on management accounting and its relationship to actors other than accountants. Thereafter I discuss the literature on how management accounting can establish operational work structures. Lastly, I discuss the literature that emphasizes that management accounting is in need of contextual interpretations.

2.3.1 Management accounting and non-accountants

Tomkins and Groves (1983) early emphasized the need to include those who are ‘doing’ accounting and doing so in their ‘everyday’ local contexts. Perhaps this need resulted in research that focuses mainly on accountants and their everyday accounting practices. In managerial settings, management accounting is expected and hopefully understandable (Jack, 2017, p. 85). However, there are other actors who also partake in accounting in their everyday work. It is not obvious that management accounting is expected and understandable to the same extent by other actors than accountants in their localized settings. Management accounting is arguably not a phenomenon which ends at the doorstep of the accounting department or ends with the reports coming from the accounting system.

Studying (operations) managers in action showed that such managers may seek information elsewhere that differs from formal information routes (Preston, 1986). Ahrens (2009, p. 42) argues that: ‘a focus on everyday practices of an organization, to the level of detail of individual shop floors and shifts, can offer valuable insights into the functioning of management accounting by exploring its embeddedness in specific cultural, social, economic, and technical contexts’. This quotation denotes that insights into management accounting and everyday operational work can be gained by studying the intersection between management accounting and operations and involving those who deal with accounting in their everyday work.

The relationship between accounting and operations provides an intriguing intersection constituted by processes, practices and institutions (Burchell et al. 1985, p. 400). Actors need to interpret this intersection in their everyday work and act thereafter. Everyday work involves practical knowledge of what is possible and appropriate in a given situation.
Both management accounting and operational work can be affected by rules, norms and taken-for-grantedness, which at times may contrast to each other. Operational actors, such as operations managers and their team members, are therefore central in this intersection as they are subject to management accounting in their everyday work on the shop floor.

2.3.2 Management accounting and operational work

Operational work may be considered temporally and spatially structured by management accounting (Hayes, 1983; Carmona, Ezzamel, & Gutiérrez, 2002). Temporal and spatial dimensions imply that these structures should not be conceptualized as ‘fixed’ or ‘final’. For instance, management accounting has the potential to structure operational work in time and space that may differ across and within organizations. Management accounting creates group belongings in terms of operational teams (Ahrens & Mollona, 2007), spatially organizes production processes (Miller & O’Leary, 1994), creates symbols or scripts for action (Abelson, 1981; Boland & Pondy, 1983), and legitimates norms for operational work (Hoque and Hopper, 1994). Management accounting can thus trigger action (Swieringa & Weick, 1978; Hayes, 1983), and perhaps that information is open to interpretation (Englund et al. 2013). These insights suggest that management accounting can be highly influential for actors within an organization and their operational work.

Time and space in operational work can be accounted for and people can be made accountable for how they use time and space (Jack, 2017, p. 79). Operations managers would thus be subject to the responsibility created by management accounting (Jönsson, 1996). This implies that operations managers and their team members can be assessed via management accounting. The knowledge of being assessed is likely to provide scripts for action (Andon et al. 2003). Chua (1996) argues that it is the institutionalized conceptions of numbers as having the power to reduce uncertainty, rather than their actual supremacy, that provides this script for action. Nonetheless, management accounting in terms of numbers and assessments can have strong effects on actors. Such effects rely on the meanings that are ascribed to management accounting information (Espeland & Sauder, 2007; Espeland & Stevens, 2008; Chapman et al. 2009; Porter, 2009).

Consequently, even though comparability may be sought via objectifying scripts for action, actors may ascribe varying meanings to management accounting, which without the inscribed meaning simply would be numbers (Espeland & Sauder, 2007). From this perspective, management accounting may too often be left unproblematized as a social phenomenon (Baxter & Chua, 2009) that is ongoing, emerging and shifting in nature (Chua, 2007). My interpretation of this is that management accounting can transfer institutionalized ideas across time and space, whether such ideas are formalized or informal, and thus shape the frames of reference of operational actors.
Researchers have found that managers in operational settings make sense of their work with both formal and informal information (e.g. Hopwood, 1972; Preston, 1986; Jönsson & Grönlund, 1988; Hall, 2010). Although Pitkänen and Lukka (2011) studied feedback in management accounting, their suggestion that informal and formal dimensions should be analyzed together is highly relevant. Informal activities, studied in the healthcare setting of integrated departments that are laterally dependent on each other (much like a production flow), did not displace formal management accounting (controls) but reinforced them (Nyland, Morland, & Burns, 2017). It is not unlikely that operational actors who deal with the intersection between management accounting and operations approach their everyday work by combining complex information and multiple frames of reference in their interpretations of operational situations.

In situations where operations managers are subject to management accounting and operations, they can draw upon developed knowledge or learning (Argyris, 1977; Jönsson, 1992; Jönsson & Solli, 1993; Hall, 2010). Therefore, the intersection between management accounting and operations can be enabling for operations managers. In these situations, management accounting may no longer be constraining on actors if it is no longer perceived as a ‘fact’ (Chua, 1995; Porter, 2009). Uniformity can be avoided when there is diversity in groups and varying perspectives on management accounting can prevail (Ahrens & Chapman, 2004).

2.3.3 Management accounting and contextual interpretations

Considering informational needs as temporal and situational complicates perspectives on management accounting as having the intended role of providing information and generating action based on rational grounds. For instance, Jönsson (1992) argues that management accounting relevance is a function of intentionality. That is, management accounting is not universally fit, but in need of localized interpretations of what needs to be done, and what is needed to do it. The interpretations of information may therefore vary with the situations (Chapman, 1998; Jönsson, 1998; Hall, 2010). Goretzki, Mack, Messner and Weber (2018) show that some indicators are more legitimate to some actors than to others, and that this depends on the positions of these actors and their respective roles and interests. It is therefore plausible that operations managers and their team members seek out the information that they need in their local situations.

For managers who work at a distance from operations, aggregating and decontextualizing operational activities into management accounting information would be essential in their sense-making processes (Robson, 1992; Espeland & Stevens, 1998; Faï, Introna, & Puyou, 2010; Hall, 2010). Decontextualizing denotes activities that are moved from their local contexts and quantified into numbers for managers who are remote from the core operations (Robson, 1992). Such aggregated information, however, may render management
accounting decoupled from operations without a visible connection between operational activities and management accounting (Uddin & Hopper, 2001).

For operational actors, such as operations managers, Abrahamson, Englund and Gerdin (2016) show that management accounting can be recontextualized. To put management accounting into context seems to require an alternation between bracketing and central-staging varying frames of reference (Boland & Pondy, 1983) or frameshifting (Jönsson, 1987; Abrahamsson et al. 2016). Operations managers among other actors may therefore draw upon such management accounting information that they consider suitable in specific situations (Earl & Hopwood, 1980; Ahrens & Chapman, 2007c; Goretzki et al. 2018). These ideas emphasize that there is no inherent meaning in management accounting information. Instead actors need to interpret its information (Boland, 1993).

Management accounting information thus needs contextualization. One possibility for contextualizing information lies in actors’ ability to reminisce on previous situations to adapt their action in new situations (Berger & Luckmann, 1966; Jönsson, 1992). Jönsson and Grönlund’s (1988) study of the changing relationship between accounting and operational work are highly informative as they show how operations managers and their team members come to break existing structures by combining local production information with formal management accounting reports. Jönsson and Grönlund’s (1988) examined how operations managers used management accounting to resolve operational problems. Even though it is difficult to explicitly read out what they imply by ‘use’, they discuss how interpretation assists in evaluating information. They illustrate episodes where operations managers resolve equipment issues as they pull out accounting reports to analyze and discuss costs. The next time, they learn and draw upon previous frames of reference.

van der Veeken and Wouters (2002, p. 347) acknowledge that there is a ‘need to understand how accounting information has its own function as part of a much larger set of information that managers use’, in their study concerning project managers use of management accounting information. They suggest that management accounting use is rather situated. They show how operations managers draw upon previously learned project knowledge and that the management accounting system that was developed in the organization was not used to support their project planning. In this way, retrospective reflection on past experience in similar situations can provide scripts for handling situations (i.e. action), which may be bound to the role of an actor (Nilsson, 2008).

It has been argued that different management accounting perceptions provide different understanding or interpretations (Hopper & Powell, 1985; Broadbent & Laughlin, 2009). Mouritsen (1999) shows that even ways of achieving flexibility differ between actors with different frames of reference and different settings. By studying interaction, Ahrens (1996; 1997) shows that management accounting understanding differs within an organization’s divisions located in UK and Germany. Interaction, especially via talk, is emphasized as
having the potential to bridge understandings since it enables management accounting to be interpreted and understood in the shared localized setting (Robert & Scapens, 1985; Jönsson & Solli, 1993). Abrahamsson et al. (2016) show how actors draw upon operational frames of reference interactively with other actors to make sense of management accounting information. Interpretations of management accounting information can thus be regarded as characterized by spatial and temporal dimensions. Even if management accounting understandings might differ in time and space, the scripts it provides may still organize operations managers and their actions in its localized setting.

At operational levels, the needed management accounting information is perhaps not always equal to the information needed at management levels (Pierce and O’Dea, 2003). Management accounting may have separate roles for operations managers than for other organizational groups, such as top management and management accountants (Hansen & Mouritsen, 2007b). Berry et al. (1985) show in a coal mine that managers are held responsible for their actions in physical terms (such as machine utility delays) rather than by management accounting. Thus, even operational frames of reference can be considered highly restrictive for operations managers and their team members. The production parameters and local operational ways of doing things, which build upon experience, judgment, and tacit knowledge, are however not necessarily in contrast to management accounting. Mouritsen et al. (2009) argues that management accounting may add perspective to organizational processes. This implies that operational frames of reference may not be contested by management accounting. Instead they may be complementary (Jönsson & Grönlund, 1988; Hansen & Mouritsen, 2007b).

From these studies, there are reasons to think of management accounting as a spatially and temporally situated practice that it is enacted in varying ways among and within organizations. Therefore, management accounting is not just a ‘collection of techniques’ (Burchell et al. 1980, p. 6), even though management accounting at times may be treated so. For this thesis, I use insights from these studies to set the lenses to interpret how operations managers and their team members are practicing management accounting in their everyday work when they interpret what is going on.
3 Research methodology
This chapter initially presents the interpretative perspective and the abductive approach that characterized my research process. Thereafter, I present the context where the field studies were carried out, followed by a description of three field visits based on varying methods that were carried out to obtain empirical insights into how management accounting is implicated in the everyday operational work of operations managers and their team members. Lastly, I present the process used to interpret the material together with a discussion of my research journey.

3.1 An interpretive research perspective
One of the first doctoral courses that I attended during this process involved paradigms in the philosophy of science. Insights from this course somewhat influenced the interest in the research question addressed in this thesis and the process devised to answer this particular question. Paradigms and the theoretical perceptions of researchers shape their perceptions of what is to be considered important in research. Researchers with differing perspectives will not see the same relevance in a specific type of scientific work. Neither will researchers with differing perspectives conduct the same sort of research because of differences in values (Lukka, 2010). Consequently, the perspective and underlying assumptions that guide this thesis need to be clarified to facilitate assessment of the research and avoid having the underlying ideology accepted without doubt (Hopper & Powell, 1985). In other words, my perceptions and expectations have an effect on my empirical observations. The question is, then, how do we know that one’s perceptions are scientific and knowledgeable? When is something ‘true’? The rhetoric in the scientific research debate often suggests that we should ‘bring the research front forward’. Knowledge, however, may not be cumulative. Research is also about scrutinizing taken-for-granted truths to develop knowledge. It is troublesome if one perspective becomes overly dominant in a debate. Then it is no longer a debate, but rather a monologue. New perspectives may be needed to achieve dynamic knowledge and to scrutinize existing research.

According to Burrell and Morgan (1979), paradigms can broadly be categorized into functionalism, radical structuralism, radical humanism, and interpretivism. The paradigms rest upon dimensions of the nature of social science (subjectivism and objectivism), and of the nature of society (regulation versus radical change). Any given research paradigm will influence perspectives, theoretical assumptions and methods during the research process. This thesis embraces the interpretative perspective. It has been argued, however, that categorization between paradigms is far from clear cut (Chua 1986), and some researchers suggest that interpretative research even ‘straddles between paradigms’ (Kakkuri-Knuuttila, Lukka, & Kuorikoski, 2008). Nonetheless, I deemed some sort of positioning necessary to guide the research process. An interpretative perspective has not taken enough space in the debate about the significance of management accounting to operations. Yet,
the research question motivating this thesis denotes an interpretative perspective to try to understand how management accounting is implicated in everyday operational work. The idea was that an interpretative perspective on the intersection between management accounting and operations would provide insights into the significance of management accounting to operations.

Interpretivism focuses on understanding individuals’ constructions and interpretations based on their knowledge and experience that lead to actions, which shape and are shaped by social realities (Chua, 1988). For management accounting research in general, this would imply interpretations of how actors understand and act on their environment, including management accounting, and how they simultaneously shape management accounting. In other words, the actors involved in management accounting would continuously shape the ongoing process of management accounting (Chapman, 1998). For this thesis in particular, interpretivism facilitates a focus on how operations managers and their team members interpret and make sense of experienced events at the intersection between management accounting and operations upon which they can act, much like a learning approach to events that take place. One consequence of embracing an interpretative perspective is that I wanted to observe the phenomena from the ‘inside’. That is, I wanted to partake in the everyday operational work and practices of operations managers in their local context. By being present, face-to-face, with operations managers, I could observe details in management accounting practices localized in their everyday work.

From the beginning of the research process, I had an interest in the actors’ interpretations of their actions. With this point of departure, an interpretative perspective was close at hand. Burrell and Morgan (1979) point to varying ‘isms’ within the interpretative paradigm. Yet, to capture how operations managers and their team members interpret and act upon situations in their everyday work, the ontological assumptions behind this thesis were related to the idea of symbolic interactionism (Tomkins & Groves, 1983; Chua, 1988; Covaleski & Dirsmith, 1990). I therefore join the perspective that acknowledges that reality is subjectively perceived and experienced by participants within a field. Like any actors, operations managers and their team members collectively attach meanings to situations that they experience. In other words, situations and action are made sense of by actors in their interaction with others (Chua, 1986). Researchers argue that repeated actions have power over organizational actors (Berger & Luckmann, 1966). From this ontological assumption follows the idea that actors are formed by previous experiences, frames of reference, values and interests, and that these are meaningful because of the meanings that are attached to them. The interaction with others may ‘objectify’ subjective understandings and transform them into symbols or scripts for action.

Given that realities are seen as subjective within actors in a field, management accounting interpretations made by operations managers cannot be ‘tested’ as true. Instead, I embraced
the epistemological idea that knowledge regarding my research question can be gained via close encounters. My interactions with the field implied that I actively tried to understand how operations managers interpret and understand management accounting in their operations and everyday work. In their everyday work, operations managers and their team members experience situations where management accounting and operations interact. The interest in this thesis in the intersection of management accounting and operations for everyday operational work denotes two somewhat different realities or frames of reference. These two frames of reference might rub against each other (i.e. operational and management accounting frames of reference). In identifying these situations (or perhaps events) and the actors’ interpretations and handling of such situations, there were opportunities to learn about how management accounting is implicated in everyday operational work. Tensions between management accounting and operations may arise, but also might insights into their interconnections which may contribute to their sense-making process. For this reason, insights into how management accounting is implicated in everyday operational work were gained by observing action in localized settings.

3.2 **Qualitative field research with ethnographic influences**

In the following section I discuss how and why the research process was influenced by ethnographic ideas. I thereafter present what characterizes a mining production context and I briefly present management accounting studies that have been carried out in this context.

3.2.1 **Ethnographic influences to interpret management accounting in everyday work**

Qualitative field research was chosen to seek to engage with management accounting where it is experienced, interpreted, handled, and lived with by operations managers and their team members in a mining production environment. As mentioned, actors ascribe subjective meanings to management accounting (Hopwood, 1983; Tomkins & Groves, 1983; Cooper & Morgan, 2008). Therefore, I considered actors central to this study. Other researchers emphasize that the complexities surrounding the intersection of management accounting and operations in everyday operational work indicate the need for field visits (Jönsson & Macintosh, 1997; van der Veeken & Wouters, 2002). Similarly, Ahrens and Chapman (2007a) emphasize the diverse ways in which management accounting is implicated in a wide range of activities and social arrangements, which makes it hard to understand the relations between actors and management accounting in another way than by presence. This implies a need to research management accounting where it takes place (Boland & Pondy, 1983; Jönsson, 1998; Jönsson & Macintosh, 1997; Ahrens & Chapman, 2007c; Baxter & Chua, 2009). Therefore, I sought to come close to the actors’ everyday work to address the thesis’ research problem regarding how management accounting is implicated in everyday operational work.
Meanings are closely interrelated with everyday work because underlying intentions affect taken-for-granted ways of doing things (Ahrens, 2009). In localized settings, groups are likely to arise that share similar ideas (Scott, 2014, p. 98). For example, research shows that specific groups arise from the everyday practices of actors that share knowledge and experience (Ahrens & Mollona, 2007; Ahrens, 2009). The intersection between management accounting and operations in mining production environments can be understood by focusing on actors who are interpreting activities and situations in relation to management accounting. In other words, things said, done and understood (Weick, 1979, p. 133).

One reason for conducting field research was as mentioned earlier to come close to the actors who experience management accounting in their everyday operational work. However, to observe how actors experience management accounting meant that I had to follow actors around in their everyday operational work. Czarniawska (2007, p. 16) argues that mobility is tricky in everyday work, and that researchers could move with the actors. As I wanted to observe actors, I found myself reading literature on ethnography. Ethnography provides ‘a description of a people’s way of life (Czarniawska, 2007, p. 17). It could also denote the work of describing a people’s ways of life (Berg & Lune, 2014, p. 200). Berg and Lune (2014, p. 201) further point out that the central idea of the ethnographic method is that the practice places researchers ‘in the midst of whatever they study’. Ethnographic methods influenced the field study in terms of my choice to work by shadowing and conducting field observations. By ethnographic influences I mean that the study is characterized by face-to-face interaction with operations managers and their team members in their own/local operational settings to get as close to the actors as possible.

Czarniawska (2007, p. 11) emphasizes that the idea with studies characterized by ethnographic traits is that researchers and actors have different perspectives. She stresses that an observer (researcher) cannot know ‘better’ or ‘more’ than an actor, only different. Researchers would study phenomena as they are perceived by organizational actors, and thereafter represent these observations as accounts (Berg & Lune, 2014, p. 201). In other words, by observing operations managers in action as they interact with others and interpret and act upon management accounting in their operational work, there were possibilities to learn and gain insights into how management accounting is implicated in everyday operational work. These insights could have been lost if I were to have distanced myself from the field. Field studies could therefore be regarding as providing richness, thick descriptions, and ‘giving voice to others’. The ethnographic method is therefore argued to not be about observing, but rather about understanding (Berg & Lune, 2014, p. 209). By meeting people in their everyday work, I could observe local terminology and ways of doing things, and perhaps see (understand) things that were taken for granted in practice.
One large Swedish mining company was chosen for this thesis to get rich information about how management accounting is implicated in the everyday operational work of operations managers and their team members.² The company both extracts and refines iron ore at the same site. This enabled me to observe the whole process where it took place and to see how actors interact across the organization and how they interact with each other, management accounting and production. Researching one company also enabled me to revisit the same plant and mine several times during my doctoral studies. That is, the time frame of the study became fluid, and I could observe and trace events that occurred over time. Researching one company also provided diversity in empirical material, where rich insights could be gained into the local context and the way that operations managers and their team members ‘do things’. Last, but not least, one company provided flexibility in the study ‘design’, as I could adhere to the empirical material and go where it took me (within the subject of the thesis). Ahrens and Chapman (2007a) suggest that research problems, theory and empirical material influence each other during the research process. For instance, when I encountered actors that were of interest, I approached them, and when one reoccurring event circulated in many discussions, I could ask other actors about that event.

3.2.2 Previous management accounting studies in mining production environments

The mining environment has been the subject of several studies in several disciplines. Environmental challenges such as pollution or mining waste treatment that characterize the mining industry are often addressed in research. Quantitative research on management accounting and mining production environments have addressed the impact of management accounting on the performance of mining networks (Mahama, 2006). Also, the key factors needed to implement continuous improvement in companies operating in the mining industry have been addressed (Jakelski & Lebrasseur, 1997). These studies have suggested that the changes in operational routines by operations managers were among the most important factors for implementing change.

Qualitative studies concerning management accounting and mining environments have also been conducted. Early research on management accounting and mining production environments in the UK found that operations were detached from management accounting practices (Berry et al. 1985). The assumption was that control of operations would lead to sustained financial results. Further studies in the UK addressed risk management in the mining industry via qualitative studies (Dhanani, 2003). From a historical perspective, archival methods have been used to study management accounting in mining during the industrial revolution in Britain (Fleishman & Macve, 2002). Archival methods have also been combined with field studies in an African gold mine to address the role of management accounting during various phases (Tsamenyi, Hopper, & Uddin, 2017). More recent studies

² The company is described more thorough in chapter 4.
on a global level address additional stakeholder perspectives such as industrial relations and budgetary use (Hoque & Brosnan, 2012).

Manufacturing companies have received more attention than extractive industries. Messner (2016) argues that management accounting research could benefit from a focus on industry specifics and their effects on management accounting. He continues by pointing out that such a focus could help us understand why management accounting is practiced the way it is in various industries. Studies taking place close to the everyday work in a mining context seem, however, to have fallen out on the research agenda, which is noteworthy for two reasons. First, the output of the mining of raw material is the input into other manufacturing processes. Yet, few studies have addressed organizations that extract raw material even though it is an important factor in efficient manufacturing processes. Second, much of the criticism of management accounting from operations stems from ideas that management accounting is reluctant to change in accordance with changing environments. Yet, the mining industry undergoes large investments and technology changes, which have not attracted attention in recent management accounting studies.

3.2.3 The mining production environment

Nordic countries are at the technological forefront of capital-intensive mining production (SGU, 2018). Mining companies often carry large assets in equipment used to extract ore and to process raw material. Moreover, the extractive industry relies on infrastructure such as remote underground railways, large crushers, and skips in the mine shafts. Such investments often have limited application to other industries and are associated with barriers for flexibility. In addition, the extractive minerals are bound to specific sites, which makes the operations bound to a location and perhaps also its inhabitants.

The Swedish mining environment is generally characterized by heavy machinery, standardized processes, high technology, large investments, and strong safety regulations. Traditionally, strong unions have characterized the mining industry, but mining processes are increasingly being transformed into remote processes on screens in control rooms (NE, 2019). Research into management accounting and its intersection with everyday work in a mining context is still rather scarce. The complexities of mining production environments and management accounting propose an interesting research field in need of further studies.

Two main reasons made the mining production environment relevant for my research about how management accounting is implicated in everyday operational work. The first reason was the standardized production process that characterizes the mining industry (Thompson, 1967). The standardized production processes in mining are likely to be sequential in nature (Macintosh, 1994, pp. 119-120). Such processes bring opportunities to notice the intersection between management accounting and operational work more clearly than in other industries. The transparency of the production process made visible how management
accounting and operational work were interrelated with (theoretically) little ‘internal noise’. In the case company, the standardized production process is sectioned into responsibility centers via budgets, which makes it easier to notice the intersection between management accounting and operations. The role of the operations managers and their team members became one of maintaining and securing a continuous production flow by preventing production stoppages. The integrated continuous production process suggests that there are opportunities to more easily locate and identify disruptions and their causes.

The second reason was the complexity permeating the mining industry outside the organizational boundaries. As in most global industries, this mining organization depended heavily on external forces such as environmental regulations, safety regulations, and market prices. There was an extensive focus on cost efficiency to compete on a global market. In the case of unprofitable operations, the case company cannot easily relocate or outsource their core operations, which put an extensive focus on internal operational and accounting processes.

3.3 Fieldwork and empirical insights

In the following sections, I discuss how and why the study was divided into three field visits. In this part, I also motivate my choices of methods to gather empirical insights, actors of interest, and topics of questions asked during each field visit. In other words, I explain how the study was designed.

3.3.1 Visits to the field

The process of gathering empirical insights can roughly be divided into three phases. Three phases enabled a longitudinal perspective on the work of operations managers and their team members. The three field visits were also a chance to approach practice again after being at the ‘drawing desk’ and provided opportunities to build relations with the practitioners and to receive and share feedback. Each phase drew upon the insights gained in previous phase(s), new literature readings, and discussions after presenting drafts at research workshops. Initially, the topic of interest was the longstanding debate surrounding management accounting’s ‘being or non-being’ in production environments, and to, from a practical point of view, get a hang on ‘why this is’.

The first field visit

The first field visit was conducted during the spring of 2014. Focus during the first field visit was to get to know the work process in the company and learn about how management accounting was implicated in operational work in the eyes of the actors. Except for having an interest in the work process of the company, my intention was to develop relations with central actors who were of interest for my research question (Berg & Lune, 2014, p. 232).

3 See chapter 4 for the case description.
Locating these actors could provide both rich details and a way into the everyday operational work environment. I was interested in actors who were involved in both management accounting and operations, or operations managers who had some type of accountability and production responsibility, which would imply that they at times were in contact with the management accountant of their department. I also had an interest in meeting these actors’ management accountants to receive their perspectives on management accounting and operations.

I focused on conducting interviews during the first field visit. As a novice researcher, formal interviews allowed me to ‘control’ our conversations and ask questions about the themes that were of interest for the research problem to receive their interpretations about different situations and action in such situations. The interview questions had their point of departure in previous literature with the research question in mind. The interview questions were shared with colleagues, where I got feedback and could rework and restructure its content and outline. Interviews took place with operations managers and management accountants. The interviews were formed around management accounting use and interaction between operations managers and management accountants.

The management accountants interviewed were each the contact of different departments. I had the privilege of interviewing management accountants from the same department where I interviewed (and later also shadowed) operations managers. In the interview questions, I focused on asking the operations managers about specific situations developed via the literature on management accounting information and operational work. The intention was to get insights (in their own words) into how they use management accounting in operations. Specific situations were asked for to prevent the actors from expressing their opinions or attitudes rather than stories of actual events. However, there is always absence in the stories provided by actors or a chance that actors cannot recollect full events and instead give fragmented storylines (de Loo & Lowe, 2012). Nonetheless, recalled stories can still provide details to our understanding of events that took place, rather than seeing them as representations of ‘reality’. See table 1 below for an overview of the interviews conducted during the first field visit.

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4 See appendix A for the interview questionnaire.
5 See appendix B for the interview questionnaire.
Table 1 shows the actor of interest, followed by the research interest which formed topics that were discussed. The third column shows the type of documentation at each specific interview. At the far-right column of table 1 the department where the actor of interest worked is listed.

Information meetings about the organization, the production and their objectives were held with a project manager. He was responsible for planning, introducing and implementing an operational performance program at the company. The project manager told me about the program, its implications, and its intentions. This information meeting resulted in an interview with the project manager. Questions were continuously asked during the conversation on matters that triggered my curiosity in relation to the research problem, but also to get to know the policies that characterized the company and their operations. A meeting with management representatives was held after the first field visit to discuss the research project and plan for the future so that I could meet relevant actors and gain access to relevant material.

The empirical insights gathered in the first field visit was continuously analyzed with the theories and perceptions that I brought into the field, which also generated extensive new literature searches. This procedure implies going back and forth between literature and practice in an abductive manner (Jönsson & Lukka, 2007). It is funny how the more one reads, the more one realizes that there is more to be known. Ongoing interpretations and analyses of empirical materials are perhaps characteristic of an interpretative perspective. It was (and still is) difficult to distinguish between design, data collection, and analysis. Empirical observations cannot be separated from the analysis, as the latter takes place continuously. Neither can the design be separated from the empirical observations as new questions were asked during the process. At times, I took a pause from the prewritten

<table>
<thead>
<tr>
<th>Actor(s)</th>
<th>Research interest</th>
<th>Type of documentation</th>
<th>Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operations manager</td>
<td>Questions formed around themes of management accounting use, situations, and interaction</td>
<td>Records and transcripts</td>
<td>Concentration plant</td>
</tr>
<tr>
<td>Management accountant</td>
<td>Questions formed around themes of management accounting practices, and interaction with production departments</td>
<td>Records and transcripts</td>
<td>Concentration plant</td>
</tr>
<tr>
<td>Management accountant</td>
<td>Questions formed around themes of management accounting practices, and interaction with production departments</td>
<td>Records and transcripts</td>
<td>Drift development North</td>
</tr>
<tr>
<td>Program manager</td>
<td>Questions formed around the operational performance program and its use</td>
<td>Field notes</td>
<td>Operational performance project</td>
</tr>
<tr>
<td>Management accountant</td>
<td>Informal questions about management accounting practices</td>
<td>Field notes</td>
<td>Division North</td>
</tr>
</tbody>
</table>
questionnaires to ask follow-up questions. Together, the analyses and the literature generated new questions.

The first field visit resulted in the design of a survey. The survey was directed to managers responsible for operations or maintenance as well as management accountants. The intention was to better grasp the extent to which management accounting information was used at operational levels. Different sets of questions were generated depending on the respondent’s position at the company. The survey aimed to capture the relationship between management accounting use and everyday operational work. For the operations managers, questions were designed around three themes: 1) management accounting use and situations, 2) management accounting and interaction, 3) management accounting and relevance. For the management accountants, questions were asked related to two themes: management accounting use and management accounting interaction with the departments. My intention with the survey was to obtain descriptive data on the information operations managers say that they use, in what situations, with whom, and their attitudes towards management accounting in their operational work. The survey results constituted the basis for a subsequent workshop in which the results were shared and analyzed together with operations managers. In this process, the operations managers subject to the study were involved in the research process analysis and shared their valuable thoughts and knowledgeable insights to help inform the research results (Baldvinsdottir, Mitchell and Nørreklit, 2010). The workshop is described under the section for the third field visit.

The interviews and meetings resulted in follow-up telephone calls with operations managers and management accountants, video calls, and Skype meetings where they shared internal material. Via e-mail, operations managers shared production data and statistics, and management accountants shared organizational charts, key indicators, company goals, and measures of performance. Additional internal material was gathered during shadowing, such as ways of working with work-order priorities, internal documents shown on projectors during meetings, whiteboard data, binders with statistical and financial information on the plant equipment, private spreadsheets kept individually by operations managers, black log books shared among foremen at shift hand-offs, process charts, production data statistics on monitors in the operator rooms above ground and in the coffee rooms underground, machine statistics, mobile notes (paper cards) of production data that could be collected and brought to the machines, and grid charts indicating where the operators should drill in the ore body. For an overview of the empirical material, actors of interest, research interest, and types of documentation that was gathered during the first field visit, see table 2 below.

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6 This survey is presented in appended Paper II.
Table 2 Empirical material gathered during the second field visit

<table>
<thead>
<tr>
<th>Actor(s)</th>
<th>Research interest</th>
<th>Type of documentation</th>
<th>Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operations manager</td>
<td>Questions formed around themes of management accounting use, situations, and interaction</td>
<td>Records and transcripts</td>
<td>Concentration plant</td>
</tr>
<tr>
<td>Management accountant</td>
<td>Questions formed around themes of management accounting practices and interaction with production departments</td>
<td>Records and transcripts</td>
<td>Concentration plant</td>
</tr>
<tr>
<td>Management accountant</td>
<td>Questions formed around themes of management accounting practices and interaction with production departments</td>
<td>Records and transcripts</td>
<td>Drift development North</td>
</tr>
<tr>
<td>Program manager</td>
<td>Questions formed around the operational performance program and its use</td>
<td>Field notes</td>
<td>Operational performance project</td>
</tr>
<tr>
<td>Management accountant</td>
<td>Informal questions about management accounting practices</td>
<td>Field notes</td>
<td>Division North</td>
</tr>
</tbody>
</table>

Table 2 more specifically shows the types of methods that were used during the first field visit. This can be read in the first column to the left. Thereafter the actor of interest is presented, followed by the research interest informing topics that were discussed. The fourth column shows the type of documentation that was made at each specific point. In the right column the department in which the actor of interest worked is listed. Note that the interviews conducted during the first field visit have already been presented in table 1 above.

The second field visit

The second field visit took place in the fall of 2015. Focus during this second field study was to take part in the everyday work of operations managers to observe their encounters with and interpretations of management accounting. I had an interest in observing events where operations managers practically had to handle management accounting in their everyday work. To grasp the intersection between operations and management accounting, I decided to conduct personal interviews, formal observations and then to shadow operations managers. In this way, via interviews, operations managers could share their previous experience with management accounting in their everyday work as well as their interpretation of this experience. Via observations, I could observe how operations managers and their team members discussed their everyday work and if management accounting was part of their discussions. And, via shadowing, I could be present when operations managers and their team members handled management accounting in their operational work.
The interviews conducted during the second field visit included operations managers at the plants and in the mines. These interviews were formed around themes of routine and non-routine situations as such situations differ in nature. Previous research points to varying types of information to be used and playing distinct roles in situations that are ambiguous from those in situations that are less ambiguous (e.g. Burchell et al. 1980). Non-routine situations were of interest owing to ideas about the boundaries of problematic situations as being fuzzy and unstable (Hales, 1999). In other words, the unexpected may enable us to research how existing structures are negotiated by actors when they face such non-routine situations. See table 3 for an overview of the personal interviews.

**Table 3** Personal interviews conducted during the second field visit

<table>
<thead>
<tr>
<th>Actor</th>
<th>Research interest</th>
<th>Type of documentation</th>
<th>Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operations manager</td>
<td>Questions formed around themes of routine and non-routine situations experienced by the actors</td>
<td>Records and transcripts</td>
<td>Concentration plant</td>
</tr>
<tr>
<td>Foreman</td>
<td>Questions formed around themes of routine and non-routine situations experienced by the actors</td>
<td>Records and transcripts</td>
<td>Concentration plant</td>
</tr>
<tr>
<td>Operations manager</td>
<td>Questions formed around themes of routine and non-routine situations experienced by the actors</td>
<td>Records and transcripts</td>
<td>Concentration plant</td>
</tr>
<tr>
<td>Operations manager</td>
<td>Questions formed around themes of routine and non-routine situations experienced by the actors</td>
<td>Records and transcripts</td>
<td>Drift development North</td>
</tr>
<tr>
<td>Operations manager</td>
<td>Questions formed around themes of routine and non-routine situations experienced by the actors</td>
<td>Records and transcripts</td>
<td>Drift development North</td>
</tr>
<tr>
<td>Operations manager</td>
<td>Questions formed around themes of routine and non-routine situations experienced by the actors</td>
<td>Records and transcripts</td>
<td>Drift development North</td>
</tr>
<tr>
<td>Management accountant</td>
<td>Questions formed around situations and interaction with their department</td>
<td>Records and transcripts</td>
<td>Concentration plant</td>
</tr>
<tr>
<td>Management accountant</td>
<td>Questions formed around situations and interaction with their department</td>
<td>Records and transcripts</td>
<td>Drift development North</td>
</tr>
</tbody>
</table>

Table 3 shows the interviewed actor, the questions of interest that formed our conversation, the type of documentation method used, and the department in which each actor worked. Table 3 further shows that the questionnaire was based on the same theme for the production actors, but follow-up questions also shaped the interviews.

Routine situations were chosen as it has been found that social structures are reinforced and reproduced in routine situations that are characterized as familiar where actors can build upon their previous experiences (Jönsson & Macintosh, 1997). These themes were

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7 See appendix C for the interview questionnaire.
operationalized into questions of operational routine situations of process development, capacity utilization, inventory management, work force management, and quality management (Corbey, 1994; Gupta & Galloway, 2003). The intention was that routine situations could help the operations managers give accounts of how management accounting was implicated in their everyday operational work. Questions about other situations that were unexpected (e.g. stoppages or downtimes), or beyond the routine situations, were also asked. Managers are often required to respond to unplanned events (Hall, 2010), where the scripts specifying what to do may no longer make sense (Weick, 1993). Such non-routine situations can also bring understanding of how management accounting is implicated in everyday operational work, and might even take on unexpected purposes for operations.

The formal meetings attended during the second field visit consisted of formal morning meetings between operations managers and their team members, and a formal target review meeting between operations managers and process engineers. A formal planning meeting between managers at the mine and the various plants and their manager was also attended. In these formal observations, I had a chance to observe how management accounting was (and was not) included in their discussions of how to handle and plan their operations. It also gave me a chance to observe how they talked about management accounting. For instance, one bullet point on one meeting agenda was labeled ‘finances’, where financial outcomes were discussed. Yet, financial issues were often discussed under other bullet points as well. This indicates a perceived detachment that prevails at the intersection between management accounting and operations. In other words, management accounting seemed decoupled from operational work on the formal agenda, but was nevertheless highly integrated in their discussions. Such inconsistencies noticed as I attended meetings in the field helped me sharpen my research questions. The morning meetings had high priority among the operations managers and their team members. In the mine, the morning meeting even had the omnipotent title of being referred to as the ‘Morning Prayer’. For an overview of the observations made during the second field visit, see table 4.
Table 4 Observations made during the second field visit

<table>
<thead>
<tr>
<th>Actor(s)</th>
<th>Type of observation</th>
<th>Type of documentation</th>
<th>Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operations managers and process engineers</td>
<td>Formal target review meeting</td>
<td>Records and transcripts</td>
<td>Concentration plant</td>
</tr>
<tr>
<td>Operations managers and production teams</td>
<td>Formal morning meeting</td>
<td>Records and transcripts</td>
<td>Concentration plant</td>
</tr>
<tr>
<td>Operations managers and production teams</td>
<td>Formal morning meeting</td>
<td>Records and transcripts</td>
<td>Drift development North</td>
</tr>
<tr>
<td>Management team</td>
<td>Formal management meeting</td>
<td>Records and transcripts</td>
<td>Company level</td>
</tr>
<tr>
<td>Operators, foremen, mechanics, operations managers</td>
<td>Informal encounters and observations of everyday routines</td>
<td>Field notes and research diary</td>
<td>Concentration plant</td>
</tr>
<tr>
<td>Operators, foremen, mechanics, operations managers</td>
<td>Informal encounters and observations of everyday routines</td>
<td>Field notes and research diary</td>
<td>Drift development North</td>
</tr>
</tbody>
</table>

Table 4 shows the actors involved during each observation, the type of observation, how the observation was documented, and the department where the actors worked.

The morning meetings observed during the second field visit constituted important tuning points for the operations managers and the production teams. Past events were discussed, operations managers and production teams notified other actors of planned activities so that synchronization of work was possible, and more importantly, note was made of activities that required extra caution to avoid accidents. Target review meetings between operations managers and engineers constituted a forum at which to deal with the efficiency requirements of the production process, and the meetings also enabled the operations managers to be informed of the technical aspects of the production process, which was essential in subsequent management meetings. Management meetings constituted a forum for operations managers to discuss occurring events that had to be taken into consideration as they were the concern of the mine and the various plants. For instance, one plant had difficulties with the texture and moisture content of the slurry. Solutions could be discussed in the management meeting and potential factors causing the problem could be eliminated due to continuous supervisions of the production process by engineers and operations managers. The management meeting gave operations managers opportunities to share their experiences with similar problems and to give advice concerning potential solutions.

After observations of formal meetings, I had opportunities to ask questions of actors involved to gain perspective on the reasons actors had acted in the ways that they did. Operations managers and their team members also used internal data during observations.

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8 Ore is refined and mixed into a slurry in the concentration plant, after which it is made into pellets and fines in the pelletizing plant.
and interviews which they shared with me. Such internal data served the purpose of aiding the ‘research interpretation’ of what was going on.

During this second field visit I shadowed operations managers from a concentration plant and one of the mines during their everyday work. I realized that rich details and understandings of everyday operational work could be gained during lunch breaks and car rides! This method was therefore chosen as it enabled me to come closer to the actors and observe how they dealt with management accounting in their everyday work as a complement to questions where they were asked about concrete situations where they used management accounting. I could observe how ‘things play out in practice’. When shadowing, I followed operations managers during their daily routines and activities and watched them interact with other organizational members (Berg & Lune, 2014, p. 232). The shadowing method gave rise to informal interviews with the actors during shadowing, but also to encounters with other actors during this procedure. The method also gave rise to many informal observations. The operations managers under shadowing were highly mobile in the plants and in the mines. Shadowing allowed for observations of varying encounters between the operations managers and operators, management accountants, engineers, and other fellow operations managers. It allowed for observations of hands-on problem-solving. See table 5 below for an overview of the actors shadowed during the second field visit.

Table 5 Actors shadowed during the second field visit

<table>
<thead>
<tr>
<th>Actor(s)</th>
<th>Research interest</th>
<th>Type of documentation</th>
<th>Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evening shift with a foreman</td>
<td>Follow actors and observe their routines, activities, interaction with other actors and their encounters with management accounting</td>
<td>Field notes and research diary</td>
<td>Concentration plant</td>
</tr>
<tr>
<td>Day shift with an operations manager</td>
<td>Follow actors and observe their routines, activities, interaction with other actors and their encounters with management accounting</td>
<td>Field notes and research diary</td>
<td>Concentration plant</td>
</tr>
<tr>
<td>Morning shift with an operations manager</td>
<td>Follow actors and observe their routines, activities, interaction with other actors and their encounters with management accounting</td>
<td>Field notes and research diary</td>
<td>Drift development North</td>
</tr>
</tbody>
</table>

Table 5 shows the actor shadowed, the research interest, how the observations made during shadowing was documented, and the department where each actor worked.

Field notes were taken to handle as much empirical material as possible. Field notes were central for constructing accounts of what was going on in practice (Berg & Lune, 2014, p. 233). Field notes were therefore used to record important events encountered by operations

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9 This concentration plant grinds the ore and mixes the ore into slurry.
managers and their team members that involved both management accounting and operations. The notes on the right side of the note pad included the actors present, the type of situation, the line of thought and the discussion taking place. On the left side of the pad, reflections on the noticed body language, feelings expressed and connections to other previous observations were added. The follow-up questions asked in relation to a specific observation were also noted. For instance, one operations manager discussed with his team whether they should ‘let go of 038 as it is a white elephant that money has been wasted on’. This referred to whether they should get rid of one of the reserve rigs, as it was a shared asset among the drifts. During an informal chat in the auto repair shop 1365 meters underground, the operations manager explained that the shared responsibility among the drifts resulted in no one’s responsibility and that was the main reason for dropping this rig.

This event is interesting as the operations manager highlighted that there are discussions of events that affect their operations and their financial outcomes, and that they need to handle varying concerns. He said with his tongue in cheek that the ‘operators think that we change the drills on the rigs too seldom, as the accountants think it occurs too often’.

After each shift, the notes were rewritten and tidied up. Mind maps were used to connect observations and situations, and as an initial attempt to analyze the empirical material. Shadowing allowed me to ask questions in a flexible manner. When I saw something that I did not quite understand, or if I wanted to know how something was related to operations, I could ask. The empirical observations were in this sense guiding the research process. This is a consequence of ethnographic studies, as there are difficulties in repeating the same journey. The research process evolved along with my own learning and understanding of the field.

Shadowing gave rise to many observations of informal meetings between operations managers and other actors in the mine and in the plants where they discussed everyday work or non-routine situations. Other informal meetings with other actors in the mine and in the plants that constituted empirical material for this study included informal discussions that took place during lunch breaks, encounters in the hallways and in the operator rooms, during car rides, on the shop floor, and in the mines where many operators were eager to show me around in their work area, what they do in their everyday work, or explain the specific situation in which we met. During shadowing, internal data were shared by operations managers and several sources of record keeping was observed. Shadowing allowed me to observe unspoken actions and get details about these actions.

After the second field visit additional questions were asked via email, telephone and videocalls. Follow-ups like this were highly valuable as they allowed me to gain further empirical insights when I realized there was something I could not fully grasp. Internal data were shared via email. Between the second and the third field visits, I started drafting the

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10 See appendix D for an extraction from the field notes.
first empirical papers (appended paper II and paper III). See table 6 below for an overview of the empirical material encountered during the second field visit.

**Table 6** Empirical material gathered during the second field visit

<table>
<thead>
<tr>
<th>Type of method</th>
<th>Actor(s)</th>
<th>Research interest</th>
<th>Type of documentation</th>
<th>Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal data</td>
<td>Formal and informal data, financial and non-financial information</td>
<td>Informal and formal routines and work processes</td>
<td>Documents and field notes</td>
<td>Drift development North, concentration plant</td>
</tr>
<tr>
<td>Telephone calls, emails, and skype meetings</td>
<td>Operations managers, management accountants</td>
<td>Follow-up questions and planning of meetings</td>
<td>Documents and field notes</td>
<td>Drift development North, concentration plant</td>
</tr>
</tbody>
</table>

Table 6 shows the types of methods used during the second field visit. This can be read in the first column to the left. Thereafter the actor of interest is presented, followed by the research interest. The fourth column shows the type of documentation that was shared. In the right column the department where actor of interest worked is listed.

*The third field visit*

The third field visit took place in the spring of 2018. During this field visit, I developed an interest in interaction between operations managers and other organizational actors. This interest came from earlier insights gained during the two first field visits where I had observed encounters between operations managers and their team members, or other actors who were engaged in production. In other words, being in the field shaped me and enabled me to specify my research questions. I previously also observed encounters between operations managers and management accountants, and I wanted to dig deeper into how their interaction may shape operations managers perspective on operations and management accounting.

This third field visit therefore relied mainly on shadowing as a method where my initial interest was to observe encounters between operations managers and management accountants. I shadowed operations managers from the concentration plant and from a machine shop. The observations of their interplays took another direction related to management accounting and operational work. I noticed that operations managers acted and spoke differently with varying actors even when they dealt with the same event/situation. This resulted in the drafting of the final paper (appended paper IV). See table 7 below for an overview of the actors shadowed during the third field visit.

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11 The machine-shop personnel perform maintenance on machines, equipment, trucks and cars.
Table 7 Actors shadowed during the third field visit

<table>
<thead>
<tr>
<th>Actor(s)</th>
<th>Research interest</th>
<th>Type of documentation</th>
<th>Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day shift with an operations manager</td>
<td>Follow actors and observe their routines, activities, interaction with other actors and their encounters with management accounting</td>
<td>Field notes and research diary</td>
<td>Concentration plant</td>
</tr>
<tr>
<td>Evening shift with an operations manager</td>
<td>Follow actors and observe their routines, activities, interaction with other actors and their encounters with management accounting</td>
<td>Field notes and research diary</td>
<td>Machine-shop</td>
</tr>
</tbody>
</table>

Table 7 shows the actor shadowed and the type of shift, the research interest, how the observations made during shadowing was documented, and the department where each actor worked.

During the last field visit I also conducted a workshop with practitioners that was used to follow up on the survey results. Prior to the workshop I had to design and plan for it. The workshop was redesigned in several drafts. Input to the workshop was sought from previous empirical insights, colleagues and practitioners. After receiving feedback on the workshop design, I redrafted both the content and the methods of collecting the material that we had discussed during the workshop. For instance, I designed the workshop so that participants would make notes of their discussions on large papers and sticky notes that I could collect afterwards. The workshop design was thereafter discussed with a former employee of the company. The workshop layout was shared with a financial manager responsible for the accountants at the mining site beforehand, which resulted in his wanting to participate in the workshop! See table 8.

Table 8 Workshop conducted during the third field visit

<table>
<thead>
<tr>
<th>Actor(s)</th>
<th>Research interest</th>
<th>Type of documentation</th>
<th>Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operations managers and management accountants</td>
<td>Formed around the survey results, the literature, research insights, and practical inputs. Analyzed together with practicing operations managers</td>
<td>Field notes and participant documentations</td>
<td>Company level</td>
</tr>
</tbody>
</table>

Table 8 shows an overview of the actors involved, the topics discussed during the workshop, how the workshop was documented, and that the workshop involved actors from several departments.

In planning for the workshop, I encountered some problems, however. Many operations managers were no longer part of the company from the date that the survey was submitted to the intended date of the workshop. This resulted in some problems reaching out to operations managers who had answered the survey and who also shared an interest in participating at the voluntary workshop. The workshop was therefore rescheduled several times.
The intention with the workshop was to include the thoughts and responses of the operations managers into the analysis of the survey results. Three figures that illustrated the survey results were shown to the workshop attendants, whereafter discussions were held about how these results could be interpreted. My theoretical interpretations were in other words supplemented with practical insights from knowledgeable actors in the company. In addition to receiving interpretations of some of the respondents of the survey results, the workshop also provided an opportunity to share research results with the respondents.

During this third field visit, I also met with several actors and had an opportunity to watch them interact across department levels and boundaries. Two operations managers and one management accountant were interviewed. For these interviews, I asked questions about observations made previously during interactions with another actors, and about their everyday work, various situations and interaction with other actors. For these interviews, I no longer relied on a prewritten questionnaire, as the intention was to dig deeper into observations made previously. For an overview of the empirical material, actors of interest, research interest, and type of documentation encountered during the third field visit, see table 9 below.

Table 9 Empirical material gathered during the third field visit

<table>
<thead>
<tr>
<th>Type of method</th>
<th>Actor(s)</th>
<th>Research interest</th>
<th>Type of documentation</th>
<th>Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observation</td>
<td>Operations managers and management accountants</td>
<td>Interaction and discussions of everyday work</td>
<td>Field notes</td>
<td>Concentration plant, machine-shop</td>
</tr>
<tr>
<td>Observation</td>
<td>Operators, foremen, mechanics, operations managers</td>
<td>Informal encounters and questions about everyday work and routines</td>
<td>Field notes and research diary</td>
<td>Concentration plant</td>
</tr>
<tr>
<td>Observation</td>
<td>Operators, foremen, mechanics, operations managers</td>
<td>Informal encounters and questions about everyday work and routines</td>
<td>Field notes and research diary</td>
<td>Machine-shop</td>
</tr>
<tr>
<td>Personal interview</td>
<td>Operations manager</td>
<td>Questions about everyday operational work, situations and interaction</td>
<td>Field notes</td>
<td>Concentration plant</td>
</tr>
<tr>
<td>Personal interview</td>
<td>Operations manager</td>
<td>Questions about everyday operational work, situations and interaction</td>
<td>Field notes</td>
<td>Machine-shop</td>
</tr>
<tr>
<td>Personal interview</td>
<td>Management accountant</td>
<td>Questions about situations and interaction with their production department</td>
<td>Field notes</td>
<td>Machine-shop</td>
</tr>
<tr>
<td>Internal data</td>
<td>Formal and informal data, financial and non-financial information</td>
<td>Informal and formal routines and work processes</td>
<td>Documents and field notes</td>
<td>Concentration plant, machine-shop</td>
</tr>
</tbody>
</table>

12 These figures are included in appended paper II.
As shown in Table 9, several types of methods were used during the third field visit. This can be read in the first column. Thereafter the actor of interest is presented, followed by the research interest that informed topics that were discussed. The fourth column shows the type of documentation that was made. In the right column the department in which the actor of interest worked is listed.

### 3.4 Processing and interpreting the empirical material

The empirical material encountered via three field visits implies that interpretation took place between (and during) each new field visit, which required additional theoretical readings between the field visits. This generated further questions to go deeper in understanding how management accounting is implicated in everyday operational work. The process of interpreting was thus ongoing. Interpretations took place during observations, discussions and meetings. For this thesis, two factors made it difficult to draw a line between empirical observation and analysis. First, shadowing was used as a method, which denotes that all the details that I observed were complementary to the fuller picture(s). Second, I analyzed part of my research results together with practitioners. These discussions (where we analyzed survey results) also provided additional empirical material. That is, I took our discussions of the survey results back to my ‘drawing desk’ and analyzed ‘what was going on’ during the discussions. Interpretations were also made continuously during the observations, implying that the observations and the analysis or interpretations became rather intertwined.

As I approached the field, I had previous empirical observations and theoretical insights in mind. I did not blindly throw myself out in the field. I had the research question in mind and I often let the empirical observations guide me. As the observations were supposed to address the research problem, theory and empirical material is intertwined (Ahrens & Chapman, 2007a). This allowed me to continuously record new observations and connect these with previous observation and interpret the observations with my theoretical frames. Reworking the material by re-listening, transcribing, and finding patterns also included interpretation. The material that was recorded and transcribed provided additional opportunities to further process and interpret the material. The formal meetings held multiple ongoing conversations which required quick transcriptions to ensure ‘fair’ recollection of what was going on during the meetings.

Multiple mind maps were drawn and redrawn to sort the empirical material and to sort thoughts as I tried to identify patterns and scrutinize such patterns. In other words, I continuously questioned the interpretations that I experienced in the field (Berg & Lune, 2014, p. 209). The mind maps initially formed patterns that could be coded into tables with columns and rows. The empirical material triggered the initial categorization, although existing theory helped to code the material. Ahrens and Chapman (2007a, p. 299) argue that ‘doing qualitative field studies involves an ongoing reflection on data and its
positioning against different theories such that the data can contribute to and develop further the chosen research question’. In other words, the observations that I made are relevant for theoretical reasons. I did extensive travels back and forth between practice and theory (even going back to the existing empirical material and reading the same literature several times) to interpret observations. Reworking the material also allows for deeper understanding and occurring events could be connected to other events encountered elsewhere in the company. This process of scrutinizing the patterns that I had noticed in these studies, and how we can theoretically understand such patterns, is informative of how this thesis rested upon the idea that actions are not objective but in need of interpretation and theoretical anchoring.

In trying to convey the empirical insights to readers, narratives were produced to show the interpretations that were made of the observations (Miles & Huberman, 1994, p. 83; Jönsson & Macintosh, 1997). The narratives included the situation encountered and the behavior of the actor(s) involved that characterizes ‘what was going on’ and aimed to represent the institutional ideas that were shared among operations managers. This is not to be confused with aggregating individual actions, but to understand the underlying mechanisms behind their interpretation and action (Ahrens & Chapman, 2007a). In other words, I tried to tell the operations managers’ story of how management accounting is part of their everyday work, but also as a researcher I tried to convey the observations made concerning the relationship between management accounting and operations. In this way the details regarding the empirical material provided transparency in the study and limited my interpretations to be taken ‘on trust’ (Cooper, 1980, p. 163), but rather to acknowledge that there are other interpretations that could be made with other theoretical frames.

‘There and back again’ can convincingly summarize the research process (Jönsson & Lukka, 2007). Theoretical concepts were not completely developed when entering each field visit. Nonetheless, there were templates based on previous literature on the intersection between management accounting and (operational) work that triggered thoughts of the observations that were made. These empirical illustrations were brought back to the ‘drawing desk’ and analyzed in relation to the relevant literature. The literature presented in chapter two was however guiding the interpretations made in this study. Baxter and Chua (1998, pp. 80-81) suggest that this process is about moving from the general to the local and then back to the general. Ideas sent me out into the field where I observed operations managers doing management accounting, and thereafter I needed to develop arguments that could illuminate my fieldwork. Above all, I sought to understand how different frames of reference were contrasted, and at times complemented, in the everyday work of operations managers and their team members, via the rules, norms and taken-for-grantedness that characterizes their social setting. With the assumption that the environment is also subjectively perceived by the actor, the surrounding environments can be seen both as subjectively affecting actors and as an outcome of their perceptions. This implies that
the structures provided by management accounting may be perceived differently among actors and trigger varying courses of action. However, even individual action can be considered reliant on the social practices that it reproduces and reforms (Whittington, 2011). With this perspective, empirical observations can be theoretically informative of the social order that characterizes the relationship between management accounting and operations.

For the thesis as a whole, I analyzed the conclusions made in each appended paper in relation to the overall research question and thesis purpose. Mind maps were used in this process, and a structured overview of the paper results leading to discussion points and ending in the overall conclusions can be found in appendix F.

3.5 Reflections on the methodology

In the pursuit of making this thesis trustworthy and credible, transparency and justification of choices was a guiding principle. This implies making methodological, theoretical and methodical choices. Other theories in a field could illuminate my research results in another way. I therefore tried to motivate my choices continuously throughout the text. As mentioned, this thesis joins the stream of research that acknowledges that social reality is emergent, subjective and constructed (Chua, 1986; Ahrens & Chapman, 2007b). For this thesis in particular, this is about making sense of how management accounting is implicated in the everyday work of operations managers and their team members. The verb in the research question ‘how is management accounting implicated in everyday operational work of operations managers and their team members in mining production environments’ denotes that there is interaction between management accounting as shaping everyday operational work and vice versa. Operations managers who engage in management accounting shape management accounting and are simultaneously influenced by management accounting practices and structures. Answering this research question required close engagement with the field. It also relied on theory that could help illuminate and interpret the ways in which operations managers and their team members practice management accounting in their everyday work. This was also guiding for the choice of theoretical lenses.

For this thesis to become trustworthy, I aspired to be open with the process of how this fieldwork was strategized, designed and conducted, but also about where I departed from my initial intentions. Ahrens and Chapman (2007c) stress that qualitative methodology entails that the field is not solely part of a given empirical nature that is out-there to be found by researchers, but that it is also shaped by researchers’ theoretical interests. The trustworthiness of interpretative research can be enhanced if researchers are open with their empirical studies (Alvesson, 2003). This might be a way of acknowledging that interpretations lie with the actor (Quattrone, 2006; de Loo & Lowe, 2012).
In the field there was also much going on simultaneously, more than I could both observe and report. Previous literature that was influential for this thesis also prevented me from being overwhelmed by large sets of empirical observations, complexity and unstructured material. The ongoing interpretations aided me in grasping the complex field, and in structuring thoughts and observations and relating these to the theory that I found relevant. Coming from the field of management accounting, I possessed some knowledge of organizations and management accounting practices, but less knowledge of the local mining settings shared by operations managers and their team members. This combination of knowledge and lack thereof allowed me to identify management accounting in everyday operational work fairly quickly, but at the same time I could (and needed to) ask questions about the ways in which operations managers and their team members practiced management accounting in their operations. In this way, they would give me their accounts of what happened and their interpretations. The actors were often eager to include me in their practices. Observations that triggered my curiosity were recorded and interpreted. When I noticed an observation that could be traced to another observation, I took notice of this as an ongoing interpretation. When I noticed a pattern within my empirical observations, I dug deeper into the literature to interpret the patterns. Thereafter I went back to the field for further observations.

In my aspiration to make the results of this thesis authentic and plausible, I presented the ‘tales from the field’ as they were told (Baxter & Chua, 1998, p. 80). This thesis adopted the line of thinking about empirical material as ‘recorded activity [found] significant for theoretical reasons’ (Ahrens & Chapman, 2007b, p. 820). Therefore, the theoretical lens that constituted the basis for each paper and for the thesis as a whole helped structure the material and extract examples from the empirical material that was grounded in the local mining setting of operations managers and the ways that they interpreted and practiced management accounting. However, it was never about gathering ‘accurate’ information (de Loo & Lowe, 2012), but about interpreting the interpretations made by operations managers encountered in this study.

The writing and communication of the research results also needed to be considered. Golden-Biddle and Locke (1993) argue that studies that draw upon ethnographic ideas have the potential to shake prevailing research assumptions when the written text can be made convincing. This is related to the writing process for this thesis. Therefore, the empirical examples were presented as narratives (Jönsson & Macintosh, 1997) or vignettes (Miles & Huberman, 1994, pp. 81-83), providing the reader with the setting and the observation encountered in practice. I reported what was noticed, where it took place and how it ‘played out’, to show authenticity in my findings. Yet, if we assume that there are absences and silences in any account, then the interviewees become a combination of players, witnesses, and creators of what is recollected (Quattrone, 2006; DeLoo & Lowe, 2012). Nevertheless,
by showing how something played out in practice, we might be able to reassess some of the prevailing assumptions about management accounting and operational work.

The strength of the qualitative research adopted here is that it adds nuances to more conventional approaches, not that this type of research also needs to generalize its results to a greater population (de Loo & Lowe, 2012). Replication in these types of studies is inappropriate as the same results cannot be expected among researchers with different points of view or at various times. My being in the field was an opportunity as it allowed me to sharpen my research question. At the same time, however, the observations done there and then hinders verification of the study results. At times, it is the unique observation that makes qualitative research interesting. Patterns in how operations managers and their team members practiced management accounting were sought. The difficulty lies in articulating these accounts of what was going on, and the ways in which operations managers and their team members practiced management accounting and how these accounts relate to theory to make the research results authentic and plausible. Even qualitative research requires great discipline, perhaps especially in studies drawing upon shadowing as a method, as I was subject to many varying impressions. It is argued, however that discipline in this respect is not to be confused with systematic and analytical checklists (Ahrens & Chapman, 2007a). Checklists were not adopted as they could cause me to overlook interesting practical insights. Rather, the field observations were guiding the study together with the research question, the ontological assumption guiding the thesis, and the theoretical lenses.

There are, however, some drawbacks with unstructured observations such as encounters during shadowing. There is a need to acknowledge that the operations managers and their team members were affected by having me around. Berg and Lune (2014, p. 209) stress that researchers need to be reflective when they draw upon ethnographic research methods. As a researcher, I needed to acknowledge that I was part of the mining setting that I explored in my studies. For instance, in appended paper IV, I was part of the negotiations that were encountered ‘backstage’ by operations managers. Operations managers could unwittingly uphold a role for themselves that they deemed appealing. However, shadowing allowed operations managers to successively release their inhibitions, and perhaps get used to my being around. One sign of this was their spontaneity when they encountered something we had previously discussed; another sign was that they often seemed willing to explain processes and activities to me. I was not one of ‘them’, but neither was I one of management. Rather, I was an outsider who did not constitute a threat to their position, or was out to expose them, but with an interest in what they did. At some points, however, I was told that the accounting figures that we discussed were for my ears only. Information that I could not share did not constitute a problem as my interest never was to disclose internal data.
As my interest was concerning the operations managers and their team members’ ‘ways of doing things’ and how management accounting was implicated in their practices, I tried to adopt ideas about observing as an insider and thinking as an outsider to bring reflexive knowledge (Berg & Lune, 2014, p. 209). That is, I continuously aspired to reflect on the insights into how management accounting is implicated in everyday operational work, and continuously reflected on how that knowledge came to be.

### 3.6 A commentary on the research process

In the following sections I discuss how the appended papers came to be and how they built upon each other. I thereafter provide a comment on how the research could be considered a journey for my own personal learning.

#### 3.6.1 The background to the appended papers

In the beginning of the research journey, much focus was on doctoral courses. This resulted in extensive reading of the literature on management accounting and operations, beginning with Jönsson and Grönlund’s (1988) foundational work on the local information needs of managers doing the operational work, and Hansen and Mouritsen’s (2007a) discussion of management accounting’s role in changing production environments. Reading these writings triggered curiosity in how management accounting was depicted in the management accounting and operations management literature. The first step in the research process was therefore to conduct a thorough literature review (appended paper I). As interest was on the intersection between management accounting and operational work, management accounting and operations management journal articles dealing with management accounting in production environments were chosen. Reading these articles triggered thoughts. Was it that the shortcomings of management accounting in production environments mostly were presented as inappropriate for operational models? The actors experiencing management accounting in their everyday operational work were often not part of the equation. Thus, an interest grew in what type of management accounting information, if any, operations managers would use in their everyday work, and in what situations and for what reasons they would use it.

In the first field visit, I observed that operations managers had central roles at the mining company. One operations manager with one foot in management accounting and one foot in operations expressed that with his responsibility follows ‘poking people in the eye’. Thus, I decided to locate these actors and their use and perceptions of management accounting information, in what situations management accounting was used, and in interplay with whom. The survey was conducted in an early phase of the study, formed around the questions that were raised while writing the first paper. The intention with the survey was as mentioned to gain information about what type of management accounting was used and in what types of situations. However, during a doctoral course treating multivariate analysis for social science, I practiced the method on the survey answers. This resulted in some
interesting findings, suggesting that operations managers perceived management accounting as relevant for their work and that they perceived that such information could be trusted. I wanted to reconnect with practice to share the survey results with the practitioners and to get their interpretations of the results. I therefore conducted the workshop with some of the survey respondents. In this way I could include operations managers in interpreting the survey findings. This not only resulted in a research paper (see appended paper II), but also in a chance to try different methods during this journey.

The survey surprisingly functioned as an icebreaker when visiting the field. Many actors turned out to be interested in discussing their work and showing me their take on management accounting. One interesting aspect that led me to take on a broad definition of management accounting in this thesis was that operations managers often were included in financial aspects perhaps more often associated with financial accounting. I did not want to leave their application of financial accounting out since operations managers actually paid attention to financial accounting reports as well.

New questions and ideas came to life after each field visit, which often required new literature to be sought and read. Interpreting empirical material and drafting research papers often resulted in new and specified questions to be brought to the field. In this way, each field visit does not correspond to one specific research paper appended in this thesis. Rather, all of the appended papers became specified as I visited the field. Another paper took form during a doctoral course. In that case the theory and the literature treated in the course visualized aspects that were also noticed during the field visits of researching operations managers’ use of management accounting. This resulted in a paper addressing the tensions that may stem from the vertical focus of management accounting and the lateral orientation of operations (see appended paper III).

The idea for the last paper took form during the field visits when I asked about certain events that took place and where I was told slightly different stories about it. Some events took varying forms in the situations and settings in which they were discussed. The empirical observations of how operations managers deal with management accounting in varying occurrences of interplay resulted in a paper addressing the role of ‘talking’ management accounting when operations managers would enter and perform different roles in their interplay with organizational groups on the shop floor and in relation to management (see appended paper IV).

3.6.2 The research process as a journey for personal learning

Internal workshops and seminars, together with external workshops with the field organization and academic conferences, constituted a main platform for bringing the studies forward with new practical and theoretical insights. The interest in ethnographic methods came from reading literature, starting with Jönsson and Grönlund’s (1988) work on ‘Life
with a sub-contractor’. I embraced ethnographic thinking to the extent possible. Usually, ethnographic studies take place over several years. In this study, ethnography influenced the research method in terms of shadowing operations managers in their everyday work and observing how and why management accounting is part of their operations. This study method was not ethnographic in the sense of ‘going native’. Yet, I shared the operations managers’ attire—workshop overalls, hardhats, boots, and protective eyewear—which perhaps made me appear as ‘one of them’. Ethnography was influential as the results would have been different as I would not have made the same observations without shadowing as a method. The strength with this method is that I saw management accounting in another way than the operations managers whom I had the joy to follow in their everyday work. If I were to ask them how management accounting is implicated in their everyday operational work, I would have been writing a different thesis.

The empirical material in this study was gathered in several complementary ways. The methods chosen did not depend solely on research perspectives (Guba & Lincoln, 1994) although some guidance in the choice of methods could be gained. The reason for such multiplicity in approaching practice and gathering empirical material is partly because I wanted to observe details about what it is that operations managers and their team members do with management accounting in their everyday work, ask actors about their actions, and the reasons for their actions. Another reason is somewhat pragmatic as I wanted to develop as a researcher and try varying methods. The survey was therefore sent out in an early phase to operations managers and accountants to explore management accounting use. The follow-up workshop enabled a collaborative analysis with practitioners. This exploratory way of interpreting the survey results was a consequence of my interpretative research perspective, and a way to include perceptions of practicing operations managers.

The experimentation with methods, including survey studies integrated with collaborative analyses, formal interviews and shadowing, which included informal discussions and observations during car rides, dinners, lunch and coffee breaks, were fun and developing. Surprisingly, the informal approach played a greater role in the research process than I imagined at the beginning of this research journey. It allowed me to observe management accounting where it ‘took place’ instead of only receiving preconceptions of what operations managers presumed that I wanted to discuss. In the beginning of conversations, I noticed that there was at times a limited view of management accounting. After attending a shift with a foreman at the concentration plant, the foreman said,13 ‘I thought that we were going to discuss management accounting? I asked if we haven’t, and she said that: ‘yea, maybe we did!’’. However, maybe the same applies for the view of operations. After discussions with one management accountant regarding the relations with operations managers...

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13 Extracted from the field notes taken during shadowing of a foreman at the concentration plant.
managers, she said: ‘I liked our conversation. It made me think about things I never think about.’

During the field visits, the survey often acted as opening for dialogue with the operations managers. It was a way for us to develop a relationship. For instance, on the drive down to the mines with two operations managers, one of them happily said:  

14 ‘I answered a survey from you! I thought it was interesting […] Follow me, I will show you how I work with management accounting.’ This resulted in a meeting in his office, where he showed me his individual spreadsheets where he kept track of his operations down to the invoice level, and discussions regarding his perceived meaning of management accounting. Another operations manager in the mines said during our first meeting that:  

15 ‘I was one of those [operations managers] receiving five emails from you [regarding the survey].’ I asked him whether he responded to the survey and he replied that: ‘Yeah, I eventually did so.’ The operations manager showed some annoyance over the recurring emails, but he eventually answered the survey. I was no stranger to him as he knew my research area of interest, and it provided an opening for discussions of management accounting and everyday work.

14 Extracted from the field notes taken during shadowing of an operations manager in the mine.
15 Extracted from the field notes taken during shadowing of an operations manager in the mine.
4 The case company

This chapter presents the empirical context and the mining company where the studies took place. I provide the reasons for choosing this specific case company, followed by company characteristics below.

4.1 The choice of a mining company

I chose the case company based on five reasons. First, the size of the company provided an illustrative case company with complexity at the intersection between management accounting and operations. Large-scale mining operations require technical expertise yet also a cost orientation because of narrow margins. Such complexities could be lost in smaller companies. This leads to the second reason. Despite the large size of the company, there were few hierarchical levels within the company. This flat organizational structure made it possible to identify actors close to the production process who had production knowledge and simultaneously management accounting knowledge. Besides, many of the operations managers were simultaneously responsible for operations and their budget. The operations managers who were subject to this study often had high monetary authorization rights, which required them to prioritize and handle management accounting in their everyday work. The operators, mechanics, and engineers that were encountered during this study were not always actively selected. During shadowing, many of these actors were encountered during the everyday work of operations managers in the mine and in the plants.

Third, the company is characterized as a high-tech company operating integrated systems that include production statistics and management accounting information. These integrated systems were often discussed within the company, and the intention was that operational actors in the company should be able to extract production information in real time and be able to track financial information down to the invoice level. Management accounting should therefore be available for everyone in the case company. Fourth, the CFO of the company shared an interest in academic research. Access was therefore granted to various levels and titles of management. This access included operators in the mine and in the plants, engineers and operations managers, and management accountants and management. By meeting with operations managers during their interactions with other actors, I could observe how management accounting was implicated in their everyday operational work at operational levels, but also how management accounting was implicated in their interactions with management.

Moreover, although the company was not the largest actor in the global arena, the company was a major contributor to Swedish industry and Swedish economic performance (SGU, 2018). Much of Swedish basic industry relies on iron ore (and minerals) provided by the case company. This leads into the fifth reason I chose this company as a case company. I wanted to do research where my research might have some practical impact.
**4.2 Company characteristics**

The company is a high-tech multinational mining group founded in 1890 in the northern part of Sweden. The company has been governmentally owned since 1976, with the headquarters located in a northern city. Several million tons of iron produced each year make mining the core operations of the company. The primary distribution of iron ore is supplemented by global distributions of industrial minerals. The company considers Europe to be their home market, but the company also distributes iron ore to steel mills in Africa, the Middle East, and Asia. The company is one of the largest producers of iron ore pellets, with an annual production capacity of 28 million tons of iron ore products. In addition, the company is processing all iron ore in their own facilities located near the mines. They have over 30 million tons of freight each year (35 percent of the total annual freight tonnage on Swedish railways).

The company is an important employer in its geographical area, providing job opportunities around the region, not only working for the company but also through subcontractors, customers and logistics. The city next to the largest mine is was built mainly as a result of the mining that involves extracting iron ore. At the beginning of the study, the company faced a decline in operating margin (from 34.6 % in 2013 down to 5.3 % in 2014). During this period, the company also suffered from severe declines in iron prices. During spring 2015, a new CEO was assigned to the company, and most of the group management was replaced. The new focus of management is on cost reduction, resulting in different measures including re-arrangement of shifts and notice for layoffs.

The study took place at one of the company’s two underground mining sites, which was referred to by the staff as drift development north. The other underground mining site was drift development south. The company also operates open-pit mining. They can pause and reopen these open-pit mining operations depending on the prices of iron ore. Most of the iron ore is extracted from the underground mines. In this study, the site of interest will be referred to as ‘the mine’. The ore body of the mine at the site of the study is 80 meters wide, four kilometers long and approximately two kilometers deep. The new main level that was put into service in 2013 is at a level of 1,365 kilometers below the surface. The mining is divided into production blocks, and each shaft has its own number. In the mine, the numbers refer to locations based on the level and number of production blocks or the shaft number. This type of terminology made it initially hard to follow in their discussions.

The advanced technology in the company set an interesting scene for management accounting in organizations that are challenged by complex production environments. Regardless of what may be thought, the advanced technology that potentially leads to highly standardized environments requires experience and knowledge on the part of actors...

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16 The case description includes information from internal documents, the company’s annual reports, website and information via interviews.
for the operations to run smoothly. Underground mining requires infrastructure both above and underground, roads and tunnels underground (i.e. drifts), facilities (e.g. machine shops both above and underground), and extensive communication. The mining equipment (e.g. drilling rigs) run on diesel when it is transported, but when it is operating it is plugged in to run on electricity. This procedure saves costs and creates a safer working environment for the operators of the rigs. See figure 1.

Figure 1 Underground junction (Photo: Johan Sandström)

Figure 1 shows a junction leading to the new lowest level in the mine. The ‘ceiling’ in the tunnels are made out of shotcrete which is a sprayed concrete to prevent the ceiling from collapsing. Rock reinforcement of wires and bolts is also added to prevent ground fall. The same procedure is used for drift development.

4.3 The mining process

The company is characterized as an integrated organization. The various plants adopt a customer/supplier-relationship between the mining, the sorting plant, the concentration plant and the pelletizing plant. In this sense, accounting structures are prominent, and accounting terminology was widely used. From the pelletizing plant, the finished goods (i.e. iron ore pellets and fines) are shipped to customers via railway to two northern harbors in Sweden and Norway where the company has buffers of finished goods to last a couple
of days. This implies that the mining constitutes the bottleneck in the process of producing iron ore. See figure 2.

Figure 2 The integrated organization structure at the case company

Figure 2 illustrates how the case company is structured in line with the production process of extracting iron ore. The production process starts underground in the mines using a mining method called sub-level caving. This method creates holes in the iron ore body by drilling and blasting. Thereafter, gravity allows the iron ore to fall where it is loaded and transported (via automatic trains at the site of the study) to large crushers. After crushing the iron ore into smaller pieces, it is automatically transported via elevators (i.e. skip hoists) to the aboveground plants. In extracting iron ore, the company develops routes in the bedrock. In a search to be efficient in extracting ore, some of the drifts are developed through the ore body. For this reason, the tunnels tend to follow the ore body where it is possible, leaving winding roads. The tunnels, which are supposed to last, are reinforced with bolts, nets and sprayed concrete. Figure 3 illustrates the process of extracting ore using sub-level caving method.

Figure 3 The process of extracting iron ore (Berger Kommunikation/Flodin Works)

Figure 3 illustrates how iron ore is extracted underground and transported to the aboveground plants. The extracted ore is transported to the sorting plant, where the residual waste rock surrounding the ore is sorted out using screening, crushing and magnetic separators. The magnetic separators can be used since the raw material in form of magnetite
ore is magnetic. The sizes of the ore sorted in this process are essential to securing the succeeding concentration process. See figure 4.

Figure 4 shows a conveyor band at the aboveground concentration plant. The ore is thereafter transported to the concentrating process where the ore is ground in grinding mills and separated to remove impurities. The finely ground ore is mixed with water into ‘slurry’. Reagent is mixed with the slurry to remove further impurities, and additives ensure the right moisture content in the intended end product. This process increases the iron content.

The pelletizing plant produces pellets and fines from the concentrate via binding minerals and large rotating drums (i.e. balling), drying and pre-heating, and finally via a 1250 Celsius degree heating process (i.e. sintering) which causes the iron ore to melt together to increase its strength. The finished pellets are cooled off and shipped to large silos in preparation for railway shipment to end customers. Fines are finely crushed iron ore in need of a sintering process before they can be used in a blast furnace.

4.4 Structure and work at the mining company

The company deals with contract sales, and at the time of the study the company continuously sold all iron ore that they produced. Contract sales leave the company with
limited strategizing opportunities to leave the ore in ‘the mountain’\textsuperscript{17} until iron ore prices rise. The open-pit mine, as mentioned, allows the company to handle price fluctuations over the long term by closing and reopening extraction of ore.

The plants were built with small buffers in mind which last the company only a few days. The continuous production process, with few buffers, makes the company sensitive to interruptions in the extraction of ore. As a result, internal disturbances need to be avoided by continuous supervision and preventive maintenance work. When disturbances occur, they are under scrutinization. Another aspect prominent in the company is safety regulations. During production meetings, the team members discuss occurrences and incidents, or ways to prevent accidents during special job tasks. Operators undergo training when they are assigned new safety responsibilities (e.g. responsibility for chemicals). Tremors occurring in the bedrock (i.e. seismic events) are continuously measured by several instruments and reported on the internal website. Because of safety issues associated with the mountain, the mountain limits operators to one blasting each night. After blasting, no one is allowed to enter the mines until the gas has dissipated.

The company is process-oriented, characterized by optimization with a strong production culture, where most managers have backgrounds as operators and engineers. At the time of the study, the company were working with an operational performance program that was designed to permeate all operations throughout the company. The company relies on ‘best practices’ and was eager to take part in the initiative coming from the operational levels via complex screening processes. Operations managers did not always appreciate these screening processes. The company runs many automated processes, which allows some operators to be located at a distance from the process for which they are responsible. For instance, the transportation from the shafts to the crushers is remotely operated. To remain in control of operations, the company runs extensive integrated systems, relying on real-time information. These integrated systems require Wi-Fi down in the mines, more than one kilometer underground, to enable all information to be entered into the system. Although many processes are standardized, there is a complexity characterizing the mining operations. This complexity provides a knowledge-intensive environment, where many of the everyday activities leave the operations managers and their team members to supplement the standardized processes with experience and judgement. See figure 5.

\textsuperscript{17} In the local language at the mining company the bedrock is referred to as ‘the mountain’ even though they mainly extract the iron from underground mines.
Figure 5 Drilling rig (Photo: Johan Sandström)

Figure 5 shows a drilling rig in the auto repair shop in the mine. The drilling rig above drills holes in the drift developments to prepare for blasting. Being in the auto repair shop and the offices underground was reminiscent of any aboveground auto repair shop.
5 A recap of the papers

The following chapter presents the four papers included in this thesis. Below, I present the main results from each appended paper separately. I end with a brief summary that constitutes the basis for the discussion that follows in chapter six.

5.1 Do research where accounting and operational practices take place


The first paper discerns the prevailing ontological, theoretical and methodical assumptions of management accounting in production environments via a literature review (appended paper I). This review addresses the paradigms, perspectives and methods in the literature on operations management and management accounting. The starting point of this review is that management accounting’s ability to provide relevant information in production environments has been discussed in the fields of management accounting and operations management for a long time. Researchers from each field are considered to play a major part not only in disseminating their research results, but also in channeling their perceptions of management accounting in production environments through journal publications. The thesis of this paper is that, via an examination of the paradigms, theories, and methods in the fields of management accounting and operations management, our understanding of the prevailing assumptions about management accounting in production environments in the academic community can be enhanced.

This literature review shows that portrayals of management accounting in production environments often are simplistic and rather deterministic. Such portrayals may reinforce perceptions of management accounting as meant to respond to operations management. The review shows a divide between the fields where operations management research is oriented towards problem-solving while management accounting leans toward a theory orientation. The review also points out that the understanding of practice divides the fields. The operations management literature deals with practice as strategic concerns of implemented management practices such as those with three-letter labels (e.g. Total Quality Management, Activity-Based Costing). The management accounting literature, on the other hand, often tends to conceptualize practice as related to the activities undertaken by organizational actors that are not necessarily a result of a management practice. The review also suggests that incorporation of practicing operational actors into research is a promising path forward because the insights and experiences of practitioners can be helpful in developing new research questions concerning the intersection between operations and management accounting. The paper then concludes that operations management research problematizes management accounting in production environments as a starting point for
their research agenda and that both fields’ portrayals of management accounting in production environments need to be nuanced.

The conclusions point to a need to challenge the expectations of management accounting that exist within both research fields. Unconventional research methods could enhance our knowledge about management accounting in production environments. The mantra that is most frequently repeated in the operations management literature, that management accounting is losing its credibility for operations, is generally left unquestioned by the management accounting literature. The review encourages future research to approach everyday practices to study the intersection between management accounting and operations management. Otherwise we may have difficulties in questioning assumptions about management accounting’s irrelevance for operational work and leaving the agenda of management accounting research to be dictated by operations management advocates.

5.2 Develop understanding of management accounting as a frame of reference

The second paper focuses on the operations managers who may need to use management accounting in their operational work to address what type of management accounting information operations managers use, in what ways and for what reasons (appended paper II). This paper adopts a mixed-methods research approach. First, a survey directed to operations managers at the case company of this thesis was sent out. Second, a qualitative workshop with some of the survey respondents was held subsequently to discuss the results.

The results from the survey unexpectedly demonstrate a positive relationship between operations managers’ use of traditional management accounting and whether they are satisfied with the management accounting system. However, the integrated systems lack this relationship in our results. Considering the rhetoric of management accounting as irrelevant for operational work, we wanted to discuss these results with practitioners at the case company. The findings from the workshop in which operations managers participated suggest that trust in integrated systems is damaged by careless handling of input in such systems. The results also pointed to interpretation difficulties caused by a lack of effective guidance from accountants. Operations managers perceive traditional management accounting as objective and appear to use it collectively as a basis for learning and improvement. Operations managers use traditional management accounting proactively with their team members, but simultaneously seek help from ‘business-oriented’ accountants to navigate in operational situations.

The paper concludes that operations managers trust traditional management accounting artefacts such as income statements, budgets, and balance sheets because such information relies on rules and principles. Operations managers and their team members use traditional
management accounting in their everyday work in ways that allow them to handle problems before they occur. Together, operations managers and their team members develop understanding for management accounting not in terms of what management accounting is, but rather in terms of understanding management accounting as a frame of reference where they recognize connections between operational action and events and management accounting.

5.3 Trigger reflexive action to question management accounting

Curry, A. & Hersinger, A. When spaces collide: exploring the dual responsibilities of operations managers, Revise and resubmit to Qualitative Research in Accounting and Management.

The third paper investigates the ways in which notions of space constituted by management accounting and operational management interact, conflict, and are managed by operations managers in a variety of situations within the context of iron ore mining (appende paper III). Field studies were conducted at the case company where operations managers were interviewed and shadowed during their everyday operational work.

The paper shows how operations managers face and manage dilemmas at the intersection between the structures provided by management accounting and the demands arising from the lateral orientation often found in operations. Operations managers cannot always articulate that the dilemmas they experience in challenging situations are caused by tensions between their responsibilities for management accounting and operations, yet their priority resides with either one. Operations managers are at times pragmatic in managing tensions. In such situations, they identify a problem in need of a solution. At other times they appear reflexive in managing these tensions. In such situations, they identify the dilemma as a tension rooted in their dual responsibility. Operations managers seem to be able to question management accounting when they acknowledge that the tensions they experience are caused by contrasting rationales of management accounting and operations. The paper shows how operations managers prioritize their actions in accordance with accounting space and lateral flow based on how they experience and reflect upon tensions they encounter, dominating artefacts, and their relationships with space. Operations managers are not tied to specific spaces but prioritize their actions towards management accounting or operations depending on the space to which they feel a sense of belongingness.

The paper concludes that tensions between an operations manager’s responsibilities do not necessarily constitute a problem for these actors. To the contrary, tensions foster reflection and choices among operations managers. In managing tensions, operations managers can reside in multiple spaces without being obstructed by the presence of those spaces. Drawing upon a conceptualization of tensions between management accounting and operations as conditions of a spatial phenomenon, it is possible to understand the dilemmas experienced
by operations managers in a dynamic and relational way. The paper proposes that it may not be a matter of minimizing tensions between management accounting and operations but instead of understanding how such tensions can be managed to create reflexivity with operations managers. Operations managers need to be both pragmatic and reflexive to run operations.

### 5.4 Translating between management accounting and operational frames


The fourth paper analyzes the ways in which management accounting allows operations managers to enter and perform multiple roles in their interplay with organizational groups from the shop floor and management, and the associated negotiations that operations managers have with ‘the self’ (appended paper IV). Based on shadowing operations with managers in their everyday work and their interaction with other organizational groups, the study draws upon Goffman’s backstage-frontstage metaphor to analyze how operations managers enter and perform multiple roles with the aid of management accounting.

The paper shows that management accounting constitutes a mechanism that authorizes operations managers to cross organizational boundaries. Via management accounting, operations managers enter a natural role in the group in which they are to interact. Management accounting further allows operations managers to put on masks in performing different roles. Operations managers can gain agency to become insiders with management by showing accounting knowledge, but the very same behavior can also make them outsiders on the shop floor. Thereby, operations managers can govern operations by switching between talking operational language and talking accounting.

The paper concludes that management accounting shapes how operations managers interplay with management accountants and their team members and that they alternate between two types of language to communicate with varying groups. It may not be unproblematic, however, to talk accounting with management as operations managers may not be perceived as authentic. There are potential gains in talking operational language with management as the operational problems that operations managers experience often are situated in the local context. To understand the issue at hand, the context becomes essential.

### 5.5 Bringing the four papers together

Bringing these four papers together, there is an objective view of management accounting in production environments that prevails in the literature. From an operations management perspective especially, this view is left unquestioned. Even though there is a rational and

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18 See appendix E for an overview of how each paper relates to the overall thesis.
perhaps technical view of management accounting expressed among operations managers, management accounting to a large extent also includes judgement. Operations managers often act collectively with their team members to interpret management accounting in their everyday work when they navigate in complex situations by drawing on many sources of information (formal and informal information, production-oriented and management accounting-oriented information, and heuristics). Management accounting and operations together trigger many cognitive processes among operations managers and their team members that require them to choose between courses of action, to deal with their choices, and sometimes to question structures that have previously been taken for granted. At other times, they reproduce the existing structures in their everyday operational work.
6 Discussion

The following chapter discusses how management accounting is implicated in the everyday operational work of operations managers and their team members in production environments. My ambition with this chapter is to develop the reasoning from each individual paper to answer the overall research question of this thesis. Below, I discuss the results that show that the everyday operational work of operations managers and their team members involves management accounting even if they do not always express it in those terms.

In the next five sections I discuss five patterns in my approach to answering the research question. I first discuss what it means to use management accounting in everyday operational work. Second, I elaborate on how management accounting is part of everyday work in settings in which management accounting rarely is associated. Third, I discuss how operations managers and their team members use management accounting in their everyday operational work. Fourth, I elaborate on the consequences that management accounting has on operational work practices. Fifth, I theorize the reasons why management accounting becomes implicated in everyday operational work. I end with a chapter summary.

6.1 Management accounting use in everyday operational work

The results reported in this thesis indicate a need to question an overly pragmatic view of management accounting use. A generally held position is that management accounting information needs the characteristics of timeliness, breadth of scope, and appropriate level of aggregations to be useful (Mia & Chenhall, 1994). First, such instrumental characteristics imply that the management accounting information that is provided is the right information. In other words, such information needs to be appropriate for operations. Second, the rhetoric implies that management accounting information is provided in a unidirectional manner to management or operations. Third, the characteristics imply a technical view where the information content in the reports needs to be tangible if it such reports are to be used. That is, the information needs to be visualized in numbers to trigger cognition.

Despite interesting findings in previous research that acknowledge that operations managers use management accounting in analytical ways (Jönsson & Grönlund, 1988; van der Veeken & Wouters, 2002), the results in this thesis indicate that we might have developed an overly pragmatic view of the concept of use. Use might be tangible not only in terms of basing decisions on management accounting artefacts, such as going through monthly reports or reviewing management accounting performance measures. Use might also be related to the experience of management accounting, where operations managers have their own perceptions of management accounting and what is to be considered meaningful in their context.
Considering the results reported in this thesis, I would argue that drawing upon management accounting, where operations managers elaborate on their operational practices in light of the management accounting knowledge that they previously acquired should also be considered as a type of use. The term ‘management accounting knowledge’ does not imply solely perceptions of facts and truths. In this thesis I use the term ‘management accounting knowledge’ in broader terms to denote interpreting and comprehending management accounting structures and relationships. A broader view of use therefore implies that operations managers may not need to rely on the ‘right information’ but rather that operations managers and their team members carry with them management accounting knowledge in their scattered everyday operational work and can benefit from this knowledge. Operations managers seem to be able to conduct calculations a priori when reading accounting reports by knowing accounting structures, as shown especially in paper II and paper IV. This further implies that operations managers are not provided with information in a solely unidirectional manner; they can make their own. Therefore, operations managers do not have to wait for numbers to become visualized to them; they seem to be able to project the present into the future by their experience and in that way draw conclusions about their financial position.

If we would only acknowledge management accounting use as relying upon an artefact (e.g. a report) or making a calculation on paper, or that action needs to be in the end of that process, then use might be hard to find among operations managers. Use might take on other forms. For instance, the results in this thesis indicate that operations managers often are aware that their actions will have an impact on management accounting reports. They seem to continuously develop management accounting knowledge. Therefore, operations managers talk about management accounting in various settings with various actors, and accounting rationales surround their everyday work. Thus, even management accounting knowledge is a big part of management accounting use, as operations managers, drawing upon their past experiences, analytically reflect upon management accounting practices and structures as well as operational practices.

Although not every operator in the teams studied in this thesis has a positive attitude towards management accounting because they feel it interferes with their work roles, they nonetheless unite around management accounting ideas when they organize their everyday work. For example, operations managers plan to synchronize their production stoppages for the stoppages to have as an insignificant an impact as possible on the production outcome. In doing so, they do not always draw upon tangible accounting reports; they sometimes reminisce on previous events and connect them to management accounting structures. Management accounting therefore seems implicated in everyday operational work by its mere presence. Management accounting terminology and rationales surround the everyday operational work in the mines and operations managers use management
accounting concepts in their discussions with other actors. They speak an accounting language.

6.2 Management accounting in alien operational spaces

The results reported in this thesis suggest that management accounting is implicated in everyday operational work where mining operations take place. Management accounting extends beyond the accounting department at the mine floor, the board room, and also beyond the meeting rooms at operational levels where operations managers review financial results. Management accounting extends to spaces where management accounting may be considered unfamiliar and portrayed as alien to, or even conflicting with, operational work. Management accounting is carried out in the mine, even in clay gouges, more than one kilometer underground, by actors who are not conventionally considered ‘doing’ accounting.

Management accounting is often conceptualized as a control mechanism that may direct actors’ efforts by keeping score of performance in production environments. However, management accounting may not always control actors in a constraining manner. Management accounting may just be difficult to identify at operational levels. McKinnon and Bruns (1992) reported that operations managers did not rely on management accounting data in their daily activities. In contrast, the results from my thesis show that operations managers and their team members who are typically portrayed as outside the scope of accounting use elaborate upon and contemplate management accounting in their everyday operational work. Operations managers are reflective actors, not always constrained by management accounting. Instead they have the knowledge and the capacity to use management accounting in their own local setting.

In everyday operational work, management accounting may not be expected to constitute the basis of order for operations managers and their team members unless incentives are created by management. Even if management accounting is not expected in all operational settings, such as down in the mines, management accounting is nonetheless an activity that is exercised and carried out by operations managers and their team members where they carry out their operational work.

In the mines, operations managers and their team members repeatedly encounter situations where they recognize cost drivers and potential cost savings in production. They learn what activities and processes affect costs and what routines can be improved on to cut or eliminate such costs. For example, paper II shows that operators combine their operational experience and knowledge with accounting numbers when they produce cursory calculations of whether they should scrap assets or conduct maintenance. Similarly, paper IV shows how operations managers recognize that the ways in which contract work is handled has an impact on the operational costs of the operations. Processes that drive costs...
are identified as operations managers integrate management accounting with everyday work where it takes place. Accounting knowledge is combined with operational expertise, which together mobilizes scrutinization of the mining process which results in cost savings. Similarly, operations managers pay attention to the recording of expenses on the balance sheet and how such capitalization would affect the operational costs of the plants. Operations managers deliberate whether an investment should be categorized as a fixed asset or as an expense for maintenance. Operations managers were found to deal with such issues as they plan their everyday work. It thus seems as if management accounting is situated in its practice by operations managers.

Even in operational settings, operations managers seem to expect management accounting to particularly shape decision-making, as shown in paper II. On the other hand, management accounting has other implications even in operational settings. Previous research has reported that management accounting structures order in organizations (Ahrens & Chapman, 2007b). Similarly, paper III shows that management accounting often structures everyday operational work, and that operational action is at times directed in accordance with management accounting. Via accountability terminology, operations managers are expected to act in agreement with management accounting directives. Paper III also shows that operations managers at times take management accounting structures for granted. When operations managers face contradictions between management accounting and operational frames of reference in their everyday work, they can negotiate between management accounting and operational courses of action, and at times even question what they previously took for granted. From the point of view of a practicing operations manager, it seems meaningless to ponder whether management accounting should be adapted to operations or the other way around. There is no inherent hierarchical relationship between the two. It is the unique conditions in each situation that determine action.

Paper IV shows that operations managers handle management accounting differently depending on the settings and with whom they interact. Certain settings are more or less characteristic for handling management accounting in certain ways (Chua, 2007). For example, operations managers are expected to deal with management accounting in, for instance, management offices, where whiteboards, projectors and conference tables constitutes symbols for a setting where management accounting is expected and legitimized. In other settings, however, operations managers would not necessarily be expected to handle management accounting in interaction with others to the same extent, such as on the shop floor in interaction with their team members. In such settings, operations managers may act as if management accounting risks delegitimizing their status at operational levels as one in the group. For example, when operations managers side with management accounting rationales and demand responsibility, they describe it as if they are ‘poking people in the eye’. This statement indicates that management accounting perhaps can cause operations managers to be viewed as outsiders to their teams. Nonetheless,
operations managers’ understanding of management accounting may put them in preferable positions in their interaction with others.

Management accounting does not replace experience, tacit knowledge or the heuristics that often guide everyday operational work. Instead, the results indicate that management accounting at times provides operations managers with another perspective. This implies that there is a danger in excluding management accounting from production or in adapting management accounting to operations too extensively as often presented as a solution to management accounting’s shortcomings for operations. Management accounting adds perspectives to operational frames of reference, which seems to keep operations managers reflective. However, the results in this thesis do not suggest that operations managers and their team members need to think ‘like centrals’ (Jönsson & Grönlund, 1988, p. 531), but rather that management accounting reaches out to operational levels and often acts complementarily to operational frames of reference. Management accounting does not seem to be decoupled from mining practices from an operations manager’s perspective. Management accounting is instead implicated in everyday operational work by non-accountant operations managers who practice and reflect upon management accounting in their everyday work.

6.3 Doing accounting in everyday operational work

The results reported in this thesis suggest that operations managers and their team members are doing accounting in their everyday work. ‘Doing accounting’ means that operations managers alternate between frames of reference, which enables them to interpret, construct, and talk accounting in their operations. Operations managers alternate between management accounting and operational frames of reference to make sense of a certain situation; they interpret management accounting information and relate it to their operations; they construct ‘mental’ calculations by integrating different parameters of production and management accounting, and by reducing management accounting information that they consider ambiguous to gain clarity and thus make operations actionable; and they ‘talk accounting’ among their fellow operations managers, with management and with their team members to bring coherence, develop thoughts, and mediate between organizational groups. See figure 6.
As figure 6 illustrates, various actions characterize each of the four modes included in ‘doing accounting in everyday operational work’ of operations managers and their team members. These four modes and their characteristics will be discussed separately below even though the alternation between frames of reference is interpreted as the mechanism that enables operations managers to interpret, construct and talk accounting.

**Alternate between frames of reference**

- Switch between management accounting and operational rationales
- Contrast operational ideas with management accounting knowledge

**Interpret management accounting**

- Relate management accounting information to everyday operational work
- Recall on experience and previously developed accounting knowledge
- Recognize connections between management accounting and everyday operational work

**Construct management accounting**

- Integrate management accounting and production parameters
- Make ‘mental’ calculations based on management accounting and operations
- Simplify complex management accounting information to gain clarity in everyday

**Talk accounting**

- Discuss operations via a management accounting terminology and typifications
- Translate management accounting into an ‘operational’ language for comprehensibility
- Mediate between organizational groups to bring coherence

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**Figure 6** Four modes of doing accounting in everyday operational work

As figure 6 illustrates, various actions characterize each of the four modes included in ‘doing accounting in everyday operational work’ of operations managers and their team members. These four modes and their characteristics will be discussed separately below even though the alternation between frames of reference is interpreted as the mechanism that enables operations managers to interpret, construct and talk accounting.

**Alternate between frames of reference**

The results reported in this thesis suggest that operations managers alternate between management accounting and operational frames of reference in their everyday work to make sense of management accounting and operational work. Operations managers simultaneously reside in the two spheres of management accounting and operations. They switch between management accounting and operational rationales and thereby seem to contrast operational ideas with management accounting.

Operations managers are influenced by both management accounting and operational frames of reference, as shown in papers II, III and IV. Operations managers are responsible for operations and financial responsibilities simultaneously. The rules, standards, and schemas occasionally differ between management accounting and operational frames of reference that put operations managers in situations with contrasting rationales and ideas. One scenario is that operations managers might need to comply with the rationales dominating either one. To comply with one frame of reference is not static, however. Operations managers often seem to switch between management accounting and operational rationales. In other words, they are not bound to one rationale (i.e. systems of principles and reasonings). Operations managers seem to be able to alternate between frames of reference to recognize and differentiate between management accounting and
operational rationales. For instance, operations managers often seem to reflect upon and negotiate their action especially in situations where they face contrasting ideas.

Contrasting frames of reference may therefore not always be problematic. Operations managers and their team members can contrast their operational ideas with their developed management accounting knowledge. They can compare management accounting and operational ideas to differentiate between their nature and purposes. Operations managers, who typically share an operational frame of reference, can handle new challenges by drawing upon their previously developed management accounting knowledge acquired via experiences, repetition and familiarity. Here, operations managers seem to be in especially preferable situations as they engage with both frames of reference. Management accounting and operational ideas can become the context of each other when one is put in figure to the other which is passed to the ground.

Interpret management accounting

The results reported in this thesis indicate that operations managers who alter between frames of reference can interpret management accounting in their everyday work. Operations managers can relate management accounting to operational work as they contextualize its information, recall on experience and developed accounting knowledge, and recognize management accounting in their everyday operational work.

Operations managers who practice management accounting in their everyday work seem to relate management accounting information to their operational work. Management accounting is not solely prepared by management accountants to be ready to use by operations managers. Operations managers say that there is room for interpretations whether it concerns production data or management accounting information, and that they need to be cautious about the many parameters included in every type of information. Paper IV shows in particular that there is an awareness of a complicated management accounting and operational relationship in the mines. For operations managers, management accounting often points out the direction of action (e.g. ‘we lack this volume’), whereas operational ideas might provide the trigger to conduct such action (e.g. ‘how can we produce that specific volume in our given time’). In other words, they relate management accounting to operational information to take action in operational situations.

Even if management accounting triggers awareness, management accounting alone may not be sensible as it would be decoupled from individual action and events. Instead, operations managers occasionally contextualize management accounting information with operational knowledge to interpret situations and act thereafter. Such a contextualization process, however, implies that information is moved from one context to another, which requires operations managers to be able to relate management accounting to their operational work. Management accounting and operational ideas work together in
triggering action as contextualization in operational settings enable operations managers and their team members to collectively interpret and make sense of information. For example, paper II shows how operations managers and their team members relate reoccurring work orders to the costs for maintenance in the accounting reports (e.g. income statements) to identify courses of action. The detection of operational errors occurs when operations managers relate operational routines to their accounting knowledge when they contextualize information.

Operations managers seem to recall previously experienced events and previously developed management accounting knowledge. Paper II shows that operations managers collectively interpret and use management accounting for action. Management accounting becomes comprehensible to operations managers and their team members when they collectively interpret its information and its composition in its local setting. Once management accounting becomes familiar to them, they can recognize connections between management accounting and operational work. The results indicate that such use spirals further interpretations of information in its local context, which can provide schemas for action related to the production processes. This implies that operations managers who draw upon management accounting and operational frames of reference can interpret situations that take place in their everyday work and learn from them.

Individuals sharing a frame of reference are likely to collectively develop schemas for action. As such, management accounting can become a shared resource among operations managers that gradually becomes culturally supported (Ahrens & Molon, 2007). Even if management accounting can guide decisions into action, the process of generating action, however, seems to rely on developed knowledge or learning. Operations managers do not seem to need to rely upon management accounting artefacts to act. Instead, they reflect upon mental templates that assist them in their interpretations of information and the associated action.

Jönsson (1992) suggests that learning consists of cycles of increased attention and a will to change. Building upon this, this thesis’ results does not find that it is one set of received information that triggers operational action, but rather that collective and aggregated learned patterns help operations managers interpret management accounting information in its contextualized mining setting. In other words, management accounting information without its context seems meaningless. Once management accounting knowledge is developed, repeat problems can be avoided by taking action in advance. When management accounting categories, typifications and schemas become recognizable to operations managers, management accounting has the potential to trigger action in the everyday work of operations managers. Ongoing interpretations of management accounting information provides familiarity which enables operations managers and their team members to relate such information to their everyday work. Apparently, (late) monthly reports may not always
be an issue. Operations managers can interpret the information in real time as they cognitively have the ability to project how future results of their action will affect accounting numbers. Operations managers act beforehand, based on their developed accounting understanding, as shown in paper II. Of course, judgment is required as it is not possible in advance to know the outcomes of decisions (Nilsson, 2008).

**Construct management accounting**

The results reported in this thesis suggest that operations managers construct management accounting in their everyday work. Operations managers integrate production parameters and management accounting information, make cursory calculations based upon management accounting structures, and simplify complex and ambiguous management accounting information.

Management accounting can be considered both too complex and too simple in terms of its potential for aggregating information. Operations managers therefore seem to integrate management accounting and production parameters. Paper III shows how operations managers compare management accounting and operational courses of action to respond to production issues. Although management accounting is thought to constitute and legitimize rules and routines (Burns & Scapens, 2000) for how to operate everyday work, management accounting also becomes formed by operational ideas when information is compared and combined. For instance, operations managers and their team members integrate production parameters and management accounting information as they conduct preventive maintenance on machines during production stoppages to keep up with their targets. They compare their present production with their targets and with ways of reaching these. Management accounting, together with production parameters, show connections between operational activities. A sudden change in accounting figures indicates a change in the production process. Management accounting could therefore set the boundaries for how operations managers interpret their local settings. The possibility of integrating information assists in this interpretation process.

As I have already pointed out, operations managers make their own calculations when they integrate management accounting and operational information and structures. For example, they at times look at cost reports and combine such information with machine statistics with the intention of making informed decisions. Operations managers do simple ‘mental’ calculations of whether the costs of, for instance, keeping a reserve rig with high repair needs is proportional to the potential gains from secured production. In their everyday work, operations managers also construct calculations that they submit to management to get their initiatives involving, for instance, exchanging a conveyor band, through. Those calculations are largely formed by operational ideas of improvement and made tangible as operations managers experience difficulties obtaining responses on investments based on tacit knowledge and experience. This indicates that operational ideas need to be grounded
in management accounting calculations. Based on tacit knowledge and experience, operations managers can quickly diagnose a situation and see a potential solution. However, to be able to take action, the solution at times needs to be translated into accounting that is specific to a given problem, and thereafter written down. During such circumstances, management accounting becomes superior to operations, yet for the sake of production outcomes.

Together with operational ideas, management accounting may clarify complex situations. Paper I shows that management accounting may be portrayed as too simple, but yet objective. At the same time, paper II suggests that operations managers trust management accounting (and especially its traditional attributes) and that local operational information at times is not perceived as delivering the same accuracy that can be provided by management accounting. In complex situations, management accounting can be contextualized with the help of operational ideas to trigger action. This suggests that, together with operational information and ideas, management accounting provides clarity to complex processes that cannot be understood by neither management accounting, nor operations alone.

At times, operations managers also simplify ambiguous and complex management accounting information to gain clarity in their everyday operational work, as shown especially in paper IV. Ahrens and Chapman (2007b) argue that meanings of objectives can become clear through ongoing contextualization. For instance, operations managers and their team members often unite around operational ideas that are based on management accounting. It seems as if this approach could assist in making complexities more clearly understood by operations managers and their team members. In this process, operations managers seem to ‘peel off’ unnecessary noise of complex information to see more clearly and mobilize action. Operations managers and their team members seem to make their operations less complex by drawing upon their operational experience and simplifying management accounting into operational activities.

**Talk accounting**

The results reported in this thesis suggest that operations managers talk accounting in their everyday work. Operations managers discuss management accounting to trigger shared and collective frames among themselves and their team members, translate management accounting into a terminology spoken by their team members, and mediate between organizational groups via management accounting.

Operations managers discuss their everyday operational work by using accounting terminology and drawing upon management accounting typifications. Support can be gained from previous research suggesting that management accounting also appears in talk by human actors (Chua, 2007). As mentioned earlier, even though management accounting
sometimes is consigned to one bullet point on a meeting agenda, management accounting rationales surround the meeting discussions, but also everyday talk in the hallways or in the coffee rooms. Operations managers draw upon their management accounting knowledge when they analytically define situations and plan their operational work. Operations managers and their team members discuss how to organize their work while drawing upon management accounting information to achieve as favorable an impact as possible on the financial results. For instance, paper II shows how operations managers and their team members collectively create frames of reference via informal reviews of management accounting reports.

Even if management accounting seems intertwined with the role of being an operations manager, paper IV in particular shows that operations managers take on the role of a ‘buffer’ between management accounting and operational frames. Operations managers occasionally contextualize and translate information to make it recognizable and comprehensible to their team members. Management accounting may not always be perceived to belong on the shop floor, it may be seen as too complex or perhaps alien for the team members of operations managers to grasp for operations managers to share management accounting with them in all settings. Even accounting talk is situated. Operations managers seem to wish to remain credible in operational settings when they at times translate management accounting information into ‘operational language’. It seems, however, that such an application of management accounting to everyday operational work relies on actors who actively take on the role of carrying management accounting ideas to the local operational setting.

In talking accounting, operations managers mediate between groups and try to bring coherence and understanding. Operations managers mediate between groups during production meetings, but also in their everyday operational work as they sometimes can provide reasons for action in the language of accounting and operational. Mediating between management and operational levels is part of what is required by operations managers to do their job. This implies that management accounting is essential for their position since it allows them to bring coherence among various actors in production environments.

6.4 Management accounting consequences on operational work practices

In doing accounting, operations managers make sense of operational situations and gain and exert agency in their everyday work. Sensemaking enables operations managers to gain perspective on and clarity in operational work practices. Agency enables operations managers to question taken for granted structures and intentions, and to mobilize action in their everyday work.
The results reported in this thesis suggest that operations managers make sense of operational work via management accounting and operational frames of reference. First, operations managers gain perspective on their operations via management accounting. Paper III shows that operations managers can gain perspective via management accounting on their operational practices when they face dilemmas in their everyday work. Management accounting have for a long time provided standards and accountability in operational settings. Operations managers are therefore organized into entities with areas of responsibilities that often orders their everyday operational work by visualizing what counts and is important. Operations managers draw upon such structures to make sense of situations that they face. For instance, drawbacks with contract work can be visualized when operations managers experience a loss of control over their core operations, as shown in paper IV. Operations managers and their team members can reorganize their operational work practices when they recognize relationships between management accounting and operational work.

Second, operations managers make actions and processes less confused and more comprehensible via management accounting and operational frames of reference. As mentioned, management accounting information can be translated into ‘operational’ language. Operations managers often compare time aspects to visualize action and processes more clearly. Long order deliveries of equipment can be compared with another supplier with quicker deliveries but where the equipment has more internal disturbances. These types of comparisons enable operations managers and their team members to try to secure their production and still keep their budget. At times, operators draw on their engineering skills to come up with solutions that will reduce internal disturbances and then keep a discussion with the supplier.

Third, management accounting and operational frames of reference structure the role of operations managers. Even if operations managers seem to encourage management accountants to take on more active roles, as suggested in paper II, the results reported here suggest that alternating between management accounting and operational frames of reference undertaken by operations managers bring perspective to operations. Operations managers can negotiate between various courses of action when they are subject to contrasting frames of reference. Building upon the argument of an extended active role played by management accountants, it seems as if the operations managers themselves occasionally embrace the role of carrying ideas between institutional boundaries, as shown in paper IV. In this way, role boundaries can be transcended via management accounting, where operations managers can influence others to carry out action (Jack, 2017, p. 60). Operations managers seem to undertake varying roles via management accounting.

The results reported in this thesis further suggest that operations managers gain and exert agency via management accounting and operational frames of reference. First, operations
managers can question taken-for-granted structures via management accounting and operational frames of reference, as shown in Paper III and Paper IV. When operations managers understand management accounting there is potential to scrutinize the structures and the order imposed by management accounting on operational work practices. Such a process may render management accounting questioned. Even though operations managers reinforce or maintain management accounting in their mobilization of action, they also deinstitutionalize management accounting schemas by questioning its rationales. Reproduction of institutionalized ideas is not an automatic process (Scott, 2014, p. 95), they can also be disrupted.

Second, operations managers who possess knowledge of the production process can critically scrutinize management accounting directives, which put them in situations where they can question taken-for-granted structures, ‘ways of doing things’, and even their own intentions. Operations managers may have a technical understanding of how management accounting and operational work are interrelated, as in how one affects the other. That is, comprehension of the craftsmanship, and recognition of management accounting numbers in a report. Operations managers may consider management accounting as objective, as shown in paper II. However, operations managers can also acknowledge that management accounting simultaneously is created (as shown for instance in paper IV) and thus has potential to be used in various ways by various actors with their biases. Because of this, by being reflective actors who draw upon their management accounting knowledge, operations managers can question whether their actions respond to their intentions, and also question the objectives and whether they are plausible and reachable.

Third, operations managers gain agency to mobilize people and action based upon management accounting and operational frames of reference. In the mines, operations managers and their team members are shown to mobilize people and activities when they organize both disturbances and planned production stoppages. Management accounting in these situations seems to direct their actions into a collective operation where several processes operate simultaneously. Nonetheless, operational rules of thumb seem to be the trigger of that action. Even though operations managers can gain agency via management accounting, paper IV indicates that management accounting can also discredit operations managers in front of their team members or management. If operations mangers cannot bring coherence to and understanding of management accounting directives among their team members, they risk facing challenges in pursuing the directives. Further, operations managers might come across as unauthentic when they talk accounting with management. Possibly, an integration of frames of reference could gain support even in talk among various organizational groups.
6.5  **Management accounting rationales in mining production environments**

The results reported in this thesis suggest that although management accounting may be expected to provide structure and order in mining settings, such structures do not always constitute the basis of order, as shown in paper III. Reflective operations managers are characterized as having one foot in operations and one foot in accounting with an interest in understanding both perspectives and their relationship. For instance, operations managers who embrace management accounting as a natural part of everyday work may perceive financial reports as providing a script for action, as shown in paper II. This can cause financial reports to gradually become culturally supported and legitimized within the team. The mechanism seems somehow *mimetic* (Scott, 2014, pp. 66-70), as operations managers suggest that extensive and frequent processing of management accounting provides a culture where management accounting is to be considered in everyday operational work. Management accounting seems to structure shared understanding and generally seems to be a culturally supported frame of reference among operations managers. These empirical illustrations suggest that operations managers and their team members often rely on shared interpretations of management accounting and that they connect events with these interpretations to gain meaning for their action.

The results reported in this thesis further show that, even though some operations managers embrace management accounting in their everyday work, management accounting can also be obligatory for operations managers. Management accounting structures everyday operational work in terms of providing priority of action, patterns of interaction between organizational members, and settings where management accounting should be expected to constitute the basis of order—perhaps especially so in settings where operations managers are expected to talk accounting, as shown in paper IV. In situations where operations managers are required to act on the basis of management accounting, the mechanism is here interpreted as *coercive* (Scott, 2014, pp. 59-64). Paper III shows how operations managers abide by management accounting even when they see alternatives. However, management accounting standards are at times designed in a way that make the standards dependent on constraints in operations. Some operational rules may more easily be contrasted with management accounting than others. For instance, the results reported in this thesis indicate that the mountain bedrock constrains operations managers as the mining procedure provides safety rules that cannot be taken lightly. During certain times each night, no one is allowed in the mine. Similarly, if the rock does not fall down after blasting, all that can be done is to wait it out. Mining therefore often constitutes the main bottleneck, and when production quotas cannot be delivered as a result of incomplete mining, accounting standards loses its expedience. In such instances, management accounting is no longer binding.
6.6 Chapter summary

In summary, management accounting is implicated in everyday operational work in a myriad of ways. Management accounting is not only implicated in the action generated by relying upon accounting artefacts in meeting rooms or in offices. Management accounting is also implicated in everyday operational work by operations managers doing accounting where their mining operations take place. Operations managers can alternate between management accounting and operational frames of reference. By alternating, they interpret, construct and talk accounting. Coinciding with two frames of reference enables operations managers to make sense of their everyday operational work and implications thereof, and to gain and exert agency. Operations managers scrutinize taken-for-granted ways of doing things, clarify operations, and structure their operational work when they integrate management accounting and operational frames of reference. Management accounting is implicated in everyday operational work via mimetic mechanisms, where operations managers and their team members no longer reflect upon its presence. At other times, operations managers abide by management accounting. In these situations, management accounting seems implicated in everyday operational work via coercive mechanisms.
7 Conclusions

This concluding chapter of the thesis sets out to answer the question ‘how is management accounting implicated in everyday operational work of operations managers and their team members in production environments?’ The thesis is inspired by the longstanding debate over management accounting’s (lack of) significance for operations in production environments and aims to study management accounting practices in the everyday work of operations managers and their team members in production environments, and further to theorize about the intersection between management accounting and operations in practice. I present two interrelated conclusions regarding everyday accounting in production environments. Theoretical, methodical and practical contributions are elaborated upon thereafter. Finally, directions for further studies are presented.

7.1 Everyday accounting in production environments

In the previous chapter, I discussed how management accounting frames of reference surround the everyday work of operations managers in mining production environments, making it a practice. Two interrelated conclusions can be drawn from that discussion.

Management accounting as a frame of reference among operations managers and their team members

First, operations managers keep management accounting frames of reference cognitively with them in their everyday operational work, whether they are in the mines or in management rooms. Skillful operations managers can develop operational rules of thumb with the aid of management accounting typifications and definitions in production environments. Cost drivers are recognized by operations managers, but they also recognize indicators of what could be the root cause of larger problems. When operations managers understand management accounting and operations, they can use management accounting to suit their needs in their everyday work. This type of use seems to be what is important for, and relevant in, their everyday work. Relevance is not in management accounting artefacts such as numbers or reports, but in the frames of reference that operations managers carry with them. It seems as if the analytical use of management accounting reduces traditionally perceived issues of timeliness, breadth of scope, and level of aggregation. When operations managers know management accounting and can draw upon its frames of reference in discussions, management accounting becomes less time-bound. Thus, operations managers and their team members can take matters into their own hands and do not need to wait for reports or numbers to tell them what they can figure out by understanding management accounting structures and practices and how it is implicated in their operations.

I therefore conclude that management accounting is implicated in the everyday operational work of operations managers and their team members through its presence as a frame of
reference. Management accounting as a frame of reference, and not as an artefact, enables everyday accounting to surround the operational work of operations managers and team members in production environments.

*Management accounting as a practice among operations managers and their team members*

Building upon the first conclusion, the idea of everyday accounting in production environments implies that operations managers and their team members live with, think about, and handle management accounting in their everyday work. Just as management accounting frames of reference can be carried with operations managers in their everyday work, so accounting can also be something they do. Operations managers are not just passive users of management accounting information, they are also accounting in terms of producing their own accounts, calculations, estimations, and projections. Management accounting is therefore not always centrally imposed upon operations managers. At times, management accounting becomes taken for granted or culturally supported within operational teams as a natural part of their everyday work. In this sense, management accounting can be conceptualized as an activity practiced in everyday work by operations managers and their team members. Accounting is a practice also in alien operational spaces and not just a practice in management settings and accounting departments.

I therefore conclude that management accounting is implicated in the everyday work of operations managers and their team members through its presence as a practice. Management accounting influences habitual routines and activities among operations managers which enable them to handle the intersection between management accounting and operations in production environments by develop ways of practicing management accounting in everyday operational work.

### 7.2 Theoretical and methodical contributions

This thesis makes two contributions to the literature and one methodical contribution. First, the thesis advances the literature on management accounting in practice by showing that operations managers habitually engage in management accounting in their everyday work although they would not necessarily say so themselves. Management accounting is not solely a practice for management and accountants. To the contrary, even operations managers practice management accounting as they alternate between frames of reference, integrate management accounting with operational ideas, and simplify management accounting when it becomes too complex for action. Operations managers talk accounting in their interactions with others, and they also translate accounting in their interactions with their team members. Management accounting therefore influences operational practices by habitualization in production environments.
However, in relation to the literature on how industry matters for management accounting (Messner, 2016), this thesis supports the idea that context cannot be emphasized enough. One interesting aspect in mining production environments is that ‘the mountain’ is highly powerful for operations managers and at times constrains them and their team members. The mountain leaves little room for temporal strategizing. In mining settings, where management accounting is unexpected, focus may possibly be on production which possibly leads to company performance (e.g. Berry et al. 1985). But this production focus is not always isolated from management accounting. Operations managers who combine management accounting and operational frames of reference seem to be able to mobilize reflective action in their everyday operational work. This interplay between management accounting and operational frames of reference render management accounting meaningful as an activity. Management accounting as a meaningful practice, and not an unnecessary evil, is perhaps particularly important in mining settings that are so highly constrained by ‘the mountain’. Even if everyday operational work processes shape management accounting as a situated practice, it can be constrained by external forces such as seismic events. An awareness of this is possibly essential if management accounting is not to lose its expedience. In other words, management accounting is not ‘one size fits all’.

Second, building on research that highlights that management accounting is implicated in the shaping of its own context, this thesis contributes to the debate on management accounting’s significance in production environments. In contrast to a view of management accounting as insignificant or threatening for operations, the thesis shows that management accounting has potential in remaining relevant and credible for operational work. The debate in the literature should not be confined merely to a question of management accounting’s relevance for operations. It is also a matter of the competence that operations managers may have of management accounting structures and practices which needs to be included in the equation. It seems in this study that the claimed shortcomings of management accounting for operations lies in perceptions of its administration as something unnecessary and overly complicated, rather than that management accounting provides dysfunctional behavior. This thesis nuances the view of management accounting relevance by showing that relevance lies in the perceptions of operations managers and their team members and seems highly related to management accounting as a frame of reference and as a practice, and not as an artefact. Without operations managers and their team members, management accounting could possibly be irrelevant for production environments.

Nearly 40 years ago, Hopwood (1983) argued that management accounting is heterogeneous. Yet, it is perhaps these insights that are central for management accounting and how it is implicated in everyday operational work by operations managers and their team members in mining production settings. Building upon ideas that management accounting is situated in its context with the actors and practices that this particular context
entails, it seems as if management accounting’s heterogeneity makes it interpretable by its actors, which requires them to interact and talk. Instead of seeing management accounting ambiguity as a weakness, it could be seen as a strength that makes it malleable for use among reflective actors.

Regarding the thesis’ methodical contribution, the thesis includes practitioners in the analysis of research results (see appended Paper II). In this way, the intention was to learn together with practice. Previous research encourages that we should be genuinely open to allowing new ideas to emerge from practice (Baxter & Chua, 2009; Baldvinsdottir et al. 2010; Lukka, 2010). Ideally, to include operations managers in the analysis of survey results is to foster dialogue, create understanding and be receptive to new ideas coming from the shop floor. Interestingly, our theoretical interpretations do not always seem to match the interpretations of operations managers. My being in the field and interacting with operations managers caused me to re-interpret the survey results. For instance, because of remote workplaces among the operations managers and their team members they share information with each other when they meet. The input into integrated systems does not entail the information they wish to convey. Hence, the updates seem to occur in the coffee rooms and hallways.

I would like to tie this thesis and its results back to where I started, that is with Jönsson and colleagues. ‘Life with a sub-contractor’ was probably the first article I read when I started the PhD studies. In hindsight, there is one important difference between my observations at the intersection between management accounting and operations and articles written many years ago. My results show that management accounting can become a natural part of operations. In other words, management accounting gradually becomes habitualized in everyday operational work. Yet, management accounting still seems portrayed as something unnatural in production environments and that operations managers are financial dopes who cannot understand management accounting. On the contrary, this thesis shows that operations managers and their team members live with management accounting. Operations managers who deal with management accounting in their everyday work are not ‘unthinking’ actors constrained by management accounting and its contrast to operations. Rather, operations managers are reflective actors who can recognize patterns in the intersection between management accounting and operation. The intersection between management accounting and operations triggers interaction and encourages debate among operations managers and their team members to interpret ‘what is going on’.

Collective interpretations of management accounting in its local setting seem to foster attitudes that management accounting could be relevant for operational work. Understanding management accounting as a practice is a potential response to management accounting shortcomings often presented in the debate over management accounting for operations. Tensions stemming from the intersection between management accounting and
operations management contribute to reflexivity in the everyday operational work of operations managers. Instead of removing management accounting from operations, perhaps management accounting needs to be closer to everyday operational work. Management accounting is perhaps not as alien to (mining) production settings as we are encouraged to think. Rather, management accounting shapes the everyday operational work of operations managers and their team members more than what might be expected. It appears as if management accounting under certain conditions can become taken for granted in everyday operational work.

7.3 Practical contributions

The thesis has two practical contributions. First, this thesis points to the importance of keeping management accounting in mind when university programs and courses are designed for engineering students. Skillful operations managers and their team members integrate varying frames of reference that allow them to make sense of their local setting. The thesis points to the competence (and not just the relevance) of operations managers and their team members as important to consider in the debate over management accounting’s significance for operations. Here, I would like to emphasize that it is the connections between accounting and operational work that are of particular importance.

On the other side of the coin are management accountants and their operational understanding. Operations managers highlight that they appreciate management accountants who visit them in their operations, and who share an interest in understanding operational processes. Therefore, this thesis contributes by highlighting the need for management accountants to engage in operations if they are to credibly discuss operational processes and technical aspects.

Second, this thesis provides some practical insights into the importance of adopting different perspectives in the everyday operational work. The thesis shows that the subtle management accounting interpretations that operations managers and their team members continuously perform in their everyday work keep them reflective rather than constrained in their operations. Management accountants, who occasionally meet with operations managers, could benefit from perceiving that the relevance of management accounting information is not solely in accounting numbers. Rather, the relevance of management accounting for operational work seems to lie in the reflection that it triggers in interaction between operational actors, and in interaction with accountants. In this way, relevance comes from interaction between management accounting (numbers) and operational realities.

7.4 Potential research paths

The research reported in this thesis indicates a need to shift focus from seeing management accounting and operations as detached from each other and to instead to conceptualize them
as interrelated. This thesis shows that there is more research to be done to gain further insights into the intersection between management accounting and operations. Future research could address the role of interaction between actors at different levels of organizations for management accounting knowledge. For instance, in greater detail focus on the interplay between operations managers and accountants.

Important insights concerning management accounting and operations could also be gained by addressing production stoppages and how such down time is practically handled by operations managers and their team members. This type of research question would require hands-on observations to explore how operations managers and their team members mobilize themselves and their activities, and why they do so in this particular way. Such research could teach us something about the role of management accounting (if any) in crisis situations. One reason for approaching such situations is that actors potentially do not have scripts for action. Typical characteristics can be identified via a search for exceptions from everyday routines. The contrast between a crisis situation and a routine situation make it possible to understand what is typical for the everyday work of operations managers. It is therefore intriguing to observe how the role of management accounting plays out in such situations.

Our knowledge of management accounting for operational work could also benefit from research that addresses how operations managers put their management accounting knowledge into operational action. Such a focus could teach us something about how operations managers go from management accounting directives and thoughts into action. The issue does not seem to be ‘how to calculate’, but rather to identify what to calculate. This thesis can influence such research by encouraging researchers to participate in practice where operations managers and their team members act with the aid of management accounting, how they draw upon its information to guide their action. In this way we could learn about how management accounting is transformed at operational levels, communicated between various groups and the role of management accounting in this interaction.
References


Appendix A  Interview questionnaire – management accountants

1. What are your main activities/tasks?
   a. For how long have you been working at MinCo?

2) Which policies and guidelines are you working with?

3) Which information systems are you using in your daily work?
   a. How are these used?
   b. How are these connected? Integrated?

4) How are the relation and the cooperation with the production unit?
   a. What characterizes the relation?
   b. What characterizes a successful relationship/cooperation? Can you give an example of an especially successful cooperation and a less successful cooperation? Can you explain the situation?
   c. Is the cooperation intimate or does it appear sporadically?
   d. Are there other significant members in the interplay between you? How are they related?

5) Which exchange of information do you have with the production unit?
   a. Is it several units? Which ones?
   b. Can you describe the exchange?
   c. What does the information consist of? The one you give and receive?
   d. How are you using the information you receive?
   e. What is your thought of how the information you provide is used by operations managers?

6) Can you tell me about for the budgetary work at MinCo? Can it be connected to the prognostic work?

7) How does the follow-up appear?
   a. Can you tell me about that?
b. Of the information you receive from the production units. Often – seldom? At what levels (individually)?

c. How do you assess your own work?

d. Is there a need for management accountants to critically scrutinize the information received from the production units? How does that work? If the follow-up reveals deviations other than expected?

8) What are the most important challenges for you as management accountant? Can you explain, give an example?

9) What are the primary improvements you would see in the exchange with operations managers?
Appendix B  Interview questionnaire – operations managers

1) What are your main activities/tasks?
   a. For how long have you been working at MinCo?
   b. How does a regular day look like?

2) What policies/guidelines do you work with?

3) How are the relation and the cooperation with the production unit? Explain, give an example?
   a. What characterizes the relation?
   b. What characterizes a successful relationship/cooperation? Can you give an example of an especially successful cooperation and a less successful cooperation? Can you explain the situation?
   c. Is the cooperation intimate or does it appear sporadically?
   d. Are there other significant members in the interplay between you? How are they related?

4) Which exchange of information do you have with the accounting department?
   a. Can you describe the exchange?
   b. What does the information consist of? The one you give and receive?
   c. Do you have control over the content of the information? Can you identify causes?
   d. How are you using the information you receive from the accounting department?
   e. To what extent is the information useful? Can you explain, give an example?
   f. Do you have access to reports? What reports? Are you satisfied/dissatisfied with the reports? Is the information aggregated or in detail?

5) What processes of information supports you in your work?
a. Are you using other information than the one received from the accounting department as a complement in your work? If so, how? What is most useful? Why? Explain

6) How does the follow-up appear?
   a. Can you tell me about that?
   b. Of the daily operations?
   c. Of the information you receive from the accounting department?
   d. How do you conduct your improvement work in relation to your objectives?

7) What are the most important challenges for you in a production unit?
   a. What is your focus? Flexibility, productivity?
   b. How serious is stoppages/shutdowns?
   c. How are you measured? Standards? Do you know what you need to improve? Do you possess knowledge of the things you are measured upon?
   d. Is it easy or difficult?

8) What are the primary improvements you would see in the exchange with the accounting department?
Appendix C  Interview questionnaire – operations managers

Tasks and goals

1) What is your position with MinCo?
   a. For how long have you been working at MinCo?

2) Will you describe your main work tasks?
   a. Will you describe an ordinary day at MinCo?

3) Will you describe the main goals for your unit?

4) How are these goals assessed? Daily basis? Every month?
   a. How are these assessments assisting you and your team in reaching your unit’s goals?
   b. Can you think of something else that can help you and your team to reach your goals? Please give an example.

Situations

5) Will you describe a concrete situation in your daily work where you used accounting information?
   a. What did you do?
   b. What was characteristic for the situation?
   c. What was successful?
   d. What was less successful?
   e. What was the consequences?

6) Think of a situation where management accounting helped you handle a problem? Will you describe this situation?
   a. How did you handle this situation?
   b. What was successful?
   c. What was less successful?
   d. What was the consequences?
7) Think of a situation where you had to handle process development. Will you describe this situation?
   a. How did you handle this situation?
   b. What was successful?
   c. What was less successful?
   d. What was the consequences?

8) Think of a situation where you had to handle capacity utilization. Will you describe this situation?
   a. How did you handle this situation?
   b. What was successful?
   c. What was less successful?
   d. What was the consequences?

9) Think of a situation where you had to handle inventory management. Will you describe this situation?
   a. How did you handle this situation?
   b. What was successful?
   c. What was less successful?
   d. What was the consequences?

10) Think of a situation where you had to handle work force management. Will you describe this situation?
    a. How did you handle this situation?
    b. What was successful?
    c. What was less successful?
    d. What was the consequences?

11) Think of a situation where you had to handle quality management. Will you describe this situation?
a. How did you handle this situation?
b. What was successful?
c. What was less successful?
d. What was the consequences?

12) Think of a situation where the cooperation with the management accountant for your unit was successful. Will you describe this situation?
   a. How did you handle this situation?
   b. What was successful?
   c. What was less successful?
   d. What was the consequences?

13) Think of a situation where the cooperation with the management accountant for your unit was less successful. Will you describe this situation?
   a. How did you handle this situation?
   b. What was successful?
   c. What was less successful?
   d. What was the consequences?

14) Think of a crisis or non-routine situation. Will you describe this situation?
   a. How did you handle this situation?
   b. What was successful?
   c. What was less successful?
   d. What was the consequences?
Appendix D  Extraction from the field notes

Auto repair shop 1365m. w/ OM DDN.

Reflections

Drift development
-2 rigs/team
-scrap O38
-shared respons. = no respons.
-1 keep contac w/ the OM for the other drift.
-see we switch drilling arm each or evry second year.
-At times, more often. The operator will see this immediately.
-see the operator think this is too seldom and the accountants that it is too often.

Standing right to a large red rig. It is a reserve.

He talked about this during the team briefing.

Apparently the other OM was sick this day. They talked this morning.
Appendix E

Mind map of how the papers relate to the thesis
Appendix F
Management accounting and everyday operational work

Results

- Paper I: Do research where management accounting and operational practices take place.
- Paper II: Develop understanding of management accounting as a frame of reference.
- Paper III: Trigger reflexive action to question management accounting.
- Paper IV: Translate between management accounting and operational frames of reference.

Discussion

- What is management accounting use in everyday operational work?
- Where do operations managers use management accounting in their everyday operational work?
- How do operations managers use management accounting in their everyday operational work?
- What consequences do management accounting use have for operations managers’ everyday work?
- Why do operations managers use management accounting in their everyday operational work?

Management accounting use is extended to include the ways operations managers analytically draw upon previously developed management accounting knowledge.

Operations managers use management accounting in alien spaces where everyday operational work takes place.

Operations managers use management accounting as they alternate between management accounting and operational frames to interpret, construct, and talk accounting.

Management accounting enables operations managers to make sense of operational situations, and to gain and exert agency.

Management accounting can become a habitual way of doing things, and it can also shape obligations to which operations managers need to abide.

Conclusion

Management accounting is implicated in the everyday operational work of operations managers and their team members through its presence as a frame of reference. Management accounting as a frame of reference, and not as an artifact, enables everyday accounting to surround the operational work of operations managers and team members in production environments.
PART II
Paper I

Across the Great Divide: A Literature Review of Management Accounting and Operations Management on the Shop Floor

Curry, A. (2019)

Published as:
Across the great divide: a literature review of management accounting and operations management at the shop floor

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Received: 12 January 2017 / Accepted: 22 August 2018
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Abstract
Management accounting’s ability to provide relevant information in production environments has long been discussed in the fields of management accounting (MA) and operations management (OM). Researchers from each field play a major part not only in disseminating their research results, but also in channelling their perceptions of management accounting in production environments through journal publications. The thesis of this paper is that via an examination of the paradigms, theories, and methods in the fields of MA and OM our understanding of the prevailing assumptions about management accounting in production environments in the academic community can be enhanced. The review shows a divide between the fields where the field of OM is oriented towards problem-solving, and the field of MA is more theory oriented. The review points out that the understanding of practice is a divider between the fields, but it also suggests that incorporation of practicing production members into research is a promising path forward. The paper then concludes that OM problematizes management accounting in production environments as a starting point for their research agenda and that both fields portrayal of management accounting in production environments need to be nuanced. There is a need to challenge the research expectations and to accept unconventional research methods to enhance knowledge about management accounting in production environments.

Keywords Management accounting · Operations management · Paradigm · Method · Theory

JEL Classification M1
Management accounting’s ability to provide relevant information in production environments has long been discussed in the fields of management accounting (MA) and operations management (OM). One early criticism from the field of MA was the loss of relevance in management accounting for production environments (Johnson and Kaplan 1987), perhaps due to technical flaws in the design of the accounting system (Macintosh 1994, p. 209). Similarly, OM researchers have questioned whether management accounting is excessive in production environments (Hansen and Mouritsen 2006). Skinner (1986, p. 44) described the typical management accounting system as “…pathetically old-fashioned and ineffective” where attempts to decrease costs instead would increase them.

Some of the main flaws in management accounting for production environments that often are elevated from researchers in the fields of MA and OM seem to be the historical (often financial) connotation of management accounting, the detached nature of managing operations from a distance, and the lack of answers of what to do, and how (Hansen and Mouritsen 2007; Otley 1999). Management accounting is thus described as unsuitable in production environments and potentially harmful for operations. In this way, management accounting seems to be expressed as having (at best) an instrumental part to play in production environments.

Operations management, on the other hand, is often characterized in terms of proactivity, providing hands-on techniques and best practices (Bourne et al. 2003; De Lange-Ros and Boer 2001; Radnor and Barnes 2007). Practices such as Just-in-time (JIT), Lean production, and Total Quality Management (TQM) have been developed and provided by the field of OM. When it comes to management accounting and operations, Maskell (2000) suggests lean accounting as a solution to the shortcomings, whilst others highlight the potential of management accounting for control, communication and improvements of operations if it is proactively designed and managed (Melnyk et al. 2004).

To a notable extent, the field of MA seems to accept the criticism from the OM field of management accounting in production environments. Some of the criticism is met by MA researchers by adapting management accounting techniques to better support operations in production environments (e.g. activity-based costing, performance management systems). Other MA researchers simply tend to admit to the lack of practical relevance as a main flaw (Jönsson 1998; Hall 2010).

Thus, the fields of MA and OM seem to be conducting their own separate lines of research in search for redemption to the criticism management accounting in production environments has been facing. At the same time, the fields are connected not the least in practice (Lowe and Koh 2007; Miller and O’Leary 1993). With the notable exception of Hansen and Mouritsen (2007) there are few researchers who acknowledge that the fields of MA and OM are interrelated and have the potential to learn from each other. Researchers from each field then play a major part not only in disseminating their research results, but also in channeling their perceptions of management accounting in production environments through journal publications. The journal publications have an impact on their audiences and on their prevailing norms, where the shortcoming of management
accounting in production environments risks becoming taken-for-granted assumptions.

In contrast to this scenario, the thesis of this paper is that an examination of the paradigms, theories, and methods in the fields of MA and OM can enhance our understanding of the prevailing assumptions about management accounting in production environments in the academic community. To the researcher’s knowledge, reviews addressing the magnitude and characteristics of the prevailing assumptions within the fields MA and OM are scarce. Understanding the interface between the fields can pinpoint differences and similarities within the fields’ research assumptions, thereby highlighting researchers’ perceptions of management accounting in production environments (Bhimani 1994; Bromwich and Bhimani 1989). Unless we examine the interface between the fields of MA and OM we may fail to test and challenge the underlying assumptions, thereby rendering research on management accounting in production environments unreliable (Lukka and Mouritsen 2002).

The purpose of this literature review is to explore the presentation of management accounting in production environments in the academic community by (1) identifying the key underlying assumptions within the MA and OM literature, (2) analyzing the magnitude and characteristics of how those assumptions are manifested in the field of MA and OM, and (3) offering avenues for inquiry that need to be addressed.

The contributions of this paper are to provide the extant literature with a comparative overview of prevailing research assumptions regarding management accounting in production environments within the fields of MA and OM and to offer research paths forward that may bring progress for knowledge creation concerning management accounting in production environments.

The next section describes how the review was conducted in terms of identifying literature and developing a classification scheme. Thereafter, the paradigms, theories and methods identified in the MA and OM literature are presented. Following this, a discussion of the underlying research assumptions within the field of MA and OM is provided. Lastly, three complementary conclusions are provided together with paths forward.

2 The approach to the literature

The following sections describe the literature search process, the development of a classification scheme, and the process of analyzing articles.

2.1 The initial three steps

The literature review builds on Hart’s (1998) ideas of how to conduct a systematic review of the literature to find differences and similarities by identifying the ideas expressed in the literature from the two research fields. This systematic approach provides basis for researchers to challenge taken-for-granted knowledge within research fields (Fisch and Block 2018). Systematic literature reviews may be used to address conceptual intersection (e.g. Graf-Vlachy et al. 2018) but also to address intersections...
between fields (Block et al. 2017). The intention was to use the highest ranked journals within MA research and the highest ranked journals within OM to find the journals that have the highest impact on prevailing research norms.\footnote{Note that this choice may not reflect the complete fields of MA and OM.} To identify the highest ranked journals, the fourth version of the academic journal quality guide published by the Association of Business Schools (ABS) of 2014 was used, with journals receiving one of the two highest grades being included in the first selection (see Table 1). The first step was to locate relevant articles using the Ebsco database during October 2014. The search words were derived from the purpose of the present review (Hart 1998, p. 172). The same search words were used for the journals in both fields. The search words were “management accounting” and “shop floor” or “production environment” or “operational level*”; they generated 32 articles in MA journals and 27 in OM journals (see Table 1 for distribution).

Table 1 shows the journals selected within each research field and the initial number of articles identified within each journal. The second step was to review the abstract of the generated articles. By considering the title and reading the abstract, the search
result was narrowed down to exclude 5 articles from OM journals and 11 from MA journals. Articles regarding external pricing and purchasing aspects and carbon dioxide emissions in production processes were excluded from the OM literature and articles regarding the bank sector, taxation, university sector, and auditing were excluded from the MA literature since neither concerns the production process. Further exclusion of articles was determined in dialogue with colleagues after reading the articles, resulting in exclusion of two MA articles and four OM articles. Examples of exclusion are Woo et al. (2008) and H’Mida and Vernadat (2009), who targeted the design and development of new products, which was outside the scope of this study.

After exclusion of articles as presented in Table 2, the third step was to carefully review the articles. The MA articles were read first since that was the primary audience and the author’s research field. Thereafter, the same procedure was followed with the OM articles. The articles were read in chronological order.

Table 2 shows the identified articles in chronological order. The articles excluded are shown in the column to the right with a note for the reason for exclusion.

### 2.2 Classification scheme

After article collection, a classification scheme was developed to obtain an overview of the information retrieved from the literature (Hart 1998, p. 144). The categories used in the classification were both derived from the literature and developed during the reviewing process. Three main classifications were made based upon the choices made by the researcher of the articles. These are paradigms, theories, and methods. The classification scheme followed these three main classifications and included sub-classifications from the literature or inductively derived during the review process.

#### 2.2.1 Paradigm classifications

Paradigm classifications were based on Burrell and Morgan’s (1979) matrix of assumptions about the nature of social science (objectivism versus subjectivism) and the nature of society (regulation versus radical change). Objectivism is characterized by deterministic assumptions, whereas interpretative assumptions characterize subjectivism. Paradigms are considered strong phenomena that do not easily allow researchers to move between them (Malmi 2010) and often create areas of normalcy (Lukka and Mouritsen 2002). Introverted dialogues may be the results of not speaking to audiences outside one’s comfort paradigm (Burrell and Morgan 1979, p. 22). Therefore, this was considered as a first classification to address underlying assumptions of management accounting in production environments.

Burrell and Morgan’s matrix has been criticized due to its categorical nature (c.f. Roberts and Scapens 1985). However, to review the articles, some categorization was necessary, and paradigms can be considered to capture the dominant meta-theoretical assumptions. Nonetheless, they should not be seen as mutually exclusive (Ahrens 2008). Paradigm classification enables the researchers to analyze similarities and differences and has been applied in previous literature reviews focusing on research approaches (Schmidt and Günther 2016). The sorting was based on the assumption...
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<thead>
<tr>
<th>Identity number</th>
<th>Publication year</th>
<th>OM articles</th>
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<tr>
<td>Identity number</td>
<td>Publication year</td>
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Table 2 continued

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<tr>
<th>Publication year</th>
<th>MA articles</th>
<th>Excluded due to</th>
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</thead>
<tbody>
<tr>
<td>57 2012</td>
<td>Fraser, M. (2012). Fleshing out an engagement with a social accounting technology. Accounting, Auditing and Accountability Journal</td>
<td>Not production environment</td>
</tr>
</tbody>
</table>

about the nature of social science on the scale of subjectivism and objectivism. However, in the sorting based on the assumptions of the nature of society, at times it was difficult to distinguish between regulation and radical change. Most articles (independent of the subjective–objective scale) were based on the sociology of regulation change and only one was classified as based on the sociology of radical change.

The classification of paradigms was guided by the stated purpose together with the way the article was written and the way the study was conducted. The following is an example of why a certain article was classified as functionalist: “We argue that decentralization choices are an important determinant of managers’ acceptance of accounting innovations and develop two intervening path models to explain why this is so” (Abernethy and Bouwens 2005, p. 219). The nature of society in the above article was considered regulatory since the rhetoric created consensus and illustrated an actual state, in contrast to radical change that would address research as a way to change existing social, political, and economic structures. Furthermore, the article is classified as within the functionalist paradigm because of its objective and analytical nature, embodied by the quotation’s rational explanation of social phenomena. An example of classification of the interpretive paradigm is “…the firm was free to construct its own skewed depiction of reality” (Archel et al. 2009, p. 1299). Note that the researcher made the classifications into paradigm and sometimes into theories based on the content in the articles since these aspects were sometimes not accounted for in the articles. For example, at times the articles build on theory without being explicit regarding its label. The research was hence classified into “general sociological concerns” or philosophy of science (Burrell and Morgan 1979, p. 26) of positivism or hermeneutics, and the theories (e.g., contingency theory, principal-agent theory) identified in the literature were classified within the sociological concerns classification.

The purpose of each article was classified as the authors expressed it, but the approach of the study was used when no explicit purpose was expressed (i.e., exploratory, descriptive, or explanatory; Hart 1998, pp. 44–47). Each purpose would
entail differences in the research design. Exploratory purposes intend to provide better understanding or illuminating a process or a problem. Questions often focus on how, what, when and where. Descriptive purposes intend to understand social phenomenon resting upon empirical observations. Explanatory purposes aim to explain causes of phenomenon, show causality and to suggests reasons for occurrences. However, explanatory research does not necessarily imply producing generalizations, but rather explain the specifics (Scapens 1994).

2.2.2 Theory classifications

The articles were classified into theories based on their articulated scientific theory. Theories aim to provide sets of principles that can aid understanding or explanation for a phenomenon or events. At times, no explicit theory was articulated. Rather, the study relied on assumptions from previous research in building their theoretical model.

The problematization of management accounting in production environments was also noted and classified as a “point of departure” (from the researchers’ introduction to the study) and/or “conclusion” (from the research findings as a way to give body to management accounting in production environments). This distinction was inductively derived due to a noted pattern in the OM literature as problematizing management accounting in production environments and then leaving it at that, with a solution and/or conclusion detached from the initial problem (i.e., management accounting).

2.2.3 Method classifications

In addition, classification was based on the methodology stated in the reviewed articles, such as method (e.g., interview, model, survey) and level of analysis (e.g., empirical such as individual or process or conceptual such as modeling). Last, each article’s findings, conclusion, and research agenda were summarized in a classification sheet (see Table 3 for categories). The classifications of context and overall findings were used to give depth to the interpretations of the three main dimensions of paradigm, theory, and methodical issues.

Table 3 shows the categories used for the initial classifications of articles. The descriptive classifications were mainly used for identification of articles. The context and overall findings classifications were essential for classifying the researchers’ perceptions of management accounting in production environments.

2.2.4 Contextual classifications

The following classifications were made to give context to the studies in the literature, including industry based on the companies’ interaction of product and process structure as in the model “process and product life cycle” (Hayes and Wheelwright 1979, p. 135). At times, this separation was not clear but, based on the product structure described in the article, the researcher derived the suggested process structure according to Hayes and Wheelwright’s (1979) model. Furthermore, the production environment was classified according to whether the business environment studied was certain or uncertain.
Manufacturing practices and/or accounting practices were classified as described in the articles (e.g., just-in-time (JIT), total quality management, lean production). The origin of the study was classified based on articles reporting empirical research.

### 2.3 Processing articles

In addition to the classification scheme, which reduced the literature to manageable amounts, mind maps were employed to process and analyze the articles. The first mind map was used to find patterns (Feak and Swales 2009, p. 17) within and between the fields since similarities and differences were used primarily in the interface of MA and OM (see Fig. 1). Thereafter, the tentative patterns extracted from the first
mind map were classified on another map in relation to the classification scheme and connected to the articles to provide tentative discussion points. This also provided an opportunity to pause and reflect on the patterns in terms of recurring regularities as well as disconfirming regularities (Miles et al. 1994, p. 246). Hence, the structure of the result is based on the patterns of the mind map and the classification sheet with the aim of providing the reader with a “logical and conceptual reasoning” (Fisch and Block 2018, p. 105).

Figure 1 shows the process of structuring the classifications of articles and verifying or rejecting the emerging patterns. This mind map was created after the classification scheme.

The process of analyzing the results were ongoing, and the classification scheme set the foundation together with the mind map. The tables illustrating the main results were used to find emerging patterns. Table 4a–c exemplify how the underlying research assumptions were derived from the interface between the MA and OM literature. These tables assisted the analysis of management accounting in production environments as expressed in the literature.

Table 4a shows how paradigms was coded and broken down into three emerging patterns of ontological standpoints, stated research questions, and terminology. The first-level coding was based on the results found in Tables 5, 6. The second-level coding was based on the pattern found within each literature classification. The third-level coding was based on the patterns of the literature taken together. Table 4b shows how

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2 Here I refer to the Tables 5, 6, 7, 8, 9 and 10 presenting the main results. These are found in the results section.
<table>
<thead>
<tr>
<th>Underlying research assumptions</th>
<th>Examples from the literature</th>
<th>1st level coding</th>
<th>2nd level coding</th>
<th>3rd level coding</th>
<th>Emerging patterns</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Paradigms</td>
<td>“…as the extent of lean manufacturing strategy increases, so does [employee empowerment].”: (Fullerton et al. 2013, p. 62). <strong>MA functionalist</strong>&lt;br&gt;“…the firm was free to construct its own skewed depiction of reality.” (Archel et al. 2009, p. 1299). <strong>MA interpretative</strong>&lt;br&gt;“…provides evidence that it is possible to demonstrate linkages between carefully chosen portfolios to tactical, strategic, and financial metrics. (Bendoly et al. 2007, p. 257). <strong>OM functionalist</strong></td>
<td>Paradigm classification (See Table 5)</td>
<td>Forces outside the organizations or value chains studied are seldom included in the research</td>
<td>The OM literature leans more toward objectivity, while the MA literature is more varied on the objective-subjective scale</td>
<td>Ontological stand points</td>
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Table 4: Coding of a paradigms, b theories, c methods
<table>
<thead>
<tr>
<th>Underlying research assumptions</th>
<th>Examples from the literature</th>
<th>1st level coding</th>
<th>2nd level coding</th>
<th>3rd level coding</th>
<th>Emerging patterns</th>
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<tr>
<td>Show that major components of modern manufacturing processes, such as inventory management and cross-training, play a significant control role (Nagar et al. 2009). <strong>MA functionalist</strong></td>
<td>Paradigm classification and research purpose (See Tables 5 and 6)</td>
<td>Reasons for undertaking research are often legitimized by developing models, testing and extending theory</td>
<td>The MA literature often aims to understand the phenomenon, test theoretical statements, develop models, or extend theory. In contrast, the OM literature often tries to develop a technique or formula for implementation in operational activities to optimize or solve a problem and provide a solution</td>
<td>Stated research questions</td>
<td></td>
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<tr>
<td>Understand how control operated at the level of practise and to explain why the systems of control worked in the ways they appeared to do (Hoque and Hopper, 1994). <strong>MA interpretative</strong></td>
<td>Paradigm classification and research purpose (See Tables 5 and 6)</td>
<td>Reasons for undertaking research are often legitimized by testing, scrutinizing and extending theory</td>
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<tr>
<td>Investigate the impact of enterprise software and scientific management approaches on operational performance (Shan and Zhu 2013). <strong>OM functionalist</strong></td>
<td>Paradigm classification and research purpose (See Tables 5 and 6)</td>
<td>Reasons for undertaking research are often legitimized by (often) a practical need of a solution to a specific problem</td>
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<td>Underlying research assumptions</td>
<td>Examples from the literature</td>
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<td>Explore how management</td>
<td>Research purpose (See Table 6)</td>
<td>Explore often aims to research a relatively known area of Knowledge</td>
<td>Explore seems to have different meanings within the two paradigms, where the (un)known area of knowledge is a divider between them</td>
<td>Terminology</td>
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<td>accounting can be designed to</td>
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<td>improve problem solving at</td>
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<td>operational levels (Emsley,</td>
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<td>2001). MA functionalist</td>
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<td>Understand management</td>
<td>Research purpose (See Table 6)</td>
<td>When the area of knowledge are rather unknown, explorative purposes are articulated in a greater extent</td>
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<td>accounting in practice and</td>
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<td>evaluate explanation for why</td>
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<td>current practices occur (Berry</td>
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<td>et al. 1985). MA interpretative</td>
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<tr>
<td>Explore and confirm the</td>
<td>Research purpose (See Table 6)</td>
<td>Explore often aims to research a relatively known area of Knowledge</td>
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<td>interaction fit between a set</td>
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<td>of managerial practices from</td>
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<td>fit to operational performance</td>
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<td>(Ortega et al. 2012). OM</td>
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<td>functionalist</td>
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Table 4 continued

<table>
<thead>
<tr>
<th>Underlying research assumptions</th>
<th>Examples from the literature</th>
<th>1st level coding</th>
<th>2nd level coding</th>
<th>3rd level coding</th>
<th>Emerging patterns</th>
</tr>
</thead>
<tbody>
<tr>
<td>(b) Theories</td>
<td>Acceptance of accounting systems as contingent on the subunit managers involvement in the design of accounting systems (Abernethy and Bouwens 2005). <em>MA functionalist</em></td>
<td>Theoretical perspectives (see Table 7)</td>
<td>Theories are often present to declare for the assumptions within the research</td>
<td>The MA literature often has not comprehended variables and interrelationships as fixed; it has included external factors in the research. In contrast, the OM literature has often comprehended fixed variables and relationships that can be predicted and, hence, controlled. In addition, logic acts as a substitute for theoretical perspectives in some functionalist MA and OM articles</td>
<td>The role of theory in research</td>
</tr>
<tr>
<td>&quot;The anthropological method (and genre) for the study of culture, can be very useful for producing longitudinal observations of organisational everyday life…&quot; (Ahrens and Mollona 2007, p. 307). <em>MA interpretative</em></td>
<td>Theoretical perspectives (see Table 7)</td>
<td>Theories are often used to illuminate and understand aspects of organizational life</td>
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<td>Underlying research assumptions</td>
<td>Examples from the literature</td>
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<tr>
<td>Establish links between managerial practices and technology, and operational performance (Ortega et al. 2012). <strong>OM functionalist</strong></td>
<td></td>
<td>Theoretical perspectives (see Table 7)</td>
<td>Relationships are often sought between variables that can be predicted and controlled by learning on logics and previous research</td>
<td></td>
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<tr>
<td>Changes in production environments changes management accounting conditions, requires cross disciplinary thinking to design MAS in congruence with new control requirements (Abdel-Maksoud et al. 2010). <strong>MA functionalist</strong></td>
<td></td>
<td>Problematizations of management accounting (see Table 8)</td>
<td>Management accounting is often problematized as a starting point by focusing on questionable or insufficient assumptions to extend theory</td>
<td></td>
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<tr>
<td>Management was using annual reports to legitimize the production processed by selecting a discourse which highlights the beneficial effects of flexibility (Archel et al. 2009). <strong>MA interpretative</strong></td>
<td></td>
<td>Problematizations of management accounting (see Table 8)</td>
<td>Management accounting problematizations often set the scene as well as end by highlighting problems and issues by and/or facing management accounting</td>
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<tr>
<td>The relationship between strategy and technology and its impact on performance have been studied from business strategy perspective, thus neglecting manufacturing strategy perspective (Ortega et al. 2012). <em>OM functionalist</em></td>
<td>Problematizations of management accounting (see Table 8)</td>
<td>Management accounting is often problematized as a central concern as a starting point in the articles which is to be solved</td>
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<tr>
<td>(c) Methods</td>
<td>There were no significant differences in the responses between these two groups of ABC adopters. […] There was no evidence of non-response bias. (Al-Omiri and Drury 2007, p. 410). <em>MA functionalist</em></td>
<td>Methods for collecting and analyzing data ( See Table 9)</td>
<td>The functionalist research are often including humans but are trying to eliminate outliers from the survey data</td>
<td>The presence or absence of the researcher is a distinguisher between the two fields, where the researcher in the functionalist paradigm is more disconnected from the whole research process than in the interpretive paradigm when it comes to gathering and analyzing data</td>
<td>The researcher role</td>
</tr>
</tbody>
</table>
## Table 4 continued

<table>
<thead>
<tr>
<th>Underlying research assumptions</th>
<th>Examples from the literature</th>
<th>1st level coding</th>
<th>2nd level coding</th>
<th>3rd level coding</th>
<th>Emerging patterns</th>
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<tbody>
<tr>
<td></td>
<td>“The data was gathered over seven months […] direct observations of work processes and the shadowing of key personnel […] topics selected for discussion […]” (Hoque and Hopper 1994, p. 3). MA interpretative.</td>
<td>Methods for collecting and analyzing data (See Table 9)</td>
<td>Interpretative research are keener on including two-way communication into the research.</td>
<td></td>
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<td></td>
<td>“A hypothetical job-shop was modelled […] We chose to model an 8-department shop with three identical machines per department.” (Philipoom and Fry 1999, p. 330). OM functionalist.</td>
<td>Methods for collecting and analyzing data (See Table 9)</td>
<td></td>
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<tr>
<td>Underlying research assumptions</td>
<td>Examples from the literature</td>
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<tr>
<td>A next logical research step would be to [...] including additional aspects of the informal organization (Fullerton et al. 2013, p. 66). <strong>MA functionalist</strong></td>
<td>Research finding and paths forward (See Table 10)</td>
<td>The findings are often related to the theoretical framework to confirm or question theory or theoretical assumptions</td>
<td>The MA literature presents theory-oriented problems with management accounting in production environments, whereas the OM literature set out with a management accounting problem which the studies aimed to fix (problem solving-oriented)</td>
<td>The research orientations</td>
<td></td>
</tr>
<tr>
<td>“This paper is not arguing that WCM is a panacea for company ills, or is it necessarily the only approach or reform that will lead to similar accounting changes. What is WCM is variable and malleable.” (Jazayeri and Hopper, 1999, p. 295). <strong>MA interpretative</strong></td>
<td>Research finding and paths forward (See Table 10)</td>
<td>The findings often develop theory with practical connotations in terms of heterogeneity in social life</td>
<td></td>
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<tr>
<td>A mathematical model was developed providing optimal solutions to managerial decision problems (Paksoy et al. 2012). <strong>OM functionalist</strong></td>
<td>Research finding and paths forward (See Table 10)</td>
<td>The findings often offer a solution to a stated problem</td>
<td></td>
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</tbody>
</table>
3 Results of literature on management accounting in production environments

The presentation of the literature is based on the schema presented in Table 3 as the underlying assumptions upon which the research rests upon can be found in the choices of paradigm, theory and method made by the researcher. Under each category, the results from the MA literature are presented first (and the results are divided into paradigms, where necessary). Thereafter, the results from the OM literature are presented, followed by a comparison of similarities and differences in the two fields.

The following sections present the paradigms, theories and methods identified within the literature. Each section starts by presenting the results found in the MA literature followed by the OM literature.

3.1 Paradigms in the reviewed literature

Paradigms the reviewed literature are based upon the paradigm classifications and research purposes as expressed in the MA and OM literature.

3.1.1 Two main paradigms in the reviewed literature

Regarding paradigms, all OM literature is classified as functionalist except one article classified as interpretive. In contrast, the MA literature is more diverse, with some articles based on the functionalist and interpretive paradigms and one on the radical humanist paradigm (see Table 5).

Table 5 shows that the OM articles are classified as functionalist in this review and that the MA articles vary between functionalist and interpretative. The classified functionalist MA articles often include measurable aspects of an organization or its value chain. The interpretive MA literature aims to study sensemaking behavior and practices. The interpretive MA literature includes broader aspects than the organization, such as history, social aspects, and politics. The articles classified as interpretive are written to highlight that accounting is not neutral (or objective). For example, Archel et al. (2009, p. 1291) capture how management through social perceptions gains legitimacy for a new production process using annual reports and official and external documents.

In the functionalist articles, the view of social reality is objective. For example, a study by Bendoly et al. (2007, p. 257) “...provides evidence that it is possible to
Table 5 Classification of articles into paradigms

<table>
<thead>
<tr>
<th>Functionalist (17 articles)</th>
<th>Interpretive (1 article)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Operations management</strong></td>
<td></td>
</tr>
<tr>
<td>Datar et al. (1991)</td>
<td></td>
</tr>
<tr>
<td>Corbey (1994)</td>
<td></td>
</tr>
<tr>
<td>Chang and Lee (1996)</td>
<td></td>
</tr>
<tr>
<td>Ghalayini et al. (1997)</td>
<td></td>
</tr>
<tr>
<td>Tayles and Walley (1997)</td>
<td></td>
</tr>
<tr>
<td>Philipoom and Fry (1999)</td>
<td></td>
</tr>
<tr>
<td>Spedding and Sun (1999)</td>
<td></td>
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<tr>
<td>Kirche and Srivastava (2005)</td>
<td></td>
</tr>
<tr>
<td>Bendoly et al. (2007)</td>
<td></td>
</tr>
<tr>
<td>Chen (2008)</td>
<td></td>
</tr>
<tr>
<td>Filomena et al. (2011)</td>
<td></td>
</tr>
<tr>
<td>Ortega et al. (2012)</td>
<td></td>
</tr>
<tr>
<td>Paksoy et al. (2012)</td>
<td></td>
</tr>
<tr>
<td>Arya et al. (2014)</td>
<td></td>
</tr>
<tr>
<td>Shan and Zhu (2013)</td>
<td></td>
</tr>
<tr>
<td>Darlington et al. (2015)</td>
<td></td>
</tr>
<tr>
<td><strong>Management accounting</strong></td>
<td></td>
</tr>
<tr>
<td>Banker et al. (1988)</td>
<td>Berry et al. (1985)</td>
</tr>
<tr>
<td>Abernethy et al. (2005)</td>
<td>Archel et al. (2009)</td>
</tr>
<tr>
<td>Al-Omri and Drury (2007)</td>
<td></td>
</tr>
<tr>
<td>Nagar et al. (2009)</td>
<td></td>
</tr>
<tr>
<td>Abdel-Maksoud et al. (2010)</td>
<td></td>
</tr>
<tr>
<td>Fullerton et al. (2013)</td>
<td></td>
</tr>
</tbody>
</table>

**Table 5 Classification of articles into paradigms**

* demonstrate linkages between carefully chosen portfolios of tactical, strategic, and financial metrics. * The article is functionalistic in terms of the presentation of tangible links between measures that are shown evidentially.

In comparisons of the two fields, the MA literature shows variance regarding classification of paradigm, whereas the OM literature is mainly classified within the functionalist paradigm. In sum, the OM literature leans more toward objectivity, while the MA literature has more variation with respect to the objective-subjective scale.
3.1.2 Research purposes in the reviewed literature

The literature mainly focuses on two types of purposes. The explanatory purpose is most common in both the OM and MA literature, closely followed by exploratory purposes (see Table 6).

Table 6 shows how the MA and OM literature addresses research with varying purposes. The purpose of explaining a phenomenon or predicting an outcome is common in the functionalist MA literature. However, the purpose of explaining is related to existing research within the field. If a specific problem needs to be solved, it would require extensive knowledge of the field and the process, which is often built on the logic of the specific reality. Reid and Smith (2000) test four hypotheses to see what dictates the best choice of management accounting system. Mia (2000) tests a statement of whether information provided by management accounting systems is critical for managers working in a JIT environment. Banker et al. (1988) examine the impact of stochasticity in the production process on relevant costs based on a dynamic assessment of capacity constraints: They develop a model. Furthermore, Fullerton et al. (2013) explain whether and how management accounting practices are used in support of lean manufacturing.

The interpretive MA literature is aimed at understanding phenomena, challenging conventional notions, and/or illustrating a phenomenon with often an exploratory purpose. For example, Berry et al. (1985) try to understand management accounting in practice and evaluate explanations for why current practices occur. Arnold (1999) challenges why manufacturing reforms are accepted in practice unconditionally from a labor perspective. Furthermore, using the actor network theory, Lowe and Koh (2007) present a case to illustrate how accounting inscriptions play a part in the competition for management attention.

The aim in the OM literature is mainly exploratory or explanatory. For example, Ortega et al. (2012) explore and confirm the interaction fit between a set of managerial practices from manufacturing strategy and another set from technology management, as well as the link of this fit to operational performance. Further examples include Corbey (1994), who explores whether relevant cost information is provided to operations upon which operations can base operational decisions. In addition, the purpose expressed in the OM literature includes problem-solving (Chen 2008).

To compare, the stated purpose in the functionalist MA literature tends to be explanatory, whereas the purpose within the interpretive MA literature tends to be exploratory or descriptive. The descriptive purpose aiming to understand a phenomenon does not appear in the OM literature. Rather, the OM literature aims to predict, explain, and at times provide an optimal solution. However, the purposes

<table>
<thead>
<tr>
<th>Research purpose</th>
<th>OM</th>
<th>MA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exploratory</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>Explanatory</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>Descriptive</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>
expressed in the OM literature are often explicitly labeled as exploratory. In sum, the MA literature often aims to understand a phenomenon, test theoretical statements, develop models, or extend theory. In contrast, the OM literature has often tried to develop a technique or formula for implementation in operational activities to solve a problem and provide a solution.

3.2 Theories in the reviewed literature

Theories in the reviewed literature are presented based on the classifications of theories used in the research, modes of presentation in management accounting in production environments, and research problematizations within the articles.

3.2.1 Theories within the reviewed articles

The theories differ between and within the research fields. In some articles, the theory is addressed, whereas in others it is left unknown. The theories are classified by philosophy of science (see Table 7). In cases where no theory is addressed, logical assumptions guide the study.

<table>
<thead>
<tr>
<th>Philosophy of science</th>
<th>OM</th>
<th>MA</th>
<th>MA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positivism</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hermeneutics</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 7 Theories in the reviewed literature

<table>
<thead>
<tr>
<th>Theory</th>
<th>OM</th>
<th>MA</th>
<th>MA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contingency theory</td>
<td>Principal-agent theory</td>
<td>Institutional theory</td>
<td></td>
</tr>
<tr>
<td>Logical argumentation</td>
<td>Contingency theory</td>
<td>Actor network theory</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Logical argumentation</td>
<td>Practice theory</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Legitimacy theory</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Contingency theory</td>
<td></td>
</tr>
</tbody>
</table>

3.2.1 Theories within the reviewed articles

The theories differ between and within the research fields. In some articles, the theory is addressed, whereas in others it is left unknown. The theories are classified by philosophy of science (see Table 7). In cases where no theory is addressed, logical assumptions guide the study.

Table 7 shows which theories are identified within each research field and whether such theory classified as positivism and/or hermeneutics. The MA literature shows variance in theory. However, the patterns that emerge point to several articles using contingency theory in a normative sense with a problem-solving approach by providing a best practice in a given situation. These articles are also classified within the functionalist paradigm. Hence, when it comes to the MA literature based on the functionalist paradigm, the literature often has a contingency theory perspective. Examples include contingencies such as management accounting playing a more crucial role in environments where managers are responsible for managing their own operations (Mia 2000) and testing whether the best choice of management accounting system is dictated by different variables (Reid and Smith 2000). Furthermore, in an attempt to convert tacit knowledge into organizational knowledge, Abernethy et al. (2005) have organizational members map the drivers of performance rather than modeling a production process. In their suggestion for further research, they point to this map as the foundation for a performance measurement system to understand what factors are contingent on what other factors.
Positivism is reflected in the functionalist MA research, which implies that the research should be unbiased and representative. Most functionalist MA research is normative in its logic and causality. For example, Nagar et al. (2009) build their study on the principal agent theory, making assumptions from pre-determined patterns of the principal in creating incentives for information sharing on the shop floor. As a result, in these circumstances, information sharing plays a significant control role. In this approach and their mathematical model, they show that excessive inventory might be an equilibrium outcome. The above is an example of how logic is used in the MA literature.

Hermeneutics is reflected in the interpretive MA research, where the aim is to understand management accounting from social actors’ point of view. However, the distinction between hermeneutics and logic is not always clear. If a researcher interprets a phenomenon, the research can use logic (hypothetic-deductive method) (Føllesdal 1979) to make sense of the interpretation. Practice theory can be considered related to hermeneutics because it follows the actors in their daily activities. The review shows different ways to interpret a phenomenon, such as using actor network theory and how accounting “facts” can be considered truth and “black boxed” (Lowe and Koh 2007). Other ways of interpreting a phenomenon and bringing new knowledge include seeing the world as socially constructed (Arnold 1999) and using legitimacy theory. The latter is used to increase understanding of the motives that lead managers to engage in social and environmental disclosure activities (Archel et al. 2009).

The OM literature often builds on instrumentality and logic. The arguments are often normative and there seems to be a preconception (c.f. Bhimani 1994) of what management accounting should provide. For example, some researchers have considered management accounting as providing relevant information (Corbey 1994), objective accounting information (Chang and Lee 1996), and reliable measurements. Furthermore, a single view of potential best accounting practice (Tayles and Walley 1997) needs to be found or developed. The results indicate that the OM literature is characterized by positivism and some studies use deterministic models (Shan and Zhu 2013) or deterministic assumptions of, for instance, orders being either fully accepted or fully rejected when building their models (Kirche and Srivastava 2005). In addition, Arya et al. (2014) assume a rational market in their article, which illustrates the functionalism identified in the reviewed literature. The OM literature has focused on contingency theory to some extent. For example, researchers have examined the interaction fit between a set of managerial practices from manufacturing strategy and another set from technology management and the link of this fit to operational performance (Ortega et al. 2012) and investigated when an accounting strategy is appropriate with what manufacturing strategy (Tayles and Walley 1997). Causality is also frequent in the OM literature; an example is exploring how to realize the optimization of strategic and tactical decisions together in the supply chain (Paksoy et al. 2012).

In a comparison of the two fields, the results within the MA literature are broader and vary in theories. Functionalist MA articles are often built with traits of contingency theory, whereas interpretive articles are more diversified. The patterns that emerge point to positivism in the OM literature. An example is the OM literature’s confidence in objective accounting measures leading to improved performance (c.f. Bendoly et al. 2007). In sum, the MA literature often does not comprehend variables.
and interrelationships as fixed; it includes external factors in the research. In contrast, the OM literature often comprehends fixed variables and relationships that can be predicted and, hence, controlled. The normative aspects distinguish contingency theory between the fields and paradigms. In addition, logic acts as a substitute for theory in some functionalist MA and OM articles.

3.2.2 Research problematizations of management accounting

The patterns that emerge point to similar problematizations in the fields. The argument that management accounting is insufficient for operations is common. However, other problematizations are also identified. The problematizations of management accounting in the articles are classified as the “point of departure” of the study and/or as the “conclusion” from the study (see Table 8).

Table 8 shows the problematizations of management accounting in production environments as expressed in the articles. The columns to the right (marked with an X) show whether the problematization is used as a point of departure in the articles or whether it is used to highlight complexities as conclusions; this continuing problematizing of management accounting in production environments is also offered as a conclusion in the article. The column to the left shows the problematizations used in the articles.

When it comes to the problematization of management accounting in production environments, the review of the MA literature reflects variance. In the functionalist MA literature, the problematization often focuses on aspects in earlier research or models that are too simple (Banker et al. 1988), that need to be redesigned (Emsley 2001), or for which something is inaccurate with respect to the assumptions (Abernethy and Bouwens 2005). In interpretive research, the problematization is often comprehensive and includes aspects that do not receive the same attention in functionalist research. A few examples of how management accounting is problematized in interpretive research are that practical observations cause problematizations, such as managers who claim that management accounting is too far from “reality” (Hoque and Hopper 1994), that informational uncertainty reinforces the lack of significance in accounting reports (Berry et al. 1985), and that accountants and operations managers have different goals and do not understand each other (Lowe and Koh 2007). Another way of problematizing involves the researchers themselves questioning management accounting as taken for granted (Ahrens and Mollona 2007) or lean manufacturing as beneficial for all and everything (Archel et al. 2009). Thus, the problematizations are rather theory-oriented, with no clear solutions offered in the conclusions.

The problematization of management accounting in the OM literature is often based on arguments such as management accounting signaling that history is the norm (Spedding and Sun 1999), that is, the status quo. Management accounting is considered incapable of being used for decision-making since it does not include production parameters (Kirche and Srivastava 2005) and sends the wrong signals to managers (Datar et al. 1991). Thus, the wrong signals are also considered harmful since operational members will “cherry pick” to increase their own performance at the expense of firm performance (Philipoom and Fry 1999) or lose competitive advantage due to poor management accounting systems (Tayles and Walley 1997). Furthermore, management accounting is problematized as inflexible (Corbey 1994) and unable to
### Table 8 Problematization of management accounting in production environments in the reviewed literature

<table>
<thead>
<tr>
<th>OM</th>
<th>Author</th>
<th>Point of departure</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Problematization of management accounting in production environments</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Too focused on short term</td>
<td>Bakke and Hellberg (1991)</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Too simplified</td>
<td>Kirche and Srivastava (2005)</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Feedback loop neglected</td>
<td>Ghalayini et al. (1997), Chen (2008)</td>
<td>X;X</td>
<td>X;X</td>
</tr>
<tr>
<td>Wrong signals to managers</td>
<td>Datar et al. (1991)</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Poor system causes loss in competition</td>
<td>Tayles and Walley (1997)</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Dysfunctional, ambiguous, or insufficient measures</td>
<td>Chang and Lee (1996), Phlipoom and Fry (1999), Kirche and Srivastava (2005), Chen (2008)</td>
<td>X;X;X;X</td>
<td>X;X;X;X</td>
</tr>
<tr>
<td>Too late</td>
<td>Bakke and Hellberg (1991), Spedding and Sun (1999)</td>
<td>X;X</td>
<td>X;X</td>
</tr>
<tr>
<td>Too aggregated</td>
<td>Spedding and Sun (1999)</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Inaccurate</td>
<td>Datar et al. (1991), Bakke and Hellberg (1991), Spedding and Sun (1999)</td>
<td>X;X;X</td>
<td>X;X;X</td>
</tr>
<tr>
<td>A preconception that MA has a pre-existing potential for fulfilling its role</td>
<td>Bhimani (1994)</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Not for factory floor</td>
<td>Ghalayini et al. (1997)</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Insufficient for operational practices</td>
<td>Bakke and Hellberg (1991), Bendoly et al. (2007), Chen (2008)</td>
<td>X;X;X</td>
<td>X;X;X</td>
</tr>
<tr>
<td>Non-visible information</td>
<td>Corbey (1994)</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Manufacturing strategy perspective neglected in the study of strategy and technology relationship</td>
<td>Ortega et al. (2012)</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td><strong>MA</strong></td>
<td><strong>Author</strong></td>
<td><strong>Point of departure</strong></td>
<td><strong>Conclusion</strong></td>
</tr>
<tr>
<td>Target and measure not aligned</td>
<td>Emsley (2001)</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Tension between managerial levels</td>
<td>Abernethy and Bouwens (2005)</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Top-down models</td>
<td>Abernethy et al. (2005)</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Insignificant accounting reports</td>
<td>Berry et al. (1985)</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Too far from reality due to strict central control</td>
<td>Hoque and Hopper (1994)</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Useless or not worth the effort to use</td>
<td>Jazayeri and Hopper (1999), Lowe and Koh (2007)</td>
<td>X;X</td>
<td>X;X</td>
</tr>
</tbody>
</table>
support improvements as it fails to provide feedback (Ghalayini et al. 1997). Corbeyn (1994) concludes that the increased discontent with management accounting is due to its inability to provide relevant cost information to operations.

In the OM literature, problematizations separated by almost 20 years are at times similar. For example, Chen (2008) stresses that the proposed integrated performance measurement systems have failed since they neglect feedback loops, are not dynamic, and cannot respond to the changing manufacturing environment. This can be compared to the problematization by Datar et al. (1991), who stress that management accounting fails to trace cost savings to new manufacturing practices, provides inaccurate cost information, sends incorrect signals to managers, and therefore preserves inefficient operations management practices. Part of the difference is that the operations management reform in the early research is not implemented because of management accounting failures in identifying action to comply with the reform. However, in the more contemporary research, reform has occurred, but management accounting has failed to assist operations during the reform.

To compare, the functionalist MA research often problematizes management accounting in production environments by focusing on problems to be solved and extending theory or closing existing theory gaps and by assuming that management accounting is not sufficient for operational activities. The interpretive MA research varies to include aspects of management accounting as insufficient for operational activities, but also to include concerns about showing aspects that have occurred in operations. In the OM literature, the problematization of management accounting is
presented as failing in many aspects when it comes to production environments, and often a specific problem with potential to be solved is targeted. In sum, the MA literature presents theory-oriented problems with management accounting in production environments, whereas the OM literature sets out with a management accounting problem that the studies aimed to fix. In other words, the OM literature is rather problem solving-oriented. In addition, some problematizations are similar to problematizations of 20 years ago.

3.3 Methods in the reviewed literature

Methods in the reviewed literature are presented by the data collection strategies and analytical tools, and findings and research agendas.

3.3.1 Data collection strategies and analytical tools

Regardless of field or classified paradigm, research methods vary (see Table 9). Empirical studies are conducted in both MA and OM using surveys, interviews, and archival material, and in both fields, laboratory research is conducted using formulas and calculations.

Table 9 shows the occurrence of each method in the research fields of MA and OM, respectively. The methods for gathering empirical data in the functionalist MA literature are diverse; they include surveys (Abdel-Maksoud et al. 2010; Abernethy and Bouwens 2005; Al-Omiri and Drury 2007; Fullerton et al. 2013), interviews (Reid and Smith 2000; Mia 2000; Lin and Yu 2002; Emsley 2001), meeting attendance (Emsley 2001), and mathematical calculations (Nagar et al. 2009). However, analysis of the empirical data is often separated from the collection process, using formulas, statistics, and regressions, building models, and testing variables.

The methods for gathering empirical data in interpretive MA research include interviews, observations, document reviews, and shadowing. Using these approaches, researchers aim to understand a phenomenon or incorporate dimensions by using their

<table>
<thead>
<tr>
<th>Identified research methods</th>
<th>Occurrence in OM</th>
<th>Occurrence in MA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Statistics</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Formulas and/or calculations</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Interviews</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Meeting attendance</td>
<td>–</td>
<td>Yes</td>
</tr>
<tr>
<td>Model development</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Observations</td>
<td>–</td>
<td>Yes</td>
</tr>
<tr>
<td>Shadowing</td>
<td>–</td>
<td>Yes</td>
</tr>
<tr>
<td>Archival review</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Survey</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Simulation</td>
<td>Yes</td>
<td>–</td>
</tr>
</tbody>
</table>
own senses guided by theories. Included are contextual factors such as industry, type of production, and production environment. However, all aspects depend on the research purpose and research questions. For example, using participant observation, Ahrens and Mollona (2007) find subcultures within a steel mill, where some groups use informal management accounting information in their practices shaped by their “notions of economic success” (Ahrens and Mollona 2007, p. 329). The interpretation is the focus and the researcher’s role is a natural part of the study.

The OM literature is based on quantitative methods. Building models and conducting simulations are methods frequently used in OM research, where the model is later tested in a case. For example, Shan and Zhu (2013) use empirical material of 1286 financial reports to test the impact of enterprise systems on operational performance (inventory). However, since the forecasts are unknown, they must simulate them. Using simulations, Philipoom and Fry (1999) aim to test whether an operations management practice can compensate for dysfunctional behavior from management accounting measures. Kirche and Srivastava (2005) provide an integrated operational cost model that explicitly links customer orders, cost of resource consumption, and capacity usage to optimize profitability. Chen (2008) presents a case simulation to verify the practical suitability of his proposed system. Furthermore, questionnaire surveys to test hypotheses are also found in the operations management literature (Chang and Lee 1996; Ortega et al. 2012). The focus is on testing and providing evidence of the existing theory. However, other methods are also employed, including documents to use cash flow analysis (Corbey 1994) to explore whether relevant cost information is provided to operations for decision-making.

The methods described in the literature are to a large extent similar, but they are used with different intentions. Functionalist MA research often uses large amounts of quantitative empirical data but also uses single problem-solving situations (c.f. Kihn and Näsi 2010). The interpretive MA research often uses case studies, histories, and dialogues. Regardless of empirical case study or laboratory research, most research from both fields has examined industry (e.g., manufacturing as prominent, and less on extractive) and type of production (e.g., assembly line). However, the (un)certainty characterizing the production environment has seldom been addressed. Rather, it is often called a “one-thing” process.

In sum, the presence or absence of the researcher is a distinguisher between the two fields, where the researcher in the functionalist paradigm is more disconnected from the research process than in the interpretive paradigm when it comes to gathering and analyzing data. There is no need to follow the process if the aim is not to understand the phenomenon. Rather, distance might be desirable if the researcher does not wish to affect the phenomenon.

3.3.2 Management accounting findings and paths forward in reviewed literature

Management accounting’s potential achievements in production environments differs between the fields. The findings from the MA literature are often characterized by causality or address alternative dimensions of management accounting but not always with a clear goal. The findings from the OM literature are characterized by causality and a problem-solving orientation (see Table 10).
Table 10 Research findings and research agendas provided in the reviewed literature

<table>
<thead>
<tr>
<th><strong>OM</strong></th>
<th><strong>MA</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Causality</strong></td>
<td><strong>Causality</strong></td>
</tr>
<tr>
<td>Providing tangible links</td>
<td>Providing theoretical causality to be applied in practice</td>
</tr>
<tr>
<td>Practical demonstrations</td>
<td>Determined in findings</td>
</tr>
<tr>
<td><strong>Solution-oriented</strong></td>
<td>Provides aspects crucial to consider</td>
</tr>
<tr>
<td>Providing script for success</td>
<td>Interaction promoted</td>
</tr>
<tr>
<td>Providing best practices</td>
<td></td>
</tr>
<tr>
<td>Interaction promoted</td>
<td></td>
</tr>
<tr>
<td><strong>Alternative roles</strong></td>
<td></td>
</tr>
<tr>
<td>Weaknesses with the conventional role</td>
<td>Identifying practical problems</td>
</tr>
<tr>
<td>Identifying informal roles</td>
<td></td>
</tr>
</tbody>
</table>

Table 10 illustrates how the OM literature is identified as more oriented toward problem-solving whereas the MA literature is identified to be oriented more toward theory and practice.

The findings in the functionalist MA literature address aspects crucial for practitioners and/or researchers to consider. For example, Mia (2000) finds that in environments where managers are responsible for managing their own operations, management accounting system information plays a more crucial role and that JIT adopters with high provision of information from management accounting systems earn high profit. This strand of research has pointed out certain requisites that (when fulfilled) produce a specific outcome. Fullerton et al. (2013) report that lean manufacturing is positively related to the use of a simplified strategic reporting system. Causality prevails in the functionalist MA literature. However, the functionalist MA literature also highlights additional aspects that may be important to consider. For example, Emsley (2001) notes that a debate regarding the usefulness of formal systems of variance analysis arises when the interactive use of management accounting is introduced.

The interpretive MA literature highlights issues with management accounting that are often observed or identified in practice but do not receive much attention in research based on the conventional view of management accounting. The informality, practical problems, and weaknesses with the prevailing paradigm and management accounting being used for more than fulfilling objectives are examples of such issues. As an example of findings based on interpretive research, Berry et al. (1985) report that managers build their own information systems due to ambiguous formal accounting reports. The informal management accounting systems are difficult to capture, but the interpretive MA research has reported that where management accounting fails in supporting and controlling operations, social control becomes dominate (Arnold 1999; Hoque and Hopper 1994). Furthermore, Berry et al. (1985) find that managers see management accounting as an end, not a means for reaching an end.
Hoque and Hopper (1994) identify formal control as a means of gaining external legitimacy. Hence, the interpretive MA literature is more critical in its findings, challenging the status quo, and addresses alternative dimensions of management accounting.

The findings in the OM literature are often phrased in terms of solutions to problems or evidence of a predicted outcome. Hence, the OM literature frequently provides scripts for success and solutions. For example, Bakke and Hellberg (1991) find (despite critical aspects of each of the techniques) that activity-based costing (ABC) and optimized production technology (OPT) complement each other. In lean environments, the two practices are considered to have the potential to support production (in producing maximum). Datar et al. (1991) use ABC to highlight real costs and Spedding and Sun (1999) argue that ABC has the potential to be a reliable decision-making support mechanism. The solutions are often built on best practices and consistency. For example, the best practice manufacturing strategy should be aligned with the best accounting practice, and consistency is needed between functional (operations management) strategies and management accounting for company survival (Tayles and Walley 1997). However, Bhimani (1994, p. 30) argues that “[t]he search for a ‘better’ accounting assumes that accounting has a pre-existing potential for fulfilling its intended roles.”

Furthermore, the OM literature advocates open communication (Ghalayini et al. 1997) and visibility (Corbey 1994). Arguments stressing the importance of a factor in achieving a desired outcome are common. For example, Chang and Lee (1996) provide evidence of the need to enhance bottom-up management in JIT environments. Spedding and Sun (1999) show that new methods of evaluating ABC can render ABC a communication tool. Other OM literature has gone in the opposite direction and created a mathematical model to solve decision-making problems (in contrast to personal interplay) in a supply chain (Paksoy et al. 2012). Philipoom and Fry (1999) introduce an operations management practice of order review/release (ORR) as a solution to problems arising from management accounting. Hence, one solution offers interactive forms of operations and accounting.

To compare, the findings in the functionalist MA literature versus the interpretive MA literature are more definite and determined. The interpretive MA research highlights issues with management accounting to a greater extent and extends management accounting. The OM research findings provide solutions to staged practical problems using variables. In sum, the OM literature findings are similar to those of the functionalist MA literature to some extent. However, they differ in terms of orientation. The OM literature is more oriented toward evidentially showing or demonstrating practical solutions, whereas the MA functionalist literature focuses on theory by developing frameworks or filling research gaps. The interpretive MA research often highlights problems with management accounting that need to be addressed in production environments.
4 Discussion

This review provides a basis to discuss the underlying assumptions upon which the research within the MA and OM fields rests. The discussion follows the same structure as the results section but discusses the emerging patterns derived in Table 4a–c (see Table 11).

Table 11 shows that the underlying assumptions are derived from the paradigms, theories and the methods.

4.1 The underlying research assumptions

4.1.1 Paradigms

The review shows that MA and OM differ in terms of paradigm. These paradigmatic differences are manifested via ontological standpoints, stated research questions, and definitions of exploratory research in the two fields of study.

The MA literature is more varied on the objective-subjective scale and paradigms travel across this “divide” (Ahrens 2008), while the OM literature leans more toward objectivity regarding ontological standpoints. This divide is potentially troublesome if it means that the fields fail to acknowledge research from other paradigms or fields, thereby underpinning the prevailing pursuit of management accounting suitable for production environments and leaving assumptions undisturbed, rather than creating dialogue and learning between the fields. Already Burrell and Morgan (1979, p. 23) elevate the importance of research with different standpoints to deliver different concepts and analytical tools. Taken-for-granted theories and methods prevailing in the core research of a field can lead to paradigmatic homogeneity. This is argued having implications for research as paradigmatic homogeneity only would provide marginal research contributions (Lukka 2010). Research credibility may be drained as unique and perhaps important research questions are left unaddressed (Merchant 2010) or fundamental assumptions are left unquestioned (Lukka and Mouritsen 2002). This tendency towards being too narrow and limited may lead to researchers pushing one way of thinking while leaving other questions unanswered (Malmi 2010), with few cross-paradigmatic dialogues (Modell 2010). An omission to speak outside one’s paradigm may result in introverted dialogues within research fields (Burrell and Morgan 1979, p. 22).

When it comes to its stated research questions, the functionalist MA literature often develops models to explain or understand a reality. In contrast, the interpretative MA literature focuses on showing complexity and problematizing management accounting realities. The OM literature tends to create models and simulations to optimize decision-making, thereby aiming to provide useful tools for practices. These different objectives imply that the fields apprehend different value in different types of research. Acknowledging this could be to look outside the box rather than ignoring differences between the fields. For both research fields there are risks coming from leaving certain questions unanswered based on existing (and accepted) paradigmatic methods (Malmi 2010; Merchant 2010).
Table 11 Underlying research assumptions, consequences for research, and paths forward

<table>
<thead>
<tr>
<th>Underlying assumptions in the literature</th>
<th>Consequences for research about management accounting in production environments</th>
<th>Research paths forward on management accounting in production environments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Paradigms</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ontological standpoints</td>
<td>Signals what is to be considered important, what can be expected from research and what research contributions that can/should be made in each field</td>
<td>Address attitudes and perceptions regarding management accounting’s intended role in production environments</td>
</tr>
<tr>
<td>Stated research questions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Terminology</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Theories</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Role of theory in research</td>
<td>Signals what is to be considered acceptable research, and what type of knowledge that can be gained in each field</td>
<td>Address management accounting shortcomings by considering different theoretical understandings</td>
</tr>
<tr>
<td>View of management accounting in research</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Methods</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Researcher role</td>
<td>Signals what is to be considered feasible research, what is to be attained and which answers are deemed insufficient in each field</td>
<td>Address management accounting in production environments by incorporating practicing production members</td>
</tr>
<tr>
<td>Research orientation</td>
<td></td>
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</tbody>
</table>
Furthermore, the results point to terminology as a similarity between the fields, but with differences in meaning. OM researchers often use the term “explore” in research. From a MA perspective, however, it is not obvious what “explore” is meant to entail (c.f. Corbey 1994; Ortega et al. 2012). Usually, an exploratory research purpose is considered suitable for unknown and unexplored areas of research (Hart 1998, p. 47). However, if it is possible to build a model, simulate an event, or test a hypothesis, the area must be known. Building on the above reasoning, the fields of MA and OM seem to differ with respect to how to conduct research within each field even when using the same terminology. On the other hand, the OM research tends to show causality but does not necessarily explain the reasons for such cause and effect relationships, thereby rendering an exploratory purpose. Without a theoretical framework it may be hard to explain a causality or phenomenon, but it may be possible to explore them.

The fields’ different ontological standpoints, interest in different stated research questions, and different definitions of the same terminology indicates how research are to be conducted and the research considered important within each field. This brings implications in terms of the MA and OM fields’ view on research, but also on the expectations of what research can contribute with.

4.1.2 Theories

The review shows differences in theories between the fields of MA and OM. The theoretical differences are manifested in the role of theory in research, and views of management accounting in research.

The role of theory in research divides the two fields as the theoretical frame of reference is not always stated explicitly in the literature on management accounting in production environments. While the MA literature provides theories to guide assumptions or understand phenomena in context, the OM literature often does not state an explicit theory; rather, logic acts as a substitute for theory. This implies that the perspective is taken for granted (Latour 1987), would not be important, or does not matter since it will not influence the research (Baldvinsdottir et al. 2010). A lack of theoretical framework is problematic since research resting on different assumptions influences the theoretical perspective (Guba and Lincoln 1994), which if not stated makes the meaning of a concept or perspective unclear. The importance (or lack thereof) of theory is especially central since it can be seen as an extension of the researchers’ worldviews. Failure to declare the theories can lead to difficulty in incorporating previous research into new research and in understanding research contributions. The lack of articulated theories in the OM literature may be explained by the orientation towards solutions expressed in the field of OM. The orientation towards theories and theoretical contributions in the field of MA, however, may also cause problems in terms of a lack of practical contributions, thereby fueling the shortcomings of management accounting in production environments.

The instrumental view of management accounting in production environments expressed in OM literature is troublesome as it spirals new techniques in an ongoing search for a “best solution” or “better accounting” (Bhimani 1994, p. 30), where the researchers perhaps seem "oblivious to their own social role in examining the status quo” (Cooper 1980, p. 165). It appears that management accounting is included
in OM research due to its potential to support rational decision-making (c.f. Macintosh and Daft 1987, p. 155). In this sense, the OM literature presents management accounting as a provider of objectivity, as instrumentally perceived, and with potential to provide rational choices. An instrumental view of management accounting in production environments complicates what management accounting can obtain in production environments, which is particularly troublesome since it pursues launching new techniques to respond to operational needs. The techniques (and new concepts) introduced to accommodate the shortcomings of management accounting in production environments might therefore be insufficient. Thus, an issue emerges of whether new techniques take the research front very far since similar problematizations are stated in articles more than 20 years after Johnson and Kaplan (1987) started the debate of lost relevance in management accounting.

The fields’ differences in role of theory for research and view of management accounting in production environments indicates what is to be acceptable research and what type of knowledge that can be gained. This complicates enhancement of management accounting in production environments. While the field of OM problematizes management accounting in production environments where the solution is one of an operations management, the field of MA contributes to the problem. The functionalist MA research shoulders the responsibility for adapting management accounting techniques to operational needs, whereas the interpretative MA research highlights management accounting’s implications in social and political practices, with little practical guidance.

4.1.3 Methods

The review shows differences in methods between the MA and OM fields. The methodical differences are manifested in the researcher role and the research orientation.

The functionalist MA literature presents a somewhat detached researcher role, which should not obstruct or intervene in “reality”. In the interpretive MA research, interpretation is an ongoing process, and the focus is on the actor(s) and/or actions, with the researcher present during the whole process. This indicates that the researchers’ role is central for conducting the research and highlighting the phenomenon within its context (e.g. Chapman 1998). Also the OM literature presents a detached and objective researcher role. This indicates that the researcher can build a model, have someone else test it, and then analyze the results (c.f. Baldvinsdottir et al. 2010). Apparently, the focus is on the results, and the collection of data can be separated from the analysis. In those terms, properly conducted science seems to require appropriate conditions stipulated by the researcher.

The functionalist MA literature has a research orientation towards theory as theoretical developments are highly emphasized. The interpretative MA literature is theory oriented, often trying to understand practice in its social, political and economic environment. The OM literature has an orientation towards problem-solving. Despite instrumental solutions at times presented in the functionalist MA literature, the orientation is towards developing or extending theory. The OM literature pays attention to instrumental solutions and new techniques to solve the problems identified for (often) operational decision-making. Despite its’ problem-solving research orientation, prac-
Tactics are neglected in the sense of researching informal ways to conduct work. In this way, uniqueness may be disregarded as uninteresting noise (Lukka 2010), as attempts are made to streamline operations. The essence of this difference in orientation is rather contradictory; despite a problem-solving orientation, the concept rather than the practice is central. For instance, operational interactions receive attention in the OM literature, but the operational work members (e.g., operations managers) seldom receive attention in terms of being central and researched. On the other hand, MA research often conducts research with practical emphasis but seems to fail to deliver hands-on practical relevance.

The fields’ differences in researcher role and research orientation indicates what is to be considered feasible research. Some questions are left unattended with determined assumptions of an appropriate researcher role and research orientation. These questions may be deemed unattainable with established methods or may be deemed less important.

4.2 The interface of the MA and OM fields

The presentation of management accounting in production environments in the OM literature signals expectations on management accounting as a provider of objective information and a lack of such “correct” information is interpreted as a failure. The OM literature thus attempts to provide solutions to problems where MA research has failed. In the OM field, actors are seldom present in the provided solutions. Rather, the provided solutions rest upon rational parameters. The research assumptions characterizing the field of OM puts emphasis on rational solutions, which MA research often are not able to respond to.

Although functionalist research characterizes the MA and OM research fields, the fields differ in terms of orientation. The OM literature takes management accounting for granted to support operational activities, while the MA literature takes a more reflexive role by adapting to new operational practices, a pattern that appears repetitively. The functionalist MA research sees to fulfil some of the OM research requirements by adapting management accounting techniques. The interpretive MA research at times forgets the practical relevance of the research, giving limited practical guidance. Rather than new and/or different accounting procedures adjusted to operational practices, communication between the fields might be needed (Lowe and De Loo 2014) to understand and work with prejudices about the other field. Perhaps we can then overcome the misalignment between research and what is communicated (Saulpic and Zarlowski 2014).

5 Conclusions

The thesis of this paper was that via an examination of the interface between the fields of MA and OM regarding paradigms, theories and methods, the understanding of the underlying assumptions upon which the research rests could be enhanced. This literature review highlight nuances in the taken-for-granted assumptions of management
accounting in production environments. These assumptions may therefore be challenged. Three conclusions, which are complementary rather than competing, can be drawn based on this literature review.

First, the presentation of management accounting in production environments in the literature is too simplistic and needs to be reconsidered in favor of a broader view. It has become a mantra for OM researchers to problematize management accounting in production environments as a starting point for pursuing an OM research agenda.

Second, the expectations on management accounting in production environments need to be considered together with the research intention. Failure to deliver research resting upon simplistic assumptions may not be considered shortcomings in the field of MA. Rather, the ways management accounting is portrayed in the functionalist research, adds to the view of management accounting as meant to respond to OM needs. This conveys a simplified image of management accounting in production environments not fully shared in the MA research field. When the pursuit to fulfill these perceptions fails, the shortcomings of management accounting in production environments seem to become taken-for-granted.

Third, the practical connotation in the fields of MA and OM needs to be considered with the research orientation. The fields do not necessarily have similar understandings of practice. Despite a problem-solving orientation in the OM field, the focus is on concept rather than practice. Little interest is shown in the OM field in researching practicing operational members and their relation to management accounting arrangements. There is also a risk of eliminating something potentially useful for practicing operational members by eliminating management accounting in research models. In addition, the theory orientation in the MA field pursues theoretical contributions rather than practical relevance. In this way, a practical understanding from an OM perspective as well as a practical relevance from a MA perspective may be at risk.

5.1 Contribution and implications

Through a comparative overview of the MA and OM literature, this review contributes to the literature by pinpointing how differences in ontological standpoints, stated research questions, terminology, views of management accounting’s role in research, the researcher role, and research orientation are discerned as central to the divide between the two fields. This review additionally points out research paths forward that may bring progress for knowledge creation concerning management accounting in production environments.

5.2 Limitations

The review is limited to exploring management accounting in production environments as presented in the fields of MA and OM in terms of paradigms, theories, and methods. The empirical differences between the fields are beyond the scope of this paper. In addition to the conclusions presented in the section above, several other aspects might clarify the assumptions of management accounting in production environments, such as country of origin, industry, historical context, and level of analysis. Several articles
are from the 1990s and the oldest in the review was published in 1985. The time aspect complicates the comparison of research. The different eras imply potential differences in ways of thinking and social norms and this has been considered in the literature review process.

5.3 Final thoughts regarding paths forward

Paradigms, theories and methods are essential in the interface between MA and OM research as they represent the defining worldview (Guba and Lincoln 1994) of the researcher. The fields seem to pursue research based on assumptions about management accounting in production environments without all too often challenging such assumptions. At stake is the research legitimacy. As OM research aims to push MA research to acknowledge errors in management accounting, the MA literature contributes to the problem in a similar way by not questioning the perceptions that OM researchers have regarding MA research. Approaching the other field with the intention of a more open dialogue may be useful as a path forward. However, this step implies awareness and acceptance (from both fields) that both fields have preconceptions of the other. The challenge for both fields is to question what is taken for granted and realize the potential and restrictions, not to propagandize each field, or the perceptions of management accounting might never be altered. In short, future research could address the perceptions and attitudes regarding management accounting’s intended role in production environments via interventionist research.

Understanding of practice stands out as a main divider between the fields, but it might also serve as a bridge. The remaining question is how research results can be communicated across research fields and be taken into consideration by the other field. The lack of understanding between worldviews in this MA and OM research interface is part of the problem of taken-for-granted assumptions. This lack of a functioning and ongoing interface between the fields can have dramatic implications, for example in terms of reinventing the wheel or making only marginal research contributions. Instead, various research studies could contribute with different and specific pieces of a puzzle. The probability of fully being able to grasp one’s own pieces may increase through an awareness of puzzle pieces from other research fields. In short, future research could address management accounting understandings by considering and conducting research with different theoretical understandings.

This review reveals interesting questions to address in empirical research, where the fields of MA and OM can learn from each other as well as from the relation between the two. Perhaps learning from each other is not enough; what is needed may be learning together in practice and research. Baxter and Chua (2009) emphasize that research and practice can learn from each other. Methods such as interviews, observations, and shadowing enable researchers to identify problems and ways of working with management accounting that arise in practice, which might not be discovered without these methods. Thus, these methods can be interpreted as evolving management accounting in practice, and at the same time practice can take management accounting research further. Hence, if we approach practice with previously unasked questions, with unconventional methods, and question the taken-for-grantedness of management
accounting, we may contribute with new knowledge about its use and interpretation on the shop floor. This might be a way forward in empirical management accounting research.

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Operations Managers’ Use of Ir(relevant) Management Accounting Information: A Mixed-Methods Approach


Published as:
Operations Managers’ Use of (Ir)relevant Management Accounting Information: A Mixed-Methods Approach

Amanda Curry, Anders Hersinger and Kent Nilsson

Abstract
This paper focuses on the operations managers’ use of non-financial information in their operational work and examines whether this use increases their satisfaction with management accounting systems. Survey responses from 168 operations managers in a Swedish mining company unexpectedly demonstrate a positive relationship between operations managers’ use of traditional management accounting and management accounting system satisfaction. Our findings from a subsequent qualitative workshop in which operations managers participated suggest that trust in integrated systems is damaged by careless handling of input in such systems and interpretation difficulties caused by a lack of effective guidance from accountants. Operations managers perceive traditional management accounting as objective and appear to use it collectively as a basis for learning and improvement. Operations managers use traditional management accounting proactively with their teams, but simultaneously seek help from ‘business-oriented’ accountants to navigate in operational situations.

Keywords:
management accounting; relevance; use; operations managers; learning; trust; mixed-methods research

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We would like to thank an anonymous reviewer and the Editor for their valuable and constructive comments. We would also like to thank the workshop participants for their contribution in terms of thoughts and time.
1. Introduction
Management accounting has since the late 1980s faced criticism for the perceived irrelevance of the information it generates to operational work. This criticism relates in part to historical connotations of the aggregated management accounting information on which operations managers are supposed to base their decisions regarding future actions. Consequently, such information faces the risk of being perceived as less relevant to operational work than other sources of corporate information. This does not imply that all management accounting information is irrelevant. Among operations managers’ varying information needs, reports of costs and financial progress have been assessed by practitioners as essential to their operational work (Kwaku & Tenah, 1986). One important indicator of management accounting relevance is that the information it generates leads to action (Bruns & McKinnon, 1993). The challenge is to determine which accounting information is needed for action (van der Veeken & Wouters, 2002). This would imply that other information is to be supplementary to management accounting.

With few empirical data indicating what information operations managers actually use to govern their operational work (van der Veeken & Wouters, 2002), operations managers behave as though they prefer information that is contextually anchored in a local operational setting to management accounting. The local needs of operations managers may differ from what is centrally provided (Argyris, 1977; Jönsson & Grönlund, 1988), which may reinforce such perceptions. Traditional management accounting could then be described as lacking the flexibility which is required for operational work in a local setting.

As flexibility is a key condition of operational work, this concept has received particular consideration in the design of management accounting systems in an attempt to overcome shortcomings in traditional management accounting. Integrated systems have been designed to provide the flexibility sought by operations managers (Davenport, 1998). Such systems enable operations managers to extract information that they deem relevant to their operational work. The intention behind such systems is to facilitate collecting, managing, and analyzing (accounting) information in ‘real time’ without having to wait for monthly reports (Davenport, 2000). Gupta and Kohli (2006) argue that, from an operations perspective, integrated systems can go a long way towards assisting operations managers’ decision-making processes in an integrated manner.

Integrated systems may not, however, be used by operations managers for their intended purpose of analyzing costs (van der Veeken & Wouters, 2002). Researchers conclude that there are reasons for developing local systems that complement integrated systems (Dechow & Mouritsen, 2005). Previous studies show that management accounting information can indicate to operations managers the need to improve operations and reduce costs (Jönsson & Grönlund, 1988). Yet operations managers’ knowledge of the production process and informal local systems make it possible to visualize aspects that are otherwise invisible in a management accounting system. In contrast to management accounting, local systems may have higher ‘information value’ to operations managers (van der Veeken & Wouters, 2002, p. 363).

These at times contradictory results reported in the literature complicate our understanding of management accounting’s relevance to operational work. The relationship between operations managers’ work and management accounting use and relevance therefore need to be disentangled (Hansen & Mouritsen, 2006; 2007). Given the process orientation of operations management, it is plausible to hypothesize that operations managers tend to value contextualized, tai-
lored information more highly than management accounting information, even if such information would be included in an integrated system. This suggests that operations managers should be given the opportunity to evaluate the information they use and find relevant to their operational work. More specifically, there is a need to explore the types of management accounting information operations managers use, understand how they use it, and analyze the reasons for which they use it.

The position taken in this paper is that knowledge about the relationship between management accounting and operational work can be produced collaboratively with practice (van der Meer-Kooistra, & Vosselman, 2012). The purpose of the study is to explore the relationship between operations managers’ use of management accounting information and their operational work.

The remainder of the paper is divided into five parts. In the first section we review the literature that is relevant to exploring the relationship between operations managers’ management accounting use and management accounting system satisfaction. The second section presents the method used in this case study, which contains both quantitative and qualitative elements. The results of a survey concerning management accounting use and operational work, directed at operations managers, is presented in section three. To enrich our understanding of the unexpected findings of quantitative analysis regarding operations managers’ use of management accounting, the paper continues in section four with a qualitative analysis of the survey results. This analysis was conducted jointly with operations managers from the case study company in a workshop setting to explore what, how and why operations managers use management accounting. In the fifth section we discuss the results of the two sub-studies in a holistic manner. Thereafter the conclusions drawn from the studies follow.

2 Literature on management accounting and operational work

The following sections review the literature on management accounting for operational work and discerns how interaction between organizational actors does or does not play a part in operations managers’ use of management accounting and their operational work.

2.1 Management accounting use to inform oneself

There seems to be no end in sight to the long-standing debate regarding management accounting’s relevance to operations. On the one hand, some acknowledge management accounting’s relevance to operations. For example, Gunasekaran and Sarhadi (1998) argue that there is a need for management accounting insofar as they found that management accounting plays a significant role in production in organizations striving to enter international markets. Further, management accounting is found to be used for making both long- and short-term decisions (Mia & Patiar, 2001). Additionally, participating in management accounting has been shown to increase users’ satisfaction when a management accounting system offers accuracy, punctuality and relevance (Napitupulu & Dalimunthe, 2016). In other words, management accounting is used when it is deemed appropriate, with researchers pointing to the adaptation of management accounting in terms of new techniques and tools (Maskell, 2000). Perhaps this is causing additional confusion for operations managers (and accountants). Management accounting seems to be portrayed as regulating operational work in a way that contrasts to the established operational ‘way of doing things’.

On the other hand, management accounting may be seen as adaptable in itself, with informal and formal information working differently in different situations (Earl & Hopwood, 1980; Ahrens & Chapman, 2007; Goretzki, Mack, Messner & Weber, 2018). Thus,
one can theorize about management accounting use in a wide range of situations and with respect to a wide range of information types. Porter (2009) stresses that information is portrayed as if it should be easy to understand and use for everyone with no or little expertise needed. Such information is supposed to be easily extracted from integrated systems. Information can however mean many things. Preston (1986, p. 523) found that ‘[t]he term “information” was reserved for the officially prepared material [. . .]’, and that informing is a process that occurs in a variety of ways. This suggests the complexity involved in determining the information deemed relevant to use for operations, although researchers have categorized operations managers’ information requirements (Kwaku & Tenah, 1986). Solely standardized reports and guidelines may be inadequate, however. Building on this, there are additional uses of management accounting information that go beyond mere decision-making (Jönsson, 2010). In other words, the practical uses of management accounting in operational work may extend beyond decision-making and include learning (i.e. questioning standards) and action for improvement (Argyris, 1977; Jönsson & Grönlund, 1988; Jönsson, 1992).

2.2 Management accounting relevance to operational work

The environment and organizational structures have for a long time been acknowledged as having influenced the relevance of management accounting (Chenhall & Morris, 1986). In uncertain environments, management accounting can help managers improve their companies’ performance (Mia, 1993). Noting the importance of aligning organizational objectives with the environment is therefore not groundbreaking. Nonetheless, the production orientation reveals redundancy in management accounting for operations (Maskell, 2000) as decisions based on management accounting information can generate action that does not fit with process-orientated objectives. This is closely related to thinking of relevance in terms of affecting the decisions of potential users (Barth, Beaver & Landsman, 2001).

Operations managers are more likely than other managers to perceive management accounting information as useful (e.g. marketing) (Mia & Chenhall, 1994). The operational way of thinking has been transmitted into management accounting research, with a preconception of management accounting’s relevance to operations (Bhimani, 1994). This relevance is often sought and argued for in management accounting research. For example, management accounting practices have been shown to be relevant to improving operational processes when control is replaced with empowerment (Gupta & Galloway, 2003). Relevance can, however, be conceptualized as including value and reliability (Barth et al., 2001; Lukka & Suomala, 2014; Rautiainen, Sippola & Mättö, 2017). Relevance therefore might stem from situational adaptation of management accounting, where interaction and learning, not decisions alone, are prominent.

Information received, reported and acted upon implies interaction between the providers of that information and the receivers. Management accountants who prepare information for decision-making managers have been found to be better informed than the receivers of information (see Rausch & Brauneis, 2015). Saying that they are better informed presumes that management accounting information is more valuable than local information. The decisions management accountants make constitute the basis for decisions made by managers (Rausch & Brauneis, 2015). The information management accountants provide will in turn be distributed to operations managers, where the (overload of) information (Eppler & Mengis, 2004) might affect how management accounting is perceived. Thus, the information emphasized should be
carefully chosen and contextually relevant to the operations managers if it is to generate action. The question remains, however, as to who would know what information is relevant if not those performing the operational work.

2.3 Relating to management accounting via interaction

The information prepared by management accountants may not be in line with the information expected by operations managers. Seemingly, there is a preparer–user perception gap, where the perceived value of management accounting varies between accountants and operations managers (Pierce & O’Dea, 2003). Integrated systems are designed to close such gaps by allowing operations managers to extract information they deem relevant to their operational work situations. Broadbent and Laughlin (2009; 2014) observe that management accounting systems can either promote or hamper relations between, for instance, operations managers and management accountants. Much of the accounting literature incorporating relations and relational aspects adopts a perspective of collaboration across organizational borders (e.g. Grötsch, Blome, & Schleper, 2013), such as interaction between actors along a supply chain. Although less attention has been paid to management accounting communication within an organization, such insights might be valuable for understanding the relations between operations managers and management accountants or other organizational actors.

Broadbent and Laughlin (2009) argue that stakeholders seeking to arrive at consensus regarding management accounting objectives need to include relational traits, such as interaction and communication. Objectives that are discursively agreed-upon between organizational groups suggest that relations between diverse organizational actors can also carry ideas within the organization (Scott, 2014). Like most artifacts, management accounting information can carry such ideas within an organization and between organizational groups (Czarniawska & Mouritsen, 2009), such as management accountants and operations managers. Such dissemination of ideas may cause actors to arrive at (at least partially) shared understandings of management accounting information.

Dialogue and discourse are important for interaction between organizational actors working at different levels (e.g. Pärli, 2014). The search for meaning can take place during interaction. Weick (1979, pp. 164–166) suggests, for instance, that recursive relations bring understanding, since cognition does not necessarily define action. This implies that interaction between operations managers and other organizational actors can engender understanding of management accounting information. It also implies that preconceptions might interfere with understanding, as ‘believing is seeing’ (Weick, 1979, p. 135). Nonetheless, interaction may cause uncertainties to be resolved and understanding to be achieved gradually (Scott, 2014, p. 99) and shared further. Thus, interaction can create management accounting understanding in organizational groups such as operations managers and their teams.

2.4 Management accounting satisfaction

Communication is perhaps more complex than has often been assumed (Jönsson, 1987). It may be quite difficult to develop new values and greater sensitivity to others’ problems and realities (Argyris, 1977). To conceptualize interaction between operations managers and management accountants in terms of consensus may generate some degree of misunderstanding, as it may fail to acknowledge debates that take place in organizations. Nonetheless, interaction can help lead to management accounting system satisfaction. From an inter-organizational view, good relations between clients and auditors breeds
greater understanding, which has been shown to increase client satisfaction (Öhman, Häckner, & Sörbom, 2012).

In the healthcare sector, a positive relationship between management accounting satisfaction and management accounting use has been found (Macinati & Anessi-Pessina, 2014). Researchers emphasize that when users understand and appreciate management accounting they are more likely to use it. Satisfaction among staff is, however, subjective, and business processes are not uniform in practice. The relationship between satisfaction and use might also be reversed, where becoming comfortable with management accounting can bring satisfaction. In other words, management accounting use can also affect management accounting system satisfaction.

Given the reasoning above, it can be hypothesized that:

**Hypothesis 1 (H1):** Operations managers use non-traditional management accounting information in their operational work.

**Hypothesis 2a (H2a):** Interaction between operations managers and management accountants has a positive influence on operations managers’ perceptions of a management accounting system as satisfactory.

**Hypothesis 2b (H2b):** Interaction between operations managers and their teams has a positive influence on operations managers’ perceptions of a management accounting system as satisfactory.

### 3 A mixed-methods approach

This case study used both quantitative and qualitative data. First, the quantitative method used for collecting data is presented, followed by a description of the workshop used to collect qualitative data to enrich the survey analysis.

#### 3.1 The case study organization

The case organization was a state-owned mining company founded in 1890. The company recently experienced a decline in its operating margin (from 34.56% in 2013 to 5.28% in 2014). A new CEO came into the organization in the spring of 2015, and most of the management group was replaced. The new focus of the management group was to be on cost reduction. The production process was characterized by continuous flow, wherein iron ore was transported from one plant to another in the refining process. The various plants were conducting highly specialized tasks and the tasks to be completed often required expertise and experience from operations managers.

The company employed a large, complex integrated system that could provide diverse key performance indicators and statistics that ranged from metrics that applied to the mines where the iron ore was extracted to metrics that measure the logistics of shipping refined products to end customers. The intention was that even down in the mines, employees on the shop floor should be able to access real-time information about their operational work and determine whether they are on target or not. In addition to deploying formal management accounting systems, operations managers used spreadsheets and ‘little black log books’ to keep track of their daily operations. Each machine had an ‘operation card’ with production data that was shuttled back and forth between the machines and the coffee room. These mobile operation cards kept by the operators indicated that not all production data were entered into the integrated system when they should have been.

#### 3.2 The survey study

In the following sections we introduce the research approach adopted in sub-study one, and explain how sub-study one and its questionnaire was designed.
3.2.1 Research design
A survey organized around three themes was first sent out to a Swedish mining company, followed by a follow-up workshop with survey respondents. Only one company was chosen because of the availability of operations managers to participate in a sequential workshop. The operations managers responding to the survey were those who attended the workshop. In this way, the workshop would build upon the responses made by the attending practitioners and their colleagues.

3.2.2 Data collection
The survey (see appendix 1) was developed based on the three themes presented in the previous chapter. The first theme was management accounting information and its use. The second theme was the perceived relevance of management accounting information for operational work. The third theme was interaction between operations managers and their teams and management accountants. Management accounting system satisfaction was used as a dependent variable. The questionnaire (in Swedish originally) was sent out at the end of 2015 to 277 operations managers in the company via email, and included a cover letter with information about the study’s purpose and contact information for the first author. Reminders were sent out, resulting in some late responses, generating answers from N=168 operations managers. This yielded a response rate of 60.65 percent. The survey answers contained no missing data as the questions were designed so as to avoid unanswered questions. The survey comprised multiple sets of questions that were distributed based on each respondent’s work title. In the present study, operations managers included employees with management positions in operational areas.

For the present study, most of the questions were answered based on a six-point Likert-type scale anchored at one. In addition, multiple-choice questions and open-answer questions were used to help operations managers explain their answers. The questionnaire results were coded in SPSS and also in Excel for purposes of usability. The results derived from the multiple-choice questions and the open-answer questions were re-coded in Excel.

Measuring variables
Questions sought information about experience in response to interest in understanding how experience impacts the daily work of operations managers and whether such experience impacts the use of management accounting. Previous research emphasizes experience and operational knowledge and the need to make tacit knowledge explicit to drive performance (Abernethy et al., 2005). Thus, the experience of operations managers could be important for management accounting. Survey items 2.3, 2.5, and 2.7 captured attitudes towards experience on a 6-point Likert scale ranging from 1 = ‘not important’ to 6 = ‘highly important’.

Previous research points to a positive relationship between the use and perceived relevance of management information systems (Robey, 1979). This relationship requires management accounting use and relevance to be explored. Operations managers may work with other information in addition to management accounting information (Jöns-son & Grönlund, 1988). Therefore, the use of traditional management accounting for daily operational work was captured via items 2.10, 2.12, and 2.14 and the use of data bases for daily operational work was captured via items 2.20, 2.22, and 2.24. Respondents’ answers regarding their use of management accounting information were coded on a scale ranging from 1 = ‘daily’ to 6 = ‘never’. In this study, we chose to take a broad view of management accounting by including financial accounting elements, such as balance sheets and income statements, that could be used by operations
manager in production improvement and cost savings efforts. Previous empirical insights at the case company suggested that the capital-intensive environment characterizing mining causes operations managers to discuss (on an operational level) whether they should capitalize expenses on the company's balance sheet to delay the full recognition of costs.

Survey questions regarding the relevance of management accounting to operational work were designed to emphasize usefulness to avoid imposing theoretical constructions on participating operations managers. Relevance is often connected with usefulness (Rautiainen et al., 2017). Questions were asked about what information was used, and whether thereafter this information was useful in their operational work. Interviews conducted prior to the study suggested that operations managers found it easier to relate to the term 'useful' than to 'relevance'. These items (4.1, 4.2, 4.3, 4.4, 4.5, and 4.6) were coded on scale ranging from 1 = 'not useful' to 6 = 'highly useful'.

The questions asked to capture interaction sought opinions about the importance of communication and of recurring communication. Respondents indicated their perceptions of the importance of interaction (questions 3.4, 3.6, 3.10, 3.12) on a scale ranging from 1 = 'not important' to 6 = 'highly important'. Frequency of interaction (questions 3.5, 3.9, 3.11) was coded on a scale ranging from 1 = 'daily' to 6 = 'never'. Previous research has shown a relationship between management accounting satisfaction and management accounting use (Màcinàti & Anessi-Pessina, 2014). This survey also examined the opposite relationship. Satisfaction with the firm's management accounting system was measured on a six-point Likert scale ranging from 1 = 'not satisfied' to 6 = 'highly satisfied'.

3.2.3 Data analysis
Exploratory factor analysis was used in recognition of the exploratory nature of this study (Daft & Macintosh, 1981). The exploratory factor analysis helped to identify unobservable factors that together could explain the relationship between management accounting and operations managers. Principal component analysis (with an oblique rotation) suggested that the variables' factor loadings represent dimensions which were labeled 'experience', 'interaction with management accountants', 'interaction with production teams', 'the use of management accounting', and 'the use of databases' (see Table 1).

In Table 1 we report management accounting information divided into three types. Previous research points to situated management accounting (Earl & Hopwood, 1980; Ahrens & Chapman, 2007). The concepts were labeled based on the management accounting techniques characterizing the factor loadings. These types comprised traditional management accounting (items 2.1.1; 2.1.2; 2.1.4), tailored management accounting (items 2.1.3; 2.1.7; 2.1.10; 2.1.11), and production-oriented management accounting (items 2.1.5; 2.1.6; 2.1.8; 2.1.9). After identifying the constructed concepts, multiple regression analyses were run.

3.3 The workshop with operations managers
The following sections explain the reasons for adopting a collaborative research approach, elaborate on some concerns regarding such an approach and thereafter present the design and analysis of the workshop.

3.3.1 Research design
This study used a mixed-methods approach to address the research question and enhance knowledge. Such a method can open up dialogues between research paradigms (Lukka, 2010; Modell, 2010; Malina, Nörreklit & Selto, 2011), and perhaps between practicing operations managers and management accounting research (Jönsson, 1998; Hall, 2010). To
### Table 1 Constructed concepts derived from survey answers

#### SURVEY QUESTIONS

<table>
<thead>
<tr>
<th>EXPERIENCE AND MANAGEMENT ACCOUNTING USE</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>CONSTRUCTED CONCEPT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q 2.3 How important is experience-based assessments to achieve improved profitability?</td>
<td>824</td>
<td></td>
<td></td>
<td>Experience</td>
</tr>
<tr>
<td>Q 2.5 How important is experience-based assessments to achieve improvement in production?</td>
<td>865</td>
<td></td>
<td></td>
<td>Experience</td>
</tr>
<tr>
<td>Q 2.7 How important is experience-based assessments to achieve cost reductions?</td>
<td>849</td>
<td></td>
<td></td>
<td>Experience</td>
</tr>
<tr>
<td>Q 2.10 How often do you use budget in your daily work?</td>
<td>645</td>
<td>395</td>
<td></td>
<td>Traditional management accounting use</td>
</tr>
<tr>
<td>Q 2.12 How often do you use balance sheets in your daily work?</td>
<td>790</td>
<td></td>
<td></td>
<td>Traditional management accounting use</td>
</tr>
<tr>
<td>Q 2.14 How often do you use income statements in your daily work?</td>
<td>834</td>
<td></td>
<td></td>
<td>Traditional management accounting use</td>
</tr>
<tr>
<td>Q 2.20 How often do you use Quickview in your daily work?</td>
<td>432</td>
<td>610</td>
<td></td>
<td>Database use</td>
</tr>
<tr>
<td>Q 2.22 How often do you use Movex in your daily work?</td>
<td>767</td>
<td></td>
<td></td>
<td>Database use</td>
</tr>
<tr>
<td>Q 2.24 How often do you use Excel in your daily work?</td>
<td>618</td>
<td></td>
<td></td>
<td>Database use</td>
</tr>
</tbody>
</table>

#### WHICH OF THE FOLLOWING ARE USEFUL FOR YOUR DAILY OPERATIONAL WORK

| Q 2.1.1 balance sheets                                                                                   |    |    | 660| Traditional management accounting relevance |
| Q 2.1.2 income statements                                                                                |    |    | 734| Traditional management accounting relevance |
| Q 2.1.4 budgets                                                                                         |    |    | 622| Traditional management accounting relevance |
| Q 2.1.5 performance measures                                                                             |    |    | 686| Production-oriented management accounting relevance |
| Q 2.1.6 logs                                                                                           |    |    | 622| Production-oriented management accounting relevance |
| Q 2.1.8 financial measures                                                                               |    |    | 523| Production-oriented management accounting relevance |
| Q 2.1.9 non-financial measures                                                                           |    |    | 589| Production-oriented management accounting relevance |
| Q 2.1.3 individual Excel sheets                                                                          |    |    | 653| Tailored management accounting relevance |
| Q 2.1.7 shared Excel sheets                                                                              |    |    | 702| Tailored management accounting relevance |
| Q 2.1.10 databases                                                                                      |    |    | 519| Tailored management accounting relevance |
| Q 2.1.11 encounters in the hall or coffee room                                                           |    |    | 336| Tailored management accounting relevance |

#### INTERACTION REGARDING MANAGEMENT ACCOUNTING AND DAILY OPERATIONAL WORK

| Q 3.5 How often do you communicate with the management accountant for your unit regarding management accounting? | 969|    | Interaction with management accountant |
| Q 3.6 How important is communication with the management accountant regarding management accounting for your daily work? | -875|    | Interaction with management accountant |
| Q 3.4 How important is communication regarding management accounting for your daily work?                 | 733|    | Interaction with team                 |
| Q 3.9 How often do you communicate with your team regarding management accounting information?             | -718|    | Interaction with team                 |
| Q 3.10 How important is communication with your team regarding management accounting for your daily work? | 887|    | Interaction with team                 |
| Q 3.11 How often do you communicate with your nearest manager regarding management accounting information? | -619|    | Interaction with team                 |
| Q 3.12 How important is communication with your nearest manager regarding management accounting for your daily work? | 897|    | Interaction with team                 |
gain a broader understanding of the results found in sub-study one, a collaborative research approach was considered suitable. Some scholars argue that research issues should be investigated collaboratively to gain ‘nuanced knowledge’ about management accounting for operational practices (van der Meer-Kooistra & Vosselman, 2012), providing an opportunity for research and practice to learn from each other (Baxter & Chua, 2009). Unexpected survey results found in sub-study one required collaborative research involving practicing operations managers. Workshop analyses have previously been used by Malmi, Järvinen & Lillrank (2004) to find alternative practical solutions, or to anchor constructed concepts in practice (Siggelkow, 2007).

Collaborative research may be tricky as researchers are encouraged to shift from an etic (outsider) to an emic (insider) perspective (Jönsson & Lukka, 2007). Adopting an etic perspective prepares a researcher to quickly recognize kinds of events and to discern slight differences between similar events (Pike, 1967, p. 40). Theoretical knowledge can be gained with the help of collaborative research, much like a field experiment (Jönsson & Lukka, 2007, p. 391). Therefore, the inclusion of the emic perspective was important in both the design and execution of the workshop. In this paper, the researchers assumed a democratic researcher role (Jönsson & Lukka, 2007, p. 391), as the aim was to learn about the uses of management accounting in operational work in collaboration with practitioners.

**Designing a workshop**

The workshop design and data-collection strategy were discussed with practitioners with experience in the case company who were not participating in the workshop prior to conducting the workshop. In this way, the emic perspective was taken into consideration. The etic perspective was included via previous literature on the research topic, along with previous literature using similar methods.

The workshop gave the researchers an opportunity to observe the operations managers’ discussions within the group, to conduct follow-up interviews regarding their reflections on the findings, and a means of analyzing the results together and incorporating the operations managers’ valuable insights into the findings (Baldvinsdottir et al., 2010). The workshop provided a basis for theorizing about management accounting information use by operations managers and gaining practical relevance.

### 3.3.2 Data collection

The participating operations managers were presented with the preliminary survey results. Thereafter they were asked to elaborate if and, if so, how, the survey results were consistent with their perceptions. They were also asked about their thoughts concerning what might explain the results. The workshop was designed to induce participants to write down their thoughts on post-it notes individually, after which discussions were held collectively. The collective discussions were then to be summarized on paper. In this way, records of the workshop could be collected. One schematic illustration drawn by the practitioners was adapted and included in this paper (see Figure 3 presented under section 5.1).

One researcher and five attendants constituted the workshop. The workshop was held on a voluntary basis, which implies that those attending shared an interest in the research topic. The company suffered from high employee turnover. Several operations managers were relocated to other plants, on sick leave or parental leave, or had sought other job opportunities elsewhere. Fortunately, the attendees had important roles in the company and were responsible for financial outcomes and operational work processes. The workshop lasted for three hours. Thereafter, the researchers asked follow-up questions of the participating operations managers. The attendant researcher kept a research diary where notes of
the discussions taking place were added. Field notes and practitioners’ reflections enabled the researchers to return to the empirical material to find ‘clues’ (Jönsson & Lukka, 2007, p. 388).

3.3.3 Data analysis
After the workshop was completed the material was sorted based on the three types of management accounting and their use and relevance, interaction between operations managers and the management accountants or their teams, and management accounting system satisfaction. Narratives that represent the workshop results were chosen thereafter.

4 Results from sub-study one
The findings are divided into and presented in two main parts. First, we identify the types of management accounting information operations managers use and explain the implications of this use for satisfaction with the management accounting system. Second, we present results pertaining to interaction between operations managers and their production teams and the relationship between such interaction and management accounting satisfaction.

4.1 Three types of management accounting
Our first hypothesis (H1) predicts that operations managers use non-traditional management accounting information in their operational work. The factor analysis suggested that operations managers divided management accounting into three types (see Table 1). These constructions were labeled ‘traditional management accounting’, ‘tailored management accounting’, and ‘production-oriented management accounting’ as a reflection of the nature of the information implied by the concepts, where traditional management accounting includes financial elements. These three concepts gain support from previous literature, as the type of management accounting information involved in a particular interaction depends on the situation (Ahrens & Chapman, 2004). It was explored whether the three types of management accounting can explain management accounting system satisfaction (see Table 2).

The evidence reported in Table 2 indicates a positive relationship between traditional management accounting and the dependent variable, management accounting system satisfaction ($\beta=0.365; p<0.05$). Surprisingly, the results of the regressions show that among the three types only traditional management accounting is associated with management accounting system satisfaction. In general, when operations managers are satisfied with their company’s management accounting system, they relate to traditional management accounting.

<table>
<thead>
<tr>
<th>MODEL</th>
<th>UNSTANDARDIZED COEFFICIENTS</th>
<th>STANDARDIZED COEFFICIENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
</tr>
<tr>
<td>Relevance of traditional management</td>
<td>1.950</td>
<td>.390</td>
</tr>
<tr>
<td>accounting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relevance of tailored management</td>
<td>-.227</td>
<td>.380</td>
</tr>
<tr>
<td>accounting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relevance of production-oriented</td>
<td>.302</td>
<td>.480</td>
</tr>
<tr>
<td>management accounting</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2 Three types of management accounting and interaction related to perceived management accounting system satisfaction

Dependent Variable: How satisfied are you with the management accounting system in general?
accounting. Neither tailored nor production-oriented management accounting was shown to be associated with management accounting system satisfaction. See Figure 1.

One interpretation of the significant relationship between traditional management accounting and management accounting system satisfaction is that operations managers find traditional management accounting to be relevant to their operational work. An alternative interpretation of these findings is that the lack of association between tailored or production-oriented management accounting and management accounting system satisfaction would suggest that operations managers do not consider such information to be management accounting information, but rather see it as an extension of established production data. Tailored and production-oriented management accounting can be too integrated into the system for operations managers to recognize that the information stems from the management accounting system. In that case, traditional management accounting may be what operations managers see as management accounting.

4.2 The importance of team interaction for management accounting system satisfaction

The hypotheses predict that interaction between operations managers and management accountants (H2a), or between operations managers and their teams (H2b), will have a positive impact on the operations managers’ perceptions of their management accounting systems as satisfactory. The factor analysis informed the traditional management accounting use, team interaction, and interaction with management accountants constructs (see Table 1). The regression analysis explored whether traditional management accounting use could explain management accounting system satisfaction, and whether this relationship was aided by the hypothesized interactions (see Table 3). The results reported in Table 3 indicate the presence of a negative relationship between traditional management accounting use and management accounting system satisfaction.
The findings indicate that traditional management accounting use causes operations managers to be less satisfied with their management accounting systems. Interaction with team members was added as a mediator, however, weakening the negative relationship ($\beta = -0.204; p<0.05$). See Figure 2a and 2b.

Figures 2a and 2b show that traditional management accounting use does not increase operations managers’ satisfaction with the management accounting system. When interaction with team members is included as a mediator between traditional management accounting use and management accounting system satisfaction, operations managers’ satisfaction with the management accounting system increases. This suggests that team interaction can alter operations managers’ perceptions of the management accounting system. Interaction and dialogue might be a way to handle some uncertainty, since meanings arise in relations with others (Scott, 2014, p. 67; Weick, 1979).

There is no significant relationship when the management accountant was added as a mediator between traditional management accounting use and management accounting system satisfaction. This may be because the information provided was irrelevant and over-
loaded (Eppler & Mengis, 2004) or the management accountant was seen as detached from operations and more closely associated with a service role (Hopper, 1980; Granlund & Lukka, 1998; Pierce & O'Dea, 2003).

5 Results from sub-study two
The following sections presents the results from sub-study two, where the relationships (or lack thereof) between the concepts derived in sub-study one were explored together with operations managers in the workshop setting.

5.1. Trustworthy traditional management accounting information
The first task during the workshop was to establish a common understanding of management accounting. During these discussions there was a coherent view expressed by workshop participants: they consider management accounting to be an integrated system. That is, management accounting includes not just the accounting system but all the connected parts, including mining production data and supply chain data. A schematic picture was drawn by the practitioners on a whiteboard over the various databases included in this definition. See Figure 3.

Figure 3 indicates how various databases were perceived by the practitioners as integral parts of the management accounting system. Focus during the workshop was nonetheless to a great extent on traditional management accounting, including budgets, monthly reports, accounting entries, cost units and cost drivers. In discussing these elements of traditional management accounting, the operations managers explained their perceptions of management accounting.

The practitioners were thereafter presented with figure 1 (presented previously in section 4.1). Concerns were raised concerning the three types of management accounting and their role in operational work. The discussions resulted in agreement among the practitioners regarding the trustworthiness of traditional management accounting. Tailored management accounting came from the integrated systems and could therefore be arranged in a variety of ways to suit varying situations. One operations manager emphasized the occasional influence of carelessness...
in entering data into the integrated system, and noted that such actions would drain the integrated system of its credibility:

*See, I cannot trust [the tailored management accounting]. I do not know what is included in those [numbers]. Anyone could have been messing with those!*

This operations manager explained that she did not want to base her decisions on information that is not considered objective. She continued by expressing concern about the effort put into trying to understand or relate to tailored management accounting and production-oriented management accounting:

*It is too much work to find such information, and when I do, it is not clear how to analyze it! It gives feedback, but we cannot base decisions upon such information.*

One interpretation of this statement is that there is a need to take better advantage of the complex store of information available to operations managers. Tailored and production-oriented management accounting are thought to provide potentially valuable input into the decision-making process, but only if that input is comprehensible and credible. Surprisingly, traditional management accounting is thought to be more relevant than other types to decision-making. One operations manager observed:

*Well, there are laws to regulate that information. […] you know what you get.*

Although the operations managers praised traditional management accounting as trustworthy and objective as it relies in part on regulations and standards, two questions remain. First, the question of use. When the operations managers equated use with decision-making, they did not perceive tailored or production-oriented management accounting information as having been used. Second, although traditional management accounting was considered trustworthy by the operations managers, they indicated a desire to use tailored and production-oriented management accounting if either could be trusted.

During the workshop, the historical connotations of management accounting were often emphasized, as decision-making relates to historical accounts of what has already happened. One operations manager explained how traditional management accounting enables the production team to discern the accounting numbers in monthly reports, make sense of them to make informed decisions, and execute the corresponding actions thereafter:

*Three years ago, we were not where we are today […] to be able to understand where the numbers come from in the reports. […] But now, the guys get a feeling for the costs as we have been working with the budget often.*

The above quote was contributed by an operations manager who decided to sit down with his production teams to work with traditional management accounting in great detail to better understand the relationship between budgeting and financial performance. The production team had learned which activities drive up costs (i.e. cost drivers) and therefore they could eliminate those activities before they showed up on income statements. The team did not get credit for this procedure, however. For example, the operations managers and his teams proactively used this information when they continuously compared these activities against the maintenance budget for one specific piece of equipment. The book value of the asset was compared (via activities) with the estimated costs to discuss whether it would be profitable to reinvest in or discard a particular asset. The more often
the participants would go through the reports and extensive learning time, the more aware and proactive they became. In this way, they related to traditional management accounting by making sense of it in teams when they formed interpretations together based on experience, knowledge and judgement. The teams used their knowledge about traditional management accounting to take cost-reductive action. This type of use was not visible to other actors in the organization (nor to outsiders such as researchers) who did not take part in the action as the costs were cut proactively. Interestingly, such a use of traditional management accounting information could easily have gone unnoticed had this study been conducted as a survey solely from an etic perspective.

5.2 Team cooperation and management accountant support

During the workshop, when the survey results pertaining to interaction between operations managers and their teams and management accountants were discussed, the teams did not receive much attention. Rather, the significance of the production team for understanding management accounting information was taken for granted by the operations managers as something natural. Instead, the practitioners were concerned with the lack of a significant relationship between management accounting and the role of the management accountants. In particular, one operations manager did not sympathize with the results presented in figures 2a and 2b:

I do not know . . . I get all the help I need [from the management accountant]. His door is always open, and he helps me untangle numbers when I have issues. This [lack of relationship] is not matching the way I see it!

There was a general perception shared by some participants of the management accountant as a number cruncher. But at the same time, the operations manager emphasized that the management accountant for his team often visited the shop floor, while another operations manager expressed the desire for a management accountant who would be present more often, showing deeper interest in operations. One operations manager leaned more towards blaming the lack of routines that came from the accounting department:

We lack the routines, the education, the knowledge, and the time!

The operations manager said that the more deeply one delves into the management accounting system, the more deficiencies one will find. In such cases, the management accountant would aid the operations managers only by providing the teams with the right cost centers, whereas the deeper understanding, she explained, was missing from the production teams. In her experience, discussions with management accountants did not lead to improvements regarding routine issues and attitudes at the shop-floor level. This reveals a wish on the part of operations managers that management accountants would invest greater effort in educating the production teams and not assume only the formal role of providing them with hands-on instructions about where to book their costs.

6 Discussion

This discussion emphasizes two main topics. First, it considers how this study found that operations managers perceive traditional management accounting information as trustworthy and how such information is used and relevant to operational work in diverse ways. Second, it considers nuances in understanding the role that interaction plays in inducing operations managers to perceive management accounting as satisfactory.
6.1 Management accounting for decision-making, or . . .?

The results related to operations managers' use of management accounting information provide support for the predicted relationship (H1). The results of the survey suggest that operations managers divide management accounting into three types: traditional, tailored, and production-oriented management accounting. Further, there is a lack of association between tailored management accounting and production-oriented management accounting with management accounting system satisfaction. The use of traditional management accounting for operational work is however positively related to management accounting system satisfaction.

In spite of early research suggesting that a broader definition of management accounting should include external and non-financial aspects (Chenhall & Morris, 1986), it would seem as though this broad view of management accounting has not been adopted everywhere by operations managers. Tailored and production-oriented management accounting information may instead be considered too blurry and messy because it is integrated into an array of systems. It could be difficult for operations managers to recognize such information as stemming from the management accounting system. Metaphorically put, too many tributaries muddy the stream water.

The workshop analysis, however, suggests that operations managers accept traditional, tailored, and production-oriented management accounting data as management accounting information. The lack of association between the latter two and management accounting system satisfaction may therefore stem from something else.

First, traditional management accounting is considered trustworthy by operations managers. Interestingly, this trustworthiness seems to be embedded in a perceived inherent objectivity in management accounting numbers based on laws and regulations, although not all of this information is legally regulated. Such information can therefore be trusted and constitutes a solid and objective foundation for relevant operational decision-making. Porter (2009, p. 316) suggests that trust is "as much the currency of accounting as is money." In other words, its relevance lay in its trustworthiness for decision-making. Production-oriented and tailored management accounting is not considered relevant to decision-making because of their inherent subjectivity, and therefore such management accounting seems to go unused in decision-making.

The rational rhetoric of the operations managers who participated in this study suggests that use is equivalent to decision-making (see Jönsson, 2010). Information that does not fit into this categorization of decision-making is therefore not deemed relevant based on a narrow definition of decision-relevance (Barth et al., 2001; Rautiainen et al., 2017). Rather, the use that is not equated with decision-making is embedded in the practices of the operations managers. Such embeddedness is almost taken for granted and is therefore perhaps not easily articulated as use (Collins, 2005). At a second glance, operations managers use management accounting for broader purposes than decision-making alone. Relevance is probably more complex than rational decision-making (Barth et al., 2001). Lukka and Suomala (2014) define relevance as something that is of significance for something else. The apparent use that is visible to the eye is retrospective use. The proactive use of learning from past events, and the action generated, are obscured and therefore may not be considered use. What is decided and what is mobilized are not necessarily equivalent. With a rational articulation of management accounting use, all that would be left for traditional management accounting to do would be to give answers retrospectively (Chapman, 1997).

Second, operations managers consider tailored and production-oriented manage-
ment accounting to be highly subjective. Even the collection of data in these forms of management accounting is considered subjective. The variety of staff involved in inputting data makes operations managers rethink their potential for their operational work. Therefore, such information is not perceived by operations managers as trustworthy. This may be explained by reference to general conceptions of the reliability of information that do not match well with open and multiple access to the system (Porter, 2009). It has been argued that integrated systems are transforming management accounting into a ‘collective affair’ (Dechow & Mouritsen, 2005). The ‘collective affair’ may therefore have additional negative consequences such as weaker control over input.

Another challenge for tailored and production-oriented management accounting is that such information is perceived as too deeply integrated, which makes extracting data time-consuming and the data hard to analyze. The intended purposes of extracting relevant information make it seem like a complicated task, which may cause such information to lose some of its value (van der Veeken & Wouters, 2002). Management accounting has the potential to be seen by operations managers as situational (Earl & Hopwood, 1980; Goretzki et al., 2018) and compared to a practice (Ahrens & Chapman, 2007). Perhaps management accounting needs to be locally learned to enable operations managers to manage problems before they arise (Argyris, 1977; Jänsso and Grönlund, 1988; Jönsson, 1992). Learning is not easily computed, since understanding what the numbers are meant to entail is difficult to grasp. Operations managers would therefore benefit from operational expertise as well as accounting knowledge (Jönsson and Grönlund, 1988).

All told, the rhetoric of operations managers suggests a rational decision-making use of management accounting in their operational work. The operations managers’ discussions of operational work, however, paints another picture of traditional management accounting use as related to learning and action for improvement. Integrated systems seem to be considered as too open, too integrated, and too complicated.

6.2 Collective learning and ‘business-oriented’ accountants
It was hypothesized that interaction between operations managers and management accountants would have a positive influence on management accounting system satisfaction (H2a). The results contrast this prediction. There is no significant influence from interaction between operations managers and management accountants on management accounting system satisfaction. It was further hypothesized that interaction between operations managers and their teams would have a positive influence on management accounting system satisfaction (H2b). The results support the predicted outcome. Interaction between operations managers and team members increases management accounting system satisfaction. On the other hand, interaction between operations managers and their management accountants does not increase management accounting satisfaction. Interaction is recognized as providing meaning. Interestingly, the team, but not the management accountant, would then assist in this sensemaking process. This is in contrast to reported findings of previous research that underscores the importance of interaction between organizational groups and management accountants to better prepare for organizational complexities (Chapman, 1998). One interpretation of this finding is that, insofar as numbers are highly contextual, interpretations need to be articulated in local settings by team members who are doing the operational work.

The results derived from the workshop suggest that interaction is more complex than suggested by the survey findings. First,
operations managers exhibit distress over the non-accounting style of operations on the shop floor (Hopwood, 1972). Simultaneously, the production teams are shown to be important for traditional management accounting use and relevance, and for learning in particular. The collective local knowledge of operations managers is essential to the sense-making process (Jönsson & Grönlund, 1988). Paradoxically, team members may serve a mediating role in achieving management accounting system satisfaction and such team interaction enables operations managers to understand management accounting. At the same time, their handling of management accounting information—the numbers produced by the team members—cannot be fully trusted. Interaction may, however, bring meaning to such uncertainties (Weick, 1979). This may reflect operations managers’ desire to spend more time learning about management accounting and less time working with guidelines. The local expertise of operations managers enables them to ‘recognize the relevant distinctions’ (Dreyfus & Dreyfus, 2005, p. 783) in traditional management accounting. Such deviations trigger templates for identifying and managing cost drivers. By using traditional management accounting and relating that to operational situations in local settings, operations managers seem able to avoid the reoccurrence of costs (Argyris, 1977; Jönsson & Grönlund, 1988).

Second, the management accountant’s role seems both situated and individually dependent when it comes to supporting operations managers. Management accountants may at times be too tightly constrained by management accounting to interact with their production teams. Other management accountants are presented as devoted to learning local operations. Management accountants do not seem to succeed entirely in importing ideas into the local operational setting (Czarniawska & Mouritsen, 2009; Scott, 2014). This may be in part related to the preparer–user gap (Pierce & O’Dea, 2003), whereby management accountants preparing information do not provide much help to those who apply their understanding of management accounting to operational work. Operations managers and management accountants may therefore understand management accounting information differently (Ahrens & Chapman, 2004), as they would use such information for different purposes when it is related to operational work. Knowing how to manage varying operational situations based on management accounting information is not the same as establishing formalized guidelines in routine situations. Learning by doing—learning from mistakes—requires taking responsibility for one’s mistakes (Dreyfus & Dreyfus, 2005). There are difficulties in making embedded knowledge explicit (Latour, 1987), which may render hands-on guides redundant.

The data we collected from the workshop adds nuances to the idea that management accountants are not important to production teams that cannot be captured solely via a survey. Management accountants often assist operations managers in compiling and analyzing management accounting information. However, more support may come from management accountants who depart from playing a strictly formal role (Hopper, 1980) when recording and reporting accounts. Strictly formal accountants are often referred to somewhat negatively as ‘bean-counter’ types (Granlund & Lukka, 1998). Yet, information that operations managers refer to as trustworthy and relevant to decision-making is material prepared by management accountants (see Rausch & Brauneis, 2015). This suggests that operations managers generally trust management accountants and the information that they provide, but that operations managers would appreciate if management accountants assumed a more interactive role.
7 Conclusions

This study explored the types of management accounting information that operations managers use, revealing how they use it and for what reasons. Three conclusions can be drawn from this study.

First, management accounting has diverse meanings for operations managers in their operational work and can be divided into traditional management accounting, tailored management accounting, and production-oriented management accounting. For operations managers the strength of traditional management accounting is its trustworthiness. At first glance, the relevance to operations managers seems to be expressed in terms of analyzing traditional management accounting information and making rational decisions based on such analytics. When digging beneath the surface, we can see that the relevance for operations managers is more nuanced than if decision-making was the only value extracted from management accounting information. In their operational work, operations managers elaborate on traditional management accounting information to learn and act to improve operations. In other words, operational action stemming from management accounting is rather hidden in the operations managers’ rhetoric when the term ‘use’ is present. Management accounting use for learning and action is not easily articulated. Traditional management accounting is presented rhetorically as trustworthy and is used to inform decisions and to control costs, whereas tailored and production-oriented management accounting lacks such traits.

To conclude, then, traditional management accounting is found to be trustworthy and its use extends beyond rational attributes of decision-making and includes learning and action that are essential for operational work. Operations managers’ expertise provides them with mental templates for action based on management accounting in local settings.

Second, production teams have considerable impact on how management accounting is understood. Apparently, however, there are layers in these results. The management accounting data produced by team members cannot be trusted completely by operations managers, but they nevertheless rely on their teams to interpret management accounting information and subsequent execution. In this way, some sort of collective sensemaking takes place around management accounting which, from the actors’ point of view, would mitigate the effects of the subjectivity that may inherent to management accounting. The role of the management accountant in traditional management accounting use for operational work is also nuanced. Hands-on instructions provided by management accountants do little to help operations managers navigate through operational settings, instead causing annoyance. Such annoyance is personified by the management accountant. To embrace a business-oriented role, operations managers want management accountants to interact with their production teams. To conclude, operations managers collectively use traditional management accounting to make sense of its impact on their operational work, and to guide them in determining what action they need to take. ‘Business-oriented’ accountants who embrace a proactive role and partake in operations could help operations managers interpret management accounting to make better sense in local settings.

Third, collaborative research that involves conducting workshops with practitioners such as operations managers are insightful for management accounting research and helpful for gaining practical relevance. Survey results can be better understood through the nuances found in discussions with practitioners during a workshop. The mixed-methods approach adopted here highlights differences in the practical and theoretical conceptual constructs. Taken together, the two sub-studies reveal that there is a rational rhetoric among operations managers when it comes...
to management accounting. At the same time, the mixed-methods approach allowed the researchers to see past the rationality that may often be associated with management accounting (Malmi et al., 2004; van der Meer-Kooistra & Vosselman, 2012). To conclude, mixed-methods research is useful for investigating the unarticulated use and relevance of management accounting for operational work.

This study contributes to the accounting literature by examining a collective use of traditional management accounting for operational work that stretches beyond decision-making to incorporate learning and action. Operations managers trust management accounting as an objective tool for their operations as they are comfortable with traditional management accounting. Operations managers nevertheless seem to want ‘business-oriented’ accountants to apply management accounting in operational work situations in local settings.

Methodologically, the workshop conducted for this study revealed other aspects than could not be captured solely by a survey-based study, including a rational rhetoric of use as equivalent to decision-making, and nuances in the role of management accountants for operational work. Simultaneously, the survey provided the researchers and practitioners with a common dataset which was practically anchored in the case company and based on the practitioners’ collective perceptions. Although the survey results were open to multiple interpretations, the diverse opinions expressed by participants could be highlighted, elaborated upon and discussed.

From a practical point of view, this study dovetails with previous research that adopts a mixed-methods methodology to encourage reflection and debates between researchers and practitioners as well as among practitioners. This may challenge narrow definitions of management accounting use in and relevance to operational work in practice. This study does not intend to claim that the relevance of traditional management accounting to operational work has been restored, but that there are nuances in need of further investigation. For management accounting research, conceptualizing decision-making seems to pose a challenge. If researchers are to be invited to participate in operations managers’ negotiations, more could be learned about the unarticulated use and thoughts of operations managers that extend beyond decision-making.
References


Jönsson, S. (2010). Interventionism–an approach for the future? *Qualitative Research in Account-


Appendix 1

### Management accounting information and operational work

Mark as shown: Please use a ball-point pen or a thin felt tip. This form will be processed automatically.
Correction: Please follow the examples shown on the left hand side to help optimize the reading results.

<table>
<thead>
<tr>
<th>1. Background information</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1 Age</td>
</tr>
<tr>
<td>□ 25 years or younger</td>
</tr>
<tr>
<td>□ 26-35 years</td>
</tr>
<tr>
<td>□ 36-45 years</td>
</tr>
<tr>
<td>□ 46-55 years</td>
</tr>
<tr>
<td>□ 56 years or older</td>
</tr>
<tr>
<td>1.2 Sex</td>
</tr>
<tr>
<td>□ Female</td>
</tr>
<tr>
<td>□ Male</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>1.3 How many years have you worked at the company?</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ 2 years or less</td>
</tr>
<tr>
<td>□ 11-15 years</td>
</tr>
<tr>
<td>□ 16-20 years</td>
</tr>
<tr>
<td>□ 21-25 years</td>
</tr>
<tr>
<td>□ 25 years or more</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>1.4 What is your work position in the company?</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Management accountant</td>
</tr>
<tr>
<td>□ Expert within production</td>
</tr>
<tr>
<td>□ Expert within maintenance</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>1.5 How many years have you worked in your current position?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>1.6 How many years have you worked in your current occupation?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>1.7 Choose your highest completed educational level:</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Middle school</td>
</tr>
<tr>
<td>□ Vocational college</td>
</tr>
<tr>
<td>□ High school</td>
</tr>
<tr>
<td>□ Non-formal adult education (Folk high school)</td>
</tr>
<tr>
<td>□ University</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>1.8 What was the area of education?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

### 2. Use of management accounting information

<table>
<thead>
<tr>
<th>2.1 Which source(s) of management accounting information is useful in your daily work? Mark the options suitable</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Balance sheets</td>
</tr>
<tr>
<td>□ Budget</td>
</tr>
<tr>
<td>□ Common spreadsheets</td>
</tr>
<tr>
<td>□ Databases</td>
</tr>
<tr>
<td>□ Income statements</td>
</tr>
<tr>
<td>□ Performance measures</td>
</tr>
<tr>
<td>□ Financial indicators/ratios</td>
</tr>
<tr>
<td>□ Encounters in hallway or during coffee breaks</td>
</tr>
<tr>
<td>□ Personal spreadsheets</td>
</tr>
<tr>
<td>□ Log books</td>
</tr>
<tr>
<td>□ Non-financial indicators</td>
</tr>
<tr>
<td>□ No management accounting information is useful</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2.2 If other, what source is useful in your daily work?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>2.3 How important are experience assessments to boost improved profitability?</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Not important</td>
</tr>
<tr>
<td>□ Highly important</td>
</tr>
<tr>
<td>□ Important</td>
</tr>
<tr>
<td>□ Very important</td>
</tr>
</tbody>
</table>
2. Use of management accounting information

2.4 Motivate your answer in question 2.3

2.5 How important are experienced assessments to address production technology improvement?  Not important [ ] [ ] [ ] [ ] [ ] Highly important

2.6 Motivate your answer in question 2.5

2.7 How important are experienced assessments to make cost savings possible?  Not important [ ] [ ] [ ] [ ] [ ] Highly important

2.8 Motivate your answer in question 2.7

2.9 Do you use budget for decision making and action in your work?  Yes [ ] No [ ]

2.10 If yes, how often do you use budget in your work?  Daily [ ] Once every six months [ ] Once a week [ ] Once a month [ ] Never use budget [ ]

2.11 Do you use balance sheets for decision making and action in your work?  Yes [ ] No [ ]

2.12 If yes, how often do you use balance sheets in your work?  Daily [ ] Once every six months [ ] Once a week [ ] Once a month [ ] Never use balance sheets [ ]

2.13 Do you use income statements for decision making and action in your work?  Yes [ ] No [ ]

2.14 If yes, how often do you use income statements in your work?  Daily [ ] Once every six months [ ] Once a week [ ] Once a month [ ] Never use income statements [ ]

2.15 Do you use balance sheets, income statements or budget for any other purpose than decision making and action?  Yes [ ] No [ ]

2.16 If yes, which ones and in what ways?

2.17 Do you use Insikt in your work?  Yes [ ] No [ ]

2.18 If yes, how often do you use Insikt in your work?  Daily [ ] Once every six months [ ] Once a week [ ] Once a month [ ] Never use Insikt [ ]

2.19 Do you use Quickview in your work?  Yes [ ] No [ ]
2. Use of management accounting information

<table>
<thead>
<tr>
<th>2.20</th>
<th>If yes, how often do you use Quickview in your work?</th>
</tr>
</thead>
<tbody>
<tr>
<td>daily</td>
<td>Once a week</td>
</tr>
<tr>
<td>once a month</td>
<td>once per week</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2.21</th>
<th>Do you use Movex in your work?</th>
</tr>
</thead>
<tbody>
<tr>
<td>yes</td>
<td>no</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2.22</th>
<th>If yes, how often do you use Movex in your work?</th>
</tr>
</thead>
<tbody>
<tr>
<td>daily</td>
<td>once a week</td>
</tr>
<tr>
<td>once a month</td>
<td>once per month</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2.23</th>
<th>Do you use Excel in your work?</th>
</tr>
</thead>
<tbody>
<tr>
<td>yes</td>
<td>no</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2.24</th>
<th>If yes, how often do you use Excel in your work?</th>
</tr>
</thead>
<tbody>
<tr>
<td>daily</td>
<td>once a week</td>
</tr>
<tr>
<td>once a month</td>
<td>once per month</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2.25</th>
<th>Do you use Ocra in your work?</th>
</tr>
</thead>
<tbody>
<tr>
<td>yes</td>
<td>no</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2.26</th>
<th>If yes, how often do you use Ocra in your work?</th>
</tr>
</thead>
<tbody>
<tr>
<td>daily</td>
<td>once a week</td>
</tr>
<tr>
<td>once a month</td>
<td>once per month</td>
</tr>
</tbody>
</table>

2.27 In which situation(s) do you use management accounting information? Mark the options suitable

- In daily activities
- In follow-up work
- In decision making
- Never
- In planning
- In quality control
- At shutdowns
- Another situation(s)
- In budgeting
- In process development
- In case of unforeseen events

2.28 If another situation, give an example

---

3. Cooperation with management accounting information

3.1 Who do you contact concerning management accounting related issues?

3.2 Who contacts you concerning management accounting related issues?

3.3 Who do you communicate with concerning management accounting related issues?

3.4 How important are those communications for your daily work?

- Not important
- Important
- Highly important
- I do not communicate with anyone

3.5 How often do you communicate with the management accountant for your department concerning management accounting information?

- Daily
- Once a week
- Once a month
- Never
### 3. Cooperation with management accounting information

<table>
<thead>
<tr>
<th>3.6 How important are those communications for your daily work?</th>
<th>Not important</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>Highly important</th>
<th>We do not communicate</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.7 Which communication channel(s) are used in your contact with the management accountant for your department?</td>
<td>Face-to-face</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Telephone communication</td>
<td></td>
</tr>
<tr>
<td></td>
<td>E-mail</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Video conference</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Intranet</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Group meetings</td>
<td></td>
</tr>
<tr>
<td>3.8 What is the physical distance between you and the management accountant of your department?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Same site</td>
<td></td>
</tr>
<tr>
<td>3.9 How often do you communicate with your team concerning management accounting related issues?</td>
<td>Daily</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Once a week</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Once every six months</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Once per year</td>
<td></td>
</tr>
<tr>
<td>3.10 How important are those communications for your daily work?</td>
<td>Not important</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Highly important</td>
<td></td>
</tr>
<tr>
<td>3.11 How often do you communicate with your closest manager concerning management accounting related issues?</td>
<td>Daily</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Once a week</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Once every six months</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Once per year</td>
<td></td>
</tr>
<tr>
<td>3.12 How important are those communications for your daily work?</td>
<td>Not important</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Highly important</td>
<td></td>
</tr>
</tbody>
</table>

### 4. Management accounting information and its usefulness

| 4.1 How useful is the accounting information (that you use) for you daily work? | Not useful | | | | | Highly useful | | | | Never use accounting information |
| 4.2 How useful is Insitek for your daily work? | Not useful | | | | | Highly useful |
| 4.3 How useful is Clockview for your daily work? | Not useful | | | | | Highly useful |
| 4.4 How useful is MoveX for your daily work? | Not useful | | | | | Highly useful |
| 4.5 How useful is Excel for your daily work? | Not useful | | | | | Highly useful |
| 4.6 How useful is Ocrn for your daily work? | Not useful | | | | | Highly useful |
| 4.7 How satisfied are you with the management accounting system in general? Not satisfied | | | | | | Highly satisfied | | | | Never use the management accounting system |

4.8 Motivate your answer in question 4.7.
Paper III

When Spaces Collide: Exploring the Dual Responsibilities of Operations Managers


Submitted for Publication
When spaces collide
Exploring the dual responsibilities of operations managers

Amanda Curry and Anders Hersinger
Accounting and Control
Luleå University of Technology

Structured abstract

Purpose: The purpose of this paper is to explore the ways in which notions of space, constituted by management accounting and operations, interact, conflict and are managed by operations managers in a variety of situations within the context of iron ore mining. We address a dual question: 1) How do accounting space and lateral flow relate to each other? and 2) What does it mean for operations managers to reside in both those spaces at once?

Design: The paper is based on field studies at a mining company involving operations managers with accounting and production responsibilities who experience tensions between two contrasting notions of space and must prioritize courses of action to create value.

Findings: In contrast to the view that management accounting poses a problem for operations managers residing in two spaces in production environments, we show how tensions foster reflection upon and choices between these spaces. The paper shows how operations managers prioritize their actions in accordance with accounting space and lateral flow based on how they experience and reflect upon tensions they encounter, dominating artefacts, and their relationships with space. Operations managers are not tied to specific spaces but prioritize their actions in any given situation to accommodate management accounting or operations depending on the space to which they feel a sense of belongingness.

Originality/value: Drawing upon a conceptualization of tensions between management accounting and operations as conditions of a spatial phenomenon, it is possible to understand the dilemmas experienced by operations managers in a dynamic and relational way. We propose that it may be less a matter of minimizing these tensions than of understanding how such tensions can be managed to create reflexivity with operations managers.

Keywords: management accounting; space; tension; everyday work; operations manager
When spaces collide
Exploring the dual responsibilities of operations managers

1 Introduction

The research problem addressed in this study concerns the nexus between management accounting and operations management. Because of their diverging orientations and focal points, previous research highlights this intersection as an important management concern in many organizations (Hansen & Mouritsen, 2007).

More specifically, previous empirical work provides evidence of tensions between management accounting and operations but also several views of those tensions. Key issues seem to involve the contrasting logics of vertical and lateral management control systems as well as the associated work of managers and management accountants (Mouritsen, 1999; Abrahamsson, Englund & Gerdin, 2016; Mack & Goretzki, 2017; Nyland, Morland & Burns, 2017; Byrne & Pierce, 2018).

From one perspective, management accounting should add a vertical point of view to operational decision-making, typically characterized by a lateral orientation of operations managers (see Hansen & Mouritsen, 2007). From another perspective, a vertical orientation of management accounting disrupts the important lateral orientation and causes dysfunctional action in operational settings (Philipoom & Fry, 1999; Chen, 2008). Some researchers suggest that there is a need to address such tensions by balancing or aligning their respective requirements to accommodate management accounting and operational work (Kaplan & Norton, 1996; Chenhall & Langfield-Smith, 1998). At the very least, scholars representing this train of thought suggest that the tensions need to be contained in various ways (Tillema and van der Steen, 2015).

This paper is based on the observation that there is a scarcity of research at the nexus between management accounting and operations, particularly studies that address the tensions that operations managers experience in their everyday work. Operations managers are deeply involved in activities that reflect their responsibility for maintaining the continuous flow of production. Simultaneously, they need to understand and adhere to management accounting to meet their responsibility for fulfilling a company’s financial goals (Styhre, 2012). As indicated by the very
concept of the ‘operations manager’, these actors transcend two territories and must be able to navigate across both domains to accommodate their responsibilities.

This paper also responds to the suggestion in previous accounting research that the theoretical concept of space represents a promising yet under-utilized approach to the study of groups, their differentiation, and responsibilities (Carmona & Ezzamel, 2009). Within the organization literature there is a growing interest in theorizing space (e.g. Jones, McLean & Quattrone, 2004; Kornberger & Clegg, 2004) and in acknowledging the spatial implications of organizational work (Delbridge & Sallaz, 2015). Yet Carmona and Ezzamel (2009, p. 138) refer to the modest interest in theorizing space in accounting research as a ‘significant omission’.

In this paper we explore what it means for operations managers to be required to deal with operational and management-accounting concerns simultaneously. Specifically, we explore the ways in which notions of space, as constituted distinctly by management accounting and operations, interact, conflict, and are managed by operations managers in a variety of situations within the context of iron ore mining. In so doing, we draw on Carmona, Ezzamel and Gutiérrez’s (1997; 2002) conceptualization of accounting space as an analytical and calculable space and contrast this conceptualization with the concept of ‘lateral flow’ as a generic term for space constituted by the flow of production. Hence, we view space as constructed through experience and perceptions (Zhang, Spicer & Hancock, 2008) and related to belongingness (Bauman, 1993, p. 184). We use ‘space’ as a broad term denoting organizational measures and procedures that underlie the differentiation and responsibilities of groups (Carmona & Ezzamel, 2009), allowing us to study how operations managers face tensions between their responsibilities.

In particular, accounting space is analytical space that is ‘articulated upon physical factory space that makes possible the assessment, comparison, ranking and differentiation of operators and activities’ (Carmona et al., 2002, p. 244). In contrast, lateral flow concerns the activities (Wheelwright, 1981; Johnston Brignall & Fitzgerald, 2002) and horizontal information-sharing (Chenhall, 2008) that enable the continuous production of output. From this point of view, we address a dual question: 1) How do accounting space and lateral flow relate to each other? and 2) What does it mean for operations managers to reside in both those spaces at once?
This paper contributes to the literature by showing how our conceptualization of tensions between management accounting and operations, conceived as conditions of a spatial phenomenon, makes it possible to understand the dilemmas experienced by operations managers in a dynamic and relational way. We propose that it may be less a matter of minimizing these tensions than of understanding how such tensions can be managed to create reflexivity with operations managers.

2  Space, accounting and everyday work in the literature

This study is theoretically informed by space and draws upon the concepts of accounting space and lateral flow in particular to contribute to the debate regarding tensions between management accounting and operations. First, we discuss previous research on the nexus between management accounting and operations. Thereafter, we address the theoretical concept of space that we use to explore tensions between management accounting and operations experienced by operations managers.

2.1  The nexus between management accounting and operations

Thompson (1967) emphasized decades ago that organizations should expect uncertainty when carrying out core production processes, leaving less space for standardization. Other early management theorists show how managers rely on tacit knowledge (Dalton, 1959) and experience to cope with the fragmentation of everyday work (Mintzberg, 1980). In this environment, lateral information-sharing across entities is said to increase employee engagement and local knowledge (Denton, 1991, p. 42; Johnston, et al., 2002) and improve operational performance (De Leeuw & Van Den Berg, 2011). To minimize disruptions in the production process requires coordination between various production sequences. In addition, focusing on operational performance puts great emphasis on reducing costs (Hansen & Mouritsen, 2006). This leaves operations managers who are responsible for the production process to handle the requirements of operational performance and cost reduction simultaneously.

Although management accounting and operations share a common agenda that focuses primarily on increasing firm value, the former has received criticism for not supporting the lateral flows that characterize successful production (Hansen & Mouritsen, 2007). Theory suggests that managing standardized production processes often relies on computational strategies (Thompson, 1967; Burchell, Clubb, Hopwood, Hughes, & Nahapiet, 1980; Earl & Hopwood, 1980). Management
accounting could be considered foundational to the computational strategies that characterize standardized production processes. In this case, concrete outputs are in focus (Lowe & De Loo, 2014), while tacit local knowledge that has been shown to be essential to production processes (see Jönsson & Grönlund, 1988) may be neglected.

On the other hand, operational work decisions typically include approximations and the exercise of judgment (Shekhar, Gustafson, Hersinger, Jonsson & Schunnesson, 2019). From a management-accounting perspective, it may be problematic not to acknowledge heuristics as a component of an operational frame of reference. Tensions may arise if management accounting intrudes on the lateral production orientation by imposing orders that are not seemingly in line with operational frames of reference. For instance, operations managers may find themselves in situations where they have to balance the need to reduce costs with the need to maintain consistent availability of production time on shop-floor machines.

From a management accounting perspective, order must be imposed on chaotic production processes. The idea that management accounting should add perspective to production-oriented processes may not be unproblematic. For instance, some studies have found that management accounting and the lateral flow of production may not always operate in harmony. The mobilization of new technologies has rendered shortcomings in an existing system visible and therefore questioned (Mouritsen, 1999). Mouritsen thereby highlights how knowledge can be mobilized to question management technologies that have been taken for granted. Management accounting and operations may also produce conflicting representations of their respective realities (Lowe & Koh, 2007).

In a production environment lateral structures shape daily activities while vertical structures provide context, forming organizational boundaries (van der Meer-Kooistra & Scapens, 2008; 2015). The combination of pressure from vertical structures and emphasis on lateral relationships has been found in previous research to be important for productive interrelationships (Varoutsa & Scapens, 2015). These studies emphasize the importance of acknowledging both vertical and lateral structures as mutually constitutive of their respective contexts. Nonetheless, the tensions that arise from the intersection between management accounting and operations are encountered by actors who work close to the production process and with one foot in each sphere, such as operations managers.
As mentioned previously, operations managers need to mobilize team members and resources to realize organizational aims. In view of their pursuit of organizational goals, operations managers may also be required to pay attention to management accounting. Irrespective of management accounting, operations managers might have a natural orientation towards focusing their attention on lateral flows. They are therefore simultaneously responsible for operations and for keeping that operational work in line with the order imposed by management accounting. In such situations marked by conflicting responsibilities, operations managers need to prioritize their actions.

Huxham and Beech (2003) suggest that tensions involve prioritizing one’s actions. Earlier research exploring a similar environment suggests that operations managers are exposed to tensions that require them to prioritize processes to balance their accounting responsibilities with their involvement in everyday work (Styhre, 2012). Actions carried out in correspondence to organizational aims are therefore often decentralized to operational levels (Miller, 1992), where operations managers interpret situations and act in response (see for example Jönsson & Grönlund, 1988).

2.2 Accounting space and lateral flow

Conceptualizing space

Previous research points to three streams of research that address space (Zhang et al., 2008). First, studies have focused on the physical aspect of space and its implications for everyday organizing. Second, studies have examined the social construction of space via actors’ experiences and perceptions, indicating that space ‘comes to life through symbols scattered’ within it (Zhang et al., 2008, p. 893). The third stream of research addresses space that is constructed to establish and maintain patterns of domination. In this paper, we follow the second stream of research by addressing the ways in which management accounting and operations can provide actors with spatial belongingness via terminology, artefacts, and actors’ perceptions.

Space is generally accepted as a complex social construction based on values and meanings, which constitutes sets of relations between artefacts and actors (Carmona & Ezzamel, 2009). The social construction of space reinforces values and preferences shared by actors within a specific space. Such a complex social construction does not imply that space is static over time. That is, new relationships may require new spaces, and spaces can be disrupted. This implies that accounting
space is constructed by actors, yet actors can be assigned to respond to this space via well-defined responsibilities. Lefebvre (1991) suggests that spaces that are assigned to actors are not necessarily equal to (other) socially constructed spaces. Actors can construct several spaces and operate in them simultaneously. In our case, this reflects the assignment of specific account-related responsibilities to operations managers while being oriented towards maintaining lateral flow.

It has been argued that space is constructed via notions of belongingness. Bauman (1993, p. 181) writes that space is constructed by intellectual, moral, and emotional processes. Space can thus be constructed via actors’ acquisition and distribution of knowledge, via moral obligations and actors’ curiosity. If knowledge is acquired and distributed in space (Bauman, 1993, p. 182), then such knowledge could establish space belongingness as a result of actors’ experience and perceptions. In other words, operations managers with an operational orientation may have greater knowledge of operations and therefore feel a sense of belongingness to the space that characterizes that operational frame of reference. Therefore, space could be conceptualized as psychological: that is, manifesting itself in individual and collective patterns of perceptions (Zhang et al., 2008, p. 892). In this way, actors such as operations managers can be assigned to respond to responsibilities associate with space, but space can also be constructed by the actors involved and their collective actions and frames of reference.

The relevance of space to the nexus between management accounting and operations

The relevance of the concept of space to accounting research concerns the ways in which space organizes everyday work by visualizing and making activities calculable. Via this process, actors and their activities can be managed from a distance (Robson, 1992). Carmona et al. (1997) show that the organization of production practices and accounting practices together improved performance in an eighteenth-century tobacco factory. Drawing on factory spaces, accounting was used to differentiate, compare, hierarchize and homogenize between groups. The precautions taken, including structural arrangements and accounting calculations, at the tobacco factory improved the flow of the production process. In a subsequent paper, Carmona et al. (2002) build on the tobacco factory study to examine the relationship between accounting practices and space, arguing that accounting practices can function as a time–space ordering mechanism as it visualizes calculable accounting spaces.
Empirical studies have explored accounting practices that call for organizing production processes into shop-floor groups in which actors can be held accountable for their performance (Miller & O’Leary, 1994). Management accounting can thus divide groups into vertical spaces. Such spaces can constitute accounting entities. Kurunmäki (1999) defines an accounting entity as a representational area of interest constructed to define activities, people and artefacts. In other words, space is defined by actors and may vary depending on the actors who operate within a space (Kurunmäki & Miller, 2008). Accounting entities were given boundaries to provide clarity regarding organizational responsibilities (Kurunmäki, 1999; Carmona et al., 2002; Carmona & Ezzamel, 2009). In this way, management seeks to manage everyday work within defined spaces (Hayes, 1983) with the aid of management accounting (Carmona & Ezzamel, 2009). An accounting entity thus differs from a purely physical space. Just as accounting space can be disrupted insofar as ‘[s]pace gains its form, function, and meaning in practice’ (Dodge & Kitchin, 2005, p. 172), so accounting space can disrupt or reorganize physical and social space.

**Artefacts in relational and constructed space**

Accounting artefacts can create calculable spaces and shape what counts as knowledge. Scott (2014, p. 104) argues that artefacts can embody certain ideas that can cross spaces. In other words, artefacts are carriers of ideas that are likely to affect operations managers, just as any other actor would. Orlikowski (1992;2007) shows how actors interact and interpret artefacts. She argues that artefacts become an integral part of everyday work. Styhre (2013) further shows how space is shaped by the relationship between actors and technological systems (i.e. artefacts). This implies that artefacts such as production-process charts, computer systems, automation systems, and management accounting shape how operations managers construct space. Czarniawska and Joerges (1996) argue that materialization of a combination of ideas are like ‘avalanches’ and that, at a given time, in a given space, one artefact can be dominating. Artefacts embodying either management accounting or operations could thus play a part in enabling operations managers to experience accounting-space or lateral-flow belongingness related to the attributes and meanings associated with a specific space. This means that space is constructed by actors and their relations with practices, people and artefacts.

Space plays a significant role in everyday work as it keeps the focus of operations managers within defined boundaries, enabling them to recognize the attributes and artefacts to be accounted for,
such as budget or production targets. What is to be understood as knowledge and how knowledge is organized is therefore highly related to space (Miller & Rose, 1990; Miller & O’Leary, 1994). This could be related to Bauman’s (1993, p. 186) distribution and acquiring of knowledge as operations managers could feel detached from accounting space because their accounting knowledge is inferior to the knowledge that they have of the production process.

**Tensions and the questioning of space**

Kurunmäki (1999) suggests that the actors who construct organizational entities do so for a variety of reasons. Constructing accounting space may therefore be problematic as the meanings of the definitions might differ to those who would be subject to accounting space. Accounting space may therefore be subject to questioning by operations managers who reside in accounting space and lateral flow. Tensions may arise because management accounting differentiates operational teams into separate entities (Carmona et al., 2002), whereas the everyday work of operations managers relies on cross-functional lateral flows of production and information (Hansen & Mouritsen, 2006). In some cases, accounting space interferes with how operations managers construct everyday work that is characterized by lateral flow. In this way, spaces might become blurred (Bauman, 1993, p. 187) and actors may experience multiple instances of space belongingness.

Bauman (1992, p. 183) argues that the higher the quality of the knowledge an actor has about something, the closer they perceive themselves as belonging to that space. This might be referred to as a ‘with-relation’ (Bauman, 1993, p. 182; Carmona & Ezzamel, 2009). The knowledge of operations managers might be so ordinary that they no longer reflect on it. A stronger perception of belonging to one space (Ahrens & Mollona, 2007) might affect how operations managers are constrained by their responsibilities. For instance, operations managers are likely to have much high-quality knowledge about the production process, and therefore they might feel that they ‘belong’ to lateral flow rather than to accounting space and thus respond to that space. This also implies that if knowledge of the attributes associated with a specific space is low or of poor quality, it might be harder to relate to that space (Bauman, 1993, p. 184). Operations managers might not feel that they belong to accounting space to the same extent as they do to lateral flow because of their operational orientation.
At times, management accounting can constrain managers (Hopwood, 1972). These constraints make it difficult to question management accounting without accounting knowledge (Knights & Collinson, 1987; Ezzamel, 1994). Questioning therefore diminishes perceived authority (Quattrone & Hopper, 2005). Bauman (1993, p. 184) argues that actors can see things more clearly if they have high-quality knowledge of the attributes within a space. He further suggests that misunderstandings can awaken actors and cause them to see the world as it is. That is, ambiguities can cause actors to experience tensions and therefore enable them to question something they previously took for granted. Yet, knowledge can become a moral responsibility in virtue of which operations managers need to respond to accounting space. This might be referred to as a ‘for-relation’ (Bauman, 1993, p. 205; Carmona & Ezzamel, 2009). Moral responsibility might cause operations managers to become ‘deaf and blind’ to what was taken for granted. Such situations where operations managers come to know management accounting might undermine lateral flow. In this way, operations managers are subject to tensions that arise between their responsibility for accounting space and their responsibility for lateral flow. See figure 1.

![Figure 1 Tensions between accounting space and lateral flow](image)

Figure 1 shows how we conceptualize an overlap between accounting space and lateral flow as experienced by operations managers. While accounting space is concerned with making abstract space analytical by quantifying actors and their practices, lateral flow is concerned with activities that are central to running smooth and continuous operations to maintain steady production output. The concern for both spaces, though, is to protect core operations, albeit with varying means. Space is in this way dynamic and constructed by relations between people, artefacts and practices and constitutes a theoretical lens through which to study tensions that arise in the nexus between management accounting and operations. Operations managers simultaneously shoulder responsibilities for accounting space and the space of lateral flow. Nonetheless, either space can
become questioned by operations managers via tensions that may cause them to deliberate and see alternative courses of action.

3 Ethnographic method

3.1 Research design

The ethnographic method of researching the micro-dynamics of everyday work at operational levels is not designed primarily to produce understanding that is ‘better’ than that of organizational members; rather, it suggests that the researcher and organizational members understand things differently (Czarniawska, 2007, p. 21). In that sense, there is a relationship between practice and research, with a shared learning opportunity for both parties (Baxter & Chua, 2009). To capture micro-dynamics of practice, researchers need to be present continuously where action takes place to render the research interpretative and authentic regarding what happens (Jönsson & Macintosh, 1997). The actions of individuals can be understood by identifying situational conditions and their interpretations of those conditions (Scott, 2014, p. 67). In other words, by observing situations in which accounting takes place in the conduct of everyday work, it is possible to understand the micro-dynamics through which actions are embedded in norms, values, shared meanings, habits and scripts for action (Abelson, 1981; Arnold, 2009).

3.2 Research setting

A mining company was chosen as the research setting, for three main reasons. First, the mining setting utilizes a process that is close to standardized and technically rational production (Hayes & Wheelwright, 1979), where all iron ore that is produced is sold, making it possible to think in terms of measuring concrete inputs and outputs. Second, in mining settings tensions have the potential to be clearly visualized, making them especially illustrative for the purpose of discussion. Mining production environments are typically characterized by capital-intensive structures, complex technology, process orientation, and safety regulations. This includes focus on production surveillance, reduced setup and lead times, internal and external networking, employee engagement, preventive maintenance, and self-inspection. Apart from standardized production processes, the everyday work undertaken to secure production is characterized by many interrelated processes. One main concern for operations managers is thus their responsibility for running the production process without disruptions. At the same time, operations managers have a financial
responsibility. Third, processes that depend largely on human judgment and therefore cannot be automated are important in mining.

**The MinCo mining company at two operational levels**

MinCo is a high-tech multinational mining group that operates in the northern part of Sweden. The mining group operates divisions for marketing, mining, and minerals and has several subsidiaries. Mining settings are capital-intensive with high yearly depreciation costs, capital-intensive investments, and simultaneously a high threshold of minimum safety requirements. In recent years, MinCo has experienced a significant decline in its operating margin (from 34.6% in 2013 to 5.3% in 2014). The company has also suffered from severe declines in iron ore prices, to which the company is highly sensitive. MinCo depends on mountains for extraction and production of iron ore. Seismic events that are a consequence of large-scale underground mining lead to tremors in the bedrock. Such seismic activity is under continuous supervision as the organization strives to reduce its impact on operations.

While this study was conducted, a new CEO was assigned to MinCo, and most of the group management team was replaced. The new focus of group management was to be on cost reduction, resulting in the re-arrangement of shift structures and several employee terminations.

The process of extracting ore from underground mines differs from that of extracting ore from open pits. In underground mines, ore is extracted using sub-level caving, wherein gravity is used to let the ore fall into development drifts (i.e. horizontal tunnels following the ore). In open pits, the ore is extracted using bench-mining methods. The mines are exploited over the course of several years, during which time a mine expands, resulting in a network of underground roads and various levels with offices and workshops. The road into the mines takes the shape of an unstructured spiral with the intention of reaching the iron ore at the same time as the road is constructed. For operators (and foremen), however, the workplace is often at the drift, in the machines, where the gathering spot is the coffee room. There are two separate operational venues in mines, development drift south and development drift north, with their own machines and equipment because of the long distances and high costs of transporting heavy machinery. This study was carried out in development drift north and in MinCo’s production plants.
Ore refining uses three types of plants: a dressing plant, where waste rock is separated from ore; a concentration plant, where the ore is processed; and a pelletizing plant, where the processed ore is converted into pellets. The concentration plant thus acts as a mediating plant between the dressing plant and the pelletizing plant. As such, the dressing plant is considered a customer of the concentration plant, which in turn is a supplier of the pelletizing plant. Teams operating within the plants have their own budgets, areas of expertise (maintenance or operations) and responsibilities, and the operations managers strive to incorporate this thinking into the teams. Thus, a mine and the associated plants depend on each other in a value chain (see Figure 2).

![Figure 2 The production chain at the MinCo mining organization](image)

Each plant operates three shifts: a morning shift, an evening shift, and a night shift (excluding off-weeks). During the night shift, no one is allowed in the mines during blasting. A typical day in the mines involves preparation for the blasting that occurs at night, whereas a production process operates continuously in the plants. Note that production that is lost for one day cannot be recouped another day, because the bedrock can withstand only a certain quota of blasting each night.

The researchers conducted this study mainly in one mine and at the concentration plant. This plant (comprising two parallel concentration facilities) is among the older plants in the set. One of the facilities operates two processing sections (the ‘twins’), and the other operates three processing sections (the ‘triplets’). Operating two sections means that a stoppage reduces production by 50 percent while the section is out of order. For this reason, there is a strong focus on preventing unplanned stoppages. Operations managers are responsible for the availability of the processing sections. This leaves a strong focus on limiting internal disturbances.
3.3 Data collection

Shadowing can help researchers avoid the taken-for-grantedness that leads one to expect others to see the world as oneself does (Czarniawska, 2007, p. 11). In the present study, shadowing entailed following operations managers in their everyday work while taking field notes. Simultaneously we exploited opportunities to ask questions and discuss actions that were observed while they were taking place. In this way, unexpected events could be captured. In addition, the operations managers involved in the study provided commentary on their everyday work. Shadowing also included formal meeting observations on the shop floor and in the mines (i.e. at operational levels) as well as interviews with operations managers and engineers to follow up on the observations. Operations managers assume responsibility for production, maintenance and engineering. Formal production meetings (such as shift hand-offs, internal manager meetings, goal follow-up meetings involving operations managers and engineers, and Monday morning staff meetings) were observed. Also, informal encounters and troubleshooting efforts were observed. In addition, the researchers accessed internal data, such as process maps, logbooks, whiteboard information, spreadsheets, meeting protocols and production data. The internal data should not be seen as a way of increasing our credibility but rather as a means of improving our understanding of the actions we observed by showing us how they played out in practice (Ahrens & Mollona, 2007).

During interviews and discussions, the operations managers were asked to account for concrete situations and explain how they had managed dilemmas in those situations. In addition, they were asked to reflect on situations in which they acted based on accounting information. They were asked to describe means and routines for handling decisions in five concrete operations-management situations as well as in non-routine situations (i.e. unexpected situations). Operational situations that were potentially important to operations managers were derived from the operations management literature (Schroeder, 1981; Corbey, 1994; Gupta & Galloway, 2003), where managerial work activities can be divided along the two dimensions of tactical and strategic decisions and operationalized into five types of operations-management situations (process, capacity, inventory, workforce, and quality). The strategic-decision (focusing on fixed costs) and tactical-decision (focusing on variable costs) dimensions generated distinct operational activities. In addition, unexpected situations were sought in the interviews and during observations. In this way, operations managers were given opportunities to account for situations that were important
to them where tensions could arise. In addition, shadowing provided opportunities for identifying situations where operations managers did not explicitly address tensions.

The first author transcribed all of the materials (including field notes and internal company documents), because working with materials as much as possible was considered an important part of the iterative process of interpreting empirical material. Additionally, meetings might be difficult for a transcriber outside of a given project to understand, as many organizational members talked simultaneously and an outsider would be unfamiliar with the meeting context (e.g. gestures, people entering or leaving a room, the material shown and discussed in a meeting). The first author kept a research diary both during shadowing (in the form of field notes) and after the shifts ended to compile the texts.

3.4 Data analysis

To interpret and analyze the empirical material, situations revealing tensions between accounting space and lateral flow, where action was undertaken, were analyzed and resulted in four narratives. These four narratives were chosen to illustrate dilemmas wherein operations managers encountered tensions that caused them to mobilize action towards lateral flow or accounting space. First, these situations were interpreted in terms of what was said and done. Second, the situations were deconstructed (Czarniawska, 1999, p. 23–24), making it possible to further sort data into themes using spreadsheets (see Table 1). Empirical coding of what was noticed, said, and done enabled categories to emerge, resulting in theoretical patterns of *types of tensions* between management-accounting and operations responsibilities and *reflection undertaken* regarding whether the reflections are aligned with tensions between management accounting and operations. Operations managers’ interpretations of the dilemmas they encountered affected our interpretations regarding whether they responded to accounting space or lateral flow. In these narratives, both operations and accounting artefacts played a central part, enabling us to observe the pattern of a *dominating artefact* in each narrative. From these observations emerged the last theoretical pattern, *priority for mobilizing action*. As this last step emerged in narratives it was analyzed together with and against other steps, generating a results table that is discussed in section five of this paper. Additionally, mind-maps were used to obtain an overview of relations between organizational members and operational situations.
Table 1. Coding scheme

<table>
<thead>
<tr>
<th>First-order concepts</th>
<th>Second-order themes</th>
<th>Aggregate dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saving the customer and therefore the production process</td>
<td>The department versus the value chain</td>
<td>Type of tension</td>
</tr>
<tr>
<td>Maintaining production, but also discussing sub-optimization</td>
<td>Sub-optimization versus production stoppages</td>
<td></td>
</tr>
<tr>
<td>Producing with a target, but also collecting evidence to reduce filling ratios</td>
<td>Maximum versus maintained capacity</td>
<td></td>
</tr>
<tr>
<td>Keeping low inventory and therefore keeping on budget</td>
<td>Tied-up capital versus flexibility</td>
<td></td>
</tr>
<tr>
<td>No concerns with budgetary results</td>
<td>Practical reflection</td>
<td>Reflection undertaken</td>
</tr>
<tr>
<td>Acceptance of low inventory costs, which did not clash with continuous production</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unexpected exchange of mill lining visualizes tensions</td>
<td>Discursive reflection</td>
<td></td>
</tr>
<tr>
<td>Concern shown for how budgets create distance between groups, creating tensions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Culturally supporting the lateral way things are done around here</td>
<td>Lateral flow priority</td>
<td></td>
</tr>
<tr>
<td>Constrained by the budget, but sees no choice but to maintain production</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extensive pressure from accounting to fulfill ratio of one's department</td>
<td>Accounting space priority</td>
<td></td>
</tr>
<tr>
<td>Strong belief in accounting rationale of differentiating between departments</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Red unfulfilled targets on whiteboard</td>
<td>Accounting artefact</td>
<td></td>
</tr>
<tr>
<td>Accounting report of tied-up capital</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Process map of integrated production process</td>
<td>Operations artefact</td>
<td></td>
</tr>
<tr>
<td>Calculated memo on broken bolts</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The results reported in Table 1 show how first-order concepts were derived from what was noticed, said, and done, generating second-order themes based on our theoretical interpretations, which resulted in the identification of four dimensions: type of tension, reflection undertaken, dominating artefact, and priority for mobilizing actions. The type-of-tension dimension indicates how a dilemma played out between management accounting and operations. Reflection undertaken shows whether operations managers saw a dilemma as a source of tension between two contrasting spaces. We have chosen to label the distinction between a dilemma that was seen as a source of tension
that operations managers could ‘put in words’ and a dilemma that had to be addressed as ‘discursive’ and ‘practical’ tension, respectively (see Haugaard, 2003, p. 100, for the distinction between practical and discursive consciousness). Guiding us in drawing this distinction was also the physical manifestations of the operations managers in terms of their body language and their vocal tones. We interpreted these as signs of frustration. Bauman (1993, p. 183) suggests that tensions can lead to cognition. Thus, confusion in operations managers triggers deliberations where new insights can be gained. Frustration indicated whether space became questioned by the operations managers. Concerning artefacts, there were at times contrasting artefacts in the narratives where one was coded as dominating, based on which artefact constituted the basis of compliance. Priority for mobilizing action shows whether operations managers prioritized their actions towards accounting space or lateral flow. The definitions of accounting space and lateral flow constituted the coding key for determining a priority.

To present the empirical findings, four narratives were constructed to represent the managers’ perspective to reveal actors’ subjective interpretations that underlie the objective conditions. The intention in constructing the chosen narratives was to provide a ‘rich and thick portrayal of a way of life, a narrative that can be read and understood by people outside and inside the community’ (Jönsson & Macintosh, 1997, p. 370). Thus, illustrations of dilemmas that arose between management accounting and operational work contributed to our understanding of organizational members’ actions. In this way, narratives were essential to our understanding.

4 Accounting space, lateral flow, and the production of iron ore

The following sections present narratives illustrating four operations-management situations experienced by operations managers at the MinCo concentration plant and in the mines. All four narratives illuminate tensions concerning operations managers’ responsibility for management accounting and operations that they experience in their everyday work. The narratives reveal how the operations managers reflected on their reasons for mobilizing action and indicate how they prioritized actions in alignment with accounting space or lateral flow. First, a summary of each situation is provided along with one or several illustrative quotations. Thereafter, we provide an interpretation of the narrative that draws on the theoretical concept of space.
4.1 Running the grinding mill down

One operations manager at the concentration plant explained that the efficiency targets were not aligned with the practical capacity of the machines. The production process was compared to a boat’s engine, where drawing the last drops of gas from the tank costs more than can be gained from making progress over the water. In the same way, using the last allotment of resources during the production process costs more than the revenue that would be generated by producing more iron ore. The operations manager stressed the need to produce at the top of the curve without passing it, which is a daily topic of discussion. He shook his head in frustration:

> The company is expecting a certain level of production. The calculation of our capacity is theoretically based on our installed capacity and our potential production at the plant . . . and that is [sighs] . . . well, yeah . . .

The operations manager showed that he did not approve of the targets he had to meet to reach his budget, because of the associated risk of financial losses caused by increased maintenance costs. A similar issue was raised at a meeting between the production and maintenance departments, this time regarding the capacity of the machines to meet the efficiency targets set in the management accounting system. As one of the operations managers expressed it:

> We need to sit down and discuss where we can produce as efficiently as possible; right now, we are not producing on pace with our goals. [Maintenance] scream that we are running the mill down with too-high filling ratios [. . .] It is a problem.

In a discussion between a process engineer and an operations manager,\(^1\) however, the operations manager said that he had received a video from one maintenance engineer that shows a mill spitting out raw goods. The operations manager scratched his head as he explained that the raw goods came out at the back of the mill. He leaned back in his chair, waiting for an answer from the person with knowledge of the process and he assigned responsibility to the process engineer. The process engineer quietly responded, as he shook his head:

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\(^1\) The process engineer was responsible for the availability of the machines, including the mills,
We are way below [max capacity]. Temporarily there may be [a spillage effect], but not all the time. That, that’s not right. It can’t be.

The discussions were brief, and the operations manager defended the high capacity needed to fulfill the efficiency targets visualized on the whiteboard even though maintenance raised concerns about the filling ratios. The operations manager was torn between his responsibility for the availability of the mill and the responsibility to produce his quota of iron ore. Simultaneously, the operations manager meant that there is no point pushing the machinery to maximum capacity unless they could increase the output of iron ore. He said with annoyance:

I can keep up the discussion and defend the process if I can be sure that you are continuously checking the process.

The operations manager’s priority was based on the pressure he felt to hit the efficiency targets for his entity, which was deemed more important than the maintained machine capacity. Even though he was explicit and discursive regarding the tension between fulfilling targets for efficiently produced iron ore and machine maintenance, he showed that he did not want to defend reducing the filling ratios without conducting a thorough analysis of the process to back up his decision.

Differences between efficiency targets and maintenance work distanced the entities from each other and created tension between the operations manager, the process engineer, and the maintenance engineer in their teams. All three managers were concerned with keeping up and protecting the continuous production of iron ore. Even though the operations manager insisted that he recognized the importance of maintaining the machines, meeting the vertical production targets (assigned by the management accounting system) was more important than acting in accordance with the local knowledge and experiences of the maintenance engineers. The assessed efficiency was perceived as valued more highly than preventive maintenance. The maximum capacity was contrasted with subjective notions of how to produce iron ore output based on tacit knowledge, experience and gut feelings. Despite subjective notions about how to protect the iron ore production process, the operations manager complied with the efficiency target.

The above narrative suggests the presence of tension between the responsibility for producing iron ore to the maximum capacity and the responsibility for maintaining machine capacity. Producing to the maximum capacity was a specified target for the production department expressed via its
differentiation of operational work. The capacity of the mill needed to be considered, however, to maintain and secure production of iron ore. The state of confusion experienced by the operations manager triggered deliberations and reflection. Reflection was undertaken regarding the tension between accounting space and lateral flow that caused the operations manager to experience tension between the responsibilities he was assigned for two contrasting spaces. This tension and subsequent reflection made the tension discursive to the operations manager. Yet the differentiation between departments shaped by accounting space and their contrasting targets remained unquestioned by the operations manager in the sense that the production targets worked out on the whiteboard showing red numbers were deemed more important as an artefact than the video of the ‘spillage effect’. The operations manager’s relationship with the accounting artefact and the engineer who supported management accounting made management accounting the basis for order. The operations manager prioritized action in accordance with his experienced accounting-space belongingness.

4.2 Conforming to accounting talk

One operations manager at the concentration plant complained about a dilemma regarding their individual inventory responsibilities as they needed to balance their budgetary results with their availability requirements and organizational goals. The inventory was divided into two categories, raw goods inventory and central supply for spare parts. The costs of keeping inventory were assigned to central supply, and the engineers or operations managers were charged when signing out spare parts. As a result, operations managers must weigh each situation regarding when to prioritize their own teams’ responsibilities or goals to maintain a secure process of continuous production and when to refrain from self-prioritizing and, instead, respond to other departments’ requirements to minimize costs.

To prioritize which spare parts to keep in inventory, one operations manager described a process in which the timing with which the spare part was received was a major factor. The aspect of not tying up capital in inventory unnecessarily was argued to be important for the organization, a view that was shared by the operations manager. The central supplies requirement of keeping inventory costs low resulted in tradeoffs between minimizing inventory costs and running the plant as smoothly as possible. This choice was not always simple. One operations manager exclaimed:
The central supply work actively to keep inventory costs low, which is healthy; we shouldn’t tie up too much capital. At the same time, I am butting heads with my availability requirements and my engineers, who often want everything in inventory to keep the machines running!

The tension between keeping inventory levels low and keeping the machines running stemmed from cost targets assigned by management and visualized through management accounting. The focus on continuous production, however, nagged at the operations manager. He accepted the accounting talk regarding keeping inventory low, but at the same time he expressed anxiety because, based on his experience, focusing on lateral flow would help to maintain adequate production output of iron ore. Keeping inventory costs low influenced the operations manager to a large extent as he did not seem to question the soundness of tying up capital for the sake of a secured production process. The costs of tying up capital were apparent in accounting reports. The risk of stoppages and the gains obtained by a secure production process, however, were not.

The above narrative suggests the presence of tension between the responsibility for reducing capital that is tied up and the responsibility for running a flexible production process. Low inventory was encouraged via the accounting space as it differentiated entities in its assessment and rankings. Flexibility in securing the production process was then forsaken. The tension identified came from differentiation between functions and determinations of who was to bear the costs. The operations manager could recognize that there was a dilemma but did not articulate the dilemma as tension between accounting space and lateral flow. Interestingly, the costs of keeping spare parts were not assigned to the operations manager’s department until the spare part was collected. The operations manager perceived space to be the bottom line for the company as a whole, and not just for his department. In other words, the operations manager constructed accounting space that dynamically expanded to the firm level. The operations manager conformed to the accounting talk associated with avoiding tying up capital unnecessarily even though it might affect iron ore production. The accounting report constituted a calculable artefact in ‘black on white’. The accounting report visualizes the soundness of not tying up capital. The experience of the engineers, however, was incalculable. The risks they raised therefore do not carry equal weight. Thus, the prioritized action was in accordance with the operations manager’s experienced accounting-space belongingness.
4.3 Saving the customer

While we were walking through the corridors of the concentration plant with an operations manager, one of the operators stopped us to tell the operations manager that the percentage of additives in the concentration process was too low.\footnote{This operator was trained to supervise monitors in the control room and follow the production process on several charts and process maps.} The operations manager thought that this was an odd occurrence, as she had not been told of any deviations at the shift handoff.\footnote{This situation occurred one hour after the evening shift took over from the day shift.} The operator suggested shutting down one of the two processing sections to manage the unexpected problem, but the operations manager wanted to take a closer look. Consequently, she scrutinized the plant’s process map on her computer, where she could follow the production process in real time, and recognized a similar situation, revealing to her that the problem did not originate in their plant but was caused by cross-driving between the concentration plant and the pelletizing plant.\footnote{The pelletizing plant temporarily used capacity from the concentration plant.}

The operations manager called her peer colleague at the pelletizing plant and asked if they were cross-driving in response to filter problems. Thereafter, she decided not to stop the processing section, believing that the pelletizing plant would fix the filter problem within a reasonable period of time. If they were to cross-drive for too long, it could affect the quality of her product (i.e. slugger), which would make it more difficult to reach the cost target for her plant. She chose to help her customer instead by keeping her sections running. The problem could be attributed in part to miscommunication, but they were able to solve it rather quickly based on the operations manager’s experience, without any additional problems or increased costs. As the operations manager expressed it:

\begin{quote}
This should have been handed over to me at the shift handoff, and it should be noted in our black book [logbook] [...] due to filter problems at the [pelletizing plant]. I recognized that it might be due to compressor issues [...] all our start-ups must be supervised [...] If [the pelletizing plant] can start their compressors, our additives will be back to normal.
\end{quote}

This unexpected situation illustrates a dilemma in which the operations manager needed to consider both the lateral flow and the financial performance of her entity. Even though to some extent she jeopardized the budgetary outcome of her own plant, she chose to cross-drive with the pelletizing
plant to help them for the sake of the production process. The operations manager also faced risks of poorer iron ore quality, but she stuck to rules of thumb regarding when quality was affected. Thus, she focused on the production process rather than on differentiating between the plants based on the budget boundaries and the customer terminology assigned by the accounting system, which divided the plants into separate entities.

The above narrative suggests the presence of tension between the responsibility for reducing the department’s bottom line and the responsibility for cooperating with other departments to secure production of iron ore. The tension between accounting space and the lateral flow identified in this narrative was not discursive to the operations manager, as the reflection undertaken focused on how to mobilize action so as not to stop the machines. A problem was noticed with the potential to harm iron ore production where she prioritized the lateral flow. She did not wish to re-start the machines, as this required surveillance by production employees, and she did not want to cause trouble for her fellow operations manager (the customer). The potential cost increases were only predicted, though, and did not constitute a strong artefact compared with the process map that visualized her relationships with the other operations manager. In this way, the operations manager relinquished accounting space in favor of her focus on the production process and reduced stoppages as she experienced lateral-flow belongingness.

4.4 Exchanging a mill lining

During summer vacation, the mill lining in one of the processing sections at the concentration plant broke down and needed to be replaced to maintain production. The function of the mill lining was to sort out impurities and grind the ore ahead of the concentration process. A broken mill lining reduced grinding capacity some 33–50 percent depending on the plant. The consequences of the breakdown were disruption of production and increased costs for the replacement of the mill lining. In addition to the lost production, the broken mill lining caused problems associated with the need to organize production workers and their tasks while replacing the broken parts. They had not budgeted for the replacement, causing one operations manager to express distress over the miscalculation. Clearly, this operations manager was constrained by the accounting system and budget boundaries. He stroked his beard as he sighed:
Nothing is successful in this situation [. . .] We had to write a memo [. . .] It was not included in the initial calculation. [. . .] The bolts broke down. They did not hold.

The operations manager relied heavily on the set budget. Because they had not budgeted for the mill-lining exchange, the fear of incurring expenses that exceeded the budget acted as a constraint on the operations manager. However, some positive aspects stemming from the management accounting system were also acknowledged. Via this disruption, the operations manager could see the advantage of writing the memo (a procedure which was required for each purchase), because doing so enabled the team to make a conscious decision about how their memo would be assessed and compared in priority ranking, especially regarding budget deviations. The operations manager reasoned with himself:

*Is [the operational cost] in the budget or not [. . .] If it is big enough to cause some effect, we write a memo [. . .] This cost is in the pipe [. . .] Do we get approval or not.*

One of the maintenance engineers, however, considered the exchange of the broken mill lining to be successful, whereas the operations manager saw the breakdown as a problem that disrupted production. The consequences of the mill-lining breakdown were more significant than the consequences of the exchange, however, insofar as it became necessary to discuss the poor durability of the mill lining with the subcontractors. An issue of sub-optimization was elevated by the operations manager, as he said, with exhaustion in his voice:

*They [the purchasing department] show nice numbers for buying cheap products [. . .] and then it appears that the bolts do not hold [. . .] Then I must stop my [processing] section, which costs. . .. Well, all the savings from buying cheap linings were lost a long time ago.*

The operations manager’s mental state reflects the frustration he experienced when he could not meet the budget. He failed to see the exchange of the mill lining as a success. Unexpected situations that jeopardized the fulfillment of budget targets were seen as failures, even when a solution was found, and the problem was handled rather quickly considering the summer vacation. The operations manager relied heavily on the space provided by the budget.

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5 This maintenance engineer was responsible for availability (the analysis of production-stoppage statistics), the budget, and personnel.
This failure, as expressed by the operations manager, can be contrasted to the success of handling the problem during summer vacation, as expressed by the engineer. Unlike the operations manager, the engineer was not concerned with sub-optimization or the production target in terms of increased costs. She was interested in minimizing down time and did not indicate being affected by management accounting to the same extent as the operations manager was. Even if the budget was set initially by the operations manager and his teams, the belief in the budget as a contract appeared to constrain the operations manager.

The above narrative suggests the presence of tension between the budget responsibility for each department and the responsibility for minimizing production stoppages. The budget constituted an artefact that encouraged separate departments (i.e. purchasing, maintenance, and operations) to sub-optimize, affecting lateral flow and putting the production of iron ore at risk. The tension identified in this narrative was not apparent to the operations manager until the unexpected breakdown of the mill lining occurred. The operations manager thus raised questions retroactively as the broken bolts required that a memo be written. In turn, the memo shook the perceptions of the budget as a contract and of space as static. The memo as an artefact, together with the tension between his responsibilities, enabled reflections wherein the operations manager prioritized highlighting the tension by discussing sub-optimization and how such acts affect production in terms of quality and production stoppages. Thus, the contrasting spaces experienced by the operations manager enabled him to question the set budget and the sub-optimization of each department. Instead, he relinquished accounting space and prioritized his action in accordance with his experienced lateral-flow belongingness.

5 Discussion

In the following sections we discuss how the priority of mobilized action for operations managers can be associated with practical or discursive reflection, relation to space, and artefacts associated with accounting space or lateral flow.

5.1 Tension, reflection and prioritized action in the four narratives

The narratives reveal several distinct tensions between operations managers’ responsibility for accounting space and their responsibility for lateral flow and indicate how operations managers
prioritize action in their everyday work when such tensions are encountered. For a summary of tensions, reflections, artefacts, relations and priorities, see Table 2.

**Table 2. Tensions, reflection, artefact, priority and action at MinCo**

<table>
<thead>
<tr>
<th>Operational situation</th>
<th>Type of tension</th>
<th>Reflection undertaken</th>
<th>Dominating artefact</th>
<th>Relations between operations managers and accounting space</th>
<th>Priority for mobilizing action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Running down the mill.</td>
<td>Responsibility for producing iron ore to maximum capacity and responsibility for maintaining machine capacity.</td>
<td><strong>Discursive</strong> reflection concerning the tension between accounting space and lateral flow. Operations manager experiences contrasting spaces.</td>
<td><strong>Accounting artefact</strong>—red unfilled targets on a whiteboard supported by a process engineer's calculations.</td>
<td>A <strong>for-relation</strong> between the operations manager and accounting space makes management accounting act constitutively and obligates the operations manager to respond to accounting space. Despite an operations artefact visualizing the production loss, the operations manager is sensitive to the engineer, who supports the accounting artefact in terms of efficiency targets. The experienced tension enables questioning of accounting space, yet is an accounting space priority.</td>
<td>Accounting space. Management accounting directives, by producing according to target, are perceived as valuable. Operations manager experiences accounting space belongingness as a result of his relationships with the engineer and an accounting artefact.</td>
</tr>
<tr>
<td>Conforming to accounting talk.</td>
<td>Responsibility for reducing tied-up capital and responsibility for a flexible production process.</td>
<td><strong>Practical</strong> reflection concerning the tension between accounting space and lateral flow.</td>
<td><strong>Accounting artefact</strong>—accounting reports concretizing tied-up capital (risks associated with low liquidity).</td>
<td>A <strong>with-relation</strong> between the operations manager and accounting space makes management accounting taken for granted by the operations manager. Management accounting is perceived as a provider of the truth underlying the tying-up of capital. Budget boundaries are not contrasted with a competing operations artefact. Accounting space is not questioned and therefore becomes the priority.</td>
<td>Accounting space. Management accounting directives to keep inventory low at the firm level. The operations manager experiences a dynamic accounting space that expands to the firm level.</td>
</tr>
<tr>
<td>Saving the customer.</td>
<td>Responsibility for the department's bottom line and responsibility for cooperation between departments to secure production.</td>
<td><strong>Practical</strong> reflection concerning the tension between accounting space and lateral flow.</td>
<td><strong>Operations artefact</strong>—a process map visualizing an integrated production chain and a continuous production process.</td>
<td>A <strong>with-relation</strong> between the operations manager and accounting space makes the operations manager take management accounting for granted. Yet, the continuous production of iron ore is visualized via a production process chart, thereby diminishing accounting space. Accounting space and lateral flow are not discursively reflected upon, yet lateral flow becomes the priority.</td>
<td>Lateral flow. By saving the customer, the production process is perceived as valuable. The operations manager experiences lateral flow belongingness, reflecting her relations with the other operations managers and a strong operations artefact.</td>
</tr>
</tbody>
</table>
Exchanging a mill lining. Responsibility for each department's budget and responsibility for minimizing production stoppages. Discursive reflection concerning the tension between accounting space and lateral flow. The operations manager experiences contrasting spaces. Operations artefact—broken bolts and their costs calculated in a memo. A with-relation between the operations manager and accounting space makes the operations manager take management accounting for granted. The operations manager is constrained by the budget and accuses the purchase department of sub-optimizing according to the accounting space rationale of differentiating between departments. The budget is contrasted with the estimated life cycle of the mill-lining bolts visualized via calculations in a memo. The discursively reflected-upon tension enables questioning of accounting space and therefore lateral flow becomes the priority.

Lateral flow. The production process exchanges the mill lining and thereafter cross-functional discussions regarding sub-optimization take place. The operations manager experiences multiple dynamic spaces and constructs lateral flow belongingness thanks to the calculations in the memo.

Table 2 shows how multiple tensions in operations managers’ everyday work situations are associated with specific reflections and priorities. The first column shows the topic of each narrative as labeled in the empirical data section. The second column shows how the encountered tension can be articulated as tension between accounting space and lateral flow. The third column shows whether the tension was reflected upon in practical or discursive terms, as this would be related to the relations between the operations managers and space. The fourth column shows the dominating artefact present in each narrative. The fifth column shows how we interpreted the relation between the operations managers and accounting space. The last column shows whether the operations managers responded to accounting space or lateral flow. Four themes emerge from this empirical study. We discuss them below.

5.2 Practical and discursive reflection on tensions between accounting space and lateral flow

The accounting talk and customer narratives suggest that reflecting on everyday dilemmas may not always result in discursive tensions between accounting space and lateral flow. Such tensions are not always obvious, as the results indicate. Rather, tensions that are reflected upon only in practical terms may make it challenging for operations managers to realize that they can prioritize in more than one way. Even though operations and management accounting are interrelated via organizational goals (Ahrens & Chapman, 2007; Hansen & Mouritsen, 2007), the narratives show that management accounting and operations encourage distinct approaches to dilemmas experienced by operations managers. Even attempts to balance distinct frames of reference (van...
der Meer-Kooistra & Scapens, 2008) cause tensions, as shown in the accounting talk narrative. To prioritize action does not necessarily, however, imply that one is emphasized while the other is disregarded. It may also be the case that dilemmas are not always recognized as tensions arising at the nexus of management accounting and operations. As a result, operations managers do not always reflect on their priorities and may take them for granted. Bauman (1993, p. 183) suggests that tensions generate knowledge. For our results, this implies that tensions can cause operations managers to reflect upon their priorities. A failure to reflect, however, could cause operations managers to accept accounting space without questioning it, as shown in the accounting talk and customer narratives.

In the grinding-mill and mill-lining narratives, the reflections undertaken suggest that tensions between management accounting and operations can become discursive to operations managers. Our narratives support the view that knowledge is needed to question order (e.g. Knights & Collinson, 1987; Ezzamel, 1994; Quattrone & Hopper, 2005). Even if organizational groups are differentiated into entities (e.g. Miller, 1992; Kurunmäki, 1999), our results indicate that tensions that are subjected to discursive reflections could cause such differentiation to become questioned. The discursive tensions may induce operations managers to question taken-for-granted accounting space. Perhaps dilemmas cannot be reflectively managed until they are comprehensible (see Bauman, 1993, p. 184). In this way, operations managers can mobilize reflective action. Mobilizing reflective action seems, however, to require additional interrelated premises, such as artefacts and operations managers’ relation to accounting space, which will be discussed below.

5.3 Contrasting and dominating artefacts in space

The narratives presented here reveal how artefacts may also take on an important role in rendering tensions discursive, mobilizing actions, and rearranging space and flow. Our results gain support from Styhre (2013), who states that strong artefacts can represent organizational processes visually. The customer narrative shows how the process chart as an artefact mobilized reflective actions towards lateral flow. In turn, this diminished the taken-for-grantedness of accounting space even though the tension between accounting space and lateral flow remained practically reflected upon. In contrast, in the accounting talk narrative, no artefacts competing with budget boundaries were experienced and the tension remained un-reflected-upon without any questioning of accounting space by operations managers. However, just because an operations artefact is not apparent to
operations managers does not imply that artefacts are altogether absent (see Orlikowski, 2007). The lack of dominating operations artefacts in this narrative caused prioritized action to be mobilized towards accounting space. The accounting artefact visualized increased costs at the expense of a secure production process.

The grinding-mill and mill-lining narratives are characterized by discursive tensions and consist of operations artefacts (the video showing the ‘spillage effect’ and the broken bolts of the mill lining that resulted in a memo) that competed with accounting space. Yet the two narratives resulted in divergent priorities. Although there were contrasting artefacts in the grinding-mill narrative, action was mobilized towards accounting space. The accounting artefact (targets unfulfilled on the whiteboard marked in red) was perceived as dominating by the operations manager. A strong for-relation to accounting space was supported by interaction with other organizational members, and the red numbers ‘outweighed their material essence’ (Czarniawska & Joerges, 1996; Scott, 2014, p. 104). In the mill-lining narrative, on the other hand, the operations artefact concretized the production cuts via a calculated memo that undermined the budget’s trustworthiness. The dominating operations artefact and the with-relation between the operations manager and accounting space enabled prioritization of mobilized action towards lateral flow. This was a situation where accounting space could be questioned.

5.4 Relation between operations managers and accounting space

The grinding-mill narrative shows how accounting space can be constraining for operations managers. This observation is reminiscent of Ahrens and Chapman (2007), who suggest that management accounting activities structure social order. Organizational processes may be structured through activities stipulated via accounting space. Accounting space in this narrative is powerful and law-like. In this sense, a ‘for-relation’ (Bauman, 1993, p. 186) to accounting space may be perceived by operations managers. With support from Hopwood (1972), the narratives reveal that operations managers’ for-relation to accounting space constrains them. In such cases, operations managers can feel obligated to respond to accounting space. If operations managers cannot relate management accounting to their operational work it may put them in situations where they perceive that they have to mobilize action according to accounting space.
In contrast, the *accounting talk* narrative reveals how accounting space also can be taken for granted by operations managers. The belief in accounting space seems strong and institutionally perceived as the legitimate approach. This can be understood with reference to Scott (2014, p. 69), who suggests that legitimized ideas provide scripts and rationales for action. In this way, the vertical premises permeating accounting space are taken for granted as a basis for compliance. This suggests a ‘with-relation’ rather than a for-relation between operations managers and accounting space, as accounting space permeates their mindset. It becomes perceived as an ordinary and integral part of their everyday work, and thus they do not reflect upon it (see Bauman, 1993, p. 182).

The *customer* narrative suggests that accounting space is not always perceived as the priority of operations managers. Instead, responsibilities associated with accounting space can be assigned to actors via accounting terminology (Hayes, 1983; Carmona & Ezzamel, 2009). In this case, the shared understanding of the importance of protecting the ‘core technology’ (Thompson, 1967, p. 19) of lateral flow, rather than accounting space, is the basis of compliance. Like the *accounting talk* narrative, the taken-for-granted accounting space suggests a with-relation between operations managers and accounting space.

The *mill-lining* narrative reveals accounting space as a constraining factor to operations managers when uncontrollable factors compromise successful outcomes. As Hopwood (1972) showed long ago, budget deviations may cause distress. Our results indicate that operations managers perceive the budget as a ‘basis for compliance’ (Scott, 2014, p. 67). In this way, a taken-for-granted accounting space suggests a with-relation between operations managers and accounting space.

### 5.5 Accounting space and lateral flow priority

The *grinding-mill* and *accounting-talk* narratives reveal ways in which action was mobilized in favor of accounting space. The premises for doing so seem however to differ. First, the narratives differ regarding the operations managers’ relation to accounting space. The constitutive accounting space in the grinding-mill narrative suggests a for-relation to accounting space whereby operations managers feel obligated to respond to accounting space (see Bauman, 1993; Carmona & Ezzamel, 2009). In the accounting-talk narrative, accounting space was largely taken for granted as a basis for compliance, suggesting a with-relation between operations managers and accounting space.
Second, the narratives differ because of the discursively or practically experienced tensions between accounting space and lateral flow. The grinding-mill narrative suggests the presence of discursive tension, whereas the accounting talk narrative suggests the presence of practical tension. Unsurprisingly, practical tensions do not seem to fully motivate operations managers to question accounting space (see Bauman, 1993, p. 184). Discursive tensions enable questioning of accounting space, but such questioning seems to be hampered when operational processes are structured by accounting space.

Third, the narratives differ regarding artefacts. The grinding-mill narrative posited an operations artefact that competed with accounting space, but this artefact became less important as a result of social interactions, the way the accounting artefact visualized management accounting directives, and the relation between the operations manager and accounting space. The accounting talk narrative did not include an artefact to compete with accounting space. The accounting space was, for its part, never questioned. In both of these narratives, operations managers experienced accounting space belongingness.

To depart from accounting space and prioritize lateral flow, on the other hand, the customer and mill-lining narratives reveal the premises of relations to accounting space, tensions, and artefacts. First, accounting space is taken for granted as the basis for compliance when accounting space is questioned. Both these narratives therefore suggest a with-relation between operations managers and accounting space. The customer narrative suggests priority towards lateral flow, though, but without an operations manager questioning the accounting space. The mill-lining narrative, on the other hand, suggests a recognition of uncertainty characterizing accounting space, rendering it questioned by operations managers.

Second, accounting space can be questioned via discursive tensions and rendered unquestioned by practical tensions. The customer narrative suggests the presence of practical tension with a priority towards lateral flow. Yet, accounting space did not seem to be questioned, but rather unreflected-upon as an area of priority. The mill-lining narrative suggests the presence of discursive tension, where questions were raised retrospectively. The acknowledgment of tension between accounting space and lateral flow indicates that operations managers can question accounting space.
Third, the customer narrative shows how an artefact of the production process visualized the lateral flow. The domination of lateral flow diminishes accounting space and it would seem that the process chart as an artefact was an influential ‘mental template’ (Styhre, 2013). Accounting space remained unquestioned, yet lateral flow was prioritized via dominating operations artefacts. The mill-lining narrative shows how a budget can be contrasted with estimates of the life cycle of a production process. The accounting artefact lost its compliance when the operations artefact of a memo visualized that the bottom line was not correct. Accounting space could be questioned. Both these narratives suggest that the operations managers experienced lateral-flow belongingness.

In the everyday work of operations managers, action is mobilized in ways that reflect their relations to space, tensions and artefacts. Operations managers mobilize action towards accounting space, at times even when they experience discursive tension between accounting space and lateral flow. In contrast, action may be mobilized towards accounting space in a routine manner during circumstances that feature practical tensions. In mobilizing action towards lateral flow, operations managers depart from accounting space and construct space in accordance with lateral flow. In this way, space is dynamic and rearranged with the help of dominating operations artefacts that can shake the taken-for-grantedness of accounting space and reinforce operations managers’ experienced lateral-flow belongingness.

6 Conclusions

The results of this study support the view that both accounting space and lateral flow are typically present in operations managers’ everyday work. Operations managers’ everyday work is multifaceted, causing them to experience tensions between management accounting and operations. This paper shows how the tensions experienced by operations managers concerning their responsibilities induce them to reflect, prioritize, and act to accommodate accounting space and lateral flow. Therefore, management accounting and operations are interrelated in ways that imply that neither can be disregarded, but rather that one usually dominates the space belongingness perceived by operations managers.

Practical and discursive tensions between accounting space and lateral flow require operations managers to mobilize reflective action in their everyday work. We find that artefacts are mobilizers of action and thus significant for the prioritization of space. A dominant accounting artefact
visualizes the priority of accounting space, whereas a dominant operations artefact seems essential to the priority of lateral flow. An operations manager’s relation to accounting space and lateral flow is crucial to the manager’s space belongingness. A with-relation between operations managers and accounting space allows operations managers to question accounting space and instead experience lateral-flow belongingness. In contrast, a for-relation leaves little space for questioning accounting space that leads to lateral-flow priority. It would seem that feeling a sense of accounting space belongingness allows operations managers to rearrange lateral flow by incorporating accounting space into existing lateral-flow structures. It would not seem unreasonable to suggest that lateral-flow belongingness may have a similar influence on accounting space.

We find that practical tensions are hard for operations managers to recognize as inconsistencies between accounting space and lateral flow. Rather, when tensions are practically reflected upon, operations managers tend not to question accounting space. In the event of discursive tensions between accounting space and lateral flow, an operations manager can recognize the tension and question accounting space or lateral flow that was previously taken for granted.

In the context of iron ore mining, our results further suggest that, when operations managers can relate to management accounting, new situations arise in which operations managers reflect, prioritize, and mobilize action. Tensions between accounting space and lateral flow induce operations managers to act. Therefore, operations managers do not stand flat-footed when experiencing tensions between accounting space and lateral flow. Rather, how they experience such tensions can change. We therefore suggest that in experiencing tensions, operations managers can integrate accounting space and lateral flow. This enables them to question something that was previously taken for granted.

In the context of iron ore mining, reflective action is shaped by three main circumstances. First, operations managers need to mobilize action irrespective of whether the tensions they experience are practical or discursive. In particular, discursive tension shapes reflection over alternative courses of action. Second, the reflective action of operations managers is shaped by artefacts representing accounting space or lateral flow. In situations characterized by contrasting artefacts, inconsistencies and differentiations within the organization can be recognized. Third, the reflective action of operations managers can be associated with either a with-relation or a for-relation to accounting space.
The findings reported here suggest four ways in which operations managers prioritize between accounting space and lateral flow. In the case where tension is discursive and accounting space is prioritized, accounting space provides a constituting schema for operations managers to follow. This relation between operations managers and accounting space can be characterized as a for-relation. In a for-relation, operations managers seem to experience accounting space belongingness in the context of iron ore mining. In the situation where tension is practical and accounting space is prioritized, accounting space seems taken for granted as a basis for compliance in the operations manager’s everyday work. In this scenario, a with-relation to accounting space is experienced by operations managers. In a with-relation, operations managers may feel a sense of lateral-flow belongingness. We find that there are situations involving discursive tensions through which accounting space is experienced as more important than lateral flow in operations managers’ action priorities. We do not find the same relation between operations managers and lateral flow.

In situations marked by tensions between accounting space and lateral flow where lateral flow is prioritized, accounting space can be questioned by operations managers. Such relations between operations managers and space can be characterized as with-relations. In this scenario, operations artefacts make it possible for operations managers to recognize alternative routes for action that lead them away from those promoted by accounting space. Interestingly, a with-relation between operations managers and accounting space seems to be a necessary premise for lateral-flow belongingness in the context of iron ore mining.

We conclude that the tensions that operations managers experience concerning their responsibilities for management accounting and operations trigger reflectiveness and cause them to prioritize their actions. In managing these tensions, operations managers can reside in multiple spaces without being obstructed by the presence of those spaces. In certain situations, operations managers experience a sense of accounting space or lateral flow belongingness. Operations managers seem to prioritize their action based on their feeling a sense of space belongingness.

This paper contributes to the debate concerning the significance of management accounting to operations by conceptualizing tensions between management accounting and operations as a spatial phenomenon. The concept of space allowed us to analyze dilemmas experienced by operations managers concerning their responsibilities in a dynamic and relational way. In their everyday work, operations managers experience tensions that enable them to question previously taken-for-granted
‘knowledge’. We propose that this may be less a matter of minimizing these tensions than of understanding how such tensions can be managed to create reflectiveness in operations managers, whereas previous studies have addressed mainly tensions between management accounting and operations as a strategizing issue. Our study shows how, because space is experienced and contested in the everyday work of operations managers, tensions between notions of space cause operations managers to reflect upon and prioritize action in accordance with their sense of space belongingness.

By revealing subtle tensions existing in a production context, this paper also provides guidance to professional operations managers that can enable them to take appropriate action in challenging work situations. This suggests that the process through which operations managers reflectively manage tensions between their responsibility for management accounting and their responsibility for operations may be seen as a discrete competence in itself.

Our conclusions provide insights upon which further studies may build (Roberts, 2006) and examine whether they are transferable to other empirical settings. We consider the mobilized actions undertaken by operations managers to be ‘comments on more than themselves’ (Geertz, 1973, p. 319). In this study, we do not analyze the consequences based on the priorities of the operations managers. This could be the subject of further studies.
References


Paper IV

Management Accounting Frontstage and Backstage: A Study of Operations Managers’ Accounting Talk

Curry, A. (2020)

To be Submitted for Publication
Management accounting frontstage and backstage:
A study of operations managers’ accounting talk

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Abstract
This paper analyzes the ways in which management accounting allows operations managers to enter and perform multiple roles in their interplay with organizational groups on the shop floor and in management, and the associated negotiations that operations managers have with ‘the self’. Using field-based studies in a mining organization, the study draws on Goffman’s backstage–frontstage metaphor to analyze how operations managers enter and perform several roles with the aid of accounting. The findings show that accounting legitimizes operations managers when they cross organizational boundaries, as accounting gives them an ‘entry ticket’ that legitimizes their presence with the group. Accounting further allows operations managers to embrace more than one role by ‘putting on a mask’ to become an outsider or insider in relation to the group. In performing their roles, operations managers exhibit varying attributes and knowledge. Accounting can thereby be withheld from, or shared with, organizational groups. The study concludes that accounting functions as an enabling mechanism that serves the several purposes of non-accountant operations managers as they cross boundaries, embrace roles, and govern operations.

Keywords: operations managers, management accounting, accounting talk, negotiations, roles
Management accounting backstage and frontstage: 
A study of operations managers’ accounting talk

1 Introduction
Operations managers are thought to be key actors within organizations on several levels. On the shop floor, these actors play a central role in operational teams (henceforth, I refer to such teams simply as the ‘shop floor’). Operations managers are also central to management and interact to a great extent with management accountants. Operations managers have been found to be accountable to management for shop-floor outcomes (Ahrens and Chapman, 2002) as well as to communicate management directions to the shop floor (Gupta and Galloway, 2003). Styhre (2012) argues that this requires them to possess diverse attributes, such as operational expertise, management skills, and administrative knowledge, including accounting knowledge. The tasks associated with the roles that operations managers perform are therefore rather fragmented in the face of increasingly administrative tasks. Morales and Lambert (2013) argue that the tasks involved in accounting work influence managers powerfully. Yet, there is limited research on operations managers and their involvement with accounting.

Another important attribute associated with operations managers is the ability to interplay with and communicate organizational goals between groups, as communication is critical for management in organizations (Jönsson, 1998). Operations managers need to communicate intentions and activities between management and the shop floor. In turn, this requires interplay with both groups. Ahrens (1997) shows how communication facilitates accounting’s interpretation of specific management problems as accounting understanding is integrated with other organizational knowledge. In other words, accounting understanding is not reached in isolation but in interplay, or more specifically, via accounting talk. Operations managers thus have to deal with accounting that spans organizational boundaries and they therefore need to speak the language associated with both groups (i.e. management and the shop floor).

To theorize that roles hinge solely on the tasks with which they are associated is problematic as it presents a role as predetermined, depending on its position within an organization (Persson, 2012). Rather, roles are thought to be shaped by the expectations of their audiences (Goffman, 1959), that is, they form during interplay with other organizational actors. Recently, research on operations managers’ expectations of accountants shows that such expectations have
implications for how roles are constructed and preserved (Byrne & Pierce, 2018). Because of taken-for-granted norms and how such norms are shaped by everyday life, operations managers can anticipate how to behave in interplay with intraorganizational groups belonging to a specific setting. In other words, to meet the varying expectations of a range of groups, actors may enter distinct roles in interplay, depending on the setting (Goffman, 1959). Such settings are referred to as the ‘frontstage’, where performance in front of other organizational members takes place and an actor seeks to manage impressions made on others. However, when operations managers are out of the frontstage spotlight, negotiations with ‘the self’ might take place that may or may not be consistent with the frontstage performance. In this paper, this setting is referred to as the ‘backstage’.

To the best of the researcher’s knowledge, there is a lack of research addressing how operations managers assume multiple roles in the interplay with the shop floor and management, how these roles are negotiated, and how the roles of operations managers are implicated with accounting. This is essential as the performance of actors, in this case the performance of operations managers, influences observers (Goffman, 1959). Recently, calls have been made to study the everyday work of those working with accounting (Jack, 2017). Management accounting research has extensively addressed the work role of accountants in organizations (e.g. Goretzki, Strauss and Weber, 2013; Hiller, Mahlendorf and Weber, 2014; Karlsson, Hersinger & Kurkkio, 2019). Because of the increasingly important role of operations managers to accounting, however, there is a need to deepen our understanding of how operations managers perform multiple roles across intra-organizational boundaries regarding accounting. Otherwise, we may fail to understand the implications of accounting for those working outside the accounting function.

The purpose of this study is to advance our understanding of how management accounting enables operations managers to enter and perform varying roles in interplay with the shop floor and management. This purpose is achieved by (1) describing how operations managers deal with accounting in their interplay with management and the shop floor, (2) analyzing how operations managers enter and perform various roles in their interplay with management and the shop floor with the aid of accounting, and (3) theorizing about the consequences of accounting for operations managers as they cross organizational boundaries in their everyday work.

In contrast to conceptions of accounting as irrelevant to operations, this study contributes to the existing accounting literature by theorizing how accounting is an enabling mechanism for those
operating outside of the accounting function. As a contribution to the accounting talk literature, this study shows how operations managers can bring their own setting into accounting talk, but also how negligence in doing so can cause misunderstandings between organizational groups. As a practical contribution, the intra-organizational processes that determine how accounting information travels across organizational boundaries that this study reveals provides organizations with incentives to develop time and space for interplay across organizational boundaries.

2 Literature on accounting and roles
The following sections build predominantly on Goffman’s work, ‘Presentation of the Self’, by addressing how roles are implicated in accounting research. Research on interplay, boundaries, and discourse and their relationship to role performance is also discussed below.

2.1 Conceptualizing roles
Most studies that analyze roles within the field of management accounting seem to focus narrowly on the roles of the management accountant. For example, studies have examined management accountants operating in multiple professional roles (Horton & Wanderley, 2016), how management accountants challenge their roles (Taylor & Scapens, 2016), how accountants’ identity work influences accounting (Morales and Lambert, 2013), and how interaction enables accountants to shape their position as a business partner (Goretzki & Messner, 2018). Also, actors serving in top management of organizations have received attention (Kastberg & Siverbo, 2016). With the exception of Byrne and Pierce (2018), who included operations managers’ expectations of accountants within the scope of their study, little attention has been directed towards actors working close to core operational activities and whose roles also are related to accounting.

As early as 1918 researchers recognized that the multiplicity of individual roles depends on observers (Gioia, 1998, p. 20). Finding one’s role is thought to be a lifelong project that involves assessing and figuring out how one relates to others (Gioia, 1998). Or, in other words, it involves understanding how to perform a role in interplay with others. In this way, roles are shaped via interplay (i.e. social interaction). Actors may therefore engage in interpretations in both public and private space as well as in practices that support their roles. It may however be

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problematic for actors to enter multiple roles. Arena and Jeppesen (2016) argue that actors serving in multiple (professional) roles may encounter tensions between those roles. For an operations manager, this may be problematic as their work role almost by definition includes crossing boundaries.

In this paper, a role is ‘an active and reflexive self that creates, sustains, and changes social structures’ (Scott, 2014 p. 44). The material structures where social encounters (i.e. interplays) occur are likely, however, to possess symbolic representations. Therefore, such material structures would still be important for the roles of actors. There has perhaps been a shift in the literature on management accounting and roles towards examining roles on an individual level (e.g. Morales & Lambert, 2013) rather than, as in earlier studies, focusing on the organizational level (e.g. Abrahamsson, Englund & Gerdin, 2014; Seal, 2001; Thrane & Hald, 2006).

2.2 Performing roles in interplay with others

It has been argued that assuming roles is central for developing oneself (Gioia, 1998, p.196). In interplay with others, an actor performs roles that are grounded in the expectations of both the intended role in terms of structure and the actor performing a role in her interplay with others (Goffman, 1959). An operations manager’s performance is not confined to the efficiency with which she fulfills tasks and goals or what she achieves in so doing. In this study, performance is related to the act of entering a role to manage impressions of oneself in front of others. In other words, this study focuses on an actor’s performance during a period of continuous presence in front of a specific group of observers that has a certain influence on the observers (Goffman, 1959, p. 28). The goal for an actor performing a role is to uphold a specific definition of a situation (Goffman, 1959, p. 80). Of course, this does not imply that an actor’s observers are passive; they perform their own roles simultaneously. Goffman then is interested in addressing how actors perform their accepted roles. In interplay with groups (or observers), an operations manager may enter multiple roles that undergo a continuous process of (re)construction.

Therefore, one may distinguish between (or perhaps integrate) two ways of conceptualizing roles. First, there is the status or position that comes with a role which gives the role specific attributes (e.g. tasks, responsibilities, or accountabilities). Some tasks are perhaps more or less associated with certain roles. Second, there are roles that develop through interplay with other actors or groups (see Persson, 2012, pp. 84–96), based on the expectations of the groups that shape how a role should be performed within the group. In interplay with management, the
expectations of an operations manager might differ from the expectations that she places on herself or her expectations of the shop floor. This implies that the expectations of management and the shop floor who are involved in interplay with operations managers may affect the latter’s roles.

**Role performance and the boundaries of a setting**

As operations managers may seek to uphold specific definitions of situations and their boundaries, they need to understand the settings in which they operate. Goffman (1959, p. 87) argues that knowledge of a setting could be a safety mechanism as it enables the actor to control that setting. Socially learned dispositions, skills and ways of acting that often are taken for granted and acquired through activities and everyday life experience have been found to be characteristic of a specific setting (Bourdieu, 1997, p. 128). Society can thus be seen as forming two inseparable shapes. On the one hand are the institutions, perhaps expressed in objects such as books and monuments. On the other hand are the acquired dispositions, the ways of being, and the acting taken for granted (i.e. habitus). The actors then become a form of existence in society (Bourdieu, 1997, p. 43). An actor reading the boundary of a field (i.e. actors and institutions striving for a common goal) and its attributes of belonging (such as habitus and symbolic capital), can anticipate how to act within a given setting even if the actor is an outsider (i.e. not part of the group) (Bourdieu, 1997, p. 130).

Actors within a group could form a team with their own boundaries. Goffman (1959, p. 79) defines a team as a group that collectively tries to uphold a lasting impression of a setting. In these settings, those actors who are not team members could be considered outsiders, to whom an impression needs to be upheld. In other words, the outsider must show that she can grasp how to act within the boundary via her performed role. For instance, in a meeting between management and operations managers, accounting could be expected to take place (Jack, 2017), whereas accounting may not be expected to occur to the same extent in interplay with operations managers and the shop floor.

If an individual is theorized as entering multiple roles, it may be problematic to think about an organization as holistic even if we acknowledge organizational sub-groups. Therefore, even organizational groups (such as management and the shop floor) may have their collective definitions of who they are as a group that applies within given boundaries as they share attributes and strive for a common goal. Boundaries may then be defined as taken-for-granted social and material arrangements that partly govern where and how operations managers perform their roles. In defining such groups (i.e. management and shop floor groups), the actors
involved are also defined through their expected behavior within the group (see Carmona, Ezzamel and Gutiérrez, 1997; Goffman, 1959; Jack, 2017; Mennicken and Miller, 2012).

Management and the shop floor may be seen as being and acting within a specific setting, sharing a boundary. When operating outside of the boundary setting of management and the shop floor (i.e. ‘backstage’), the operations manager may embrace another role when she drops her guard. Goffman (1959, p. 113) defines ‘backstage’ as the space where an actor does not expect her observers to intrude. This is also important to acknowledge in the study of interplay as it gives insight into ‘appropriate behavior’ when an operations manager is in the presence of management and the shop floor, and also what is deemed less ‘appropriate’ to show up front. To maintain their positions, previous research has reported that actors purposefully choose what information they reveal to other actors in an organization (Puyou, 2018).

**Role performance and discourse**

To meet group expectations, an operations manager needs to conduct herself in a particular way under the given circumstances. This includes using the ‘appropriate’ language. In the various groups with their boundaries in which the operations manager works, there are certain professional discourses that might contrast with the conventional discourse of another setting (Jönsson & Solli, 1993). The professional discourse of accounting (i.e. accounting talk) might be difficult for outsiders to understand. Ahrens (1996) shows how accountants at two breweries used distinct professional discourses—operational discourse and accounting discourse. Yet, Ahrens (1997) argues that talk implicated accounting in organizational action. Several studies posit that talk—not solely accounting reports or accounting indicators—is important for developing meaning in accounting (Carlsson-Wall et al, 2016; Catasus, Ferri & von Laskowski, 2016).

The rhetoric might then differ among organizational groups. Jönsson and Solli (1993) theorize about inner and outer dialogues. An inner dialogue concerns speaking with one’s own self and translating stories into principles. Yet, to gain the ‘narrative meaning’ of such principles, the stories need to be understood (p. 318). Some stories might become so taken for granted that the principles constitute the ‘talk’, which renders the stories unnecessary. For Jönsson and Solli’s study specifically (1993), an outer dialogue concerns clarifying accounting reports and areas of responsibilities between organizational groups. An outer dialogue therefore serves a clarifying role as there might be incompatibilities between various professional discourses. For instance, Carlsson-Wall et al. (2016) show how accounting metaphors enable understanding for actors who work outside the accounting function. They suggest that, by using accounting words to
which actors can relate, an accounting mentality is triggered. Catasus et al. (2016) suggest that talk is presented as more essential than the design of accounting indicators. In their study they show how actors designing accounting indicators gradually create awareness among themselves that the intention with the indicators is to create awareness among the users to talk about the indicators.

3 Methodology
The following sections describe the methodology of the study. I first present the underlying assumptions guiding the research. I then discuss how I designed the method by drawing upon ethnographic ideas. Lastly, I present the procedure used to analyze the empirical materials.

3.1 Research approach
This study was based on notions of social constructivism. Social worlds are contextually and socially constructed, implying that interplay plays an important part in constructing operations managers’ and their roles. Nor is accounting considered to be constructed in isolation (Ahrens, 1997). This study embraces an abductive approach as the phenomenon studied was identified during a research project examining management accounting’s significance on the shop floor at a large mining company, and further supplementary observations were made.

3.2 Research design
In the study of a field, attributes specific to that field can be discovered. Recently, industry specifics have been called for within the field of management accounting (Bromwich and Scapens, 2016). This field study is conducted in a mining context for two main reasons. First, the clear process of extracting iron ore and producing ore pellets makes it easy to visualize intra-organizational processes through which information travels, which facilitates the identification of interplay between operations managers and management on the one hand and the shop floor on the other. In other words, micro-processes were visualized. Second, mining was considered an important industry in Sweden and other countries with rich natural resources that is due for accounting research.

Traits of ethnography
Micro-processes were deemed essential building blocks to theorization (Roberts, 2006), as knowledge stems from patterns of mechanisms specific to a phenomenon (Bourdieu, 1997, p. 127). The intertwining of accounting and other tacit organizational knowledge is apparent in these micro-processes (Ahrens, 1997).
To capture these micro-processes, the researcher needed to be present where the interplay took place. Understanding of how accounting shapes roles could be gained by identifying the interpretations, the ways of communicating, from accounting to the shop floor and management. In other words, we need to observe the roles enacted by operations managers when they communicate with accounting in the interplay with their observers (i.e. management and the shop floor). For this study, the empirical material was gathered during three visits to the case company between 2014 and 2018. The methods used to gather empirical material for this study included observation and shadowing. For the project as a whole, though, additional methods were used, such as interviews and workshops. Five operations managers were followed during their shifts to observe their interplay with others. Shadowing allowed the actors to perform their roles and present their interpretations of the world (Czarniawska-Joerges, 2007, p. 11).

Shadowing in this study included attending formal meetings between the operations managers shadowed and their teams as well as with management. It also included informal observations of operations managers’ backstage negotiations without being under the scrutinizing eyes of management and the shop floor (Goffman, 1959, p. 113). Goretzki and Messner (2018) conceptualize the backstage for accountants as accounting interaction with peers and CFOs. In this study, I conceptualized interaction between an operations manager and her peers as taking place on the frontstage because the empirical material indicated that peers can also be expected to intrude on a performance.

As a researcher I was present and took part in the reflections and negotiations that took place backstage during car rides and daily walks through the plants. The reflections of the operations managers are therefore discussed with, or shown to, the researcher. Building on Goffman’s (1963, p. 38) distinctions that characterize the relationship between an actor and stigma, the researcher could be theorized as residing outside the normal context of operations managers’ interplay with management and the shop floor. Operations managers may therefore feel less intimidated by someone who shares their concern but is not part of the actors’ ‘own’ team, nor one of the ‘normal’ actors (i.e. other organizational members). As a researcher, I nonetheless intervened in practice by socially interacting with operations managers, both frontstage and backstage.

2 I have relied on Goffman’s analogy of the ‘normal, the own and the wise’, which he draws upon in *Stigma* (1963).
In this study, I attended morning production meetings on the shop floor, target review meetings, briefings with the shop floor, and management meetings with managers alone as well as with management and accountants. I was also granted access to formal data, such as production data and statistics, operational performance against targets, and accounting reports. I was also allowed to observe what could be called informal information shared during discussions with other actors in the organization, information that was written down in ‘little black books’, or informal calculations and accounting systems created in actors’ offices and on their computers.

The organization

The mining organization operates in the northern part of Sweden and extracts and processes iron ore from open pits and from underground mines using sub-level caving. All produced iron ore is sold, requiring the organization to cut costs during times when results drop below expectations. There are two separate operational extracting sites in the mines—development drift south and development drift north—with their own machines and equipment as a result of the long distances between the drifts. Both mining sites deliver their extracted raw material to the dressing plant, which is the first of the three plants in the refining process. In the dressing plant the iron ore is separated from the waste rock. Thereafter the iron ore is delivered to the concentration plant, where it is processed. Lastly, before shipping to the end customer, the pelletizing plant converts the processed ore into pellets and fines. A customer–supplier relationship is adopted between the plants. Teams operating within the plants have their own budgets, areas of expertise, and responsibilities. Thus, the mine and the associated plants depend on each other in this integrated organization (see Figure 1).

![Figure 1](image)

**Figure 1** The production chain in the mining organization

The mining organization adopts a flat organizational structure with few management levels, which implies flexibility and autonomy, according to textbooks. Nonetheless, the organization is rather hierarchical, maintaining tight control over the responsibilities of operations managers across these few management levels. Given the rather flat organizational structure, operations managers play a central role in connecting management accounting and operational work. In
this way, operations managers become central actors in the organization with direct connections to management and the shop floor.

**The operations managers**

The operations managers in this study typically started their careers within the organization on the shop floor. They worked within the organization during their high school summer breaks or served internships at the organization, after which they were offered positions on the shop floor after graduating. After a couple of years within the organization they enrolled in university studies and/or climbed the hierarchical ladder. Some operations managers were recruited after their university studies. The operations managers have local connections as well as a certain status on the shop floor, where they may feel closer to operations than to accounting. Each operations manager responds to budgetary accountability and attends management meetings once a month.

Every Monday morning the operations managers attend production meetings on the shop floor. During these meetings they discuss safety issues, production target, the work environment, and environmental targets and do follow-ups on accounting performance. In the mines, the operations managers start every morning with a production meeting to which they refer as the ‘Morning Prayer’. One reason for holding all these meetings is the blasting that occurs each night. Potential hazards stemming from mining work need to be shared with the group. During these meetings, participants also share production outcomes and organize their mining work.

The discourse during these meetings was at times difficult to follow. The actors used many acronyms and production language. The operations managers share an inner dialogue with the shop floor as they talk in ‘operational’ terms. When I asked questions about a word I did not know or if I did not understand a discussion, the operations managers often shared the ‘stories behind the principles’. For instance, there is a tradition of referring to the bedrock at the mining site as the ‘mountain’.

Operations managers’ offices are located close to the operations, for instance where the mining takes place underground, or in the building next to the plants. In this way they enjoy easy access to the shop floor and have hands-on access to operations. This everyday work in the mines forces them to wear the same mining overalls, boots, and hardhats as the shop floor members.

**3.3 Research analysis**

Three events are narrated based on the observations that took place during shadowing. The role attributes involved in the tasks were observable, as were the roles performed by the operations
manager in interplay with the shop floor and management. It was also possible to observe what operations managers do with accounting and how they negotiate in such situations. In turn, these observations made it possible to theorize about accounting, its interplay and how it constitutes a mechanism enabling operations managers to embrace roles and cross boundaries.

The field notes taken included registration of observations and were written down directly when those observations occurred. Notes were taken of the observations’ locations and of the actors involved. Because observations were made during a process, new observations were added to previous observations when these were somehow connected. These connections between observations were made continuously as they were observed or realized. For instance, one observation regarding workforce cutdowns in the interplay with the shop floor were connected with observations of the same situation but in negotiations ‘backstage’. The reflexivity of connecting observations in these field notes thereafter encouraged theorizing and were part of the analytical work.

The analysis was conducted in three steps (but of course continuously during the three field visits). First, each empirical observation was classified into a setting and whether the observation was connected to another observation was noted. Second, connections between the observations were categorized based on the symbolic representation of where meetings occur and physical structures, the topics discussed, the negotiations in the various roles, and the role of accounting in performing these roles in the various settings. Third, the roles of the operations managers in the various settings could be discerned. These three steps were done through mind maps and thereafter via a coding scheme (see Table 1).
Table 1 Coding scheme for the key interpretations of the observed performances and negotiations

<table>
<thead>
<tr>
<th>Role/Boundary</th>
<th>Observation</th>
<th>First-level order</th>
<th>Second-level order</th>
<th>Third-level order</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shop floor frontstage performance</td>
<td>Cutting the workforce</td>
<td>A management decision with economic consequences is a valid rationalization mechanism which allows the operations manager to perform a detached role to the decision.</td>
<td>The insider becomes an outsider via accounting and the decisions that are made.</td>
<td>Accounting as a mechanism for crossing boundaries</td>
</tr>
<tr>
<td>Making numbers green while managing distant operations</td>
<td>A role detached from accounting’s implications for operations is performed.</td>
<td>The insider does not intrude on the shop floor within an accounting setting. Lack of accounting as a mask.</td>
<td>Accounting as a mechanism for agency</td>
<td></td>
</tr>
<tr>
<td>Management frontstage performance</td>
<td>Cutting the workforce</td>
<td>Banter about shop floor concerns and seek support from management.</td>
<td>Visualized accounting knowledge represents power to the operations manager, which allows masking ‘the self’.</td>
<td>Accounting as a mechanism for embracing a role</td>
</tr>
<tr>
<td>Lacking operational cost awareness</td>
<td>Diverse accounting understandings hamper consensus as the operational setting is not discussed.</td>
<td>The outsider becomes the insider via accounting talk even if there is no coherence in the discussions.</td>
<td>Accounting as a mechanism for crossing boundaries</td>
<td></td>
</tr>
<tr>
<td>Backstage negotiations</td>
<td>Cutting the workforce</td>
<td>Rationalizing the decision and simultaneously showing nuance in the rationalization.</td>
<td>Putting on an accounting mask and hiding behind calculations when entering and performing roles.</td>
<td>Accounting as a mechanism for embracing a role</td>
</tr>
<tr>
<td>Making numbers green while managing distant operations</td>
<td>Hiding the tight control of production from the shop floor with complex informal systems.</td>
<td>Hidden accounting knowledge is power to the operations manager.</td>
<td>Accounting as a mechanism for agency</td>
<td></td>
</tr>
<tr>
<td>Lacking operational cost awareness</td>
<td>Details about the non-accounting style at the shop floor.</td>
<td>The insider becomes an outsider via an accounting mindset on the shop floor.</td>
<td>Accounting as a mechanism for crossing boundaries</td>
<td></td>
</tr>
</tbody>
</table>

The coding scheme included a first-order level where the actors’ interpretations (the actors’ levels of representation) regarding the observation frontstage is declared, and a second-order level where the patterns observed in actors’ representations are the basis for grounded and
theoretical explanations (see Gioia and Chittipeddi, 1991). The coding results in patterns indicating the extent to which accounting is a mechanism for agency with operations managers.

4 Findings
The following sections show how the operations managers perform their several roles within three boundaries of the constellation of management accounting and operations management. The first narrative includes 1) operations managers’ performance with management, 2) operations managers’ performance with the shop floor, and 3) negotiations that take place when operations managers are no longer in the spotlight of attention from their observers. The other two narratives include the operations managers’ performance with either management or the shop floor and end with backstage negotiations.

4.1 Cutting the shop-floor workforce
The first narrative concerns cost reduction on the shop floor, reflecting the mining organization’s poorer results. Declining iron ore prices caused the organization to take action. A decision was taken at the management level to cut the workforce to deliver the cost-reduction goals. Of course, this decision met with some resistance by the shop floor. This narrative played out at the concentration plant.

Frontstage performance with management
The consequences of the organization’s poorer results included a decision that the workforce had to be reduced to cut costs and secure the profitability of the operations. The order of dismissal came from top management and depended on calculations of poorer financial performance by the organization. Hence, the budget was tightened by reducing teams from ten members to nine. The need for layoffs was triggered by trustworthy management accounting numbers. The rationale for layoffs was still based on the calculation provided by top management, which gave the operations manager some distance with respect to the layoffs. Daily discussions occurred at the shop floor regarding the effects stemming from cutting the workforce. During a management meeting among the plants’ operations managers (OMs) and their plant manager, they discussed how this message was received at the shop floor:

OM 1: It is getting alive now, the workforce cut downs [. . .] yeah, well, some [of the safety representatives] attended some educational courses [. . .] about stress and accidents. ‘It is going to be stressful and people are going to get hurt. What are you going to do about it? Risk analyses,
and so forth.’ But I point to our everyday operations: if one plans one’s day, then the stress is less. ‘I can plan your whole day, and box it up. Then you do not have to stress’. So, it is about countering arguments. ‘We are not going to make this work unless you help, yeah?’

OM 2: Just look at the [lubrication unit] and their follow-up. They went through their consequence analysis and the re-organization. They said, ‘all is going to hell, on all areas. Everyone is going to leave, everyone is going to get hurt’[. . .] and in their letter it says: ‘contract work is rising, people are leaving.’ It is just so whiny, the whole letter.

OM 1: It was ‘the sports club of the clams’ during that meeting.3 [Everyone] was quiet. So, I was like, well I guess there is nothing [to discuss] then!

OM 2: They call for the consequence meeting at our plant. ‘What the heck was that document?’ It is all ‘expand the workforce’ on every point.

OM 3: [Mike] had the same issue [regarding expanding the workforce] with operations. There is no point discussing that. We need to talk about what we can do instead. [. . .] Do not elevate the issue!

OM 4: We have some work to do now. To deal with these risk analyses that are made and to do something real out of them.

OM 1: We do not cut the workforce because we think it is fun, it is a matter of our survival. It is not in our hands anyway.

This conversation should not be confused with mocking the shop floor. Rather, the operations manager relied on management for support of the decision regarding workforce cuts. Reading between the lines, we can see that they sought to underpin and confirm that they all were on the same page and had each other’s backs. The operations managers did not talk about the calculation, or whether such calculations were reliable or correct, or if they could think differently. Instead, they discussed the consequences coming from the calculation and the implications of being a ‘messenger’ between management and the shop floor. Little was done, though, to critically examine the calculation that constituted the basis of order. This

3 The operations manager implies that no one wanted to speak during the discussions with the shop floor.
conversation can be seen as a way of defying the official roles that the operations managers entered, where they felt like they were being shot as messengers when they conveyed the organizational goals.

Frontstage performance with the shop floor

During a briefing with the shop floor, one operations manager [operations manager 1 from the abovementioned management meeting] took a broad stance and initially looked down at the ground, as he said with discomfort:

   It is never an easy decision, [. . .] someone is without a job. [raising his head]
   However, if we do not make this decision, we will all be without jobs sooner or later. [. . .] You can tell it is bad times. They withdraw the newspaper, then you know it is a sign.

The organization had the intention to reduce costs, which made each operations manager responsible for scrutinizing their plants to find areas where costs could be reduced, including the workforce. Although during the management meeting operations managers gently mocked the workforce and their concerns about being one head short for each shift, in this case the operations manager showed that he is part of the group and had empathy for those being dismissed. Nonetheless, he was seriously affected by the dismissal calculation, and this artefact gave him leverage to execute the order while still retaining his place in the shop floor group. As he delivered the message, he maintained a united front with management concerning the decision. The setting here was designed and controlled by the operations manager. Even though the operations manager was defending the dismissal decision, the rhetoric about ‘us’ and ‘them’ reflects how he used management accounting as a defense to illustrate how the cuts were to be taken seriously and that decisions about cost reductions were above his paygrade. He used metaphors by referring to cutting small newspaper costs to illustrate their poor financial position, something that previous research has shown to be fruitful for accounting understanding (Carlsson-Wall et al., 2016). By referring to the accounting artefact and putting it into a context that made it visible to the shop floor, the operations manager brought his setting with him and established a scenario in front of the shop floor that could not easily be questioned. The operations manager let accounting inform the discussions and hid behind it, but it also divided him from the shop floor as he was part of management and thus the decision-making.
Erik’s backstage negotiations

Erik, the same operations manager as in the observation above, expressed concerns about the dismissal process during our ‘backstage’ conversation. He and his operations manager colleagues had to dismiss five organizational members each. Prior to the dismissals there were teams of ten. Erik explained that before the economic boom the teams had nine members, but they needed extra members when the company began doing well. In an attempt to be rational during the layoff process, he explained:

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\text{You need to look historically [...] we had one extra member covering up for short-term absence [...] and swoop, the tenth person has its own area, and then s/he is part of the team as a tenth member. [...] the tenth person is then taking responsibilities from the others [...] so, that decision was made. One member of each team] had to go. We all have to contribute [...] Often members talk about heads, but I like to turn it around and talk about tasks [...] after doing risk analyses, we decided that all plants are contributing with five members each.}
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The decision was made, and five members had to go. Erik relied on history as a point of reference and intended to be rational in the search to find members to dismiss to secure production. During our conversation, he used an outer dialogue to clarify the calculations and the responsibility he had that required him to make this decision. As he previously noted about the discussion with management, he defended the decision about how this in the end is a matter of everyday operations.

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\text{The shop floor team is the big dilemma [...] The foremen of each team keep diaries. And if you ask how their night was, they say: ‘It was okay. Quiet’. ‘But you’re dirty from head to toes!’ ‘Yeah, but we had all these jams there, and there, and there.’ ‘but write that down then!’ ‘but [handling daily operations] is my job’. You need to have discussions with every individual. It is good for the next shift to read about the night, if one has been crazy hard-working, and not just an ‘OK’.}
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Erik reflected on the importance of conveying the night’s happenings, and not just incidents that required reports. In this way, during the hand-off the next shift can be mentally prepared for what had been troublesome, where holdbacks had occurred, and what had been taking up time. In this quotation, Erik added nuance to the discussion about the shop floor having little to
do and taking responsibilities from each other. Although there was a belief in objective
calculations and decisions, the subjective nature of such calculations was highly apparent, as
Erik developed his thoughts about how such calculations depend on the setting. In explaining
the operations, he used an outer dialogue where he gave his principles context and meaning.
Taken together, this narrative shows how the operations manager rationalizes action and
decisions with management accounting artefacts, such as calculations and risk analyses.
Frontstage, the operations manager performs a distanced role, backing up management’s
directions by controlling the setting and firmly showing that this topic is not up for discussion.
It is not their decision, but the decision is essential and obvious for everyone with their minds
intact. There is a unity presented frontstage and no one wants to interrupt or question the
operations manager in his performance. Goffman (1959, p. 84) explains that in such a situation
the actors would depend on interplay to uphold their specific definitions of the situation. The
unity allows the operations manager to project his perception of the decision to the shop floor.
Those on the shop floor do not necessarily have to agree with him, but they do not interfere in
his performance. Nuances are shown backstage, however, but rationalization provides the
operations manager with distance to facilitate the execution of cutting the workforce. The
operations manager dismisses the cuts as part of a bigger-picture issue. Thus, the responsibility
is no longer on him or his peers. The professional discourse of the operations managers where
he highlights the need to address disruptions during shifts does not seem to completely match
his claimed belief in the financial calculations and the subsequent decision.

4.2 Making numbers green while managing distant operations

The second narrative concerns target fulfillment and cost reduction by outsourcing work under
contract. To eliminate fixed costs, the organization utilized contract work, which affects the
control over operations exercised by the operations managers. This narrative played out in the
mines.

Frontstage performance with the shop floor

During ‘Morning Prayer’ in the mines (that is, the morning production meeting), one operations
manager was going through information on the whiteboard with red and green markers.
Everyone was standing around the whiteboard where the operations manager systematically
addressed one point at a time. Safety was the first point, which illustrates its importance to the
teams and the organization. Some incidents had happened since yesterday’s meeting that
required reports. One operator reported a gas leak when they were drilling. Another operator reported that rocks had been falling down in the excavation, and that they did not put up sufficiently many signs to warn contractors about the risk of collapse. A third operator reported a traffic incident where one car was hit from behind. Lively discussions took place about what had happened and who was to blame, where one shop floor member reported the damages that occurred in this incident. The operations manager firmly ended the discussion by saying:

Yeah, well, this you’ll figure out together in synergy after the meeting. Let’s move forward.

With this statement the operations manager signaled that he relied on the shop-floor teams to maintain control over operations, and that he did not need to partake in the sequels stemming from that incident. He instead moved on with his lists and the lively discussions came to an abrupt end. The operations manager reached the rock-bolting point on the agenda. Rock bolting requires heavy machinery and is a way to reinforce tunnels to prevent unstable rocks from caving in. Long bolts are installed into the rock, and a net or wire is attached. Regarding the rock-bolting teams’ operations, the operations managers noted the numbers on the whiteboard and gave the teams some quick credit:

The bolting looks green and nice [pointing to the white board]. It is green for the week and it is green for the year.

The operations managers applied the same procedure concerning all the teams’ operations and responsibilities, even those showing red numbers on the whiteboard. Thereafter he moved on to the next point on the production agenda without further comment. The quotations show that the operations manager gave the shop floor space in which to deal with operations by themselves, to discern incidents and to organize their operational work in a decentralized manner to keep production running. He distanced himself in managing the teams and did not attempt to interfere in the teams’ operations. At the same time, the labeling of the morning production meeting as omnipotent (i.e. ‘Morning Prayer’) reflects how the continuous production process is constitutive of operations managers and the shop floor, and that tight control is essential. As the extraction of iron ore is highly remote and executed in widely separated places, it is important that the responsible operations manager receive information

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4 Extraction can only follow the iron ore body and the machines are not easily transferred. Maintenance and preventive maintenance are performed where needed. Loading is automated and performed via aboveground remote-control centers.
to keep control of the production process. The 700 kilometers of tunnel make it difficult to keep
the control of operations centralized. The operations manager gave the shop floor a free hand
partly because of frequently occurring meetings that maintained his control over operations,
and partly because of the distance between the two development drifts (i.e. North and South).

*Karl’s backstage negotiations*
Karl, the operations manager who was leading the ‘Morning Prayer’, drove me through the
mines to show me the mining work that is carried out. Such varying work in the mines includes
reinforcements, drift developments, and making sure the pumping equipment works properly
to avoid flooding the mines. Daily tasks for operations managers in the mines imply using
judgement, dealing with calculating costs, being efficient, and adhering to standards, not to
mention addressing physical dangers, which was expressed as a priority down in the mines.
Safety routines are intended to be followed at all times, as emphasized during the ‘Morning
Prayer’. Most accidents in the mines are however caused by traffic in the tunnels. Karl stopped
at a clay gouge (a zone in the mountains with a muddy texture) in a development drift where a
sub-contractor was standing. Some tasks in the mines, such as some aspects of reinforcing clay
gouges with rock bolting, are under contract. The sub-contractors also however need to follow
safety routines and procedures. Karl explained that clay gouges are problematic, because the
tunnels in the mines need extra reinforcement with the aid of rock bolting, resulting in more
expensive drifts:

*The difference from regular infrastructure is the life length. Down here [in
the mines], we only need to extract the iron. […] but some [sub-contractors]
want to go around [the infrastructure requirements] and make [the drifts]
less sustainable. Not exactly how we want it.*

The intention with the contract work was to eliminate fixed costs and was a management
directive. Drawbacks were discussed, however, because operations managers lost further
control of the operations. If the drifts or tunnels do not last, the consequence is disruption of
production or perhaps even safety issues. This is especially problematic because the mountain
is setting the conditions for the extraction rate of the mining. Lost production cannot be
recouped. Karl handled some of the uncertainties in the mines by compensating with tighter
control over his teams’ expenses. The costs of Karl’s operations had decreased by 30 percent
since he changed the routines for invoices. As Karl explained while showing his spreadsheets,
he does follow-up on invoices, color-codes according to the types of operations to which they
belong, and negotiates with suppliers and contractors regarding what he is to pay, thereby reducing some uncertainty.

*The negotiations [are now] based on my requirements and wishes. The invoices [should be based on] the number of bolts and so on. Not on stand times or hours!*

Backstage, Karl showed how he maintained control while still providing the shop floor with control over daily operations. Fixed costs were eliminated by contract work, but these contracting costs where too variable for the operations manager and he did not know what they entailed. To figure this out, he organized face-to-face meetings, picked up his phone and called the supplier when he found some questionable numbers that he could not understand. He relied on talk to understand accounting and to maintain control over operations. In this way, he developed his own accounting system to reduce some uncertainty inherent to the ‘mountain’ which he felt grew with the outsourcing of contract work.

Over all, this narrative shows how the operations managers creates his own system to maintain control over distant operations that are hidden from the shop floor. The operations are in many ways automated but with high operational expertise. Management chose sub-contractors to buffer the cost-sensitive part of production. Frontstage, the operations manager enters a detached role with respect to operations and target fulfillment by allowing the teams to report their results and thereby maintain decentralized operations. He creates a setting where the operations belong to the shop floor. In this way, operations managers can use an inner dialogue with the shop floor where the principles that apply to production process outcomes are in focus. Backstage, however, the operations manager expressed a sense of loss of control over the production process. In our conversation, he clarifies how the principles came to be by providing ‘narrative meanings’ (Jönsson & Solli, 1993, p. 318) of the control he seeks to maintain. The operations manager seems to place expectations on himself to enter an official standpoint (Goffman, 1959, p. 80). To maintain control over distant operations (both in-house and under contract) the operations manager creates his own management accounting system, yet he does not share this system with the shop floor.

### 4.3 Lacking operational cost awareness

The third narrative concerns what an operations manager at the concentration plant experiences as a lack of operational cost awareness with the shop floor and the failure of management to respond to her concerns. This narrative is apparent in two observations. The first observation
took place during an interaction between the operations manager and the finance manager for her plant. The other observation took place when she showed me around the concentration plant.

*Frontstage performance with management*

All operations managers at the mining company are provided with monthly accounting reports from the accounting system. They are expected to extract any information they need, even such information that is not included in the reports from the accounting system. One operations manager did not feel that the reports are fruitful in providing them with guidance for their operational decisions and execution. Above all, routines for handling accounting at the shop floor were missing. Simple accounting routines were expressed as if they would enable the shop floor to make informed decisions and execute thereafter. During a meeting with management, the operations manager said with nervous laughter:

*There is a big problem with our lack of understanding for how costs affect our [operational work].*

The operations manager complained that the standardized reports did not aid the shop floor in their operational work. Yet, she saw potential in including more management accounting information in their daily operations to increase efficiency. The finance manager for the mining site defended the routines:

*You know, we chose standard reports. We are not able to give everyone what they want.*

Even though the finance manager defended the routines, it is not obvious that the operations manager wants tailored reports. The operations manager sought control and felt that control would come from ‘better’ localized management accounting. The operations manager emphasized that accounting numbers can give her the information that she needs to standardize the work of the machines. The idea seems to be that, without cost awareness at the shop floor, the operations would be difficult to make more cost efficient.

*Emma’s backstage negotiations*

During a walk with Emma through one of the concentration plants, the operations manager from the observation above she expressed concern about the non-accounting style on the shop floor:
You see, this is what I am talking about! Someone just left their gloves right here. There is a cost in those also. Suddenly you might find a coring bit just thrown on the ground with a worth of 50 000 [SEK].\(^5\) We do not have that [cost-saving] mindset here.

Emma would like to see cost management permeate the shop floor. Cost awareness was lamented as lacking from the shop floor and support was lamented as lacking from the accounting department. Although the cost awareness issue had been raised with management, the discussions never became detailed in terms of her practical observations and experiences that could require routines to save costs.

Emma remarked that neither of the mill stoppages at her plant were planned with a focus on economic terms. There was a wish from her side to visualize what can be gained by thinking in terms of cost parameters. Easy routines that would assist the operations manager in calculating the economic consequences of operating each machine were missing from the organization’s routines. Such routines would also create mental frames to encourage the shop floor to think about costs. The routines were not institutionalized with the shop floor, however. The operations manager browsed through papers in a binder that was used to keep statistics on the machines and said:

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\text{As it is now, the only focus is on quality. [...] the stoppages are random, and not calculated. There is no consistency in these papers.}
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Emma said this with a laugh, but simultaneously she conveyed feelings of dejection. In the operational team, Emma felt alone in her quest for cost awareness. Instead of cost awareness, the non-accounting style was internalized at the shop floor, and management were not supporting the desired routines regarding operational accounting issues—or perhaps they could not understand them.

Over all, this narrative shows how the operations manager reflects on operational work and management accounting in terms of accounting routines. Frontstage, the operations manager sets the tempo and seems to dominate the interplay by pursuing the issues on her agenda. Yet, she does not share her production knowledge with management. Instead, she conducts a dialogue that deals with management accounting information and reports that seem rather detached from her and her team’s operations. She seems to ‘talk accounting’ and use an

\(^5\) The end of the drill is commonly referred to as the coring bit.
accounting inner dialogue with management, which may make it difficult for them to completely grasp the meanings of what she tries to convey. Even though she does not bring her own setting to this interplay, in a way the stage becomes hers (Goffman, 1959, p. 86). The operations manager embraces the role of an insider with respect to the management group, which causes her not to share the connections between daily operations and management accounting that she has observed. Instead, the initiatives are presented in aggregated terms. Backstage, the operations manager puts cost awareness issues into context by providing stories that include details about the work process and what can be done. These details are what makes the principles understandable in the local context. Backstage, the operations manager no longer seems to put up a front to the group and instead ‘talks operationally’ through an outer dialogue.

5 Discussion
The following sections discuss the ways in which operations managers enter roles in their interplay with management and the shop floor and the negotiations that take place backstage. Thereby, I theorize about how accounting plays a part in operations managers’ interplay with the shop floor and management.

5.1 Accounting as a mechanism for crossing boundaries
The narratives presented above suggest that accounting legitimizes the operations managers’ roles in their interplay with management and with the shop floor. Operations managers can embrace an officially remote role with respect to accounting, where the shop floor organizes their own work in accordance with accounting standards, as shown in the observation with managing distant operations. One interpretation is that operations managers have expectations regarding their role that requires them to uphold an official standpoint (Goffman, 1959, p. 80). Simultaneously, operations managers’ local connections may allow them to perform the role of an insider that can be accepted by the shop floor. In this way, operations managers cross the boundaries of the shop floor without intrusion as they share ‘symbolic capital’ by wearing shop floor overalls and hard hats (Bourdieu, 1999, p. 97). When accounting is brought into the setting by operations managers (Goffman, 1959), though, the role of an outsider, as shown in the observation with the workforce cuts, can be entered by an operations manager.

Crossing boundaries is inherent to the role of an operations manager (Styhre, 2012). This study indicates, though, that there are reasons to think about accounting as a mechanism that invites organizational members to cross boundaries and to become fairly accepted inside a boundary even though a given actor might be an outsider. In this way, accounting is an important script
for operations managers’ performance that can be brought to various boundaries, and that can perhaps substitute for an organizational member’s lack of ‘habitus’ in a new setting (Bourdieu, 1997). Despite miscommunication between operations managers and management, as in the observation with operational cost awareness, accounting acts as an entry ticket which legitimizes operations managers, enabling them to perform a role in front of management. The talk is central as it positions operations managers as outsiders or insiders.

5.2 Accounting as a mechanism for embracing a role

The narratives we have considered show that accounting enables operations managers to embrace multiple roles. Operations managers need to balance and process roles simultaneously in their interplay with others where accounting enables them to put on a mask and perform these roles. In interplay with management, operations managers can rationalize the potential consequences stemming from management directives, as shown in the observation with the workforce cuts. Just as an accountant produces ‘truthful knowledge’ (Lambert & Pezet, 2011), so operations managers perform a messenger role by providing such ‘truthful’ messages. The calculations showing the need for a cut are strong and reliable. In this case, the operations manager seeks support from management for the consequences of their collective decision in which the operations manager embraces a messenger role. It seems, however, as if the messenger role is ascribed additional attributes, where the operations manager embodies an official role in protecting organizational interests across these boundaries. It seems as if accounting can also ease some of the tensions between the roles described by Arena and Jeppesen (2016).

In their interplay with management, operations managers can be duped by their own performance (Goffman, 1959, p. 26), as shown in the observation with workforce cuts. The calculations show the need to cut the workforce, and to not believe them is presented as irrational. Yet, the small town in which this company is located means that employees’ children may be enrolled in the same school or attend the same soccer teams. Thereby, in such a small town, people have a tendency to bump into each other. Operations managers can nevertheless reflect upon the roles they performed, and accounting may be negotiated differently when operations managers are backstage. Operations managers do not adapt only to accounting rationales in their performance in front of others; they also adapt to accounting rationales in their negotiations backstage, as shown in the observations with managing distant operations and operational cost awareness. Accounting would then not only enable operations managers
to embrace the performed roles by masking themselves with accounting, but also to internalize accounting rationales via visualized financial responsibilities (Ahrens & Chapman, 2002). Accounting talk is thus interpreted as a way to ward off unwanted criticism.

5.3 Accounting as a mechanism for agency

The narratives we have considered suggest that accounting enables operations managers to pursue their agendas and exert agency. Agency would then imply influencing others to carry out action (Jack, 2017, p. 60). Operations managers both visualize and withhold their accounting knowledge to gain or maintain control. At times, it was difficult for the actors observed to reach consensus in the interplay between operations managers and management with visualized accounting knowledge. Focusing on a tangible accounting artefact (e.g. monthly reports) does not necessarily make communication easier (Jönsson, 1998). Instead, divergent understandings of accounting artefacts hampered consensus, as shown in the observation associated with operational cost awareness. Miscommunication can therefore come from insecurity with operations managers about the knowledge possessed by management regarding a localized setting and its implications for accounting. Operations managers may aim to bring their localized settings (e.g. operational knowledge or contextual stories) to the management boundary (Goffman, 1959).

When aggregate rhetoric is used in the interplay between operations managers and management, and operations managers are talking accounting, the understanding of detailed operational routines that is sought is difficult to achieve. Expectations may be of importance here (Byrne & Pierce, 2018), as operations managers may not expect management to be locally informed. Knowledge (i.e. capital) of operations may be thought of as valuable only inside the boundaries of the shop floor (Bourdieu, 1997, p. 128) and therefore should not be shared with management. Operations managers’ accounting knowledge is shared in the interplay with management but the contextualization that is missing in the attempt to make it easier for accountants to understand the issues encountered at local levels instead becomes counterproductive.

While operations managers perform a detached role with a relaxed attitude towards accounting, tight control may be withheld from the shop floor in informal systems, as shown in the observation with managing distant operations. To gain agency from accounting, operations managers can position accounting to gain leverage. This implies that knowledge about (accounting) artefacts and their contexts is highly valued (Bourdieu, 1997). At the shop floor,
this knowledge does not necessarily need to be shown to team members. Rather, control maintained by operations managers can be withheld from their observers, making the operations managers remain insiders in the eyes of the group. Bringing accounting into the shop floor setting may render operations managers outsiders. Operations managers may not talk accounting with the shop floor, even if they consider accounting issues during their interplay with the shop floor. It seems as if operations managers actively choose what they want to share and with whom (Puyou, 2018), and this may situate accounting agency. Just as accounting knowledge can be used to execute agency, withheld accounting also endows operations managers with agency.

6 Conclusions

Via observations of frontstage performance with management and the shop floor and the ensuing backstage negotiations, this paper analyzes the ways in which accounting enables operations managers to enter and perform varying roles in their interplay with the shop floor and management. Despite operations managers’ non-accounting background, accounting serves as a legitimizing ‘entry ticket’ that enables them to cross boundaries between the management and shop floor settings. Via their talk and rhetoric, operations managers can visualize and withhold accounting knowledge from observers to enter roles to remain insiders or become outsiders to the group. At times, embracing the role of an outsider (or insider) may be deemed necessary for agency to govern operations and remain in authority. Accounting therefore serves as a mechanism for non-accountant operations managers that enables them to cross boundaries, embrace roles, and exert agency to govern operations.

The study contributes to the accounting literature by showing that accounting for operations managers outside the accounting function serves a wider role than the attributes that are traditionally associated with their work positions as operations managers. Operations managers are not passive actors receiving accounting reports and delivering production outcomes. They are also ‘reflexive selves’ who cross organizational boundaries by elaborating on accounting and its implications for everyday encounters. Operations managers not only have expectations of accounting, they can also pursue their operational agendas by embracing roles deemed suitable for observers within a boundary.

This study also contributes to the literature on ‘accounting talk’ by showing that adopting insider rhetoric and terminology in the interplay with a group can be problematic. The stories behind the shared principles can become neglected, which may cause the audience to
misinterpret the discussions. When operations managers talk accounting with management, there may be no adherence, where the context for the problem at hand is lost, or worse, may come across as unauthentic.

Roles may influence operations managers’ identities. Future research could address these multiple roles and investigate how they affect an operations manager’s identities. Shop floor members may be characterized as having strong identities and may therefore develop apparent boundaries with which operations managers may identify themselves (or perhaps the apparent boundaries of the shop floor shape the powerful identities?). Yet, operations managers often show the shop floor that some accounting rationale needs to be followed and it seems as though the collective shop floor identity does not always measure up to a management identity. Is it that accounting challenges identities when accounting rationales contrast with operational rationales?
References


