THESIS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

Involving individuals in the manufacturing strategy formation: Strategic consensus among workers and managers

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Gothenburg, Sweden, 2015

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ISBN: 978-91-7597-309-8

Doktorsavhandlingar vid Chalmers tekniska högskola
Ny serie nr 3990
ISSN 0346-718X

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Chalmers Reproservice
Gothenburg, Sweden, 2015

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ABSTRACT

Decisions made and actions taken by individuals in the operations function impact the formation of a company's manufacturing strategy (MS). Therefore, it is important that the MS is understood and agreed on by all employees, that is, strategic consensus among the individuals in the operations function is essential. This research contributes to the current body of knowledge by including a workers' perspective on MS formation. It is the workers on the shop floor who bring the MS to life in the actual operations through their daily decisions and actions. The MS falls short if the priorities outlined do not materialise in practice as intended. The purpose of this research is *to investigate how the individuals in the operations function perceive the MS in order to understand how these individuals are involved in the MS formation*. The research is based on five studies, differing by evidence, as follows: one theoretical, three qualitative in the setting of small and medium-sized enterprises (SMEs), and one quantitative at a large company.

Based on the findings presented in the six appended papers, the results show that empirically and conceptually, workers have been overlooked or given a passive role in the MS formation. Empirically, it is seen that workers and managers do not have a shared understanding of the underlying reasons for strategic priorities; hence, the level of strategic consensus is low. Furthermore, the level of strategic consensus varies among the different MS dimensions depending on their organisational level. Moreover, the empirical findings reveal that internal contextual factors influence the individuals' perceptions of the MS and the possibilities for strategic consensus. Regarding the external context, the results show that major customers' strategies influence the subcontractor SMEs' MS formation. The usage of means of communication in the operations function has also shown to be of importance for how the MS is perceived. Conceptually, the findings indicate that the MS literature tends to treat individuals in the operations function in a deterministic manner; individuals on the shop floor are regarded as manufacturing resources. To ensure a successful MS formation process, where the patterns of the decisions made by the individuals in the operations function forms the MS, the view on human nature within the MS requires a more voluntaristic approach. This research suggests to view the MS formation as an iterative "patterning process" which builds on a reciprocal relationship between workers and managers. The introduction of the patterning process contributes to the research on MS formation by explaining the perception range within the hierarchical levels, by re-defining the hierarchical levels included in the MS formation and by detailing the activities in the MS formation.

Keywords: Manufacturing strategy, strategic consensus, behavioural operations, workers, managers

List of appended papers

Paper 1

Edh, N., Winroth, M. and Säfsten, K. (2012), "Production-related staff's perception of manufacturing strategy at a SMME", *Procedia CIRP*, Vol. 3, pp. 340–345.

Edh Mirzaei presented an earlier version at the 41st CIRP Conference on Manufacturing Systems, 15–18 May 2012, Athens, Greece.

Contributions: Edh Mirzaei was the lead author. Edh Mirzaei and Winroth initiated the paper. Edh Mirzaei, and partly Winroth, collected the data. Edh Mirzaei conducted the analysis and wrote the paper. Winroth improved the structure and readability of the paper. Säfsten was the project leader for the research project and established the company contact.

Paper 2

Edh Mirzaei, N. and Halldórsson, Á. (2015) "Manufacturing strategy from a behavioural operations perspective: The people dimension".

Edh Mirzaei presented an earlier version at the 20th EurOMA Conference: Operations Management at the Heart of the Recovery, 7–12 June 2013, Dublin, Ireland.

Contributions: Edh Mirzaei initiated the paper. Edh Mirzaei and Halldórsson conducted the analysis and co-wrote the paper.

Paper 3

Edh Mirzaei, N., Fredriksson, A. and Winroth, M. (accepted, forthcoming), "Strategic consensus on manufacturing strategy content: Including the operators' perceptions", *International Journal of Operations and Production Management.*

Edh Mirzaei presented an earlier version at the 22nd International Conference on Production Research, 28 July–1 August 2013, Iguassu Falls, Brazil.

Contributions: As the lead author, Edh Mirzaei initiated the paper, designed the study and collected and analysed the data. Edh Mirzaei and Fredriksson refined the analysis and co-wrote the paper. Edh Mirzaei was the leader of the process. Winroth improved the structure and readability of the paper.

Paper 4

Edh Mirzaei, N. and Fredriksson, A. (2015), "Exploring contextual factors influencing workers' perceptions of manufacturing strategy".

Paper submitted to an international journal.

Edh Mirzaei presented an earlier version at the 21st EurOMA Conference: Operations Management in an Innovation Economy, 20–25 June 2014, Palermo, Italy.

Contributions: As the lead author, Edh Mirzaei initiated the paper, designed the study and collected and analysed the data. Edh Mirzaei and Fredriksson refined the analysis and co-wrote the paper. Edh Mirzaei was the leader of the process.

Paper 5

Edh Mirzaei, N. (2015), "Communication in manufacturing strategy formation: enabling strategic consensus".

Paper submitted to an international journal, invited for a special issue.

Edh Mirzaei presented an earlier version at the 22nd EurOMA Conference: Operations Management for Sustainable Competitiveness, 26 June–1 July 2015, Neuchâtel, Switzerland.

Paper 6

Edh Mirzaei, N. and Lantz, B. (2015), "Strategic consensus: differences in perceptions of competitive priorities among individuals in the operations function".

Edh Mirzaei presented an earlier version at the 22nd EurOMA Conference: Operations Management for Sustainable Competitiveness, 26 June–1 July 2015, Neuchâtel, Switzerland.

Contributions: As the lead author, Edh Mirzaei initiated the paper, designed the study, collected and analysed the data and wrote the paper. Lantz provided support with the quantitative data analysis, structure of the results and refinement of the analysis. Edh Mirzaei was the leader of the process.

To Mum and Dad

"Far away there in the sunshine are my highest aspirations. I may not reach them, but I can look up and see their beauty, believe in them, and try to follow where they lead."

— Louisa May Alcott

Acknowledgements

Without a number of people, this thesis would never have been finished (at least not with my sanity still intact).

Thank you, Magnus and Mats, for believing in me that cold spring day in 2010 when I still very much felt like a confused student. You gave me the opportunity of a lifetime.

My supervisors have meant more to this research process than others. Mats, I am grateful to you for letting me find my own ways and make my own mistakes and for always being supportive. Anna, thank you for the endless hours on Skype and the phone, for co-writing and re-writing, for your honesty and willingness to always push me a little bit further. I have not always been happy with you nor very polite, but I always appreciate your feedback and friendship. Arni, I am indebted to you for always sorting out my thoughts, offering new viewpoints on seemingly unsolvable problems, allowing me to speak English when I get too excited to keep my thoughts in order and always being there during tough times.

Research can be done without connections to industry, but to me and this research, these connections have been essential. I express my warmest thanks to my case companies and other industry contacts. You have not only given me the possibilities to collect data but also helped me sort out research issues and allowed me to ensure that my research is actually relevant outside room 3323 at Chalmers. My special gratitude goes to my interviewees on the shop floors around Småland. Without you, I would not have had any thesis to present. Through your answers to tricky questions and by introducing me to the metalworking industry, you have taught me a great deal about the job on the shop floor. I truly appreciate your sincerity and the ways you have opened up to me.

To my current and former colleagues at the Department of Technology Management and Economics, thank you for the discussions, seminars, PhD courses, kick-offs, coffee breaks, lunches, conference trips, pedometer competitions and hallway hellos. It has not always been the most enjoyable thing in the world to go to work knowing that some text has to be re-written for the ten thousandth time, but your presence has always cheered me up. Over these five years, some people have become closer to me, with whom I have developed relationships that eventually have become deep friendships. I am forever grateful for the wonderful people I have met at Chalmers and whom I now call my friends.

To my colleagues around the globe, the academic world is a wonderful environment, where I have met so many amazing people. Thank you for being open-minded, spontaneous and always ready to give constructive feedback. A special thank you goes to the EurOMA social media team members, to my fellow classmates at the EurOMA summer school in 2014 and to the colleagues at the University of Bergamo.

I also extend my gratitude to those external reviewers whom I have come across during my research process. A special thank you to Anna Öhrwall Rönnbäck who was the discussant for my licentiate seminar, to Mats Johansson who gave valuable insights at my second research

proposal seminar and to Nicolette Lakemond whose feedback at the final seminar truly helped improve this thesis.

Outside this somewhat crazy academic world, a few people would never ask if I was sure that my ontological standpoint matched my research questions. Rather, they have asked if this school business is not finished soon and if I have eaten properly. Mum and Dad, thank you for always believing in me and teaching Jonna and me that no matter how hard life is, it is always worth it; I love you! Thank you for letting me go my own ways and for the courage you have given me. Mum, I am grateful for the endless hours on the phone. I know you have tried to understand what I have said, and even if I have at times gotten angry, I appreciate how you have tried to give me perspectives on what is truly important in life. Dad, thank you for being my safe harbour, answering silly questions about production and always having an extra hug or two to spare. Jonna and Jonas, thank you for the love and support. Grandma Lilly, *tack för allt ditt stöd. Jag är klar med skolan nu!* Maryam, Ahmad, Pegah and Amin, *kheili mamnun az hemayat haye shoma*. It is wonderful to have a second family! Sophie, Tobias, Tindra and Trixie, I will never be able to express how much it means to me to have you in my life. *Jag älskar er tjejer, och snart kan jag komma och leka mycket mer med er!* Paraskeva, Sebastian and Nathaniel, family is important, but what defines family is up to us to decide. Thank you for letting me be a part of your lives.

To my friends at home in Sweden, in Iran and spread all over the world, thank you for never being farther than a Skype call or a Facebook message away. I hope now that finally, I will be able to see a bit more of you all.

Last but not least, to my "husbandi" Pedram, thank you for all the dinners you have cooked, all the times you have done the laundry or the dishes (even though I have promised to do them), all the cups of tea you have brought to the office late at night and all the sweets you have bought. I appreciate all the times you have listened to my very detailed explanations about my day at work, all the times I have woken you up in the middle of the night because I have been stressed or worried or simply just have had to get up to write something. You mean the world to me! *Duset daram azizam*.

As a final note, and the most important thing I have learnt: always remember to see people as individuals!

Nina

Gothenburg, December 2015

"It's not just about hope and ideas. It's about action."

– Shirin Ebadi

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1 Introduction

This chapter starts by addressing the practical and theoretical relevance of this research. It introduces the background to the research problem, defines relevant key concepts and states the purpose. Lastly, the scope and delimitations are presented.

1.1 Background: the Swedish context

This research takes a perspective on the manufacturing strategy (MS) that focuses on the individuals in the operations function. The MS outlines the priorities, primarily related to cost, quality, delivery and flexibility, for the operations function and the individuals on the shop floor are the ultimate executors of these priorities. The research problem exists at four levels: the national, industry, company and individual levels. The first two levels serve as the setting for the research problem, while the last two are the focus of the research.

At the national level, the empirical setting is Sweden. The success of Swedish economic development builds on large amounts of natural resources, particularly forest and iron ore, and the refinement of these resources (Ekonomifakta, 2013). Therefore, Sweden is a country where manufacturing has an important role in "securing jobs and welfare" (Vinnova, 2015, p. 3). Swedish industry is characterised by small, entrepreneurial companies with a "long tradition of strong unions and a government committed to an egalitarian society" (Svenskt Näringsliv, 2015). A majority (99 percent) of Swedish companies are small and medium-sized enterprises (SMEs), employing more than 40 percent of the Swedish workforce (Svenskt Näringsliv, 2010) Sweden is highly dependent on its extensive export of produced goods, representing 31.3 percent of its gross national product (GNP) in 2014 (Ekonomifakta, 2015). Therefore, to remain a successful industrial country, Sweden does not only have to deal with domestic challenges in how to improve the competitiveness of the industry in general, but it also faces issues associated with increased global competition from both industrialised and developing countries with rapid progress in manufacturing (Vinnova, 2015, p. 3). Moreover, Sweden, along with the rest of Europe, faces major demographic changes where the young population, that is, the incoming workforce, is decreasing (Berlin et al., 2013; Svenskt Näringsliv, 2003).

At the industry level, these demographic changes become increasingly important for the manufacturing industry as the diminishing young workforce considers jobs in industry less desirable and therefore seeks employment in other sectors, for example, as caretakers of the increasing elderly population (Berlin et al., 2013; Svenskt Näringsliv, 2003). To improve the attractiveness of the manufacturing industry and to ensure future competitiveness of Swedish production, activities and research initiatives from both practice and government have been launched, such as the strategic innovation programme Produktion2030 (Vinnova, 2015) and the lean-based initiative The Production Leap (Produktionslyftet, 2013b).

To meet the challenges at both national and industry levels and to maintain industry competitiveness, Swedish manufacturing companies should improve on several dimensions – sustainable growth (e.g., through increased efficiency of the production systems), attractiveness for employees, environmental sustainability and innovativeness (Produktionslyftet, 2013b;

Vinnova, 2013). Produktion2030 (Vinnova, 2015) emphasises that the increasingly complex production systems call for competent individuals who work together in new types of teams with great capabilities for adaptive changes, continuous improvements and efficient information sharing. However, as companies are most often constrained by limited financial resources, time and knowledge, most companies need to prioritise among the improvement directions. Therefore, it is essential that the MS outlines how and in which order to execute strategic decisions. The combination of the two terms *manufacturing* and *strategy* inherently captures a commitment to an interaction between two levels of an organisation. One level comprises the manufacturing processes in the operations function, and the other level consists of the managerial decisions related to strategy. This research originates from the notion that a micro-level perspective often is overlooked in the study of the MS. In other words, the MS literature reveals a gap concerning the operating individuals, their perceptions of the company's MS and their roles in the materialisation of the MS. Therefore, the MS research risks overlooking the important impact that the "everyday decisions made on the shop floor" can have on a company's "ultimate strategic position" (McDermott & Boyer, 1999, p. 21). An MS is "only effective if it is fully understood and implemented by the operational-level employees who make small but ultimately crucial production decisions on a day-to-day basis" (McDermott & Boyer, 1999, p. 22). Hence, there is the risk that the decisions made on the shop floor are inconsistent with the overall objectives of the company's strategy formulated by managers. Therefore, this research focuses on the micro level – the individuals on the shop floor working with everyday execution of the MS – by taking a behavioural operations (Croson et al., 2013) perspective on how the work with the MS actually forms/materialises in the manufacturing processes in the operations function. While earlier research to a great extent has adopted the management perspective on this MS formation (Barnes, 2002), this research takes the workers' perspective.

The strategic issues related to the individuals in the operations function have partly been addressed by the employers' organisation in Sweden, Teknikföretagen, along with the Swedish Governmental Agency for Innovation Systems, Vinnova, through the programme Produktion2030 and its Made in Sweden agenda. In this agenda, "the humans in the production system" are defined as a research area to target in order to make Sweden one of the world leaders in sustainable production before 2030. This "human" research area in Produktion2030 has focused on comprehending the future complex production systems' implications for their individual workers. The testimonies from practitioners who are active in The Production Leap (Produktionslyftet, 2013a) also address the importance of managing communication to place the individual at the centre. The Production Leap accounts for managers' testimonies showing that workers tend to take on greater responsibilities after being allowed to participate in implementation work (Produktionslyftet, 2013a). Furthermore, it reports on the importance of everyone "pulling in the same direction" as a prerequisite for companies to manage tougher business conditions (Produktionslyftet, 2013b). Regarding the workers' participation in implementation, Vinnova (2013) emphasises the "importance of strategic management and work organisation for well-functioning workplaces and thereby the efficiency and long-term development of operations" through their Management and Work Organisation Renewal programme. However, to enable a company's MS to play an important role in the Swedish

industry's future success, the MS field in itself needs to develop. Increasingly complex production systems require a new view on their individual workers. Future workers on the shop floor will unlikely execute simple repetitive tasks; rather, they will be substituted by machines for such functions. The workers who are still needed on the shop floor will take part in "new evolving forms and systems of interaction and collaboration between people and advanced automation" (Vinnova, 2015, p. 11). Central to the success of these complex future production systems is that the individuals in the operations function understand the strategic implications of their work on the shop floor, as "traditional production work is evolving into sophisticated knowledge work" (Vinnova, 2015, p. 11). In these new production systems, the organisation will be characterised by "great responsibility and decentralized decision-making" (Vinnova, 2015, p. 11). The current Swedish research agenda therefore indicates an increased focus on the important role that the individuals in the operations function play in production. The emphasis on the individuals becomes crucial for the country's future prosperity.

A central concept for strategic management on the shop floor is strategic knowledge, which enables strategic alignment and strategic commitment (Gagnon et al., 2008) to the strategic goals. As almost all individuals in the operations function make operations decisions, it is vital for effective decision-making that "everyone have a shared understanding" (Boyer & McDermott, 1999) of the company's MS, including the lower levels of the organisation, specifically, the workers (Marucheck et al., 1990). Strategically committed individuals, who put their trust in the organisation, show strategic-supportive behaviour. McDermott and Boyer (1999, p. 22) explain that "a lack of strategic consensus can do serious damage". Therefore, the concept of strategic consensus (Boyer & McDermott, 1999) among the individuals in the operations function is essential for the understanding of the workers' perspective on the MS. However, the workers' perspective on the development of strategic consensus on the MS and the MS formation process requires more research attention since these individuals are the ones making crucial decisions on the shop floor (McDermott & Boyer, 1999). Empirical studies from the workers' perspective with a behavioural operations perspective on the MS, are especially needed. This research aims to fill this gap and therefore takes an approach with a more human-centred view on the operations function than what previous research in the field has taken.

In this research, the Swedish context is prevalent, but the issues and problems related to the MS formation is international, as indicated by the worldwide interest shown in the results of the International Manufacturing Strategy Survey (IMSS, 2015) over the past two decades. This survey study includes data from 931 manufacturing plants in 22 countries, and its six editions have resulted in numerous publications. The study of only one national context may of course limit the findings. However, the Swedish national culture emphasises "participative and autonomous leader characteristics" (Holmberg & Åkerblom, 2006, p. 323), and the Swedish industry workforce is among the most empowered and unionised in the world (approximately 80 percent) (Kjellberg, 2015). Therefore, it is believed that the Swedish context particularly offers opportunities to study the MS in an industrial setting where the operations function is traditionally given a prominent role.

1.2 Key concepts

This section captures the key concepts on which this research is based. First, it briefly describes the core of the MS and problems related to the development of the field. Second, it elaborates on the individuals' roles in the MS and introduces the behavioural operations perspective. Third, it explains the concept of strategic consensus.

1.2.1 Manufacturing strategy

Skinner (1969) identifies manufacturing as the missing link in corporate strategy and proposes the MS concept. A strategic focus on the operations function, hence an MS, is essential for a manufacturing company to remain competitive (e.g., Dangayach & Deshmukh, 2001; Skinner, 1969) and has become increasingly important as the global economy becomes more competitive. Traditionally, an MS is defined in terms of creating a fit between the market's preferences and requirements and the company's operational resources (Skinner, 1969; Slack & Lewis, 2011). Thus, the MS mainly aims to provide a link between the operations function and the company's corporate strategy (e.g., Miltenburg, 2005; Skinner, 1969; Slack & Lewis, 2011) in order to achieve a "long-term advantage" (Miltenburg, 2005, p. 2). The MS is commonly operationalised by a distinction between content (which comprises strategic decisions made with respect to competitive priorities and decision categories) and process (i.e., formulation and implementation) (Dangayach & Deshmukh, 2001; Mills et al., 1995; Slack & Lewis, 2011). The MS can be viewed as a pattern of structural and infrastructural decisions about the operations function that are made over a longer time frame to support the company's corporate strategy and thereby remain competitive (Hayes & Wheelwright, 1984; Marucheck et al., 1990; Miltenburg, 2005). Therefore, the role of the MS is to translate the company's strategic objectives into operational activities (Lowson, 2003). This research primarily adheres to Marucheck et al.'s (1990, p. 104) definition of MS as "a collective pattern of coordinated decisions that act upon the formulation, reformulation and deployment of manufacturing resources and provide a competitive advantage in support of the overall strategic initiative of the firm".

The MS field has encountered (at least) two main problems. First, it has become increasingly isolated. Other fields within the operations management domain have interacted with external fields and domains to explore "contemporary operations practice through alternative lenses and frameworks" (Taylor & Taylor, 2009, p. 1325) and have borrowed ideas from the resource-based view (RBV), for example (Pilkington & Meredith, 2009). In contrast, the MS field has "increasingly lost touch with the mainstream corporate and business strategy literature" (Brown & Blackmon, 2005, p. 794). Furthermore, a "lack of effort to integrate manufacturing strategy ideas with established concepts and theory developed in related disciplines" can be observed (Leong et al., 1990, p. 117). Hence, an increased isolation of the MS field has been seen over the past 25 years.

Second, the MS concept has primarily developed around its content aspects, leading to decreased academic attention to research on the process aspects than is the case for corporate strategy (Barnes, 2002). Kiridena et al. (2009, p. 387) argue that "compared to the rich insights developed into business-level strategy processes, the current level of understanding of MS processes is very limited". Barnes (2002, p. 1105) contends that the MS process literature is

"underdeveloped and particularly lacks empirical investigations into the formation of manufacturing strategy in practice". In this research, MS formation is defined as the iterative process in the operations function where the 'collective pattern of coordinated decisions' (Marucheck et al., 1990: 104) and actions conducted by the individuals working there lead to the materialisation of a realised strategy (Mintzberg et al., 2009). The "simplified, if not simplistic" view on the MS formation in the traditional literature leads to an one-dimensional rather than multi-dimensional way of thinking (Barnes, 2002, p. 1106). Kiridena et al. (2009, p. 406) explain that using simple hierarchical links to describe the relationships among business strategy, MS and strategic manufacturing decisions and actions does not capture the complexity among these entities. Such a simplified view causes operations managers' MS formation to "be impoverished due to poor understanding of the manufacturing strategy process in practice" (Barnes, 2002, p. 1107). Addressing this problem calls for a broader analysis, with enhanced conceptual understanding of the MS formation in practice, including individual, cultural and political factors, along with the organisational structure (Barnes, 2002; Kiridena et al., 2009). Such an expansion of the analysis opens up the introduction of new concepts and perspectives to the MS field.

1.2.2 The individuals in the operations function

A greater focus on the individuals in the operations function, including their roles on the shop floor and in the company's hierarchy, their perceptions of the company's MS and their relations to one another, is a novel perspective on the MS formation. The majority of earlier writings on the MS often defines workers as a homogeneous group and as operations resources constituting the input for the operations task (e.g., Heizer & Render, 2011; Hill, A. & Hill, 2012; Slack et al., 2010). Such definitions indicate closeness to a deterministic view of human nature where the individuals and their activities can be completely determined by the situation in which they function — in this case, the operational setting on the shop floor. Despite shop-floor workers comprising the majority of the workforce in the operations function, they are seldom viewed as individuals with different backgrounds, cultures and politics. Overlooking these factors may reduce the conceptual understanding of the MS formation (Barnes, 2002, p. 1107). Concepts such as strategic alignment (Kathuria et al., 2007; Schraeder et al., 2006; Skinner, 1974), strategic commitment (Gagnon et al., 2008) and strategic resonance (Brown & Blackmon, 2005) somewhat address the individuals in the operations function even if they often take a managerial perspective.

Based on Itami's classification of human resources into two categories (the labour part and the problem-solving and competence part) as cited in Lowendahl and Haanes' (1997) work, a characterisation of the literature can be made. While the traditional MS literature has focused on the labour part, the competence part has been more elaborated in other fields in the operations management domain. For example, the literature on lean production has a more human-centred view (Liker & Meier, 2007). However, the clearest focus on the competence part of the individuals in the operations function can be found in the behavioural operations field. Behavioural operations research is defined as analysing "decisions, the behavior of individuals, or small groups of individuals", that is, the micro-level of an organisation (Croson et al., 2013, p. 2). The behavioural operations field thereby offers a perspective that more clearly captures

the roles of individuals (Bendoly et al., 2006; Croson et al., 2013) and focuses on viewing them as "potentially non-hyper-rational actors in operational contexts" (Croson et al., 2013, p. 1). This field also deals with the "study of human behavior and cognition and their impacts on operating systems and processes" (Gino & Pisano, 2008, p. 679). In this research, the phrase "non-hyper-rational actors" is defined in relation to Croson et al.'s (2013, p. 2) explanation of the characteristics of hyper-rational actors: "(A) they are mostly motivated by self-interest, usually expressed in monetary terms; (B) they act in [a] conscious, deliberate manner; and (C) they behave optimally for a specified objective function". In this research, "non-hyper-rational actors" are thus understood in the context of the operations function as heterogeneous individuals who cannot be considered equal to rational operations resources with optimised and predictable decisions and actions, such as robot cells or automated assembly lines. Nonetheless, they are regarded as rational enough to acknowledge the benefits related to working towards the common goals set by the company's MS. The behavioural operations perspective offers a more voluntaristic view of individuals in the operations function. Furthermore, the empirical context on which this research is based consists of companies with work tasks similar to those of "future production systems" (Vinnova, 2015). Specifically, most workers perform more knowledge-intensive tasks than is the case in traditional, labour-intensive production systems.

1.2.3 Strategic consensus

The traditional MS literature seems to overlook the individuals in the operations function, while the behavioural operations perspective offers a different view on these individuals. Meanwhile, the concept of strategic consensus combines the strategic perspective with the individual focus and includes "employees at all levels of the organization" (Boyer & McDermott, 1999, p. 292). Strategic consensus concerns shared understanding and commitment to the company's strategy and is identified by the level of agreement on the MS among the individual employees (Boyer & McDermott, 1999, p. 290; Kellermanns et al., 2005). The notion of "agreement within an organization" (Boyer & McDermott, 1999) implicitly indicates an aim for all its individual employees who come into contact with "operational goals" and "operational policies" to have a shared understanding of the MS.

Strategic consensus is essential for effective decision-making and strategic fit (Boyer & McDermott, 1999) and is an important construct in the strategy process (Kellermanns et al., 2011). Strategic consensus is also "positively and significantly associated with organizational performance" (Kellermanns et al., 2011, p. 132), especially the agreement involving strategic priorities. McDermott and Boyer (1999, p. 21) describe strategic consensus as a "prerequisite" for "effective implementation" of strategic goals. Furthermore, they define operations as one of the core functions where a shared understanding between management and employees at the operational level is essential. The underlying reason is that the everyday decisions on the shop floor "can have as much, if not more, impact on the ultimate strategic position a firm takes as the 'higher-level' decisions made by management" (McDermott & Boyer, 1999, p. 21).

1.3 A changed perspective

The practical problems of making everyone in the operations function pull in the same direction, the theoretical problems of the increased distance between the MS and general strategic management literature, and the limited behavioural operations perspective in the MS field call

for a changed perspective on the MS. This research's approach to this changed perspective is in line with the behavioural operations logic and similar to the approach presented by Kiridena et al. (2009). The authors emphasise the importance of "looking beyond the dichotomous terms towards embracing a more holistic, sophisticated and naturalistic view of MS", where analysis is focused on "examining micro-level issues" (Kiridena et al., 2009, p. 408). The present research addresses this changed perspective by emphasising the individual workers in the operations function (i.e., the micro level), particularly their roles within their company's hierarchy and relations to and perceptions of their company's MS formation. To illustrate this changed perspective, Figure 1.1 presents the building blocks, which are referred to throughout the thesis. These key entities in this research are used to illustrate different views on the field, the research questions and how they relate to one another. The building blocks include the two hierarchical levels of the individuals focused on within the operations function – the workers and the managers. The MS is also included as a separate entity, to which the individuals relate. Further on, additions are made to this basic illustration to illustrate different focuses and contributions.

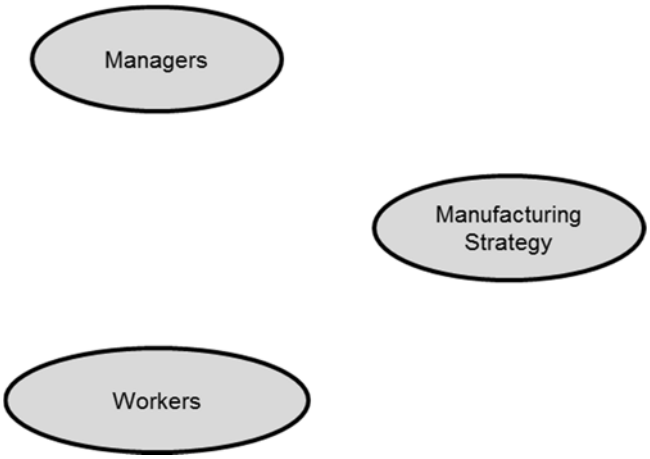

Figure 1.1. Building blocks central to this research

This research studies the MS formation as a phenomenon through the lens of how workers and managers relate to the MS and to one another, addressing the problem of how the MS materialises. This means that the level of analysis is the organisational unit in which workers and managers operate, the operations function in this case (Figure 1.2). The operations function, as well as the relationships among workers and managers, can be captured through the intra-functional organisational level where both horizontal and vertical alignments are needed (Kathuria et al., 2007). Horizontal alignment concerns the exchange and cooperation among functional activities, while vertical alignment involves decisions consistent with strategic objectives (Kathuria et al., 2007). While the operations function is the level of analysis, the unit of analysis consists of the individuals in the operations function and their relations to one another and to the MS formation.

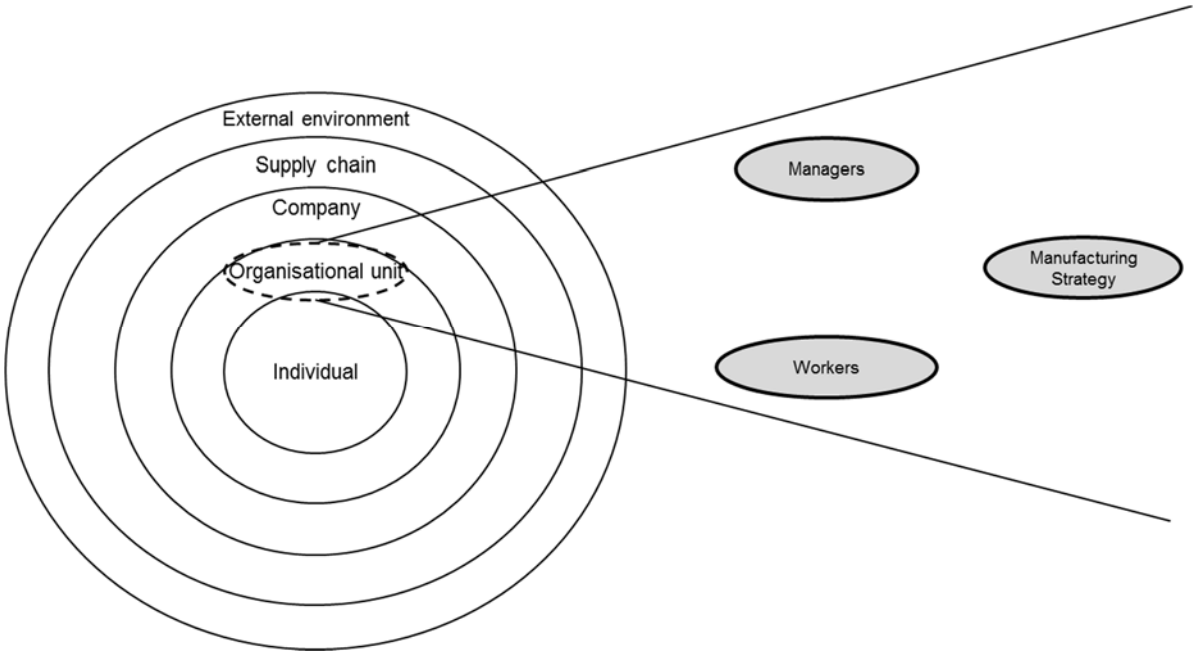

Figure 1.2. Level of analysis (left) and unit of analysis (right)

1.4 Research purpose

The left side of Figure 1.3 captures the current state of the MS field as it is viewed in this research. In the traditional MS literature, the relations between strategic decisions and operational resources can be conceptualised as a unilateral link; intended plans are enforced from the top down to the operational level. With such a view, the risk is high that the individuals in the organisation will not work towards the same goals, that is, there will be a lack of strategic consensus. One way to gain understanding about this link is to regard it as a potential relationship between the strategic and operational levels. The right side of Figure 1.3 captures this relationship between the strategic (i.e., the managers) and the operational levels (i.e., the workers). The transfer from a more deterministic view (with a link, left side of Figure 1.3) to a more voluntaristic view (with a relationship, right side of Figure 1.3) can be helped by applying a behavioural operations perspective, which makes the individuals visible by considering them non-hyper-rational actors.

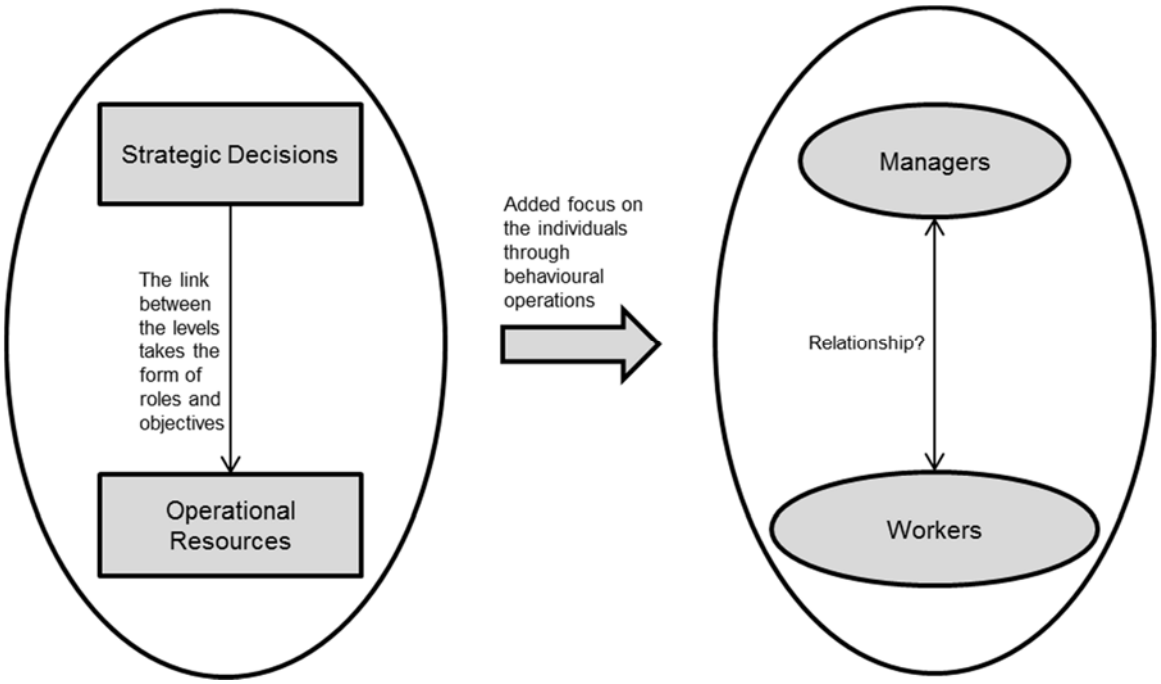

Figure 1.3. Behavioural operations perspective on MS

Figure 1.3 illustrates what happens with the traditional MS field when the behavioural operations perspective is added; the people are no longer resources but have changed into individuals. Adding a focus on the individuals places greater emphasis on the problem-solving and competence part (Lowendahl & Haanes, 1997), where the individuals are not easily substitutable. The relationships among the individuals at the strategic and operational levels can be observed from different viewpoints. This research takes the workers' perspective (i.e., the operational level) and presents an increased focus on how the MS in practice materialises in organisations. In relation to this emphasis, strategic consensus is an essential concept. Thus, the purpose of this research is *to investigate how the individuals in the operations function perceive the MS in order to understand how these individuals are involved in the MS formation*.

A key assumption for this purpose is that the MS formation is a result of strategic consensus. The operational level (i.e., the shop floor) is distinguished as a subset of the operations function (since the managerial level also exists there). Furthermore, the workers' perspective is used to emphasise that the operational level is studied from the blue-collar and white-collar workers' perspectives. In other words, I try to distinguish my research from the vast amount of previous studies that studied the shop-floor activities based on the data gathered from managers and their perspectives.

1.5 Scope and delimitations

This research focuses on individuals' perceptions of the MS at an organisation's operations function. Hence, the goal is not to understand why a potentially intended MS has been formulated in the way it has. On the contrary, the MS focus here is on how the individuals perceive the content of the different MS dimensions. This content is defined based on earlier research in the MS field. However, due to the context primarily being Swedish subcontractor SMEs not all MS dimensions, or their content, are equally important. This is due to the majority

of the MS literature being developed in different contexts than the one studied here. Therefore, not all aspects of MS are relevant, especially not for the study of the workers' perspective of MS. Rather, the workers' perspective implies that the focus is on the MS dimensions which are of importance for how the decisions and actions on the shop floor take place, such as concerning quality and process technology. That is, decisions and actions that influence the actual formation of the strategy at the shop floor level. This also means that the level of strategic maturity will not be evaluated in this research. Furthermore, the focus on strategic consensus and particularly, on the shared understanding of the MS across hierarchical levels, defines individuals' perceptions as a core component of the MS formation. This delimitation therefore implies that secondary data, such as policy documents and their role in the MS formation, is outside the scope of this research.

The studies presented here were primarily conducted in the organisational context of small and medium-sized enterprises (SMEs). The four SMEs studied are all subcontractors in the metalworking industry and located in Jönköping County in Småland, Sweden. All four companies have similar situations; they do not have their own product development, and one or two customers represent more than half of their production volume. Their production is organised into functional groups of 3–20 operators, with group leaders as the hierarchical level between the operators and production managers. They also have no explicitly formulated MS, but it is embedded in the corporate strategy. However, the fifth company is a large multinational corporation, where the study has been undertaken at one of the factories in the same geographic region as the SMEs' location. This large company has clearer separations between the corporate and operational levels and thus works with the MS in a more formalised manner. The four SMEs were mainly studied through interviews; hence, a qualitative research approach was used. However, a survey-based study was used for the fifth company, thus adopting a quantitative research approach.

The terms *manufacturing strategy* (MS) and *operations strategy* (OS) are used interchangeably in this thesis when necessary, in relation to the references. The OS also includes strategies at the operational levels within a service organisation's context. This research focuses on the strategy in manufacturing settings and research; therefore, it concentrates on the MS literature. However, since the terms operations strategy and manufacturing strategy have been used interchangeably over the years, a great deal of the literature focusing on manufacturing uses the OS terminology.

Regarding its theoretical scope, this research is positioned within the operations management domain. The individuals are studied within this domain through the behavioural operations perspective. Thus, concepts such as organisational behaviour, organisational psychology, motivation theory, knowledge management and evolutionary theory, which very well could have been used to study individuals in the MS, are outside the scope of this research.

1.6 Thesis outline

This is a compilation thesis consisting of the main text and six appended papers. The main text is structured as follows:

Chapter 1 presents the background of the research and introduces its purpose.

Chapter 2 gives an overview of the theoretical background and frame of reference that have shaped the research. It also states the research questions (RQs).

Chapter 3 describes the research design, including the decisions made, how they were made and their implications.

Chapter 4 summarises each of the six appended papers and presents their main contributions to this research.

Chapter 5 explains the answers to the RQs by analysing the findings from the six papers.

Chapter 6 discusses the findings in relation to the research purpose and existing literature. It also gives suggestions regarding managerial implications.

Chapter 7 presents the conclusions of the research. Finally, it cites the research limitations and recommends directions for further research.

2 Theoretical background and frame of reference

This research is positioned within the operations management domain, specifically the MS field, where the main contribution of this research lies. However, to address the research purpose, some additional theoretical fields, concepts and perspectives are needed in order to extend the analysis and enable further development of the MS literature. These complementing fields can be viewed as outer reference points and have been included based on their focus on the individuals in the operations function and their potential of adding important ideas and viewpoints to the somewhat deterministic view in the traditional MS literature. Figure 2.1 illustrates how these complementing fields relate to one another and to the core of this research within the MS field. The small white circle in the figure indicates the relative position of this research within the MS field. The arrows, on the other hand, indicate how ideas from the complementing bodies of knowledge are borrowed and drawn into the MS field.

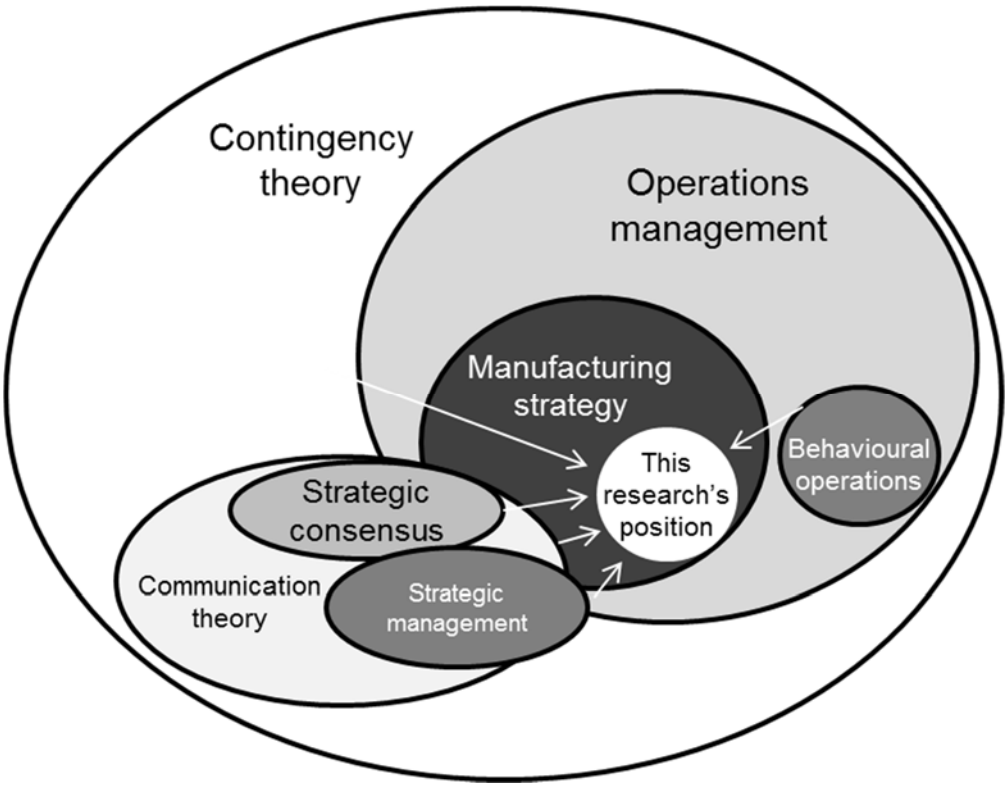

Figure 2.1. Theoretical fields incorporated in this research

The contingency theory is viewed as an overarching frame since all operations management research, and perhaps the MS research in particular, are conducted in a setting where the context is important, at both organisational and individual levels. In such a setting, the contingency theory becomes vital to explain the whereabouts in the "real" world. The MS formation process is "contingent on context and strategy" (Voss, 1995, p. 8) and on uncertainty and contingency factors (Saad & Siha, 2000). Hence, the contextual richness and dependencies (Sousa & Voss, 2008), with which the decision makers are working, play an important role in understanding the complexities and dependencies in the MS. By viewing the individuals in the operations functions as potentially non-hyper-rational actors (Croson et al., 2013), they too become part

of this contextual richness. They thereby provide more depth to the analysis of the MS formation. The contingency theory questions the current research stream focusing on best practices and instead assigns significance to the contextual richness, context dependence and effects of the firm context (Sousa & Voss, 2008).

The behavioural operations perspective offers new standpoints as it primarily emphasises the need to study operational contexts at a micro level, based on the assumption that people are non-hyper-rational actors (Croson et al., 2013). Therefore, the behavioural operations perspective helps support the development of the MS literature's emphasis on individuals through its explicit focus on them as the unit of analysis. The foundation of behavioural operations is that "almost all contexts studied within operations management contain people" (Croson et al., 2013, p. 1), who form a "critical component of the system" (Gino & Pisano, 2008, p. 676). Gino and Pisano (2008, p. 679) define behavioural operations as "the study of human behavior and cognition and their impacts on operating systems and processes". The notion of non-hyper-rational actors comes from the argument that most operations management literature views people as hyper-rational (Croson et al., 2013). Loch and Wu (2007, p. 9) state that "most OM [operations management] studies implicitly assume that people can be integrated into manufacturing or service systems like machines". Loch and Wu (2007, p. 2) explain that despite similarities with the organisational behaviour field, it is not the purpose of behavioural operations to join it. Neither does the behavioural operations perspective imply "throwing out of the window"[1] already existing theories within the operations management domain; rather, it suggests incorporating additional considerations to provide stronger results (Loch & Wu, 2007). Behavioural operations and operations management share the same "intellectual goal" but with a difference. The traditional operations management literature has either ignored human behaviour or treated it as a "second-order effect". On the other hand, behavioural operations research focuses on human behaviour and views it as a first-order effect – "human behavior as a core part of the functioning and performance of operating systems" (Gino & Pisano, 2008, p. 680).

Strategic consensus expands the human-centred view, which is added through the behavioural operations perspective by further focusing on the inclusion of an inherent relationship between the management and operational levels. The strategic management literature referred to in this research is mainly related to the Mintzbergian view (Mintzberg et al., 2009) on strategy formation, which serves as an important complement to the MS formation literature. Finally, the communication theory is included as an important aspect of how the MS materialises/forms in the company and hence how strategic consensus is built.

2.1 Manufacturing strategy

The MS concept has assumed an important role in the operations management literature since Skinner (1969) identified the missing link between manufacturing and corporate strategy. He stresses the importance of increasing the status of manufacturing decisions from an operational to a strategic level, suggesting a top-down approach where manufacturing policies stem from corporate strategy. With this notion, Skinner (1969) emphasises the need for top management

[1] Reference to Gary Becker, Nobel laureate economist, in (Loch & Wu, 2007, p. 6).

to take control of the manufacturing function by involving itself in manufacturing policy decisions, hence reclaiming the link between corporate strategy and manufacturing. In the traditional MS literature, definitions of the MS involve the linkage between the manufacturing function and the company's corporate strategy (e.g., Miltenburg, 2005; Skinner, 1969; Slack & Lewis, 2011). The MS consists of a sequence of structural and infrastructural decisions made in manufacturing over a long period of time (Hayes & Wheelwright, 1984, p. 32; Miltenburg, 2005, p. 2) and aims to make manufacturing a supporting function for the company to "achieve a long-term advantage" (Miltenburg, 2005, p. 2). To achieve a "desired manufacturing structure, infrastructure, and set of specific capabilities" (Hayes & Wheelwright, 1984, p. 32), there is a need for a fit between market requirements and operations resources (Skinner, 1969; Slack & Lewis, 2011). This research primarily adheres to Marucheck et al.'s (1990, p. 104) definition:

> *"Manufacturing strategy is a collective pattern of coordinated decisions that act upon the formulation, reformulation and deployment of manufacturing resources and provide a competitive advantage in support of the overall strategic initiative of the firm".*

Since Skinner's seminal work, with its emphasis on manufacturing's role in strategy, the MS field has grown extensively (e.g., Dangayach & Deshmukh, 2001; Taylor & Taylor, 2009). However, the development within the field has also been criticised; for example, Barnes (2002, p. 1090) states that "thinking about the process whereby manufacturing strategy is formed seems to have advanced little beyond Skinner's (1969) original prescriptive model" and that the MS literature often presents "the process as one that can seemingly take place regardless of the context and the key players involved" (p. 1105). As early as 1989, Anderson et al. (1989, p. 145) called for an increased focus on the individuals in the operations function involving the MS: "While there is profuse literature in Human Resources and Organizational Behavior, infrastructure decisions generally and the workforce dimension specifically, are not normally thought of as strategic". Barnes (2002, p. 1092) questions the focus of the MS research: "The concept that manufacturing strategy can come about other than by the plans and intentions of senior managers is almost entirely absent in the manufacturing strategy literature". The majority of the MS writings barely touch on the operating individuals and their roles in the MS process but regard the workers as a resource among others. Slack et al.'s (2010, p. 62) traditional definition of OS as *"the pattern of strategic decisions and actions which set the role, objectives and activities of the operation"* is used here to clarify the argument.

This definition is problematic for two reasons. First, it indicates a top-down approach, a sequence where decisions are made to define the actions of the operations. Second, it is difficult to see any individual humans in this definition. Implicitly, Slack et al. (2010) suggest that the "setting" is made by managers (through the notion of management), but "the operation" is not defined in terms of people. This leads to the problematisation around what "operations" comprise and what role individuals play in "operations". To understand this, the vocabulary used in the MS literature needs further attention.

Slack et al. (2010, p. 11) and Hill, A. and Hill (2012, p. 10) view operations as a transformation process (input-transformation-output) where the workers ("staff" and "people") are defined as transforming resources, along with facilities (Slack et al., 2010, p. 11), or as resources alongside materials, energy, capital and data (Hill, A. & Hill, 2012, p. 10). Heizer and Render (2011, p. 45) address the workers in terms of "labour" and equate them with other resources, such as capital. Stevenson (2012, p. 6) regards "human" as input to the transformation process. In Stevenson's (2012) definition, human input is divided into physical and intellectual labour. Meredith and Shafer (2013, p. 7) emphasise the roles of people in their operations transformation process: "People, too, must operate productively, adding value to inputs and producing quality outputs". Miltenburg (2005, p. 65) rather discusses human resources as one of the production system's manufacturing levers, which "comprises the company's human resource policies" where decisions on the "mix of skilled and unskilled employees", "whether employees will be multiskilled", the "level of supervision" and the "responsibility and decision making given to employees" have to be made (Miltenburg, 2005, p. 66). By emphasising the managers' role in relation to the MS, Skinner (1969) provides a view of the MS as something that shall come from the top and be implemented through programmes. Skinner (1969) highlights the use of control functions and places the responsibility for those with the delegating managers, not with the workers performing the tasks. The workers are not mentioned; they seem unimportant for both the actual decision-making and as participants in or receivers of the implementation programmes. This vocabulary in the MS field implies a one-sided view on the individuals in the operations function, as well as a unilateral link between workers and managers.

Following Skinner's work, several definitions of what the MS (and the OS) encompass have been presented; Table 2.1 lists some of them.

Table 2.1. MS definitions

Reference	MS definition
Swamidass and Newell (1987, p. 509)	"Manufacturing strategy is viewed as the effective use of manufacturing strengths as a competitive weapon for the achievement of business and corporate goals".
Marucheck et al. (1990, p. 104)	"Manufacturing strategy is a collective pattern of coordinated decisions that act upon the formulation, reformulation and deployment of manufacturing resources and provide a competitive advantage in support of the overall strategic initiative of the firm".
Hill, T. (1994, p. 12)	"Manufacturing needs to be involved throughout the whole of the corporate strategy debate to explain, in business terms, the implications of corporate marketing proposals and, as a result, be able to influence strategy decisions for the good of the business as a whole".
Miltenburg (2005, p. 2)	"The pattern underlying the sequence of decisions made by manufacturing over a long time period [...]".
Slack and Lewis (2011)	"The total pattern of decisions which shape the long-term capabilities of any type of operation and their contribution to overall strategy [...]".

Swamidass and Newell's (1987) definition is one of the earliest and does not indicate people or their roles. Marucheck et al. (1990) follow the same logic, stating that the manufacturing function is important for the company's survival and that a collective pattern of coordinated decisions is needed. However, they do not mention who is part of this "collective" or who will make the "coordinated decisions". Hill, T. (1994) discusses the ways in which manufacturing can strengthen a company. However, in Hill's definition, it is "manufacturing" that will explain the implications and influence strategy decisions. It is not explained which individuals or hierarchical positions are involved, indicating that this important aspect of strategic work can be successful, independent of which individuals constitute the manufacturing function. More recent definitions use similar formulations, indicating their closeness to the deterministic view of human nature where individuals and their activities can be completely determined by the situation in which they function – in this case, the operational setting on the shop floor. For example, in Miltenburg's (2005) definition, people are not considered decision makers, but the rather vague "manufacturing" entity is used as an actor. Slack and Lewis (2011) give a similar definition of OS, implying a top-down approach where manufacturing acts as a supporting function for an organisation. Hill's (1986, p. 11) definition indicates an increased (in comparison with the above-mentioned references) amount of interaction between and within levels by referring to the "coherent thrust within manufacturing and raising the level at which this is agreed and implemented" and a "co-ordinated approach which strives to achieve consistency between functional capabilities and policies and the agreed current and future competitive advantage necessary for success in the market place". However, despite its references to coherence, agreement, co-ordination and consistency, this definition also fails to explicitly mention the individuals in the operations function as actors.

2.1.1 Content versus process: a common distinction in manufacturing strategy literature

The traditional MS literature distinguishes between content and process (see Figure 2.2) (e.g., Dangayach & Deshmukh, 2001; Leong et al., 1990; Mills et al., 1995; Slack et al., 2010). Content refers to the distinct competencies of the manufacturing function (Swamidass & Newell, 1987) and the strategic decisions made with respect to competitive priorities and decision categories, which set the manufacturing's role, objectives and activities to achieve competitive advantage (e.g., Dangayach & Deshmukh, 2001; Slack et al., 2010; Slack & Lewis, 2011; Swamidass & Newell, 1987). Process consists of the formulation and implementation of the MS (e.g., Dangayach & Deshmukh, 2001; Slack & Lewis, 2011; Swamidass & Newell, 1987) and is "the method that is used to make the specific 'content' decisions" (Slack et al., 2010, p. 62).

In the MS content literature, the competitive priorities and decision categories offer a well-structured breakdown of MS dimensions into factors. Figure 2.2 schematically presents the MS dimensions and how they are linked to the content and process.

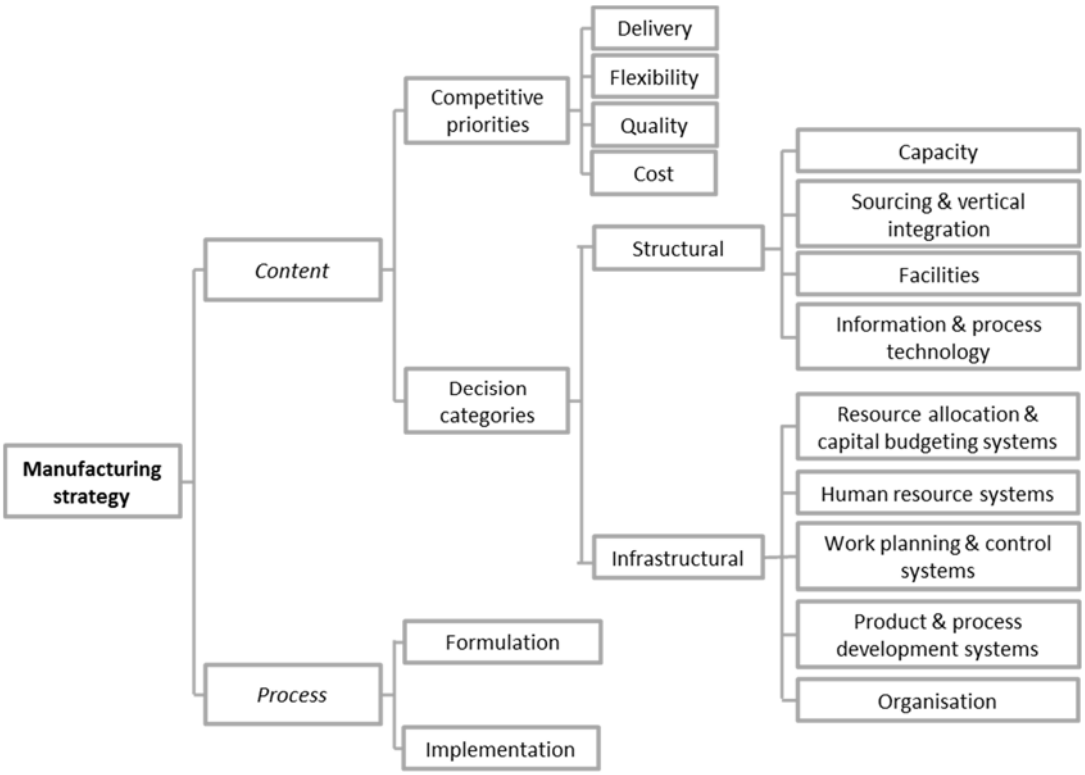

Figure 2.2. MS dimensions

2.1.1.1 Manufacturing strategy content

The strategic decisions (i.e., the content) are made in relation to the company's competitive priorities and decision categories (Dangayach & Deshmukh, 2001). The exact definition of the competitive priorities varies among sources (Dangayach & Deshmukh, 2001; Mills et al., 1995; Slack & Lewis, 2011), but they most often encompass cost, quality, delivery and flexibility. This research focuses on these four traditional competitive priorities:

- *Cost* includes procurement, overhead (Acur et al., 2003) and production expenses (Kathuria et al., 1999).
- *Quality* encompasses both specification quality (i.e., product quality and reliability) and conformance quality (i.e., reliable and consistent manufacturing) (e.g., Acur et al., 2003; Slack & Lewis, 2011).
- *Delivery* involves both dependability and speed (e.g., Dangayach & Deshmukh, 2001; Slack & Lewis, 2011) and includes production lead time, procurement lead time and the ability to meet delivery promises (e.g., Acur et al., 2003; Boyer & McDermott, 1999; Kathuria et al., 1999).
- *Flexibility* refers to changes in the product, product mix, product variety and sequence (Boyer & McDermott, 1999; Dangayach & Deshmukh, 2001), along with volume flexibility (Acur et al., 2003), capacity adjustments and variations in customer demands (Boyer & McDermott, 1999; Kathuria et al., 1999).

The MS decision categories most often encompass structural and infrastructural decisions (Hayes et al., 2005, p. 41; Hayes & Wheelwright, 1984), which are subsystems of the production system (Miltenburg, 2005). *Structural decisions* refer to the categories where the company's physical attributes are determined. Structural decisions often require a substantial capital investment and are difficult to alter (Hayes et al., 2005, p. 42). These structural decision categories are as follows:

- *Capacity*, which includes the amount, type and timing (Hayes et al., 2005, p. 41; Hayes & Wheelwright, 1984, p. 31; Slack & Lewis, 2011), along with production planning and control (Miltenburg, 2005; Skinner, 1969, p. 141).
- *Sourcing and vertical integration*, comprising the direction, extent and balance (Hayes et al., 2005, p. 41; Hayes & Wheelwright, 1984, p. 31; Miltenburg, 2005), also called the supply network (Slack & Lewis, 2011).
- *Facilities,* consisting of the size, location and specialisation (Hayes et al., 2005, p. 41; Hayes & Wheelwright, 1984, p. 31; Miltenburg, 2005).
- *Information and process technology*, which refers to the degree of automation, interconnectedness and lead versus follow (Hayes et al., 2005, p. 41), as well as technology (Hayes & Wheelwright, 1984, p. 31), process technology (Miltenburg, 2005; Slack & Lewis, 2011), and plant and equipment (Skinner, 1969, p. 141).

Infrastructural policies and systems refer to categories where more tactical activities are governed. "They are linked with specific operating aspects of the business, and they generally do not require highly visible capital investments" (Hayes & Wheelwright, 1984, p. 31). These categories are as follows:

- *Resource allocation and capital budgeting systems* (Hayes & Wheelwright, 1984).
- *Human resource systems,* comprising selection, skills, compensation and employment security (Hayes et al., 2005), also referred to as workforce (Hayes & Wheelwright, 1984), human resources (Miltenburg, 2005), and labour and staffing (Skinner, 1969).
- *Work planning and control systems,* including purchasing, aggregate planning, scheduling, control or inventories and/or waiting time backlog (Hayes et al., 2005), along with production planning/materials control (Hayes & Wheelwright, 1984).
- *Quality systems*, relating to defect prevention, monitoring, intervention and elimination (Hayes et al., 2005; Hayes & Wheelwright, 1984).
- *Product and process development systems*, referring to leader or follower and project team organisation (Hayes et al., 2005).
- *Organisation*, which involves centralised versus decentralised, which decisions to delegate, roles of staff groups and structure (Hayes et al., 2005), includes measurement and reward systems (measures, bonuses and promotion policies) (Hayes et al., 2005), and has also been referred to as development and organisation (Slack & Lewis, 2011), organisation and management (Skinner, 1969), and organisation structure and controls (Miltenburg, 2005).

2.1.1.2 Manufacturing strategy process

The MS process consists of formulation and implementation (see Figure 2.2). The MS formulation process sets the content of the strategy. This part of the process is often described as the top management's efforts to link strategic decisions to different dimensions, such as in the case with the OS matrix (Slack & Lewis, 2011) and the MS framework developed by Miltenburg (2005). Despite the MS literature's focus on the importance of companies explicitly formulating their MS, the IMSS conducted in 2001 showed that only 36% of the Swedish companies participating in the survey had a written and formalised MS (Acur et al., 2003).

Implementation is the means by which the MS is put into practice (Marucheck et al., 1990). It includes "what must be done, why it must be done, how it will be done, when it will be done, and who will do it" (Miltenburg, 2005, p. 112). In this process, it is essential to get the employees to accept and consent to the strategy and build teamwork towards the same goals (Marucheck et al., 1990, p. 117; Miltenburg, 2005). Since the implementation is considered the most difficult phase of the MS process (Mills, Neely, Platts, Richards, et al., 1998, p. 153), charts and other types of pictorial methods can be useful in communicating the MS and making it understandable and communicable for the manufacturing managers and the workforce (Mills, Neely, Platts, & Gregory, 1998, p. 1081). Previous empirical research (e.g., Gagnon et al., 2008; Mills, Neely, Platts, & Gregory, 1998, p. 1081) has stressed the important role of information-sharing tools in communicating and sharing the MS. Marucheck et al. (1990) also emphasise the impact of corporate culture, top management commitment and managerial styles on the MS implementation. There is a need for communicating the strategy to the employees, where the MS process is a team effort, rather than solely applying a top-down approach (Marucheck et al., 1990). However, Mills et al. (1995, p. 43) note that the MS literature rarely discusses "methods for achieving a wide understanding of the logic of strategies". The MS process has received limited attention (Barnes, 2002, p. 1090) and has therefore become underdeveloped, lacking empirical studies with a broader analysis of "individual, cultural, and political factors" (Barnes, 2002, p. 1105).

2.1.2 Manufacturing strategy formation

When studying different theoretical approaches to strategic management, one of the main differences relates to how the actual strategy is considered to be formed. In which part of the organisation is it developed, by whom and in which (if any) sequential order is it formed? As mentioned, this research does not attempt to cover the whole field of strategic management but keeps strong boundaries around the operations management field, particularly the MS frame of reference. However, as pointed out in the introductory chapter (section 1.2.1), since the MS literature has increasingly lost touch with both ideas in the general strategic management field and has a limited incorporation of more human-centred views, it is necessary for the development of this research to borrow ideas from other fields. The traditional MS literature is regarded in this research as primarily building on Mintzberg et al.'s (2009) prescriptive group of three schools of thought – the design school (e.g., Selznick and Andrews), the planning school (e.g., Ansoff) and the positioning school (e.g., Porter, Schendel and Hatten). The prevalent structure in these schools clarifies the logic that builds on a sequential approach to strategy formation, where the top managers are the ones who formulate and take responsibility

for the implementation. Mintzberg (1978, p. 935) refers to the traditional definition of strategy as consisting of a "deliberate conscious set of guidelines that determines decisions into the future", where strategy is "(a) explicit, (b) developed consciously and purposefully, and (c) made in advance of the specific decisions to which it applies". Thus, a strategy is traditionally viewed as a plan created by managers (Mintzberg & Waters, 1985). Mintzberg (1978) refers to this traditional formulate-then-implement paradigm (Barnes, 2002) as intended strategy. Such a standpoint on strategy formation is regarded as "seriously limited", with a need for the strategy process to "be viewed from a wider perspective so that the variety of ways in which strategies actually take shape can be considered" (Mintzberg & Waters, 1985, p. 257).

Complementing this view is the concept of realised strategy, which is defined as "a pattern in a stream of decisions […] where a decision is defined as a commitment to action" (Mintzberg, 1978, p. 935). According to this logic, a strategy is formed "when a sequence of decisions in some area exhibits a consistency over time" (Mintzberg, 1978, p. 935). This means that viewing the MS operationalisation (or the way the MS materialises) as a formation process rather than according to the traditional formulate-then-implement logic allows for a more holistic perspective where the strategy formation is considered a learning process resulting in an emergent strategy (Mintzberg, 1978). Mintzberg et al. (2009) view the strategy formation process differently than the traditional MS literature does; realised strategies have to form and be formulated based on intended strategies (plans), as well as emergent strategies (patterns of actions, shaped along the way by step-by-step decisions). Mintzberg et al. (2003, p. xiii) clarify this further: "[...] as in reality, formulation and implementation are intertwined as complex interactive processes in which politics, values, organizational culture and management styles determine or constrain particular strategic decisions". Central to this emergent formation is that rather than having "strategy makers" formulating and "subordinates" implementing, there is an iteration where implementation feeds back to formulation (Mintzberg, 1978). Kim et al. (2014) bring this iterative process into the operations function context and state that the inconsistency between the managers' intentions and "the actions of an organization's employees" may be addressed by incorporating a bottom-up perspective to complement the traditional top-down perspective on the MS formation process. Barnes (2002) further elaborates on the complexities of the MS formation process by identifying the formation as involving "a combination of deliberate and emergent actions and decisions" (p. 1103), which are influenced by the organisation's internal and external contexts. Central to this influence are the "interpretative processes" of the involved individuals (in this case, the managers), "both individually and collectively" (Barnes, 2002, p. 1103).

2.1.3 Manufacturing strategy literature in relation to strategic management

As this research is positioned within the operations management field, it does not delve in depth into the general strategic management literature or study the strategy concept from a business level. It rather focuses on the management of the operations function. However, to understand the theoretical background used in this research, it is important to comprehend the bigger picture. A few key concepts from the strategic management literature are explained in this regard.

Nag et al. (2007, p. 944) define the strategic management field as dealing with "the major intended and emergent initiatives taken by general managers on behalf of owners, involving utilization of resources, to enhance performance of firms in their external environments". Hence, it is at a corporate level rather than a functional one. Furthermore, the alignment aspects are rather with the external context than among different internal hierarchical levels. Furrer et al. (2008, p. 16) indicate an evolution of the strategic management field where "narrowing of the dichotomy" and "thinking in economic terms being enriched by the identification of complementary behavioural questions and issues" are evident.

Mintzberg et al.'s (2009) division of the strategic management field into ten schools of thought and three main groups shows that strategy does not have a common definition and is a difficult concept to define in a brief, standardised way. This elucidation of the ten schools of thought provides an overview of the strategic management literature and allows a comparison among different schools and the possibility of identifying theoretical streams that have or may have influenced the MS literature. This division into schools is regarded in this research as a frame according to which the MS literature is positioned (see Figure 2.3). Some of the schools show indications of a focus on the individuals in the operations function. These indications are explained to show which aspects of the strategic literature outside the operations management domain and the MS field could be beneficial to expand. Figure 2.3 shows the connections between, on one side, the operations management domain and the MS field, and on the other side, the ten schools of thought. Keywords have been identified for each of the ten schools. A solid line indicates a clear connection; a dashed line represents a partial connection. These connections are further elaborated.

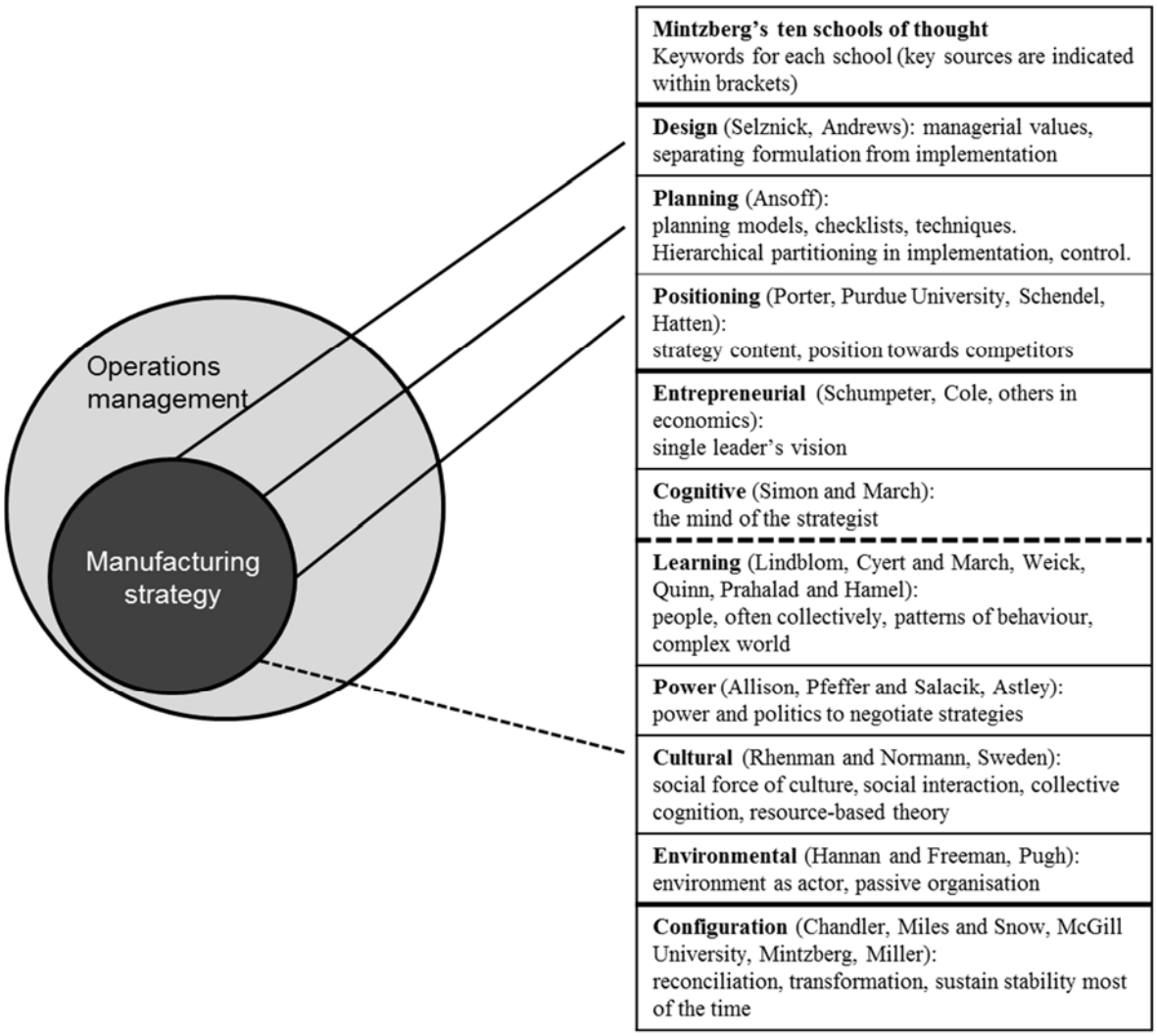

Figure 2.3. Manufacturing strategy's connection to the ten schools of thought

The traditional MS literature can primarily be positioned within the first group of schools – the three prescriptive ones. There are clear connections between the MS and all three schools. The separation between formulation and implementation comes from the *design school*. The hierarchical partitioning and planning models with checklists and techniques originate from the *planning school*. The *positioning school* is the source of the strong focus on the strategy content. It seems that the setbacks in the strategic management literature (e.g., in the *planning school*) have not been as predominant in the MS literature. Planning models and formal processes still have a profound role in the MS.

Over the past decade, the MS literature has to some extent embraced the resource-based view (RBV), which can be positioned within the *cultural school* (Mintzberg et al., 2009). The RBV has also received a great deal of consideration within the operations management literature in general (e.g., Pilkington & Meredith, 2009; Taylor & Taylor, 2009) and has developed to become an important body of research within strategic management (Barney, 1991; Barney et al., 2001; Conner, 1991; Priem & Butler, 2001). The RBV has developed into a theory of generating and sustaining competitive advantage (Kor & Mahoney, 2004), while it aims to clarify the link between resources and competitive advantage (Santos & Eisenhardt, 2005). The

RBV concerns the long-term competitiveness of companies and how they develop based on differences in performance (Conner, 1991; Rangone, 1999); it may "help explain why some firms consistently outperform other firms" (Barney, 2001, p. 649). It can be noted here that although the RBV adds another perspective to the operations management domain and to the MS field, it remains closely linked to the traditional MS literature, viewing people as organisational or human resources.

Although the human-centred view, as explained in the behavioural operations field, is not made explicit in any of Mintzberg's schools, there are indications of such in several of them. Both the *entrepreneurial school* and the *cognitive school* focus on individuals; however, they concentrate on one strong leader as a formal head or strategist. The subsequent schools place greater emphasis on individuals but at a group level. The *learning school* highlights strategies emerging from collective learning. The *power school* stresses the exercise of influence as a means to negotiate strategies. The *cultural school* accentuates social interaction and collective cognition. The *environmental school* views external forces as actors; hence, the emphasis is not on the individuals within but those outside an organisation.

There is no explicit chronological order in the development of the different schools. Despite this, the layout in the table in Figure 2.3 indicates a progression where it is evident that the traditional MS literature has fallen behind the development in the general strategic management literature. Identifying the keywords and main focuses of each school (as done in this section) helps define the aspects from the schools that could influence the MS research to develop the focus on individuals in the MS.

2.2 Strategic consensus

The concept of strategic consensus is closely related to the MS formation logic. While (Mintzberg, 1978) calls for a view on the MS formation that focuses on the consistency in the sequence of decisions made, the strategic consensus concept builds further on this consistency by relating it to operating decisions made at "all levels" in the organisation (Boyer & McDermott, 1999, p. 292). The strategic consensus concept builds on the underlying hypothesis that "higher degrees of strategic consensus are associated positively with coordination and cooperation in the implementation of strategy, and hence, with organizational performance" (Kellermanns et al., 2005, p. 722). According to Boyer and McDermott (1999, p. 292), strategy is a compass that provides a "general framework for employees at all levels of the organization", with the development of strategic consensus as one of its core components. Boyer and McDermott (1999, p. 290) define strategic consensus as:

> *"the level of agreement within an organization regarding the relative importance of cost, quality, delivery and flexibility to the organization's operational goals, as well as the relationships between these competitive priorities and operational policies".*

This definition not only incorporates the core of what defines the MS content but also emphasises the need to expand the scope of decision makers to involve all levels of an organisation. The definition also relates to the MS formation because the development of

strategic consensus requires an active ongoing process of mutual consent and information sharing among individuals. For this research, the most important part of the definition is "agreement within an organization", which implicitly indicates an aim for all individuals who work in an organisation and come into contact with "operational goals" and "operational policies" to consent to the MS. The strategic consensus concept can be viewed as comprising some key aspects, including shared understanding, commitment, agreement and shared perspectives (Floyd & Wooldridge, 1992; Kellermanns et al., 2005; Rapert et al., 2002). In this research, the agreement aspect, as explained by Floyd and Wooldridge (1992), is central. Agreement can be defined along two dimensions: cognitive (as shared understanding and common perception) and emotional (as commitment) (Floyd & Wooldridge, 1992, p. 28). The lack of a common perception allows individuals to drift in different directions, while the absence of commitment leads to half-hearted actions (Floyd & Wooldridge, 1992). Individual strategic commitment depends on "(1) how the contemplated strategy fits with what the managers perceive as the interest of the organization and (2) how it fits with the managers' own, personal self-interests" (Floyd & Wooldridge, 1992, p. 28). While Floyd and Wooldridge (1992) have taken a management perspective on the strategic consensus concept, this research also includes the workers' perspective, based on Boyer and McDermott's (1999) definition stating the inclusion of "everyone". Therefore, a precondition for the development of agreement and strategic consensus is the understanding of all individuals' perceptions of the MS.

Similar reasoning can be found in Sarmiento et al.'s (2008) work, for example, which stress strategic consensus on the competitive priorities of manufacturing (quality, delivery, flexibility and cost). Sarmiento et al. (2008) emphasise the need to explore "the lower levels within organisations (e.g., shop-floor employees) to understand how these employees' knowledge of operational priorities [would] influence outcomes" (p. 840). Gagnon et al. (2008) argue that organisations should strive to have strategically aligned individuals who "possess a global understanding of their organization's strategy" (p. 429) and whose "behaviors correspond with their organization's strategy" (p. 426). Several other studies implicitly or explicitly address strategic consensus at different hierarchical levels within organisations. While Boyer and McDermott (1999) focus on the differences in perception of strategy between workers and managers, others highlight the managerial level. An example is Kathuria et al.'s (1999) study about the differences in perception of competitive priorities between two managerial levels and the characteristics (demographic factors and organisational variables) of the lower level managers. Another case is Feger's (2014) research on the cross-functional strategic consensus among purchasing, production and logistics.

2.3 Communication

Strategic consensus is an important means for a successful MS formation (Kellermanns et al., 2005). Central to the concept is the implication that a company's MS is not materialised/formed until it is communicated, and employees' decisions and actions follow accordingly. Therefore, the communication theory is important as it creates a frame for how the MS may materialise. Table 2.2 presents some positioning quotes that illustrate how the importance of communication is captured in the literature. Particularly, pictorial methods and communication channels have been shown to play an important role in an understandable strategy communication between

manufacturing managers and workers (Gagnon et al., 2008; Mills, Neely, Platts, & Gregory, 1998). With an emergent perspective on the MS formation, the means of communication become central as enablers for consistent decision making. The communication theory can thus be used as a lens to study the worker–manager relationship in the MS context.

Table 2.2. Positioning quotes for communication

Quote	Reference
"The essence of these initiatives (note: continuous improvement, e.g., [just in time] JIT and [total quality management] TQM) is to create **communication channels** for new ideas and to **involve** lower-level organizational members in **collaborative decision making and problem solving**".	Kim et al. (2014, p. 463)
"[…] top managers should establish an **organizational environment** that encourages employees to try new ideas with regard to **improving** their work and that provides **communication channels** to **share ideas** with other members in the organization as well as across [the] organizational hierarchy".	Kim et al. (2014, p. 472)
"[…] effectively implementing a strategy within a manufacturing environment – perhaps more than in any other functional area of the firm – is incredibly dependent on the **effective communication** of management's well-considered goals and strategic priorities to another level of **employees: those at the operational level** of the firm".	McDermott and Boyer (1999, p. 21)
"In contrast to the manufacturing **managers** who attend high-profile **meetings**, hourly workers rarely get a glimpse of the strategic outcomes of these meetings. The outcomes can be translated too easily into **slogans**, **banners**, and, occasionally, **pep talks** aimed at **motivating** the work force".	McDermott and Boyer (1999, p. 22)
"It is not enough to have the right strategy; it must also be **understood and communicated throughout** the organization".	McDermott and Boyer (1999, p. 27)

The Oxford Dictionary (2015) defines communication as "the transmission or exchange of information, knowledge, or ideas, by means of speech, writing, mechanical or electronic media". Hence, communication concerns sending and receiving messages between people. The communication theory builds on several models of how information flows among individuals. Shannon and Weaver (1949) developed the first linear model of communication, referred to as the transmission model. Berlo (1960) expanded it into the source-message-channel-receiver (SMCR) model of communication. Several elements of communication can be defined (see Table 2.3). The sender initiates and encodes a message, which is transferred through a channel to the receiver, who decodes the message.

Table 2.3. Elements of communication

Element	Characteristics
Sender/source	Communication skills, attitude, knowledge, social system, culture
Message	Content, elements, treatment, structure, codes
Channel	Hearing, seeing, touching, tasting, feeling The medium through which the message travels
Receiver	Communication skills, attitude, knowledge, social system, culture

In this research, the means of communication in an organisation are defined as the transfer of information related to the MS, which exists in an articulated format. The senders and receivers are referred to as actors. Regarding channels, only those that can be heard or seen are included. Concerning the message, only the content aspect is considered. The traditional MS literature often views the relationship between the workers and managers in the operations function as unilateral. The communication theory terminology refers to this case as a mutually exclusive system where the managers act as senders and the workers as receivers, similar to the transmission model of communication (Shannon & Weaver, 1949). This research attempts to view the relationship between managers and workers as dyadic. This allows for the study of two types of actors and the connection between them. An organisation's choices regarding communication channels has to some extent formalised its communication. However, the way in which individuals relate to the means of communication and the alternative ways they choose to communicate are not often formalised.

2.4 Contextual factors

In this research, the contingency theory has been applied as a means to view the individuals in the operations function in relation to their context. Central to the contingency theory in this research are the contextual factors influencing the MS formation and the possibilities for strategic consensus. Previously, the contingency theory focused on understanding the MS content (Voss, 1995). In doing so, managerial choices and environmental factors had been primarily emphasised (Ho, 1996). However, it is important to conduct a broader analysis (Barnes, 2002) and to consider the internal and external contexts (Mills et al., 1995; Pettigrew, 1992). The internal context concerns alternative strategy modes, a firm's size, ownership, culture and stage of development (Kiridena et al., 2009; Mills et al., 1995, p. 40). The external context is defined as "supplier power, buyer power, availability of substitutes, threat of entry, existing competitors, regulation, political and economic context, geographical position" (Mills et al., 1995, p. 40).

To connect the behaviours, perceptions and attitudes (which are undeniably related to individuals) with the operational level and its MS, a researcher needs to dig deeper into the organisation's internal context – the individual and organisational contextual factors (Saad & Siha, 2000). Saad and Siha (2000) link the "hidden factors" to both the managers' and workers' behaviours and "their perception and attitudes toward each other and toward the change process" (p. 1153). Pettigrew (1992, p. 8) also highlights the crucial roles played by human "differences in power, knowledge, and other resources" in the "opportunities for the realization of influence in social processes". Some significant previous works have studied the contextual

factors influencing strategy formation and strategic consensus (e.g., Barnes (2002); Kellermanns et al. (2005); Kiridena et al. (2009)). In his framework for the MS process, Barnes (2002) defines the key elements related to the organisational context. Besides the content of the strategy, he emphasises external factors (related to customers and competitors in the organisation's market), ownership factors (related to the owners' goals, particularly financial), internal context ("the hard internal contextual factors, such as the firm's resources and capabilities, and the soft factors like culture, politics and leadership") and external context ("political, economic, sociological and technological factors in the wider business environment") (Barnes, 2002, p. 1094). He also explains that the MS development depends on individual interpretations, which in turn are impacted by three factors: individual ("personalities, levels of knowledge and expertise", influenced by "backgrounds, education, work experience"), cultural (organisational culture and collective beliefs) and political ("exercise of the managerial power") (Barnes, 2002, p. 1102). Kiridena et al. (2009, p. 406) identify four internal factors – "individual, cultural and political factors along with the organizational structure" – influencing the progression of strategic initiatives. Furthermore, the authors cite three internal factors – a firm's size, stage of a firm's development, and ownership – directly affecting the kind of MS formation. In their directions for future research, Kiridena et al. (2009, p. 408) emphasise the need to examine "the impact of organizational culture and managerial styles". Kellermanns et al. (2005, p. 732) conclude that the top managerial team's degree of strategic consensus depends on the group's behavioural integration, that is, "the amount of information exchange, collaborative behavior, and joint decision making". The authors explain that despite the absence of such behavioural integration, consensus may still be attained on the basis of common interpretations, due to the individuals' similar backgrounds and sets of experiences. The same case should hold true for individuals at the operational level.

Kiridena et al. (2009) categorisation of contextual factors includes three levels – external, organisational and individual – where the last two together comprise the internal context. As this research takes the workers' perspective on the MS, it mainly focuses on the operational, internal level of an organisation. Table 2.4 presents the internal contextual factors, as derived from the literature (Barnes, 2002; Kellermanns et al., 2005; Kiridena et al., 2009; Mills et al., 1995). It classifies the factors identified in previous research into the two internal levels: individual and organisational.

Table 2.4. Contextual factors at two levels

Level	Factors
Individual	• Background (Barnes, 2002; Kellermanns et al., 2005) • Level of knowledge (Barnes, 2002; Pettigrew, 1992) • Personality (Barnes, 2002) • Level of expertise (Barnes, 2002) • Education (Barnes, 2002) • Work experience (Barnes, 2002; Kellermanns et al., 2005)
Organisational	• Organisational culture (Barnes, 2002; Kiridena et al., 2009; Mills et al., 1995) • Managerial styles, leadership (Barnes, 2002; Kellermanns et al., 2005) • Collective beliefs (Barnes, 2002) • Political, managerial power (Barnes, 2002; Kiridena et al., 2009) • Alternative strategy modes (Mills et al., 1995) • A firm's size (Kiridena et al., 2009) • Ownership (Kiridena et al., 2009) • Stage of a firm's development (Kiridena et al., 2009; Mills et al., 1995) • A firm's resources and capabilities (Barnes, 2002)

2.5 Research questions

The purpose of this research is *to investigate how the individuals in the operations function perceive the MS in order to understand how these individuals are involved in the MS formation*. Central to this purpose are three entities: the two hierarchical levels of individuals in the operations function [(1) workers and (2) managers] and (3) the MS itself. These have been captured first in Figure 1.1. Figure 2.4 illustrates the relationships among these three separate building blocks. Workers and managers are seen as two nodes in a system that focuses on the relationship between them, captured through the concept of strategic consensus. To understand this relationship, the nodes' perceptions of the MS should also be understood. To grasp this relationship, the nodes and the context four research questions (RQs) are formulated. The RQs concern the MS formation and how it emerges among the individuals in the operations function in a manufacturing company. Figure 2.4 visualises these RQs and their interrelations. The main focus is on RQ2, which asks about the workers' perceptions, and RQ3, which asks what might influence strategic consensus. Meanwhile, RQ1 functions as an overarching frame for RQ2 and RQ3 by inquiring about what terms the strategic consensus on the MS might be described. Furthermore, RQ4 ties all together by further exploring the actual MS formation.

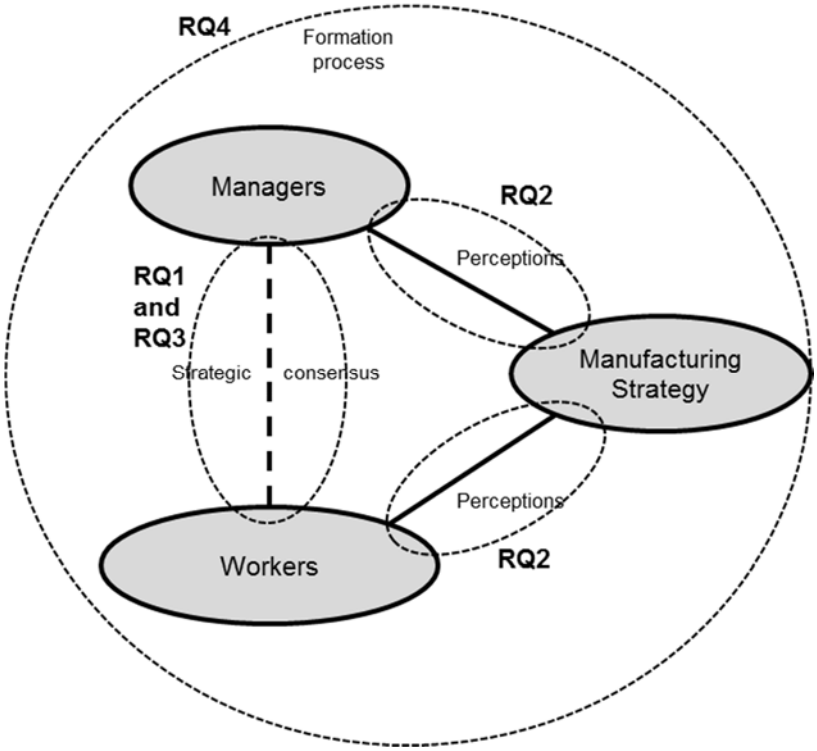

Figure 2.4. Context of the research questions

RQ1 addresses how workers and managers relate to one another within the frame given by the MS, that is, how strategic consensus develops. RQ1 particularly focuses on how such a construct as strategic consensus may be described in an empirical context within an operations function. Figure 2.5 illustrates RQ1.

- RQ1: How can strategic consensus among the individuals in the operations function be described?

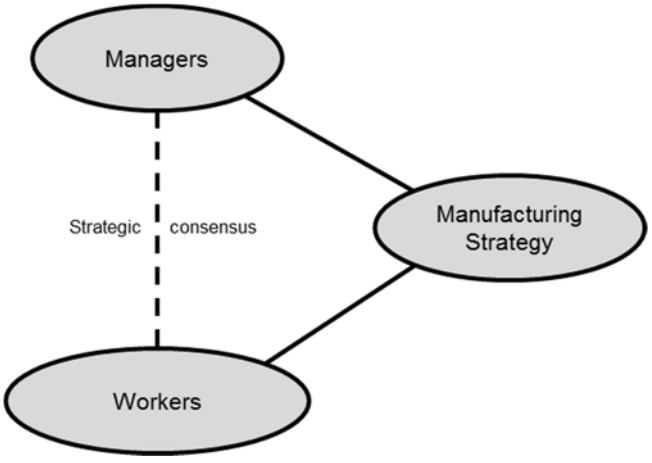

Figure 2.5. Strategic consensus on MS

As the traditional MS literature has focused on the management level and the managers' perceptions of the MS, this research complements that perspective by emphasising the workers' perceptions. Therefore, RQ2 primarily concerns how the workers perceive the MS content. The

use of the word “perceive” here should be interpreted as the combined meaning of understand, grasp and comprehend. It is not only about the information received by the individuals but also what they have done with it, that is, their internalisation of the information. RQ2 does not aim to capture what the company’s MS really is, how it was formulated, or how and why the MS is the way it is. Figure 2.6 illustrates RQ2.

- RQ2: How do the individuals in the operations function perceive the manufacturing strategy content?

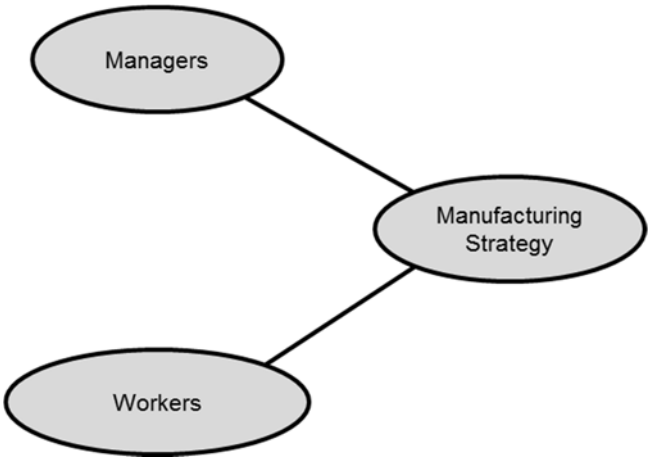

Figure 2.6. Individuals’ perception of MS

Barnes (2002, p. 1102) identifies three factors affecting the managerial interpretation of the MS: individual, cultural, and political. In this research, it is assumed that similar factors also have an impact on the workers’ interpretations. Kiridena et al. (2009, p. 408) emphasise the importance of studying the micro-level issues, “such as organizational culture and managerial styles”. Moreover, Kellermanns et al. (2005) point out the possible impact of a common background and set of experiences on strategic consensus. Therefore, RQ3 searches for these factors influencing strategic consensus (see Figure 2.7).

- RQ3: What are the factors influencing strategic consensus on the manufacturing strategy?

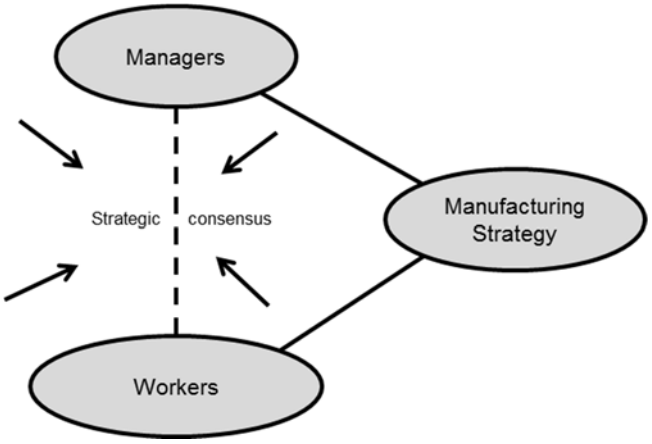

Figure 2.7. Factors influencing strategic consensus

RQ4 aims at a more holistic view on the MS (called for by Kiridena et al., 2009) and focuses on how the MS emerges and what aspects of the activities in the operations function lead to strategic consensus. What actions and roles do people take, and what interplay does that lead to among the individuals in the operations function? To capture this, RQ4 is formulated, as illustrated in Figure 2.8.

- RQ4: How does the formation of the manufacturing strategy emerge in the operations function?

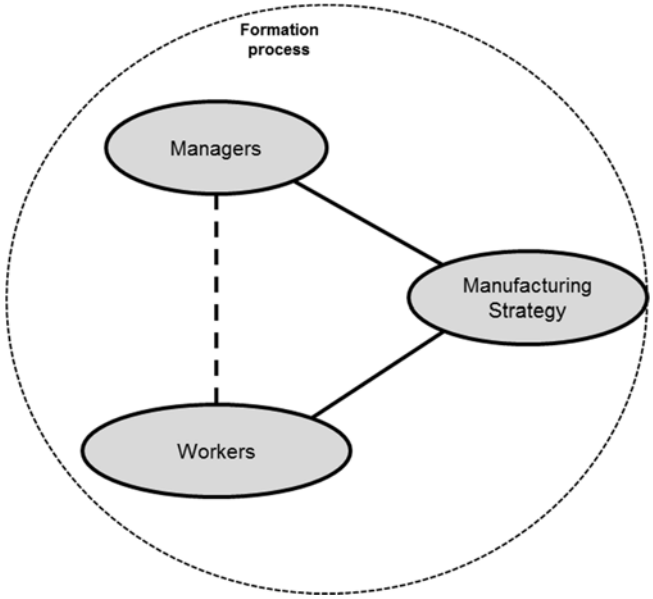

Figure 2.8. MS formation

Answering these RQs is the first step towards understanding how the MS materialises in the operations function. It enables understanding the relationships present on the shop floor, particularly between workers and managers, and how these influence the possibilities for high levels of strategic consensus.

3 Methodology

This chapter describes the research design, what decisions were made, how they were made, and what the implications of those decisions were. The chapter thus outlines the chosen methods and how they were used in the five studies.

Figure 3.1 illustrates how the six appended papers are related to the five studies and to the RQs. This chapter is primarily structured around these five studies. The connections between the papers and the RQs are further explained and elaborated on in chapter 5 (Analysis). The six papers can be viewed as pieces in a puzzle and relate to one another in the following ways: Paper 1 starts with the broad perspective on the MS implementation from the workers' perspective. Paper 2 continues with the theoretical base related to individuals in the MS. Paper 3 adds the strategic consensus concept and includes the managers' perspective as a complement to Paper 1. Thereafter, both Papers 4 and 5 delve deeper into the individuals' context in the operations function. Finally, despite its limited role in this thesis, Paper 6 adds quantitative data from a large company, and thereby both develops insights regarding the suitability of methodological choices and also further develops the workers' perspective on the MS. The papers are named as follows:

- Paper 1: The explorative paper
- Paper 2: The conceptual paper
- Paper 3: The strategic consensus paper
- Paper 4: The contextual paper
- Paper 5: The communications paper
- Paper 6: The blue-collar and white-collar workers paper

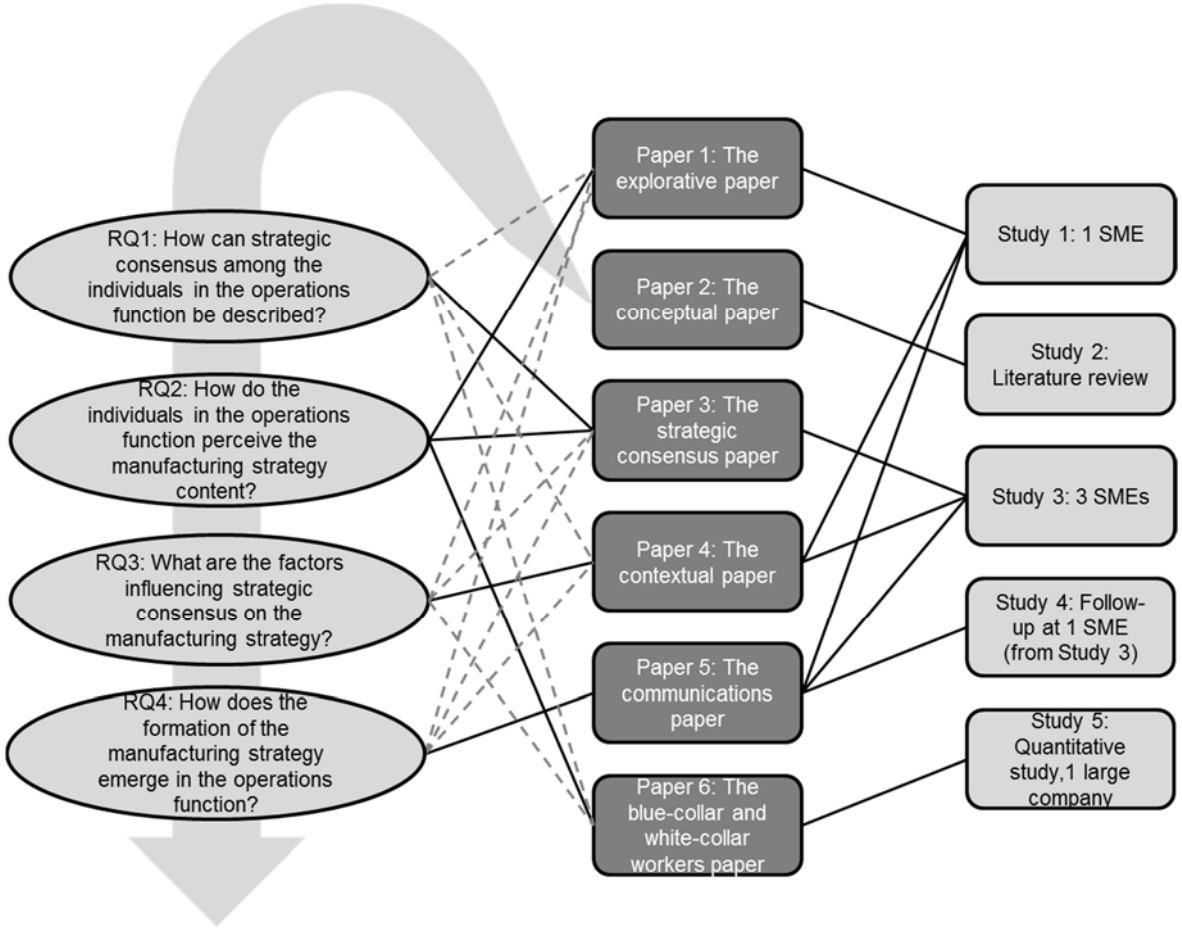

Figure 3.1. Relationships among the research questions, papers and studies (a solid line indicates complete coverage; a dashed line represents partial coverage)

Based on the nature of the four research questions certain types of data was needed. Table 3.1 summarises the four research questions, the data needed and the research methods that were chosen to gather that type of data. The table also illustrates in which study the data collection has been conducted.

Table 3.1. The research questions, research methods and studies

Research question	Data needed	Research method	Study
RQ1: How can strategic consensus among the individuals in the operations function be described?	Perceptions of MS dimensions by individuals in the operations function	Interviews with workers Observations	Study 1: 1 SME
		Interviews with workers and managers Observations	Study 3: 3 SMEs
		Survey of workers and managers	Study 5: Quantitative study, 1 large company
RQ2: How do the individuals in the operations function perceive the	Perceptions of MS dimensions by individuals in the operations function	Interviews with workers Observations	Study 1: 1 SME
		Interviews with workers and managers Observations	Study 3: 3 SMEs

Research question	Data needed	Research method	Study
manufacturing strategy content?		Survey of workers and managers	Study 5: Quantitative study, 1 large company
RQ3: What are the factors influencing strategic consensus on the manufacturing strategy?	Perceptions of MS dimensions and organisational context by individuals in the operations function	Interviews with workers Observations	Study 1: 1 SME
		Interviews with workers and managers Observations	Study 3: 3 SMEs
		Survey of workers and managers	Study 5: Quantitative study, 1 large company
RQ4: How does the formation of the manufacturing strategy emerge in the operations function?	Perceptions of MS dimensions and means of communication by individuals in the operations function	Interviews with workers Observations	Study 1: 1 SME
		Interviews with workers and managers Observations	Study 3: 3 SMEs
		Interviews with workers and managers Observations	Study 4: Follow-up at 1 SME (from Study 3)

3.1 Research process

The research process was initiated through a deductive study of the MS implementation process at Swedish SMEs. However, when taking a holistic view on how the research design developed it is evident that it was rather an interactive development process where the initial deductive study turned into an iterative research process that combined empirical data with input from existing literature, that is, an abductive research approach. Primarily based on the traditional MS literature, the initial assumptions that it would be possible to focus only on the implementation aspects of the MS from the workers' perspective without understanding the level of strategic consensus or the contextual factors constraining this shop-floor environment, developed further as the complexities related to the MS formation emerged from the empirical data. It was not until the combined results from the six papers were known that the MS formation patterns emerged. For example, it was neither the content nor the process of the MS that was central but the continuous interactions between the two. This section describes the research process in a rather chronological order.

The need for iterations between empirical and theoretical evidence/data in the research process (see Figure 3.2) became evident when the findings of the first empirical study (Study 1) were examined. A gap appeared to exist in the traditional MS literature related to the individuals' roles in the MS formation process. Therefore, fields closely related to the MS had to be reviewed, resulting in the construction of the theoretical background presented in chapter 1.

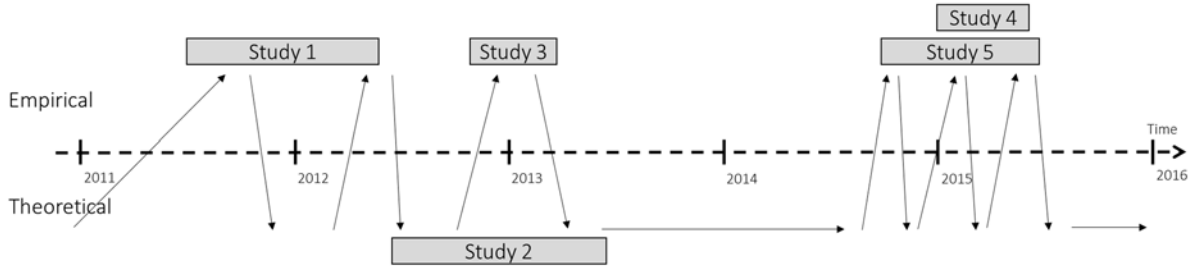

Figure 3.2. Iterative research process

The initial study (Study 1) originated in the traditional MS literature and set out to find out how workers in an SME perceive MS. As this was an initial exploration, it covered many different aspects of the MS and took the standpoint of addressing the MS implementation process. This was captured in Paper 1 (the explorative paper), which emphasised the special characteristics of the SME context.

This initial study revealed that the understanding of the MS was limited by the traditionally dominated focus on the managers. After Study 1, it was concluded that not only was the MS a more complex topic than originally thought, it also needed to be addressed from different viewpoints, both conceptually and empirically. This reasoning resulted in the identification of four key aspects to the research problem to investigate further in this research in order to be able to address the research purpose. First, during the data analysis for Paper 1, it was realised that much literature did not bring up the workers' perspective, and based on the first study, this was concluded as important for further investigation. Second, Study 1 showed the workers' *differing perceptions* of what the MS comprised. These diverse perceptions also seemed to vary from the company's MS as presented by the top management. Third, there were indications that patterns could be observed in the way the perceptions differed among the individual workers. For example, the workers' role in the production system was important for their perceptions of the MS. Fourth, the organisational context appeared to play an essential part in how the workers perceived the MS.

These four aspects laid the foundation for two different research paths, one conceptual and one empirical, partly taking place in parallel. The conceptual path addressed the first aspect – the limited MS research about the workers' perspective – with a more structured literature review (Study 2). The study focused on understanding how and with which terminology the workers had been addressed in previous MS literature, resulting in Paper 2 (the conceptual paper). The behavioural operations perspective was used to explicate some fundamental assumptions that were not well understood in operations management. This clarified why the focus on individuals in the operations function was important and how it could be addressed.

The empirical research path addressed the second (differing perceptions), third (perception patterns) and fourth (organisational context) aspects through empirical studies. Since Study 1 and the subsequent Paper 1 heavily focused on the SME context, this was decided to be kept as the SMEs' setting offered a suitable context in which the aspects could be studied. This suitability was linked to the size of the companies, where flat organisational structures and short distances between hierarchical levels enabled an overview of the whole production system.

Three new SMEs in the same industry as the first one were selected. Guided by the second aspect (differing perceptions), it was considered important to also involve the managers in this study (Study 3), as an attempt to understand the companies' intended MS. This inclusion was also guided by the addition of a new theoretical concept, strategic consensus, which was regarded as a useful frame to capture and understand differences in perceptions, not only among workers but also between workers and managers as groups and among the managers themselves. The second aspect was then captured in Paper 3 (the strategic consensus paper). To address the third aspect (perception patterns), the interviews in Study 3 also considered the workers' individual characteristics in an attempt to identify different individual factors and explore individual characteristics of importance for the MS perception. It became evident that the individual factors were closely related to the same type of problems addressed by the fourth aspect (organisational context). Both the third and fourth aspects could be tackled by examining the companies' internal operational level from a contingency-based perspective. This was achieved in Paper 4 (the contextual paper), where both individual and organisational contextual factors influencing the workers' perceptions of the MS were analysed. It became evident that means of communication could not really be viewed as an organisational contextual factor but seemed to impact the workers' perceptions of the MS. This communication aspect of the workers' organisational context was further addressed in a follow-up study (Study 4) of one of the companies already studied in Study 3. These communication aspects were covered separately in Paper 5 (the communications paper).

Along this second research path, it also became evident that while studying SMEs previously had been considered only a strength, it also had its limitations. These were mainly related to the very flat structures of the studied organisations and to their dependence on their customers' MS. It was decided to complement the findings regarding MS in SMEs with data capturing strategic consensus among individuals in a large organisation. This was done in Study 5 with the help of quantitative research methods (Study 5), focusing on understanding this particular organisation rather than a representative sample of the entire population. Due to this large company having a less flat structure than the SMEs, it became possible to distinguish different groups of workers from one another. The findings resulted in Paper 6 (the blue-collar and white-collar workers paper), which gives some initial insights regarding strategic consensus among individuals in a large company.

3.2 Research design

Maxwell (2005) reasons that as qualitative research always includes reflexive work conducted in the context of simultaneous ongoing activities, each influencing all the others, the research can never be structured in the form of a plan or protocol. It should rather be viewed through an interactive model (Figure 3.3) consisting of five parts: goals, a conceptual framework, research questions, methods and validity. As this research had an interactive nature, the model was adapted to present this research. Each of the five parts is briefly discussed in this section, while longer discussions on each part can be found elsewhere in this thesis, as indicated by the chapter or section numbers in the model (Figure 3.3). In the model, the five parts can be viewed as creating two triangles – one upper (goals, conceptual framework and research questions) and one bottom (research questions, methods and validity). It is important that the upper triangle of

the model be a closely integrated unit; clear links should exist among the parts (Maxwell, 2005). These links are primarily illustrated in chapters 1 and 2. The integration among the components of the bottom triangle should also be explicit (Maxwell, 2005). Such emphasis on the close links among research questions, methods, and validity relates to the discussion on quality criteria for qualitative research (see the further discussion on this topic in section 3.6).

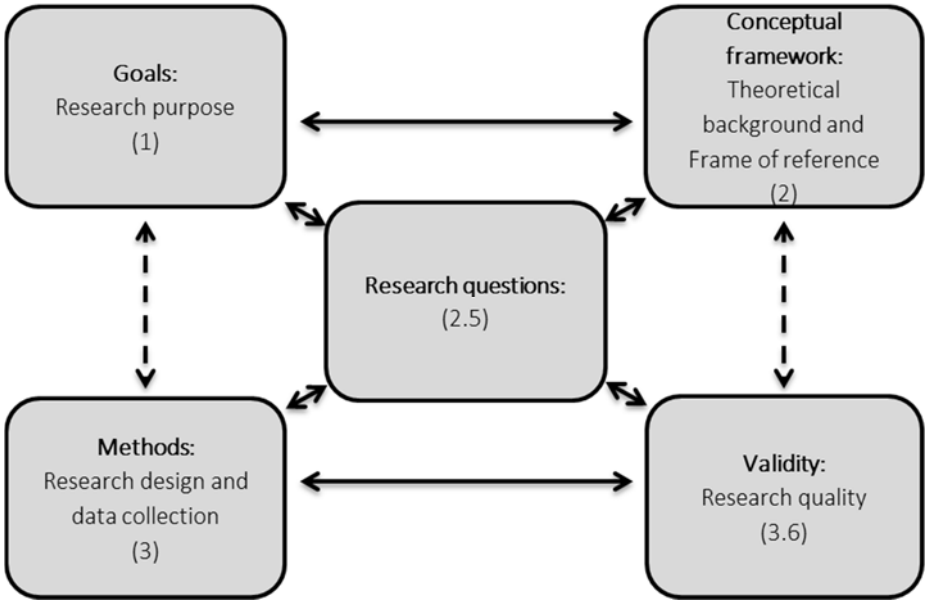

Figure 3.3. Maxwell's Interactive Model of Research Design (2005, p. 5)

Maxwell (2005, p. 15) defines goals as including "motives, desires, and purposes – anything that leads you to do the study or that you want to accomplish by doing it". In this research the initial motives were laid out by the research during the master's thesis project, where it was observed that the workers on the shop floor were seldom or never directly involved in the MS formation, despite possessing knowledge about the production system and having strong opinions on what to improve and how to do so. Therefore, the purpose of this research developed to focus on the investigation of *how the individuals in the operations function perceive the MS in order to understand how these individuals are involved in the MS formation*. The purpose has influenced the research design and the underlying problematisation is elaborated further in chapter 1. What this research set out to accomplish was a deeper understanding of how the MS formation emerged on the shop-floor level and what it could look like if the workers took part in the process.

Maxwell (2005, p. 33) defines the conceptual framework part as "the system of concepts, assumptions, expectations, beliefs, and theories that supports and informs your research". The research is framed within the operations management domain, primarily the MS field. However, the assumptions, expectations and beliefs with which I entered this research process called for the inclusion of other perspectives. As the fundamental idea centred on humans – the individuals in the operations function, primarily the workers on the shop floor – the concepts that were more closely related to a human-centred view were required to be able to address the MS formation in the operations function. Therefore, the contingency theory served as a foundation on which the research moved towards the behavioural operations perspective. The

concept of strategic consensus grew to become central to the research as its core constructs captured the individuals and their perceptions. Meanwhile, the communication theory received a more prominent role the deeper the empirical evidence delved into the actual foundations of the MS formation. Mintzberg's (2009) view on strategy as emerging further helped in guiding the development of the ideas related to the conceptualisation of the MS formation. In the iterative research process, the bodies of knowledge served as both the theoretical base of the studies and sources of comparisons between empirical data and prior research findings. This iterative process is further described in section 3.1.

Related to the research questions of the interactive model, Maxwell (2005, p. 65) stresses that they are at the heart of the research design and should define "what you specifically want to understand by doing your study". The four research questions in this research explicate the research purpose. Their answers yield a deeper understanding of how the MS emerges from the individuals in the operations function, how these individuals perceive the MS, what factors influence their perceptions and hence the strategic consensus among them, and how the MS forms based on these premises. The research questions are further explained in section 2.5. The development of the RQs was (as mentioned) an iterative process. Without having the answers for RQ1, RQ2 and RQ3 or without bringing together the data from all the six appended papers, RQ4 could not have been formulated. RQ4, along with its answer, emerged from the abductive research approach with constant iterations between empirical data and theoretical concepts. The actual formulation of the RQs also developed along the research process. Especially challenging was the formulation of questions that managed to capture the purpose while not overlapping each other.

Maxwell (2005, p. 79) refers to the methods part of the model as what will actually be done; this is not limited to data collection but also includes "establishing research relationships with those you study, selecting sites and participants, and analysing the data that you collect". This research used interviews as the principal method of data collection, complemented by a survey study. The research methods and procedures are described in detail in chapter 3.

The validity part of the model refers to "the correctness or credibility of a description, conclusion, explanation, interpretation, or other sort of account" (Maxwell, 2005, p. 106). Validity is to be viewed as a "goal rather than a product", relative to the research purpose and circumstances; in other words, the assessment of validity is context dependent (Maxwell, 2005, p. 105). Maxwell (2005, p. 108) defines two main types of threats to the validity of the research: (1) researcher biases, how the researcher's "values and expectations influence the conduct and conclusions of the study" and (2) reactivity, the researcher's influence "on the setting or individuals studied". In this research, the validity is also discussed in relation to the concept of trustworthiness (section 3.6). Trustworthiness is applied to assess the research quality since it is a concept used to mirror the common quantitative criteria by qualitative terms. The credibility of the research has also been assured by careful elaborations of fundamental assumptions and the special attention paid to the descriptions and interpretations.

3.3 Empirical context: companies studied

The research presented in this thesis is primarily positioned within the context of SMEs, focusing on subcontractors with few customers and no product development of their own. This organisational context was chosen because it was believed that (1) studying small companies would clarify the connections between workers and managers due to the shorter distances between the "top" and "bottom" hierarchical levels, and (2) studying subcontractors would ensure that the MS was a focus within the companies since other functional strategies were either non-existent or played much less prominent roles in such environments.

Several characteristics distinguish SMEs from larger companies; the most fundamental distinctions are the company size and their relation to other companies. To be considered an SME, a company should have less than 250 employees and an annual turnover of less than €50 million (see Table 3.2). The SMEs can also be subdivided into those that are autonomous, partners or linked with other companies (European Commission, 2005). Furthermore, structural and cultural differences have been identified, together with aspects of the organisational and competitive environments and management practices, to distinguish SMEs from other companies (Hudson Smith & Smith, 2007). The SMEs are characterised by their flexibility and closeness to markets; the presence of a reactive, fire-fighting mentality; and their flat and flexible organisations featuring personalised management, the scarcity of resources and low levels of employee involvement (Cagliano & Spina, 2002, p. 1383; Dangayach & Deshmukh, 2001; Löfving, 2009, p. 27).

Table 3.2. The new thresholds of enterprises (adopted from European Commission, 2005, p. 14)

Enterprise category	Staff headcount	Annual turnover	Annual balance sheet
Medium-sized	< 250	≤ €50 million	≤ €43 million
Small	< 50	≤ €10 million	≤ €10 million
Micro	< 10	≤ €2 million	≤ €2 million

The case companies in the qualitative studies (i.e., the SMEs) are characterised by their size, industry and lack of a structured MS formation. None of them had a formalised (i.e., written) MS. The company in Study 5 was a larger multinational corporation with several production facilities around the world. It had a formal structure for strategy development and had for several years aimed at implementing a global production system, inspired by the ideas from Toyota and lean production. Table 3.3 shows the case companies' characteristics.

Table 3.3. The case companies' characteristics

	Company 1 (Study 1) Referred to as "The company" (Paper 1) and "Alpha" (Paper 4 and Paper 5)	**Company 2** (Study 3 and Study 4) Referred to as "Alpha" (Paper 3) and "Beta" (Paper 4 and Paper 5)	**Company 3** (Study 3) Referred to as "Beta" (Paper 3) and "Gamma" (Paper 4 and Paper 5)	**Company 4** (Study 3) Referred to as "Gamma" (Paper 3) and "Delta" (Paper 4 and Paper 5)	**Company 5** (Study 5) Referred to as "The company" (Paper 6)
Company size (number of employees in 2012)	88	66	60	36	13,476 (1,000 at the studied site)
Annual turnover (2012)	SEK 67 million	SEK 100 million	SEK 90 million	SEK 44 million	SEK 31 billion
Profitability	5% Focus on growth	Last year: 7–10% Had been much more profitable earlier	Last year: 3.5–5% Normally around 5–7%	Below expectations last year Aiming for 10% annually	.
Company ownership	Managed and owned by two people	Owned by a venture capital company	Family-owned group	Managed and owned by the same family	Public limited company
Management group	Five men, one woman: CEO, Finance, Production, Quality, Sales, HR	Recently changed. Six men: CEO, Finance, Production, Sales, Quality, Purchasing	Stable for many years. Five men, one woman: CEO/Market, Finance, Production, Quality, Purchasing, Logistics/Planning	Stable for many years. Three men, one woman: CEO, Finance, Production, Quality	Eleven board members: four women, seven men
Type of production system	Functional/ Cellular	Functional/ Cellular	Functional/ Cellular	Functional/ Cellular	Dedicated production lines
Products	Aluminium working/Metal processing	Sheet metalworking/ Metal processing	Manufacturing tubular products	Sheet metalworking/ Metal processing	Outdoor power products
Customers	One main customer	One main customer	One main customer	Two main customers	Consumers and professional users

3.4 Data collection

This section describes how the data was collected. Each of the five studies is described in detail.

3.4.1 Methodological considerations

The decision on what research methods are most appropriate depends on the issues and the specific context in which those issues are studied (Maxwell, 2005). As the research was initiated through an explorative approach to the workers' perspective on the MS, the qualitative research approach was considered the most suitable for the initial studies. As emphasised by Flick (2009, p. 16), "qualitative research is not based on a unified theoretical and methodological concept". Therefore, it is important to be aware of the data collection opportunities available for the conduct of qualitative research and to structure the methodological decisions accordingly. Qualitative research offers several methodological options (Bryman & Bell, 2011; Flick, 2009; Yin, 2009), which primarily centre on the data collection. Flick (2009) divides the data into observations, verbal data and mediated data. Table 3.4 presents the methodological choices made in this research according to this division. Table 3.4 also presents the methodological choices made in terms of the quantitative research method in Study 5. Whereas Table 3.1 links the methods to the research questions, Table 3.4 attempts to delve deeper into the methodological considerations made. The table intends to give an overview; the choices made are further explained in the following descriptions of the studies. However, the rightmost column presents reflections on the methodological choices and the potential usage of the methods that were not part of this research.

Table 3.4. Research methods

Methodological options (based on Bryman & Bell, 2011, p. 389; Flick, 2009, pp. 212–213, 284–285; Yin, 2009, p. 101)		**Methods selected for this research**	**Reflections**
Observations and ethnography	• Ethnography • Participant observation • Non-participant observation	Non-participant observations were conducted in Study 1, Study 3 and Study 4.	An ethnographic approach or participant observations could have been suitable to study the MS formation in the operations function. However, such a study would have limited the number of organisations that could be studied. At this early explorative stage, it was considered more beneficial to broaden the perspective instead of deepening it in one organisation.
Verbal data	Interview types: • Focused • Semi-structured • Problem-centred • Expert • Ethnographic Group procedures: • Group discussion • Focus groups	Semi-structured interviews were conducted in Study 1, Study 3 and Study 4. In Study 1, group discussions with the workers were also conducted to confirm the findings.	The semi-structured interview was the best approach to capture the individuals' perceptions of the MS in a structured manner, while simultaneously allowing for new perspectives and insights to emerge. Group procedures could have been used to a larger extent to capture strategic consensus directly at the group level.

Methodological options (based on Bryman & Bell, 2011, p. 389; Flick, 2009, pp. 212–213, 284–285; Yin, 2009, p. 101)		**Methods selected for this research**	**Reflections**
	• Joint narratives		
Mediated data	• Using documents (such as archival records) • Physical artefacts • Visual data methods: o Use of photos o Film analysis o Video analysis • Narratives as data: o Narrative interview o Episodic interview • Language-based approaches to collection of qualitative data	Physical artefacts had been part of the observations to some extent, especially the boards and instruction sheets used by the management to communicate with the workers.	As the interest of the research was not to study what an actual MS contained but the individuals' perceptions thereof, the study of documents was not part of the research approach. Furthermore, the studied SMEs lacked such documentation on their MS. However, the study of other types of archival records, along with visual data methods, could have been useful in an ethnographic type of study to capture details of the communication, such as during meetings, to understand the MS formation. Language-based approaches have not been applicable. Language has not been a research topic but a medium used to communicate with interviewees.
Survey	• Structured interview o Face-to-face o Telephone • Self-completion questionnaire o Supervised o Postal o Internet	Self-completion questionnaires were distributed among the workers and managers in Study 5.	The self-completion questionnaire was chosen to test the propositions that were developed in the earlier studies in a large company context. Since not all workers had access to computers, the questionnaire was completed on paper. Furthermore, as the company decided on what time during the work shifts could be allocated for filling out the questionnaire, the data collection was not supervised but resembled the postal version. Structured interviews could also have been applied but were primarily ruled out due to time and research constraints.

Table 3.4 shows that this research primarily used interviews to gather data. Interviews were believed to be the type of data collection that best corresponded with how to answer the research questions. To capture individual perceptions, it is important to ensure that interviewees are comfortable and trust the interviewer. Interviewees must also have enough time and opportunity to think about their answers. Perception was a central concept in this research. To capture individual perceptions, the following measures were taken: (1) The individuals in the operations function were interviewed, ensuring (a) more than one interviewee per company and (b) diverse

interviewees, as guided by the selection. (2) The questions in the interview guides addressed both facts and perceptions. (3) During the interviews, follow-up questions were asked to assure that each interviewee was understood correctly. (4) In some cases, the interviews were followed up by additional sessions.

At the initial stages of the research process, it was thought that surveys would not adequately capture the complexity of individual perceptions of the MS phenomenon. In order to understand the nature of the strategic consensus concept it is important to ensure sensitivity both to the individual and organisational context. It is therefore important to get to the individuals and ensure that it is their individual answers that are being captured. Furthermore, it is also important to ensure that the individuals' contextual settings and their own personal perceptions are understood. However, to be able to capture differences in perceptions, it is also important that the answers are given to comparable questions. Therefore, the interview guides were relatively highly structured although both the interviewer and the interviewees elaborated on the topics that arose during the interviews. These semi-structured interviews might have limited the findings, as the interviewees were not speaking freely about the MS. However, as MS in itself is a complex, abstract concept, and a majority of the interviews took place with individuals who seldom, or never, get in contact with such phenomenon, the interview guide helped in ensuring structure to the interview situation and comparability among the interviewees. In Study 1, Study 3 and Study 4, the interviewees' natural setting (Yin, 2009) was visited through plant tours. In Study 1, these tours were complemented with non-participant observations at the interviewees' workstations. In both Study 1 and Study 4, the researcher attended the meetings on the shop floor. However, as a result of the first four studies, different patterns emerged from the data regarding how the individuals perceived the MS dimensions. Therefore, a quantitative study (a survey) was developed to test the propositions based on these detected patterns.

3.4.2 Study 1: Workers' perceptions of MS

Study 1 explored how the employees at a Swedish subcontractor SME in the metalworking industry perceived the MS content and to some extent, the MS process. The company was selected partly out of convenience; it was one of the five companies participating in a larger research project on the MS formulation in SMEs (the Stratego project). The company was chosen based on its size and willingness to participate in the study. It also had ISO (TS 16949) certification, and its management had recently aimed to focus on the MS in a structured manner. A certain level of strategic maturity was thus evident. The interviews did not focus on the MS per se nor on the management's view of it but on the workers' perceptions.

The decision was made to start the study with an initial pilot case study/pretest (Yin, 2009, p. 92), where three interviews were held. The most important reasons for conducting a pilot case study are to refine the data collection plan in terms of "the content of the data and the procedures to be followed" (Yin, 2009, p. 92). A pretest is a formal test of the final plan (Yin, 2009). This initial study was a cross between the two; the questions were retained, but the manner in which they were posed and the observation procedures used were changed to give a clearer structure to the data collection. The initial study was followed by five further interviews with the workers. Thereafter, two follow-up sessions were conducted; the interviewees were divided into two smaller groups to enhance the depth of the discussion. Not all interviewees were able to attend.

The study was divided into three main parts: a plant tour, non-participant observations and semi-structured interviews. Additionally, the researcher attended two weekly group meetings and a weekly production meeting to grasp the bigger picture and to understand the organisational communication channels to which the interviewees referred. The plant tour and the non-participant observations were necessary to obtain an overview of the workers' organisational context and to relate to the shop-floor layout and machinery (among others) mentioned in subsequent interviews. During the tour, some physical artefacts, such as information boards, were also studied as part of the organisational context. The interview guide (see Appendix 1) consisted of a standardised set of questions based on the MS content as presented in the OS matrix (Slack & Lewis, 2011). The interviewees (see Table 3.5) were selected in cooperation with the production manager and the HR manager; the aim was to obtain a representative profile of the interviewees. Bryman and Bell (2011, p. 408) observe that "the people who are interviewed in qualitative research are not meant to be representative of a population […]. [The] findings of qualitative research are to generalise to [a] theory rather than to populations". The interview duration ranged from 50 minutes to 1.5 hours. All interviews were recorded and transcribed.

Table 3.5. Interviewees in Study 1

Interviewee	Length of stay at the company	Organisational group/Position
Company 1		
Worker 1	16 years	Welding group/Regular worker
Worker 2	16 years	Bending group/ Metalworker
Worker 3	1.5 years	CNC group/CNC operator, measuring operator
Worker 4	6.5 years	Assembly group/Production staff member
Worker 5	6 months	Fan rings/Aluminium processor
Worker 6	9 years	Assembly group/Robot operator
Worker 7	5.5 years	CNC group/Robot operator
Worker 8	25 years	Production planning/Planner

After the data analysis had been conducted, the company was visited again. On this occasion, the workers were divided into two groups, and group discussions were held regarding the study's findings. This was done to verify the results, as well as to gain more knowledge on how the workers related to the MS content and to what extent their perceptions varied when they were in a group rather than when they were interviewed individually.

3.4.3 Study 2: Focus on individuals in MS literature

The second study was conceptual. The findings of Study 1 called for a more structured literature review than had been formerly performed. The study aimed to provide an understanding of the importance and role of the individuals in the operations function as presented in the MS literature, with particular attention to two levels in the organisation: workers and managers.

Throughout Study 2, many different search terms, databases and search methods were used in an effort to capture the essence of the MS literature in relation to the individuals in the

operations function. In the beginning, the focus was on the core literature reviews already conducted in the field (e.g., Anderson et al., 1989); special attention was paid to the most recent review by Dangayach and Deshmukh (2001). The references cited in this review were consulted to grasp the principal thoughts of the experts in the field. Thereafter, several structured searches were conducted to capture various MS dimensions. An approach using trusted sources was employed; highly ranked journals, including the *Journal of Operations Management*, the *International Journal of Operations & Production Management*, *Production and Operations Management*, *Academy of Management* and *Decision Sciences*, were browsed to reveal the patterns of the MS publications and special issues. As the research continued, new dimensions and important concepts emerged from the empirical studies, structured literature searches and snowballing from different references. It became evident that a narrower structured search was necessary to determine the existence or non-existence of the focus on individuals in the MS field.

Therefore, more focused searches incorporated different dimensions of the behavioural operations perspective; "manufacturing strategy" was used as a search term in combination with different wordings for the individuals in the operations function. This work is described in Paper 2. These searches concentrated on the academic articles in the ABI/INFORM and Science Direct databases and captured the extent to which the individuals were represented in the MS literature. Appendix 2 presents an overview of the literature searches.

3.4.4 Study 3: Strategic consensus between workers and managers

Study 1 revealed certain complexities, and it became clear that an understanding of the conditions on the shop floor and the workers' involvement in the MS required studying not only the workers' perspective but also that of the managers, and the relationships between these two nodes. The concept of strategic consensus (as defined by Boyer & McDermott, 1999) and the behavioural operations perspective (as defined by Croson et al., 2013) were discovered during Study 2, which paralleled the preparations for Study 3 (this study).

For Study 3, the participating companies were selected via sampling. The organisational context of Study 1, subcontractor SMEs, was retained. Moreover, it was decided that the research would remain within the metalworking industry. These boundaries were set for the following reasons: (1) The SMEs permit an easy overview not only of production processes (the organisational context) but also of organisational hierarchies, thus making it possible to understand how individuals are connected. (2) The subcontractors do not make independent products; thus, they have few functional strategies, and manufacturing has the most prominent role. (3) The researcher was familiar with the metalworking industry and hence had a background in understanding the production systems in which the interviewees operated. Furthermore, the researcher decided to choose Swedish SMEs in Jönköping County, a region well-known for its entrepreneurial spirit, industrial districts (e.g., Gnosjö and Vetlanda) and the presence of many subcontractors supplying Sweden's large international corporations. The Swedish database Affärsdata was used to identify relevant companies based on their size and Swedish Standard Industrial Classification (SNI) code. It was believed that very small companies would not employ enough individuals to allow the MS process to be studied, and the search was thus narrowed to include only companies with 20–250 employees. The code C-25 (manufacture of

fabricated metal products, except machinery and equipment) and the sub-code C-25620 (machining) were used in this effort. These codes were identical to those of the companies in Study 1. The search yielded 47 companies. From this point, the sampling process could be defined as purposeful selection (Maxwell, 2005, p. 88); particular settings, companies and individuals were deliberately selected in the expectation that they might provide the information needed to answer the research questions. First, the companies' financial status was evaluated based on the information in Affärsdata; second, the companies' websites were browsed. The companies in solid financial circumstances and that had websites featuring their employees and/or strategic work, improvement work or possession of different certificates were given the highest priority. An email was sent to these companies, which briefly described the study's purpose and the estimated time needed at the company site. The email was followed up by a phone call. Some companies declined to participate because of their heavy workload and the imminence of the holiday season; others were simply not interested. Since the study largely depended on the individuals' willingness to participate, it was essential that the companies were positive toward the study. The three selected companies (1) had management that was positive toward the study, (2) offered access to the production facilities and (3) allowed interviews with their workers.

To collect the data, plant tours (non-participant observations) were combined with semi-structured interviews at two organisational levels: workers and managers. Each company was visited over a single day, starting with the plant tour in the morning, followed by two interviews with the managers and three with the workers. The tours were guided by either the CEO or the production manager and served to provide an understanding of the organisational context and to enable the observation of the physical artefacts and the communications and interactions on the shop floor. The selection of worker interviewees was left to the CEOs and production managers because the researcher had no previous contact with the companies. The managers were asked to choose the workers who were maximally diverse in terms of gender, age, work experience, work tasks and personality. This selection was made as diverse workers, especially with different tasks at different places in the production system, would better reflect potential differences in how the MS was perceived across the operations function. Notably, not all individuals chosen by the managers for the interviews had tasks resembling what the researcher would describe as typical for workers. The interviewees handled such diverse tasks as production planning, material supply, group leadership and tooling. Table 3.6 lists the interviewees' characteristics.

Table 3.6. Interviewees in Study 3

Interviewee	**Length of stay at the company**	**Organisational group/Position**
Company 2		
Manager 1	1 year	CEO
Manager 2	1 year	Production manager
Worker 9	7 years	Robot welding group/Regular worker
Worker 10	1.5 years	Machining group/Set-up technician, operator
Worker 11	6 years	Laser group/Machine operator

Interviewee	Length of stay at the company	Organisational group/Position
Company 3		
Manager 3	13 years	CEO
Manager 4	20 years	Production manager
Worker 12	24 years	Machining group/ Machining centre operator
Worker 13	1 year	Warehouse/Warehouse personnel
Worker 14	6 years	Welding group/Robot welder, alternating group leader
Company 4		
Manager 5	30 years	CEO
Manager 6	20 years	Production manager
Worker 15	15 years	Planning and order group/Planner
Worker 16	2 years	CNC operators/Operator
Worker 17	12 years	CNC/Shift leader

An analytical framework was created to structure the core MS dimensions regarded as important to fulfil the purpose; the key competitive priorities were essential as analytical dimensions. For each dimension in the analytical framework, questions were formulated in two separate interview guides (see Appendices 3, 4 and 5). These were used when interviewing workers and managers, respectively. The interview questions were based on several earlier studies and frameworks (Acur et al., 2003; Bhat & Kumar, 2004; Boyer & McDermott, 1999; Cagliano & Spina, 2002; Kathuria et al., 1999; Slack & Lewis, 2008). A 7-point Likert scale was used to allow the interviewees to rate the importance of particular MS dimensions and associated factors. Additionally, the interviewees elaborated on what certain factors meant to them. The interviews were semi-structured (Bryman & Bell, 2011), but again, the interviewees were allowed to elaborate on their answers. However, the interview guide was followed more carefully than was the case in Study 1. Each interview lasted for about one hour and was recorded and transcribed.

3.4.5 Study 4: The follow-up

Study 4 was a follow-up of Study 3. The study had a twofold purpose. First, as the data sets from Study 1 and Study 3 were analysed, it became evident that the MS formation, rather than being viewed as static, benefited from a dynamic view where it emerged over time. Therefore, further data collection at one of the companies already studied in Study 3 was considered beneficial to understand how such emergence would materialise. Company 2 was selected for this follow-up study partly due to their recent development and work with strategic issues in the operations function, partly due to their willingness to participate in the study. For comparative purposes, the study was based on the same interview guide (see Appendices 3, 4 and 5) used in Study 3. The interviewed managers were the same as in Study 3. Unfortunately, only one of the workers who participated in Study 3 was still employed at the company. However, this data was complemented with interviews with two additional workers. Table 3.7 shows the interviewees' characteristics. As the findings from Study 1 and Study 3 indicated the importance of the organisational context and the means of communication used in the

operations function, special attention was given to these aspects. Therefore, as a complement to the questions in the interview guide related to these aspects, they were also captured through non-participant observations of the morning meetings on the shop floor. The meetings only lasted for a couple of minutes, as they normally do on the shop floor, but they provided empirical evidence for the communication content and the usage of physical artefacts. Furthermore, they showed who from the shop floor was present and participated at such meetings.

Table 3.7. Interviewees in Study 4

Interviewee	Length of stay at the company	Organisational group/Position
Company 2		
Manager 1 (second interview)	3 years	CEO
Manager 2 (second interview)	3 years	Production manager
Worker 9 (second interview)	9 years	Robot welding group/Regular worker
Worker 18	8 years	Laser group/Machine operator
Worker 19	7 years	Machining group/Group leader

3.4.6 Study 5: Quantitative study

To study only SMEs turned out to have some limitations, such as their dependence on their customers' MS and their flat organisations with a limited amount of levels and individuals at those levels. Therefore, the SME studies were complemented with survey-based data collection in Study 5. Being the final study, and only capturing quantitative data from one company, the present study's findings function as illustrative rather than comprehensive and thereby play a moderate role in this research. The study was conducted at one of the plants of a large Swedish manufacturing company in the region of Småland. The company was primarily selected due to its size and the level of strategic maturity, as it has worked with strategic development in the operations function for several years. Furthermore, it was also selected based on its willingness to participate in the study, hence a convenience sample. The questionnaire was primarily developed based on Boyer and McDermott (1999) previous study. The same abilities under the competitive priorities were also used by Boyer and Lewis (2002). The additional questions in the questionnaire were inspired by the interview guide used in Study 3 and Study 4. The questionnaire thereby included Likert-type items on the respondents' views of the importance of cost, quality, delivery, flexibility, structural and infrastructural decisions, and questions related to responsibility. Questions on the respondents' perceptions of organisational structure and information sharing were also included, along with questions related to their personal backgrounds and personalities. The questionnaire is shown in Appendix 6.

Before the questionnaire was distributed to the respondents in the operations function, a meeting was held with the plant's top management. A plant tour was conducted, and discussions on how to structure both the questionnaire and the actual data collection were held. Furthermore, the

questionnaire was tested among academics and practitioners before distribution to ensure that the questions were not interpreted in a different way than intended. After the meeting with the top management, it was agreed that the company itself would manage the distribution of the questionnaire forms to different departments in the operations function and the collection of the completed questionnaires. It was decided that the respondents would include representatives from the top management group, three departments of white-collar workers with close connection to the shop floor (two departments with production engineers and one assembly planning department), and four assembly lines with blue-collar workers, where each line produced different products. Table 3.8 shows the distribution of the respondents across the organisational levels. Eleven of the workers (one white-collar and ten blue-collar workers) had managerial responsibilities.

Table 3.8. Respondents in Study 5

Organisational level	Number of respondents
Top management	3 members from top management group
Workers	15 white-collar workers
	81 blue-collar workers

3.5 Data analysis

Based on the abductive research approach, with iterations between empirical findings and theoretical concepts, there had also been iterations between the data collection and data analysis. These iterations among data collection, data analysis and theory not only developed the way in which the studies were conducted, but also the way in which theory was used. When the traditional MS literature was not sufficient to capture the complexities appearing in the phenomenon under study, other theoretical fields were brought into the theoretical frame (see chapter 2 for elaborations on the fields). These theoretical fields supported the data analysis and enabled the development of theoretical contributions from this research (see further discussion in chapter 6). In particular, through these iterations the patterning process model in Figure 6.3 in chapter 6 was developed.

As most of the data had been collected through interviews, the text from their transcriptions had been the main focus of the data analysis. The analysis of qualitative data typically encounters difficulties due to the large amount of data to be handled (Bryman & Bell, 2011), which was also true in this research. It was problematic to ensure that all important aspects of the interviews and observations were captured while the data had to be sufficiently sparse to enable an overview. One solution to this problem would involve the use of computer software (Bryman & Bell, 2011), but this research did not employ such a tool. It was considered essential that the researcher should examine the data manually and "play" with it (Yin, 2009).

Preliminary analyses (Flick, 2009) of the data from Study 1, Study 3 and Study 4 started while the recorded interviews were being transcribed. During the transcription, notes were taken, and patterns began to appear in the interviewees' answers. These patterns can be seen in the answers to the RQs in chapter 5. They concern a sequence as to how the individuals perceive the MS dimensions, the influence of different contextual factors and the role means of communication

play for MS formation. In Study 1, Study 3 and Study 4, the data was initially to a great extent structured in terms of the interview guides. This could be viewed as a simple type of coding (Bryman & Bell, 2011). Furthermore, the analyses conducted in Paper 3 and Paper 4 were based on the thematic coding procedure for comparative studies (Flick, 2009). In this procedure, "the research issue is the social distribution of perspectives on a phenomenon or a process" (Flick, 2009, p. 318). Thematic coding is used to compare differences among predefined groups' "specific ways of seeing and experiencing" their social world (Flick, 2009, p. 318). Thematic coding also allows comparison between theory and practice (Hudson et al., 2001). For this research, the predefined groups were workers and managers, respectively, and their social world of interest was the operations function. Guided by the thematic coding (Flick, 2009), the research can be viewed as including three hierarchical levels of cases. First, the aggregated level was composed of the contextual cases, which set the context for the subsequent levels, comprising the case companies and their operations functions. The second level consisted of the two predefined groups of workers and managers. The third level included the single cases, the individual interviewees.

The thematic coding and thematic structure (Flick, 2009) of the data enabled the distribution of the individuals' perceptions of the MS dimensions. It also allowed for the identification of which MS dimensions were more easily perceived by the individuals and enabled a structure of the MS dimensions to form, while allowing visibility of the degree of agreement between the hierarchical levels (this structure can for example be seen in appendix 2 in Paper 3).. Based on the interview guide in Study 3 and Study 4, a table was developed to organise the individuals' answers relating to the MS dimensions' elements. Each interviewee's answer to each question was copied from the transcribed data into the table as full quotes. Once all the data was organised in the table, the quotes were translated into English and subsequently summarised to incorporate the core answers. For communication purposes, all data was gathered in Swedish but subsequently translated into English. The translations do not always retain the precise wordings but capture the essence of the interviewees' answers. The interviewees were grouped according to their hierarchical level to obtain an overview of the data. The cases of disagreements among the interviewees at one hierarchical level from the same company were explained in the table. The final table's structure was developed through iterations and cross-checked while each individual's answers were added. This procedure allowed the development of the thematic structure (Flick, 2009), which showed the social distribution of the perspectives on the MS dimensions and compared individual perceptions. The analysis aimed at explaining individual perceptions of the MS dimensions to assess the level of strategic consensus, as well as the underlying reasoning, both among individuals and between the two hierarchical levels. Based on the thematic structure, a three-step analysis was performed: first, the workers' perceptions of the MS dimensions; second, the managers' perceptions; and third, the differences in perceptions between these two levels. The reasoning in chapter 5 is a result of this thematic structure.

The qualitative data analysis was complemented with quantitative analysis in Study 5. Rather than being a representative sample of an entire population, the collected data is based on a survey study at one large company and should thereby primarily be viewed as a single case

study. The analysis was conducted by calculation of the three groups' (managers, white-collar workers and blue-collar workers) average ratings of the four competitive priorities and identification of the three groups' rankings of the four competitive priorities. Since these initial steps showed differences among the groups' ratings of the competitive priorities, the data analysis continued by studying the differences on a more detailed level. The data were broken down into the level of abilities under the competitive priorities Due to the small sample size, this analysis could only be conducted for the differences between the two groups of workers.

3.6 Quality of the research

Research quality can be evaluated in a number of ways, the most common being a positivistic approach using conventional quality criteria such as validity, reliability and objectivity. Due to the more subjectivist nature of this research, incorporating a more voluntaristic view of human nature, quality criteria that can be more directly linked to qualitative research are more suitable. The use of these criteria enables better assessment of the research; a subjectivist research approach does not have to employ criteria based on objectivity. Rather, the focus is on the fit between the research questions, research design and validity. In this thesis, two such approaches are elaborated on: first, Maxwell's (2005) definition of validity and second, the concept of trustworthiness.

3.6.1 Maxwell's validity concept

Maxwell (2005) proposes that to address the two threats to the validity of the research – researcher biases and reactivity, the validity of qualitative research shall be assessed by a checklist of important strategies to consider. These strategies primarily focus on testing the conclusions drawn from the research, rather than simply verifying them. The following subsections define the eight strategies and how this research has addressed them.

Intensive, long-term involvement: The intensive, long-term involvement strategy is based on the premise that "repeated observations and interviews, as well as the sustained presence of the researcher in the setting studied, can help to rule out spurious associations and premature theories" and to "develop and test alternative hypotheses during the course of the research" (Maxwell, 2005, p. 110). In this research, the "repeated observations and interviews" and the "sustained presence in the setting" has not been at the same company but within the same organisational setting (on the shop floor), with the same organisational level (the workers). In Study 1, this process was conducted in three steps; two sets of interviews and observations were followed by two follow-up sessions with the interviewees. This initial study assured the relevance of the research purpose. Study 3 learned from the experiences in Study 1, and as the organisational context remained in the same type of industry, the ideas derived from Study 1 could be further tested. Study 4 returned to one of the companies studied in Study 3 to further reflect the need for "sustained presence" and to further develop propositions. These propositions were then tested in the survey in Study 5.

Moreover, the long-term involvement with the organisational context has been captured through three seminars with practitioner organisations (regional and national) in the same region as that of the studied companies. These practitioners have not been involved in the conducted studies but have held the same types of responsibilities as those of the studied individuals. On these

three occasions with 20–130 participants, feedback on the validity of the research has been received. Several practitioners witnessed the same type of problems and issues as had emerged in the empirical studies. The developed models have also been tested and received positive feedback, perceived as "simple and illustrative for what we have to do".

However, more visits to the companies, particularly stays for a longer time period, might have added validity to the research as it would have assured long-term involvement with each company.

Rich data: Maxwell (2005, p. 110) defines rich data as "data that are detailed and varied enough that they provide a full and revealing picture". This requires both "verbatim transcripts" of interviews and "detailed, descriptive note taking" during observations. Both if these requirements have been fulfilled in all three qualitative empirical studies in this research. The researcher has recorded and transcribed all the interviews. Detailed field notes have been taken during all observations, both during shop-floor visits and the attendance at several meetings.

Respondent validation: Maxwell (2005, p. 111) defines respondent validation as "systematically soliciting feedback about your data and conclusions from the people you are studying". The participants' feedback has primarily been captured in two ways. (1) The follow-up questions during the actual interviews and observations has helped prevent misunderstandings and immediately clarified confusions. (2) Follow-up sessions with the interviewees has confirmed and clarified the findings. Unfortunately, this has not been possible to conduct after all interviews.

The researcher's own biases could not be completely prevented since the research methods were subjective. However, as the interview guides were based on previous studies within the field, the main structure of the interviews provided a frame that had been checked by others beforehand to minimise researcher biases. Furthermore, the interview transcriptions allowed for "raw" data, where the researcher's own biases had not imposed what data to record from the interviews.

Intervention: According to Maxwell (2005, p. 111), intervention often refers to experimental manipulation. The author also claims that "the researcher's presence is always an intervention in some ways" even if it is considered more informal. In this research, the researcher's presence on the shop floor and the nature of the questions asked during the interviews might very well have influenced the interviewees' responses. However, there was no formal attempt to do so; for example, participant observation or action research has not been applied.

Searching for discrepant evidence and negative cases: In relation to this validity strategy, Maxwell (2005, p. 112) emphasises the need for the researcher to be "aware of all of the pressures to ignore data that do not fit your conclusions". Furthermore, it is important to ask others for feedback as "a valuable way to check your own biases and assumptions and flaws in your logic and methods" (Maxwell, 2005, p. 112). As the data collection has taken place stepwise over several years and in different organisations, the conclusions have been revised on several occasions. The findings have been discussed, not only with the studied companies but also (as mentioned) at several practitioner seminars. Moreover, the appended papers have

all been presented at international conferences. Therefore, the "others" in academia, particularly in the operations management research, have on several occasions given feedback on the research. Since the research process also has been part of a doctoral educational programme, the supervisors, lecturers and seminar leaders have continuously given feedback on the quality of the research, the methodological decisions and the logic of the conclusions drawn.

Triangulation: By applying a mixed-method approach, this research addressed "the risk of chance associations and of systematic biases due to a specific method" (Maxwell, 2005, p. 112). The qualitative methods were primarily interviews and observations, complemented with quantitative data in Study 5 to ensure "a better assessment of the generality of the explanations that one develop[ed]" (Maxwell, 2005, p. 112). Furthermore, five different companies were studied; at each company, several individuals from different hierarchical levels and organisational groups and who had performed different work tasks were interviewed or answered the questionnaire.

The quantitative elements in this research intended to increase the validity of the research and to further test the transferability of the findings from the qualitative studies. Due to limitations in the data sample, the study play a modest role for the research findings. It confirms what was found in the qualitative studies, rather than contributes with own results. However, despite this limitation, the study contributed to insights regarding methodological choices. Despite quantitative methods being a common approach by researchers to study both the MS and the level of strategic consensus, this study revealed difficulties associated with handling this phenomenon through this type of methodology. Strategic consensus on MS and the MS formation seems to be dependent both on individual and organisational context, and individualised communication seems central to successful MS formation in the operations function. Therefore, the usage of quantitative measures where differences in perceptions are aggregated to different group levels seem to lose the sensitivity to the context and be too superficial as simplifications have to be made in order to capture data in a questionnaire without opportunities for follow-up questions. Identification of perception gaps among all individuals in the organisation, rather than among groups, is a potential development of the study. However, as the MS formation to a large extent is context dependent, it is doubtful that such findings would be relevant outside the scope of the single organisation.

Quasi-statistics: Related to this quasi-statistics strategy, Maxwell (2005, p. 113) states that it "not only allow[s] you to test and support claims that are inherently quantitative, but also enable[s] you to assess the amount of evidence on your data that bears on a particular conclusion or threat, such as how many discrepant instances exist and from how many different sources they were obtained". To address these points, this research presented extensive amounts of data, particularly by including the interview data in the appended papers. The presentations of these data supported the conclusions and made the data analysis more transparent.

Comparison: Maxwell (2005, p. 113) states that explicit comparisons are most common in quantitative studies. In this research, this type of comparison was made between blue-collar and white-collar workers in Study 5. Furthermore, Maxwell (2005, p. 113) explains that "there are numerous uses of comparison in qualitative studies, particularly in multicase or multisite

studies". In this research, comparisons were made among individuals within the same hierarchical level at the same company, between the two hierarchical groups within the same company, and among the four companies studied in the qualitative studies.

3.6.2 Concept of trustworthiness

Trustworthiness consists of four aspects: credibility, transferability, dependability and confirmability (Bryman & Bell, 2011; Halldórsson & Aastrup, 2003).

Credibility (How believable are the findings?): Reality exists only in the minds of the interviewees; the credibility aspect of trustworthiness therefore aims to capture how well the research results match the interviewees' constructs of reality.

The research focused on the interviewees' perceptions of quite complex constructs (the MS was not always explicated at the companies, and this rather abstract concept was often handled at an aggregated level). It was important to achieve as close a match as possible between what the interviewer perceived and what the interviewees actually had in mind. This problem was addressed in several ways. First, during all interviews, if it was suspected that the interviewee did not fully understand the question, it was rephrased, and the issue was discussed to ensure that the interviewee's intended meaning was captured. In Study 1, the company was visited on five occasions, and although the same people were not interviewed each time, these repeated visits enhanced the understanding of the organisational context and enabled closer relationships to be developed with the interviewees. Such trust-building and the follow-up sessions increased the possibility of actually capturing the true perceptions of the interviewees. In Study 3, this situation did not occur; each company was visited only once. However, in Study 3, the researcher was by then more familiar with the organisational setting and therefore bonded with the interviewees faster than was the case in Study 1. This faster bonding was also evident in Study 4, where one of the companies from Study 3 was revisited.

Transferability (Do the findings apply to other contexts?): The transferability aspect of trustworthiness relates to the extent to which research findings can make general claims about the world.

The transferability aspect of this research was captured through analytical generalisation. The research originated from a somewhat limited theoretical frame. This frame laid the foundation for the first explorative study (Study 1). Thereafter, as illustrated in section 3.1, an iterative process took place, where the empirical data was continuously tested against the theory. Other researchers' definitions acted as a foundation. The researcher's own conclusions could then be tested against this frame. This process shares similarities with systematic combining (Dubois & Gadde, 2002). This approach also allowed for transparency in the research process and a visible chain of evidence across the papers.

The qualitative studies in this research were conducted within the specific context of subcontractor SMEs in the metalworking industry in a narrow geographic area. This might limit the transferability of the findings. These limitations are threefold: (1) SMEs differ to large companies in several ways, in particular, and relevant to this study, they have fewer hierarchical levels and often make other types of strategic decisions than what larger companies are facing.

(2) All studied companies are Swedish and the studied SMEs also primarily act on the Swedish market. This implies that national culture might have impacted the results and that the findings are not immediately transferable to companies in countries outside of northern Europe. (3) The literature on MS is primarily developed through studies of larger companies. Therefore, the differences between this research's findings and the traditional MS literature might have been smaller if the companies studied had been of the same size and complexity level as those organisations normally captured within the field.

However, despite these limitations, the present research has also revealed the limited emphasis on the workers' perspective in the MS field. This problem is not necessarily dependent on the organisational context in which it may be studied, as all manufacturing companies to some extent employ humans on their shop floors. For example, the study of the large company showed similar findings to the studies of the SMEs. Indeed, the research shows that differences in individual perceptions of the MS can be explained along contextual factors, but many of the factors identified here may well be applicable to other organisational contexts. Hence, the same type of factors may influence a worker's perception of the MS at any type of manufacturing company. Furthermore, to test the generalisability of the findings and conclusions drawn in this research, they were presented at three practitioner seminars. At these seminars the audience confirmed similar conditions in their own organisations.

Dependability (Will the findings likely apply to other times?): Dependability refers to the stability of the data over time and relates to the logic of process and method decisions.

Because the focus was on individual perceptions, the same answers would unlikely be obtained if the same people were asked the same questions. This effect is mainly attributable to the process triggered in the interviewees' minds by the questions posed. The interviewees stated that the questions made them aware of dimensions that they had not previously considered consciously. Hence, the mere posing of questions would automatically influence the organisational context. However, by thoroughly documenting the research process (for example, recording and transcribing the interviews) and the progress made, this study could assure dependability by allowing others to take part of the actual data.

Confirmability (Has the investigator allowed his or her values to intrude to a high degree?): The confirmability aspect of trustworthiness addresses researcher bias. In many aspects, it is impossible for a researcher who studies individual perceptions not to affect an interviewee. As previously explained, the mere posing of questions changes some values held by interviewees. However, the researcher endeavoured to remain neutral as much as possible, both in the manner in which the questions were posed and in the reactions to the interviewees' answers. The researcher's knowledge of production processes and the way in which people would normally communicate in such a context decreased the gap between the researcher and the interviewees. Hence, by being familiar with the organisational context and trying to remain neutral during the interviews, measures were taken to reduce the exposure of the researcher's values and beliefs. Furthermore, the transparency of the data collection and choice of methods enabled reviewers to examine the logic, from the data and the analysis to the conclusions.

Moreover, the interactive model of Maxwell (2005) illustrates a methodological fit; further enhancing the trustworthiness of the research.

3.7 Positioning the research

To position this research, the analytical scheme for studying the social theories and assumptions in social studies introduced by Burrell and Morgan (1985) will be referred to. Their scheme is built on two sets of approaches – subjectivist and objectivist – which are defined along four basic sets of assumptions. This section lays out the assumptions made in this research in relation to ontology, epistemology and human nature (see Figure 3.4).

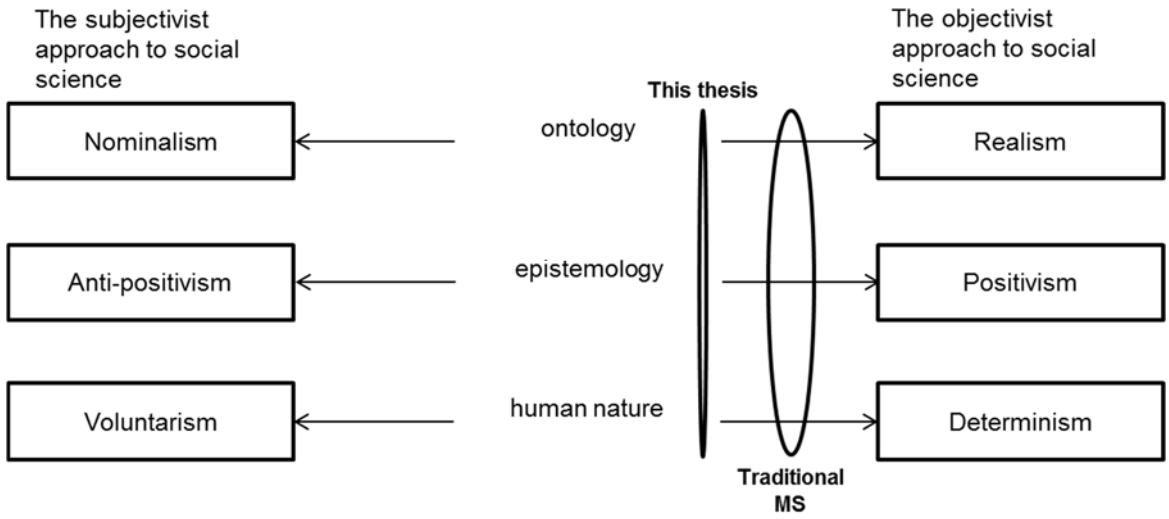

Figure 3.4. Analytical scheme for analysing assumptions about the nature of social science, presenting this thesis' position and traditional MS position (based on Burrell & Morgan, 1985, p. 3)

The focus on individual perceptions of the MS and the perspective of people as potentially non-hyper-rational actors (i.e., behavioural operations) indicate the need for a research approach where ontological considerations move from pure realism towards nominalism. Thus, it shifts towards a view wherein "reality" is the product of individual cognition and where the social world cannot exist "independently of an individual's appreciation of it" (Burrell & Morgan, 1985, p. 4). This move is important if it is sought to understand the complex social systems related to the MS formation within companies. Since the MS formation in this research is viewed as a materialisation through decisions and actions by the individuals in the operations function, this shift also relates to the contingency theory approach, as the organisational context plays a vital role in the possibilities for strategic consensus development. The focus on the individuals in this research opens up for a contextualisation of the MS formation, which complements earlier research. It allows for a contextual depth of the MS that accounts for the individual contextual factors. Such depth would not have been possible with pure realism because such an approach would imply a view where the phenomenon (the MS formation) could exist independently of the individuals (Burrell & Morgan, 1985).

In terms of epistemology, this research sought to move closer to a view of a social world that "[could] only be understood from the point of view of the individuals [...] directly involved in the activities [...] to be studied" (Burrell & Morgan, 1985, p. 5). In other words, it intended to

study individual perceptions of the MS; the individual point of view was the focus. Hence, on a continuum between positivism and anti-positivism, this research aimed to position itself one step closer to anti-positivism than what had often been the case in the traditional MS research.

Moreover, the position held by the traditional MS literature in the operations management domain allows for further elaborations on the definition and incorporation of a human-centred view. The somewhat limited standpoint taken in the MS field (Barnes, 2002, p. 1105) might be partly explained by the MS researchers' perspectives about human nature. Human nature concerns "the relationship between human beings and their environment" (Burrell & Morgan, 1985, p. 2) and can be considered a continuum between determinism and voluntarism. In the deterministic view, human beings and their experiences "are regarded as products of the environment" and "completely determined by the situation or the 'environment'" in which the human beings are located. This stance shares similarities with the view of people as hyper-rational actors, as presented by the behavioural operations perspective. On the other hand, according to the voluntaristic position, "man is completely autonomous and free-willed" and has a creative role; "man is regarded as the creator of his environment, the controller as opposed to the controlled, the master rather than the marionette" (Burrell & Morgan, 1985, pp. 2, 6). Applying this dimension of the scheme to the MS field clarifies the field's view of the individuals in the operations function. This research aimed at viewing human nature as less deterministic than the standpoint of the traditional MS research, hence regarding the individuals as non-hyper-rational to understand the MS formation from the workers' perspective.

Applying Burrell and Morgan's (1985) analytical scheme to this research has enabled a relative positioning of the ontological and epistemological considerations and the view of human nature presented in this thesis in relation to the traditional MS literature. Such positioning does not only clarify methodological standpoints but also enables comparisons and explications of contributions. This research studied a complex social system comprising individuals, their perceptions of the MS and to some extent, the relationships among these individuals. In such a system, it is important to be detailed but at the same time, to retain a holistic view of the MS formation.

3.7.1 Rationale for a mixed-methods approach

This research is primarily based on a qualitative approach. Qualitative research primarily distinguishes itself from quantitative research through its emphasis on words rather than on numbers (Bryman & Bell, 2011; Maxwell, 2005). Qualitative research focuses on specific situations or people (Maxwell, 2005) and is not based on a unified theoretical and methodological concept (Flick, 2009, p. 16). The qualitative research was complemented by a quantitative study that further investigated the patterns emerging from the qualitative studies.

The social sciences commonly adopt such a mixed-methods approach that combines several methods in different ways (Bryman & Bell, 2011); it was the path chosen in this research. It can be argued that qualitative and quantitative research methods originate from different ontological and epistemological standpoints and are thus not possible to combine (Bryman & Bell, 2011). However, in this research, the quantitative method was employed as complementary to the qualitative methods, based on the assumption about the autonomous

nature of research methods that could therefore be "pressed into the service of another" (Bryman & Bell, 2011, p. 630). At the stage of this research where the quantitative method was employed as the final study, the data from the qualitative studies allowed for the structure of the survey that adequately captured the differences in individual perceptions. The richness of the data in the qualitative studies was compromised to benefit from a larger sample where comparisons among individuals could be made more easily. This enabled triangulation (Bryman & Bell, 2011) and cross-checking of the results from the qualitative studies. As explained by Bryman and Bell (2011), this research could thereby benefit from the process where the explorative qualitative studies guided the quantitative study by providing hypotheses and aiding the measurement. Without the results from the earlier studies, the questionnaire would not have taken the form it did.

3.8 Summarising the methodology

This research investigates *how the individuals in the operations function perceive the MS in order to understand how these individuals are involved in the MS formation*. Primary source of evidence was collected by interviewing workers at the shop floor and managers at Swedish SMEs. The decision regarding organisational context was made based on the researcher's preunderstanding for the industrial setting and the perceived possibilities for organisational overview provided by smaller organisations. The decision to use interviews to collect data was based on the need to understand individuals' perceptions and underlying reasoning regarding the MS. The company selection was done through a combination of convenience sampling and purposive sampling of SMEs by the criteria of the size, location, strategic maturity and willingness to participate. As the theoretical frame developed through iterations between data analysis and literature it became evident that many of the theoretical foundations were built on quantitative studies of large companies in other cultural contexts than the one which was studied here. To triangulate the data and enable further transferability, the decision was made to include a large company as a study object by applying a quantitative research approach. A large company in the same region as the other companies studied was willing to participate. It had a certain level of strategic maturity and allowed access to the shop floor workers.

The companies participating in this research corresponded to a number of predefined criteria for selection and were part of a predefined population. Nevertheless, it can be argued that the combination of convenience sampling and purposive sampling in this research has limited the data collection and thereby put constraints on the findings. However, as the companies' willingness to not only allow for visits and observations at the shop floor, but also allow for workers to be taken out of production to be interviewed, was crucial for the research execution other sampling methods could not be used.

4 Summary of contributions from appended papers

Six papers are appended to this thesis. This chapter summarises the papers in terms of the key points related to the research purpose. Each paper is briefly presented, providing a bullet-point list with the essential aspects for the subsequent analysis in chapter 5.

4.1 Paper 1 (the explorative paper): Production-related staff's perception of manufacturing strategy at a SMME

The purpose of Paper 1 is "to focus on an area within the MS implementation process [that] is quite unexplored within the literature: how the employees perceive the MS content". This paper refers to the employees on the shop floor as "production-related staff", with a direct connection to everyday production work, including operators, team leaders, production technicians and warehouse personnel, among others. The MS dimensions addressed in Paper 1 are derived from the OS matrix (Slack & Lewis, 2008). The theoretical frame includes the traditional MS literature on content and process, along with concepts on learning processes in organisations. Based on Study 1, the paper includes interviews with and observations of eight workers in a Swedish subcontractor SME.

The paper shows differences among the workers in how they perceive the MS content in relation to the MS dimensions in the OS matrix. These employees understand their own work context; they are aware of their group's work and how it is organised. However, they seem unable to relate to their role within the company or to understand the management's long-term planning. Hence, they can give more detailed explanations of the MS dimensions that are more closely related to their own work context (e.g., product requirements). These differences are based on a multitude of factors, such as employment period (later referred to as length of stay at the company), organisational belonging and the workers' own interest. Furthermore, the management's usage of the means of communication plays an important role in how the workers understand the MS. Concepts such as knowledge sharing, empowerment and organisational learning are also connected to these communication aspects. The paper concludes that the lack of communication is the main obstacle to the workers' perceptions of the MS. Moreover, the paper points to the gap between the management's view of the MS and the workers' actual perceptions. The special SME context primarily seems to be related to learning processes and communication strategies.

The paper suggests that taking the workers' perspective on the MS makes an important contribution to the literature about the MS implementation process.

Paper 1 is positioned in relation to this thesis in the following ways:

- It focuses on the operations function and the operational level.
- It points out differences in workers' perceptions of the MS dimensions in the OS matrix by indicating some sort of hierarchy related to the MS dimensions.
- It identifies differences among workers and between workers and managers by initiating the idea of strategic consensus (referred to as "strategic alignment").

4.2 Paper 2 (the conceptual paper): Manufacturing strategy from a behavioural operations perspective: The people dimension

Paper 2 aims "to provide an understanding of the importance and role of people in the manufacturing strategy, with particular attention to two layers in the organisation: the managers and operators". This literature review identifies 46 articles as relevant for understanding how operators and managers are viewed in the MS research. The earliest article dates back to 1984, and the rate of publication seems to have declined in the early 2000s, with the bulk of the publications presented over a 15-year period. This subject is somewhat dispersed across a variety of academic disciplines (24 academic journals).

The paper analyses the MS literature from a behavioural operations perspective. The findings show that the articles can be categorised according to how they address the individuals: (1a) conceptual articles addressing individuals as human resources or a workforce, (1b) empirical articles with a strong focus on the managerial level, (2) articles referring to different hierarchical levels of individuals but with a predominant managerial perspective and (3) articles stressing the importance of involving workers and employees (e.g., by emphasising open communication and employee acceptance of the strategy).

The paper presents two propositions: (1) the predominant focus on managers as key actors of the MS must be complemented by including the roles and viewpoints of operators, and (2) the difficulties in the implementation and further advancement of the MS are constrained by these key assumptions about human beings. Behavioural operations offer a perspective and vocabulary to question these assumptions. The paper also suggests that future research's unit of analysis should refer to a micro level, in which a part of an organisation is studied.

The paper concludes that the MS literature tends to treat individuals in the operations function mechanistically, assuming that clear strategies can be formulated and that individuals will subsequently follow these. The paper contributes to a redefinition of the MS formation process by incorporating the individuals in the operations function.

The paper suggests that it is during the implementation of MS that the individuals in the operations function and their perceptions of MS become crucial for the MS formation.

Paper 2 is positioned in relation to this thesis in the following ways:

- It explains why further focus on the workers in the operations function is relevant.
- It relates the work to the behavioural operations perspective, in which the role of the individuals in operations management is acknowledged.
    - This enables further scrutiny of individuals in the operations function.
- It points out the MS literature overlooking the role of individuals, particularly workers, in the MS formation.

4.3 Paper 3 (the strategic consensus paper): Strategic consensus on manufacturing strategy content: Including the operators' perceptions

The purpose of Paper 3 is "to empirically examine the level of strategic consensus on the MS within the operations function, that is, the operators' and managers' perceptions of MS". This was studied through interviews and observations at three subcontractor SMEs in the metalworking industry, with three operators and two managers from each company. The paper addresses the MS in terms of seven so-called MS dimensions: cost, quality, delivery, flexibility, information and process technology, human resource systems and organisation. The paper presents four observations, as follows: (1) Strategic consensus seems to be in place to a much larger extent than what is implied by, for example, Boyer and McDermott (1999). However, the paper also shows that when strategic consensus is present, in most cases the understanding of the underlying reasons for prioritisation is not shared; (2) The levels of strategic consensus vary among the MS dimensions, depending on how close a dimension is to the workers' own work tasks and organisational groups. The MS dimensions are structured according to three organisational levels: intra-organisational group level (quality and information and process technology), inter-organisational level (delivery and flexibility) and intra-organisational upper level (cost, human resource systems and organisation). (3) The information-sharing channels play a vital role in creating the possibilities for strategic consensus. (4) The subcontractor SMEs' MSs are influenced by their customers' strategies. These swift changes and strong interdependencies seem to require even more coherence among the workers and managers.

The paper suggests that to improve the MS implementation, managers should be involved in everyday work on the shop floor and initiate regular discussions on the MS content. The MS dimensions are addressed differently, depending on the individual workers' understanding, and the focus is on seeing the "bigger picture".

The paper contributes to current MS research by going beyond the traditional management level and including both managers and workers as the unit of analysis. It expands the scope of the MS dimensions under study, offering a stronger resource-based perspective on the MS and strategic consensus. Furthermore, it views workers as individuals, as opposed to a homogeneous group.

The paper suggests that strategic consensus is important for a successful MS implementation process.

Paper 3 is positioned in relation to this thesis in the following ways:

- It builds further on Paper 1 and the differences in perceptions by adding the management level.
- It builds further on Paper 2 by focusing on the workers' perspectives.
- It introduces the strategic consensus concept.
- It points out the importance of viewing the workers as individuals.
    - With empirical evidence, it contributes to the behavioural operations perspective.
- It presents potential categorisations of contextual factors influencing the possibilities for strategic consensus.

4.4 Paper 4 (the contextual paper): Exploring contextual factors influencing workers' perceptions of manufacturing strategy

The purpose of Paper 4 is "to explore the contextual factors influencing workers' perceptions of MS content in order to understand the development of strategic consensus within the operations function". This was studied through interviews with 16 workers at four subcontractor SMEs. The paper builds on the contingency theory perspective; perceptions are affected by uncontrollable variables and contingency factors.

The paper focuses on the organisations' internal context. It identifies five organisational contextual factors (possibilities for work enlargement, manufacturing system: layout and shift work, mental distances between workers and managers, informal groupings, and labour union's role) and five individual contextual factors (organisational group and position in production process, work group identity and sense of belonging, length of stay in the company, personal interests and willingness to learn, and commissions of trust). By adding the workers' perceptions, the factors identified in the paper offer details about the factors previously identified in the MS literature. This detailing helps explain the differences in individual workers' understandings of the MS dimensions.

The paper concludes that for a successful MS formation process, it is critical that the contextual contingencies be understood and prepared for by the management. The paper also questions the formulate-then-implement paradigm and the separation of content from process. Rather, it suggests that content and process are intertwined, where understanding the complex shop-floor reality is essential and where the means of communication should be adjusted accordingly.

The paper suggests that the strong MS participation of workers enables strategic consensus and is affected by the organisational context.

Paper 4 is positioned in relation to this thesis in the following ways:

- It builds further on Paper 1 and Paper 2 and the importance of the organisational context.
    - It focuses on the distinguishing factors influencing strategic consensus in the organisation's operational internal context.
- It adds the contingency theory perspective.

4.5 Paper 5 (the communications paper): Communication in manufacturing strategy formation: enabling strategic consensus

The purpose of Paper 5 is "to explore how communication occurs within the operations function, particularly, what means of communication are used for the formation of MS". The paper includes data from four Swedish SMEs and analyses it based on an analytical framework developed from the transmission model of communication, particularly focusing on the communication channels and the message content. Twenty-eight interviews with workers and managers show similarities among the four studied companies in relation to all communication elements.

The findings show the studied companies' heavy focus on verbal communication channels. Eleven channels are identified. Four channels are verbal, divided into three formal – (1) daily contact on the shop floor, (2) group meetings and (3) general meetings, and one informal – (4) rumours and gossip. Seven channels are non-verbal, as follows: (5) work card, (6) information board, (7) Intranet, (8) screens, (9) the Material requirements planning (MRP) system, (10) meeting minutes and (11) visible faulty products. The three main senders of information to the workers are identified as the group leader, the production manager and the CEO. While the group leaders and the CEOs use formal channels, the production managers have no such means of communication. Significant for all four companies is the lack of a strategic perspectives in the message content. The short-term perspective is often quite brief, involving issues that need to be dealt with instantly. The long-term perspective is also of short duration, comprising weeks and months rather than years.

The paper contributes to earlier research on MS communication by studying the communication aspects of strategic consensus on the MS from the workers' perspective. Thus, it also contributes to the management of the worker-manager relationship in terms of the MS formation and the role played by communication in strategic consensus.

The paper suggests a dyadic relationship between workers and managers as a prerequisite for a successful MS formation, with high levels of strategic consensus among everyone in the organisation.

Paper 5 is positioned in relation to this thesis in the following ways:

- It adds the communication theory.
    - It broadens the theoretical perspective on how the MS emerges.
- It builds further on the context focus in Paper 4.
    - It adds the usage of the means of communication as an important factor influencing strategic consensus.

4.6 Paper 6 (the blue-collar and white-collar workers paper): Strategic consensus: differences in perceptions of competitive priorities among individuals in the operations function

The purpose of Paper 6 is "to investigate the strategic consensus among three organisational levels (top management, white-collar workers and blue-collar workers) regarding four competitive priorities that include quality, delivery, flexibility and cost". This is achieved by gathering survey data from 99 respondents at one Swedish assembly plant.

The paper builds further on Paper 3 and Boyer and McDermott's (1999) work by showing that the three hierarchical groups in the operations function rank the importance of the competitive priorities differently. First, the absolute ratings of the competitive priorities' importance differ among the three studied groups of individuals. When comparing workers with managers, the managers rate all four priorities higher than the workers do. Based on Boyer and McDermott's (1999) definition of what constitutes strategic consensus, the research in Paper 6 shows that there is a lack (or at least low levels) of strategic consensus among all three groups. While all

three groups rank quality as the most important priority, their subsequent rankings vary. For example, while the managers rank cost as the second most important competitive priority, it is ranked last by the blue-collar workers and second last by the white-collar workers. When the competitive priorities are broken down into abilities the paper shows that for six of the 16 studied abilities, the white-collar workers rank them significantly higher than the blue-collar workers do. These abilities are (1) for cost – (a) increase capacity utilisation, (b) reduce production costs and (c) increase labour productivity; (2) for quality – (a) provide high-performance products, (b) offer consistent, reliable quality; and (3) for delivery – (a) reduce production lead time. The paper argues that the blue-collar workers' lower ratings can either be explained by these workers' lack of understanding of the abilities, or by the implication that if the blue-collar workers rated them higher they would rate their own efficiency as low. Furthermore, the differences in rating are explained by the workers' respective positions in the production system, where the white-collar workers' more holistic views could indicate their perception of these abilities as more important compared to the BCWs' perspectives. The difference in ratings could also be explained by the fact that the BCWs in this study work on a dedicated assembly line, thus limiting their insights into the end customers' requirements and needs.

The paper contributes to the MS literature on strategic consensus by studying differences in rating on abilities and not only on aggregated competitive priorities and by further breaking the worker level down into two groups (blue-collar and white-collar workers).

Paper 6 is positioned in relation to this thesis in the following ways:

- It builds on Paper 3 by further developing different levels of strategic consensus within the operations function.
    - It adds quantitative data from a large company.
- It details the MS dimensions.
    - It indicates that strategic consensus exists at different levels for different MS dimensions or even parts of the dimensions.

5 Analysis

This chapter presents a concluding synthesis of the findings, which provides answers to the four research questions presented in section 2.5.

The purpose of the research has been *to investigate how the individuals in the operations function perceive the MS in order to understand how these individuals are involved in the MS formation*. RQ1, RQ2 and RQ3 had particular focuses – to investigate how strategic consensus among the individuals could be described, the individuals' perceptions of the MS and what factors might impact strategic consensus. As explained in section 2.5, this thesis mainly focuses on answering RQ2 and RQ3, and RQ1 functions as an overarching frame for these two questions. Meanwhile, RQ4 aims at bringing together the first three research questions and gaining a better understanding of the MS formation in manufacturing companies. The following sections analyse the findings presented in the six individual appended papers by answering the stated RQs and relating the papers' findings to one another. The analysis shows that RQ1 is answered in Paper 1, Paper 3, Paper 4 and Paper 6. RQ2 is answered in Paper 1, Paper 3 and Paper 6. RQ3 is answered in Paper 1, Paper 3, Paper 4 and Paper 6. RQ4 is primarily answered in Paper 5; however, it is also answered through the combined analysis of the appended empirical papers that are based on qualitative data. Bits and pieces from these papers result in patterns starting to appear, related to how the MS formation emerges. Therefore, the main synergies found among the papers are primarily related to answering RQ4. Furthermore, Paper 2 has no clear link to any of the RQs but acts as a conceptual background for all of them. The relations between the RQs and the papers are presented in Figure 5.1, where the solid lines indicate complete coverage, and the dashed lines signify partial coverage. Meanwhile, Figure 5.2 illustrates how the RQs are linked to the building blocks in the research.

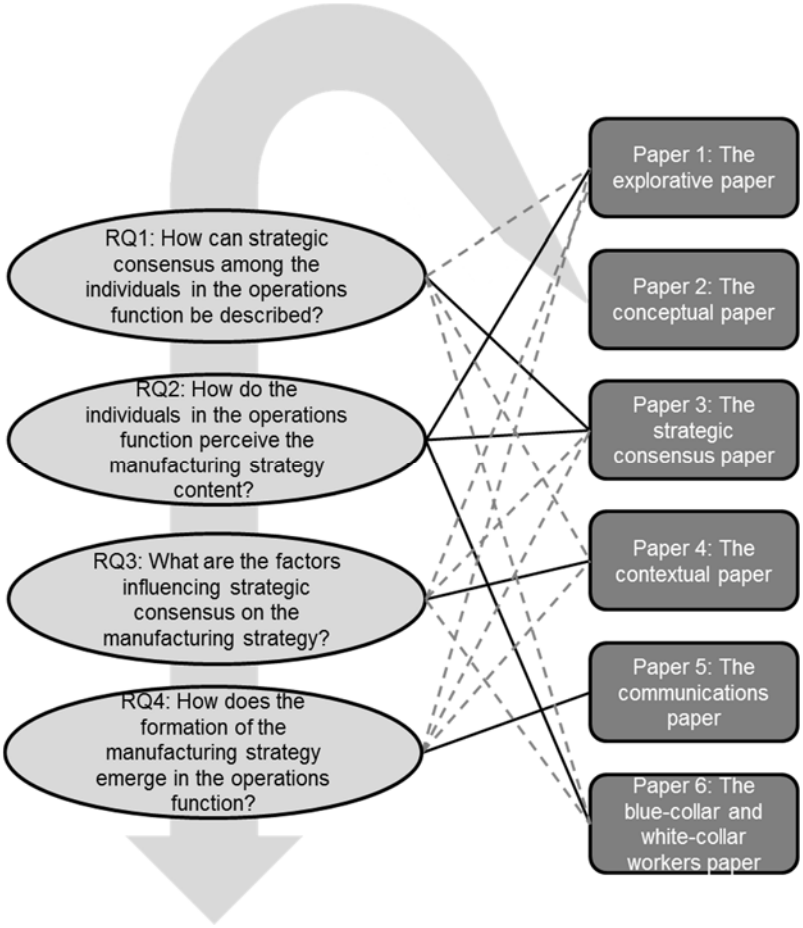

Figure 5.1. Relations between the RQs and the papers

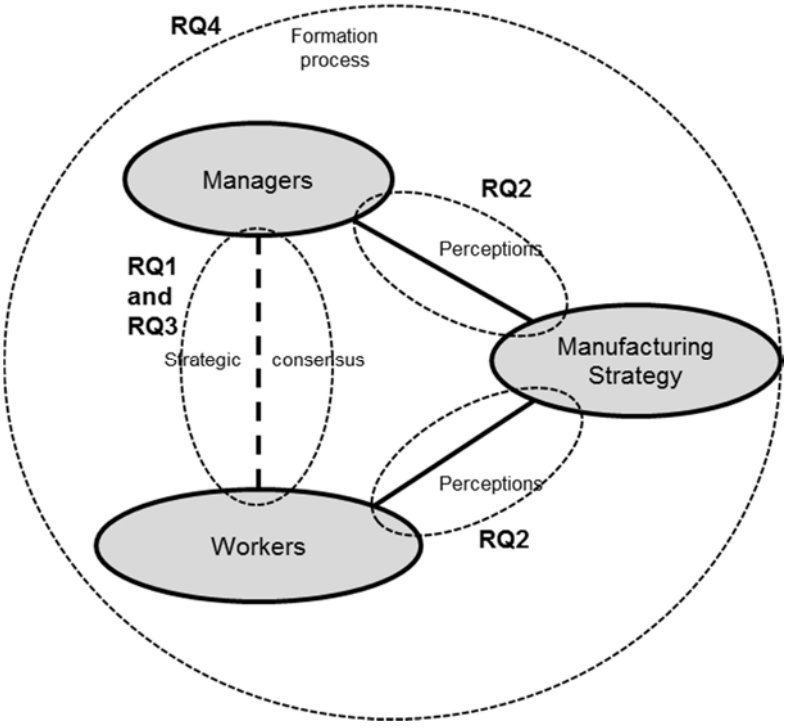

Figure 5.2. Links among the building blocks and the research questions

5.1 RQ1: How can strategic consensus among the individuals in the operations function be described?

RQ1 functions as an overarching frame for RQ2 and RQ3 in attempting to state how strategic consensus may be described among the individuals in the operations function, particularly between the workers and the managers. The findings from Paper 3 (the strategic consensus paper) and to some extent, Paper 1 (the explorative paper), Paper 4 (the contextual paper) and Paper 6 (the blue-collar and white-collar workers paper), can help answer this question.

Based on the empirical data studied in this research, the most prevailing reasons for different levels of strategic consensus are associated with:

(1) the individuals' perceptions of the MS dimensions and
(2) the context in which the MS forms.

First, the individuals' underlying understanding of the meaning and importance of the different MS dimensions varies between the two hierarchical levels (Paper 3). This is not immediately apparent when reviewing the interviewees' choices on the Likert scale, but it becomes evident through the thematic coding of their more detailed answers. When the answers are analysed based on a numeric scale, the concept of strategic consensus becomes rather static; it can be interpreted as if two individuals who have given the same value to an MS dimension also share the same understanding of that dimension. However, the analysis of the more detailed answers reveals that the interpretations of a dimension's meaning varies among individuals, indicating a more dynamic nature of the strategic consensus concept. Therefore, rather than strategic consensus being something an organisation has or lacks, it can be viewed on a scale. Thus, strategic consensus among individuals in the operations function can be described as being present at different levels for different MS dimensions.

For example, when analysing the interviewees' answers on the Likert scale, all interviewees at Company 2 seem to agree on the importance of reducing the company's production costs. However, the managers state that it is only possible to a certain extent and that it is important to release capital for investments. Meanwhile, one of the workers mentions that the significance of reducing the production costs is related to the owners' desire to earn more money. The same worker later (during the interview) also acknowledges that from his experience, there is an absence of information about corporate long-term plans. At first, it might seem as if the company has reached strategic consensus on this MS dimension; the individuals within the organisation agree. However, when examining the underlying ways of reasoning, that is, not only awareness but also deeper understanding, greater complexity is indicated. If a worker believes that all the money that he or she saves by controlling the costs goes straight to the owners, while simultaneously thinking that he or she does not know what will happen to the company by next month, the worker probably does not feel committed to reducing costs. On the other hand, if the worker knows that the money that he or she saves is planned to be reinvested in better machinery so that the company can remain competitive with high-quality products, the worker will more likely endeavour to monitor his or her impact on production costs.

However, one worker at Company 2, who holds a commission of trust, shows a greater understanding of the company's long-term plans. This illustrates that some of the variations in understanding are related to individual interest, not only to the hierarchical level to which the individual belongs.

This research does not only identify the workers' differences in the way they perceive the MS dimensions. The findings in Paper 3 also show that the two levels of managers (production managers and CEOs) disagree on several MS dimensions, such as those related to delivery flexibility and workers' possibilities for work enlargement. This is surprising since these are dimensions where it could be assumed that the CEO and production manager should agree, especially if both belong to the top management group, as is the case in the studied companies. The internal incongruity between the managers indicates not only low levels of strategic consensus among individuals but also a lack of vertical alignment between corporate and manufacturing strategies (Skinner, 1974). Furthermore, as none of the studied companies has a clearly formulated and written MS, the individuals in the operations function are allowed to include their own personal ideas in their interpretations of the MS.

Second, as the individuals' diverse perceptions of MS dimensions are closely related to their own interpretations of the strategic priorities, their contextual setting, the activities on the shop floor and how they perceive these are important for how the strategic consensus develops within the organisation.

This research describes strategic consensus among the individuals in the operations function as a dynamic process where different MS dimensions are understood differently, where the individuals perceive different aspects differently and where the contextual setting has an important influence. Hence, the level of strategic consensus develops differently for different MS dimensions at different levels of the organisation. Strategic consensus is thereby an important attribute in the MS formation process. Figure 5.3 illustrates the relationships in this dynamic process. The hierarchical groups are seen as individuals rather than homogeneous groups, where each individual has her or his own interpretation of the MS. Strategic consensus does not merely develop between two hierarchical groups but rather among individuals in both these groups, as well as between individuals in the different groups. This reasoning can be related to the vertical and horizontal strategic alignment as defined by Kathuria et al. (2007). Therefore, strategic consensus can be seen as developing at different levels at different times. Furthermore, the contextual setting is in Figure 5.3 captured as an overarching factor influencing these levels of strategic consensus.

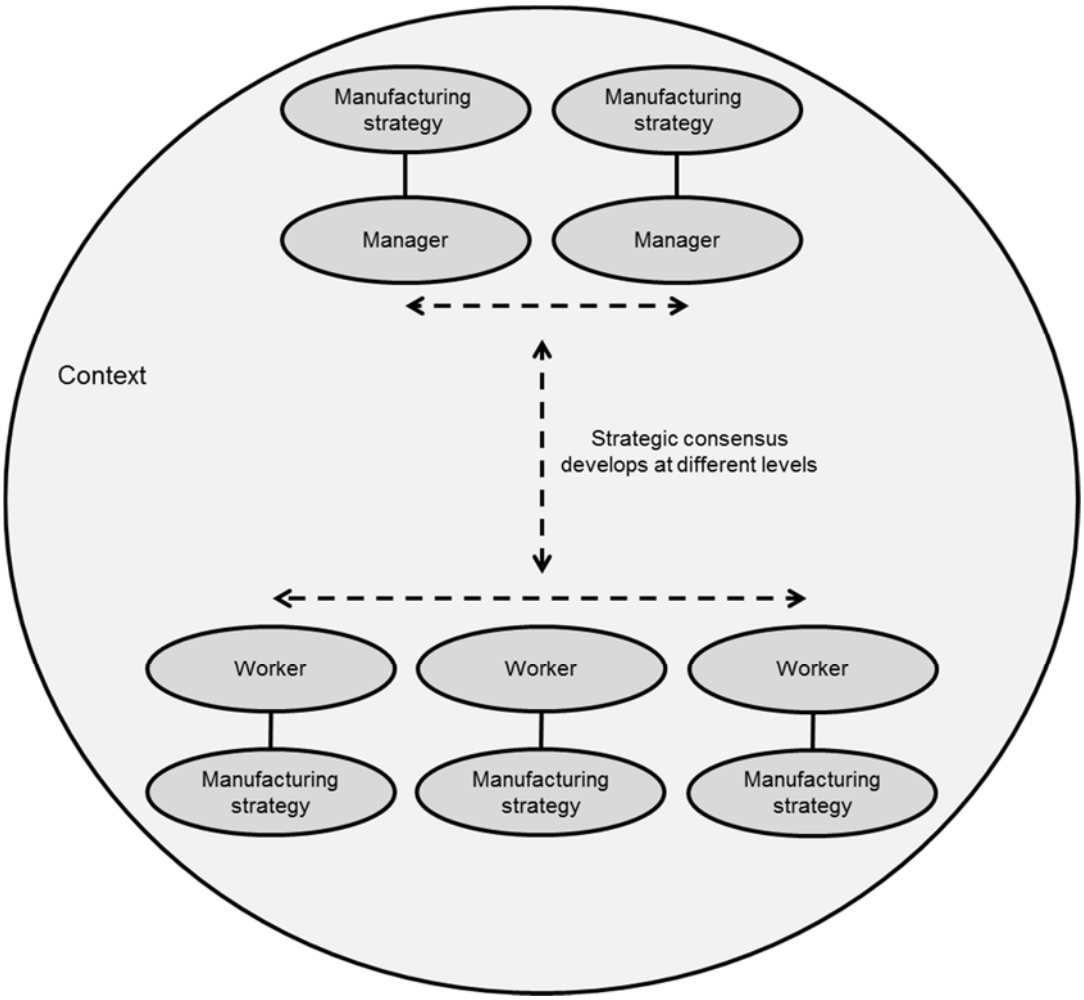

Figure 5.3 Strategic consensus at different levels, among individuals' own interpretations of MS in a contextual setting

5.2 RQ2: How do the individuals in the operations function perceive manufacturing strategy content?

RQ1 defined the individuals' perceptions of the MS dimensions as one of the most prevailing reasons for different levels of strategic consensus among the individuals in the operations function. RQ2 is therefore based on the assumption that to achieve a successful MS formation process, it is important to understand how the individuals on the shop floor in the operations function, those who make many of the operating decisions and perform many of the operational actions, perceive the content of their company's MS. The findings in Paper 2 (the conceptual paper) indicate that the people dimension in the MS literature has largely focused on the management level. It has primarily emphasised the "link" between top managers and production managers, as well as production managers' relations with other functional managers. In this research, three groups of individuals in the operations function have been studied: blue-collar workers, white-collar workers and managers. The blue-collar workers have been empirically studied in Paper 1, Paper 3, Paper 4, Paper 5 and Paper 6. Paper 6 has distinguished between blue-collar and white-collar workers. The managerial level's perceptions (those of production managers and CEOs) have primarily been captured in Paper 3 and Paper 5. As explained by this research's purpose and also evident in the attached papers, the research presented here has

an extended focus on the workers' perspective. Therefore, RQ2 mainly focuses on these individuals and complement these findings with insights related to the managers' perceptions of the MS dimensions. A worker is a person whose primary tasks are related to the work on the shop floor. In the appended papers, the worker has been defined as both a production-related staff member and an operator. These terms shall be interpreted as interchangeable since the vocabulary has developed during the research process.

The papers studying the individuals' perceptions of the MS content (Paper 1: the explorative paper, Paper 3: the strategic consensus paper and Paper 6: the blue-collar and white-collar workers paper) show that certain patterns emerge as to how the workers perceive the different MS dimensions. It can be observed that the workers perceive the MS dimensions differently, depending on how close the dimension is to their own tasks and organisational groups (Paper 1 and Paper 3). Paper 1 shows that the workers are aware of their own group's work and how it is organised, but they seem unable to relate to their own roles within the company or to perceive the company's long-term planning to the same extent. These initial patterns, indicating that the MS dimensions may be structured according to their closeness to the workers' work groups, are later elaborated on and structured in Paper 3. The continuation of this section addresses these patterns according to the structure offered in Paper 3. The individuals' perceptions of the MS dimensions are treated along three organisational levels: intra-organisational at the group level, inter-organisational and upper intra-organisational level (Table 5.1).

Table 5.1. Organisational levels and the MS dimensions (derived from Paper 3)

Organisational level	MS dimension
Intra-organisational group level	Quality Information and process technology
Inter-organisational level	Delivery Flexibility
Intra-organisational upper level	Cost Human resource systems Organisation

The intra-organisational group level refers to the MS dimensions with which the workers come into daily contact and hence are most often handled within their own work group. The inter-organisational level refers to the MS dimensions that, from the workers' perspective, involve contacts with customers and suppliers. The upper intra-organisational level refers to the MS dimensions that relate to strategic decisions at an organisational level that is higher than the group level, most often at a production management or corporate management level. The following sections elaborate on how the individuals' awareness and understanding of the MS dimensions vary among the three levels. The division of MS dimensions into three main organisational levels indicates that it is easier for the workers to perceive the competitive priorities and decision categories that are associated with their own group, that is, the intra-organisational MS dimensions at the group level. By presenting data identifying these dimensions and how workers relate to them, this research helps structure the MS formation at manufacturing companies.

5.2.1 Intra-organisational group level

Workers have an extensive understanding and are able to make detailed statements about the intra-organisational MS dimensions at the group level: *quality* and *information and process technology*. These dimensions are handled within their own organisational group and to some extent, among groups on a regular and often daily basis. For example, related to the *quality* dimension, the workers can explain factors such as customers' product requirements in a detailed manner, defining tolerances and surface requirements. For instance, Worker 4 (at Company 1) explains, "All products have surface requirements on a scale from 1 to 5. There are also measurement requirements". Furthermore, regarding workers' perceptions of the quality dimension, Paper 6 shows significant differences between the blue-collar and the white-collar workers for two of the defined quality factors: to provide high-performance products and to offer consistent, reliable quality. In both cases, the white-collar workers rate the factor significantly higher than the blue-collar workers do.

Concerning the *information and process technology* dimension, the studied workers have a deep understanding of the equipment and machines, as long as they are the ones handling them, but their understanding decreases when external parties, such as set-up technicians or maintenance workers, are involved. In Paper 3, the information and process technology is addressed by focusing on the production process, production planning and the factory layout. Regarding these factors, the studied workers are able to explain their roles within the internal production flow, as well as how their work affects the individuals before and after them within the internal production flow. For example, Worker 12 (Company 3) describes the factory layout, "It is very crowded, and the robots are placed here and there. Earlier, everything was at one place, but now, it is probably planned for the large jobs we have, that everything shall be close by for them".

5.2.2 Inter-organisational level

The inter-organisational level pertains to the MS dimensions of *delivery* and *flexibility*. Similar to the dimensions at the intra-organisational group level, these two MS dimensions have a connection to the workers' organisational groups and are handled regularly. However, what distinguishes this inter-organisational level is its clear connection to the external environment, specifically, the company's customers and suppliers. The workers' awareness of these dimensions is lower than their awareness of the dimensions at the intra-organisational group level but higher than that of the dimensions at the upper intra-organisational level. This seems to be primarily related to the intensity of the workers' contact with these dimensions, implying greater differences among the workers in terms of these dimensions than the dimensions at the intra-organisational group level. In Paper 1, these results are explained by the differences in awareness and understanding between make-to-stock (MTS) workers and make-to-order (MTO) workers. The findings indicate that the MTO workers more easily understand customer needs because they work with small batches and have closer contacts with the end customers. For example, Worker 2 (Company 1), who mostly performs MTO tasks, explains, "We prioritise some customers before others. Some customers have been a bit mean, and then they have slid down the priority list. There are three customers on top of the list; we have agreed on that". Meanwhile, Worker 3 (Company 1), who works with MTS, says, "I do not know" when

asked about customer demands on the delivery lead time. In Paper 3, this distinction between MTO workers and MTS workers cannot be made as the workers all work in the same type of production system. Rather, the differences in perceptions of the delivery and flexibility dimensions are explained by the workers' relationships with the company's customers and suppliers. Hence, the workers' contact with the external "world" is central, but depending on the type of production system and production planning at the company, the relationships with these customers and suppliers are regarded differently by different workers. The workers at the workstations in the beginning or the end of the production process show a better understanding of the delivery dimension, particularly the customers' delivery demands, than the workers who have less contact with the customers. However, Paper 3 also admits that none of the workers seems to have a clear view what the demands imply or how they are managed. Furthermore, Paper 6 reports significant differences between the blue-collar and white-collar workers' ratings of one delivery dimension factor – to reduce the production lead time – with the white-collar workers rating it higher.

Regarding the flexibility dimension, there are differences among the workers in relation to the size of the product portfolio. While the managers can explain the size of the product portfolio and how the number of active products varies over time, the workers seem unable to observe any such patterns.

As for flexibility, the workers' answers deviate regarding the size of the product portfolio. The reasons are that all three companies produce only a small portion of the thousands of different products in their systems on a regular basis, and the workers seem to have limited knowledge about products that are not part of their own tasks. This implies that workers who rotate among groups or in other ways have a greater understanding of the whole production process and a higher awareness of flexibility. The deviations in perceptions and understanding of delivery and flexibility among workers, depending on their positions in the production process, indicate that these dimensions are handled at an inter-organisational level. A good understanding of these dimensions requires relatively frequent contacts with the external world.

5.2.3 Upper intra-organisational level

The dimensions of *cost*, *human resource systems* and *organisation* are defined as being at the upper intra-organisational level because they are primarily handled by the management and not on an everyday basis in the studied companies (Paper 3). The findings in Paper 1 relate to a similar logic in the division of the MS dimensions, and both *cost* and *development and organisation* follow the same reasoning as that in Paper 3. These intra-organisational MS dimensions at the organisation's upper level are not encountered daily by the workers. Instead, managers handle them at a higher hierarchical level. Therefore, the workers have not been made aware of them, that is, many of the workers are unable to provide answers related to these dimensions. Concerning the cost dimension, most (if not all) of the studied workers are unsure about what the production costs imply and include. Therefore, they make guesses regarding their company's production costs, resulting in significant deviations in their answers and indicating low levels of strategic consensus. In Paper 6, three cost-related abilities differ significantly between blue-collar and white-collar workers, as follows: increase capacity

utilisation, reduce production costs and increase labour productivity. These three abilities can all be viewed as being close to the blue-collar workers' own tasks.

5.2.4 Managers' perceptions

The structure with organisational levels is primarily based on the workers' perceptions. However, the findings in Paper 3 indicate that the managers' perceptions can also be understood along the same dimensions even if managers in general have a greater understanding of most of the MS dimensions than the workers do.

The empirical data shows managers' generally high awareness and better understanding of the MS dimensions as they are able to concretely elaborate on the majority of them. This is expected since all managers in the studies are part of their company's management group. However, none of the studied companies has an explicit and documented MS, allowing the managers to include their own interpretations in their answers. The managers at Company 2 disagree on several dimensions. The managers at Company 3 and Company 4 also indicate some disagreements though less frequently. Company 2's CEO and production manager are relatively new; thus, deviations are not surprising because they have not had the time to develop strategic consensus. The divergence in the answers at Company 4's management level can most likely be associated with the company size and how they have chosen to organise themselves. Company 4's production manager is more operations oriented than those at the other companies, partly because of family relationships within the company and their focus on maintaining a flat organisation, with the CEO's daily presence on the shop floor.

Related to the *quality* and *information and process technology* dimensions at the intra-organisational group level, the managers elaborate on customer requirements, the production flow and the information-sharing tools they use to communicate with the workers. At one of the companies, the managers refer to the TS[2] requirements. Regarding *quality* and *information and process technology*, there seems to be strategic consensus among the managers at all three companies. This finding indicates that the MS dimensions where the workers show the highest awareness and greatest understanding are also those where the managers agree the most. This can be linked to the fact that these dimensions are handled daily on the shop floor; hence, they constantly need to be addressed by the management.

Regarding the MS dimensions at the inter-organisational level, *delivery* and *flexibility*, the managers show some degree of understanding of what the dimensions encompass. However, there are deviations in the importance given to some of the factors. For instance, Company 3's managers express contrasting opinions on delivery and the factors related to buffer usage. Company 2 managers' perceptions differ regarding flexibility and the factors associated with changes in the delivery date. While one manager at Company 2 suggests that the company policy is never to change, the other indicates that change is never impossible. The disagreements regarding these dimensions, which to a great extent are connected to the external environment, reveal a misalignment, possibly influencing the relationships with both suppliers and customers.

[2] ISO/TS16949 covers the technical specifications for suppliers to the automotive industry.

Related to the MS dimensions at the upper intra-organisational level, the managers' understandings remain high, but there are some deviations among their answers. Concerning the *human resource systems* dimension, the managers at Company 2 disagree on the factor related to work enlargement possibilities for the workers. There are also varying degrees of both awareness and understanding regarding the *organisation* dimension; for example, the factor of long-term plans is addressed differently among the managers, with some having a modest perspective of less than one year. This most likely relates to the fact that all three companies rely on a few customers and may not be as independent in long-term planning as more diversified companies.

5.2.5 Individuals' perceptions of MS content

How individuals in the operations function perceive the MS content follows a certain pattern. While the individuals have their own perceptions of the MS, which results in several individual MSs in the organisation (as depicted in Figure 5.4), these perceptions seem to follow a step-wise sequence. The empirical data has revealed that the individuals in the operations function more easily perceive the intra-organisational group level MS dimensions and thereby develop an understanding for these dimensions easier than for the other dimensions. The MS dimensions which are the most difficult to develop an understanding for, especially for the workers, but also to some extent for the managers, are the ones associated with the upper intra-organisational level. For the MS dimensions which here are defined as inter-organisational: delivery and flexibility, the level of perception and subsequent understanding depends on the individual's position in the production process. Workers with more knowledge intense tasks, where the work is less repetitive and contacts with suppliers and customers are common, are more aware of the inter-organisational MS dimensions. Figure 5.4 thereby illustrates a sequence for the perception of the MS dimensions as follows: (1) intra-organisational group level, (2) inter-organisational level and (3) upper intra-organisational level. This sequence seems to primarily be valid for knowledge-intense manufacturing settings, as is the case for many of the interviewees in the studied SMEs. It might be that the sequence changes if the work is conducted in a manufacturing setting with highly repetitive production of large batches which are made to stock. However, even if the understanding for an MS dimension and the importance given to it cannot directly be related, it shall be noted that the data from the large company, retrieved from blue-collar workers on dedicated assembly lines that make products to stock, indicate the same sequence for the competitive priorities when the importance of them is being rated.

The central idea here is that the division of the MS dimensions does not follow the traditional division into competitive priorities and decision categories, but is structured according to the closeness to the individuals' tasks. This research thereby contributes to the insight that workers more naturally associate their work with MS dimensions such as product quality and factory layout than with factors related to production costs and educational possibilities. This implies that when the focus on the individuals increases, particularly through the workers' perspective, the view on MS and its formation on the shop floor also alters. This relates back to the conclusions in Paper 2 where the importance of also including the world views of the workers was emphasised.

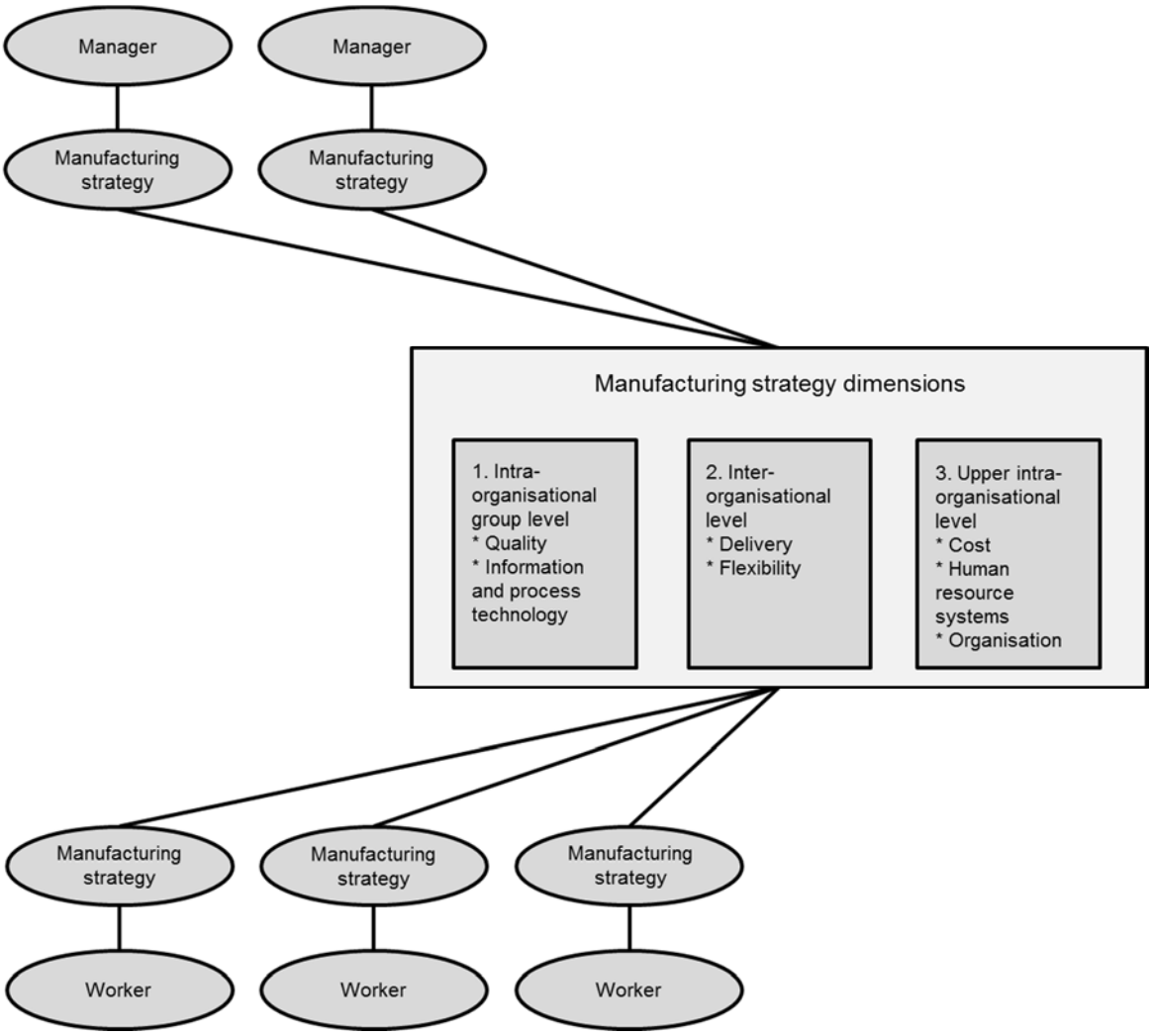

Figure 5.4 Individuals' perceptions of MS dimensions as a sequence of understanding

5.3 RQ3: What are the factors influencing strategic consensus on the manufacturing strategy?

As concluded in the answer to RQ1, different levels of strategic consensus seems to exist. The research shows that several factors influence this level of strategic consensus on the MS. The following elaboration on these factors heavily focuses on the organisation's internal context (the context studied in Paper 4 – the contextual paper). The internal context is divided into the factors related to the individual and the organisation, respectively. However, as Paper 1, Paper 3 and Paper 6 have elaborated on the contexts studied in the respective papers, some conclusions are also made based on these papers. Paper 6 contributes with a large company organisational context. Meanwhile, Paper 1 and Paper 3 contribute with an SME perspective, which is put into perspective as part of a supply chain, hence related to the external context. The following analysis starts with the individual contextual factors, continues with the organisational ones and finishes with a brief description of the external context.

5.3.1 Internal contextual factors: individual level

In the initial, broad explorative study reported in Paper 1, a number of factors have already been identified as related to the workers' diverse perceptions. These have been complemented by an

additional study (Study 3), with the combined results presented in Paper 4. Therefore, the results in this section are primarily based on the findings in Paper 4. This section to a large extent follows the same structure as that of Paper 4, presenting five individual contextual factors:

- organisational group and position in the production process,
- work group identity and sense of belonging,
- length of stay at the company,
- personal interests and willingness to learn and
- commissions of trust.

5.3.1.1 Organisational group and position in the production process

The organisational group and position in the production process refer to where in the production process a worker performs her or his tasks. Workers handling MTO products in small batches seem to have a greater understanding of the MS and its underlying fundamental ideas than those who work with MTS products in large batches. This difference is due to the MTO workers' closer relationships with external parties, specifically suppliers and customers. However, as some of the studied companies cannot be distinguished based on whether their workers produce to stock goods or to fulfil orders, Paper 3 also emphasises differences in perceptions, depending on the workers' respective positions in the internal production process. Workers at the beginning or the end of the process, hence in closer contact with external parties, show greater understanding of the MS dimensions, particularly those at the inter-organisational level. In relation to these differences, Paper 6 shows variations in the way the blue-collar and white-collar workers rate some of the MS dimension factors. Since all blue-collar workers studied in Paper 6 work on the assembly lines at a large company (i.e., MTS production of large batches), the differences in perception may also be explained by the logic that due to their limited contact with external parties, MTS workers have limited understandings of the supplier-buyer relationship and the end customers' requirements and needs.

The organisational group and work position also seem to influence the managers' understandings of the MS dimensions. The findings reported in Paper 3 show that not all production managers are as aware of the MS dimensions as are the CEOs. The production managers' role can differ from being more operational or more strategic. At one of the studied companies, the production manager plays a more operational role, with a heavy responsibility for the daily work and planning. However, the responsibility for the strategic work and long-term planning for this company is left to the CEO. Regarding the presence on the shop floor, Paper 3 shows that the answers of some CEOs indicate a disconnection from the manufacturing "reality". They do not seem to fully understand the problems occurring daily on the shop floor with respect to the MS. Some workers, who claim that the managers do not know what is going on, also state this observation.

5.3.1.2 Work group identity and sense of belonging

In Paper 1, job rotation appears as an important factor influencing the perceptions of the MS, and the knowledge and knowledge sharing seem to decrease when there is no job rotation. This is further studied in Paper 4, which shows that workers who identify themselves as performing more than one task and belonging to more than one work group have an expanded scope of

organisational belonging. This seems to result in an increased understanding of the activities and decisions in the operations function, and how these relates to the MS.

5.3.1.3 Length of stay at the company

Regarding the length of stay at the company, Paper 1 and Paper 3 show that workers who have been employed at the same company for a long period of time have often performed different tasks, belonged to different groups, and in many cases, received more responsibilities. The workers' previous experiences within the operations function can therefore be related to their length of stay at the company. Paper 4 summarises these findings by identifying the length of stay as an important factor influencing the possibilities for strategic consensus on the MS. The article concludes that workers with a long tenure have often performed various tasks, belonged to different groups, and in many cases, have been assigned more responsibilities.

For the managers as well, the length of stay is important for their understanding of the MS dimensions. Paper 3 shows that the shorter duration an individual has held a position, the more his or her perceptions deviate from those of the majority. At one of the companies, both the CEO and the production manager are new, and they are the pair of managers having the most disagreement. This indicates that factors such as length of stay and organisational belonging affect the perception about the MS, even at the managerial level.

5.3.1.4 Personal interests and willingness to learn

Individual differences in the workers' perceptions and understandings of the MS dimensions that cannot easily be connected to any other contextual factor are observed. Therefore, the differences point to additional, more personal factors as plausible explanations. In other words, the workers' personal interests and willingness to learn are viewed as an important individual factor influencing the possibilities for strategic consensus development in the operations function as it influences the worker's perceptions. This indicates that workers cannot be regarded as a homogeneous group to which the management "pushes" the same information, as individual factors have to be taken into consideration.

5.3.1.5 Commissions of trust

Paper 4 shows the differences in perceptions and understandings of the MS dimensions between workers with and without commissions of trust. In the studied companies, commissions of trust are either related to the actual production work (for instance, as a shift leader or an "expert" in some tasks within the group) or associated with other dimensions of the work within an organisation, such as an internal auditor or a labour union representative. Workers who have held commissions of trust seem to be able to give more detailed explanations of the MS dimensions than workers who do not have such responsibilities. Therefore, the workers who have held commissions of trust have expanded their scope from their own group to incorporate the entire company, and in some cases, also the relations between the company and external parties.

5.3.2 Internal contextual factors: Organisational level

The main findings related to the organisational contextual factors are derived from Paper 4, with complementary findings in Paper 1 and Paper 3. It is notable that the managers' focus (as

reported in Paper 3) results in an additional organisational contextual factor – the company size. The factors analysed in the following sections are:

- possibilities for work enlargement,
- manufacturing system: layout and shift work,
- mental distances between workers and managers,
- informal groupings,
- labour union's role and
- company size.

5.3.2.1 Possibilities for work enlargement

The workers' career within their organisation can be related to what is referred to in this research as the factor possibilities for work enlargement. From one point of view, workers' careers can be viewed as primarily related to the individual context and to the individual's personality and willingness to learn new things. However, from an organisational perspective, the possibilities for work enlargement are closely linked to how the company manages its HR system in terms of education. None of the companies in this study seem to offer a structured educational programme; rather, the training is provided on an ad hoc basis. That is, when customer requirements call for new production techniques or skills the education takes place. Furthermore, the lack of a formal educational programme risks the educational opportunities to only be reserved for those workers who already have a certain educational level or who are in regular contact with managers. These inconsistencies, along with the ad hoc mentality, leads to differences in how the workers perceive their possibilities for work enlargement. Further, the short-sightedness might cause the workers to perceive their own organisation as not being prepared for unexpected events or organisational changes.

5.3.2.2 Manufacturing system: layout and shift work

In section 5.3.1.1, the worker's position in the production process and the nature of the task she or he performs are identified as important individual contextual factors to consider in terms of how the worker perceives the MS dimensions. At the organisational level, Paper 4 identifies the structure of the manufacturing system as an essential factor to take into account. Particularly, the factory layout and the amount of shift work done are found to influence the workers' perceptions.

The factory layout is related to the worker's understanding of his or her own role in the production process. In Paper 1, Paper 3 and Paper 4, the findings are based on studies of SMEs with functional layouts. While the work card plays an important part in communicating the production sequence in these organisations, several workers in this study still have difficulties explaining the sequence outside their own work group. This may be related to the fact that the functional layout prohibits a visual flow through the factory. When workers do not see or understand the tasks performed by others in the same production system, they evidently have difficulties relating to these individuals; hence, the possibilities are low for strategic consensus among them.

One additional factor related to the manufacturing system is the shift work. The findings reported in Paper 4 indicate that the workers with shifts after normal office hours experience greater challenges in understanding the MS dimensions. Since the managers in the studied companies work regular office hours, the workers assigned to alternating shifts (i.e., afternoons every other week) have limited contacts with both their direct manager and other managers. This limited contact with the management causes an imbalance in the information flow between the weeks. The situation seems even more critical for night shift workers, who can work for several weeks with minimal managerial contact. Due to the time frames and design of this research, none of the interviewees was working steadily at night. However, both the workers who had been working at night and some of the managers indicate that the workers on the night shift do not participate in the company activities in the same way as the rest of the workers do. This non-participation will decrease the possibilities for high levels of strategic consensus.

5.3.2.3 Mental distances between workers and managers

In Paper 1, Paper 3 and Paper 4, the studied companies are SMEs. Generally, the preconditions due to the small, flat organisations at all four companies should enable an open-minded corporate culture, with good communications about the MS dimensions across hierarchical levels. Despite this structure, long mental distances are present at some of the companies. In Paper 4, a mental distance is defined as the workers' perceived distance between individuals or groups. Some workers admit feeling a lack of connection with the managerial level. For example, Worker 8 (Company 1) describes the relation between the workers and managers: "I do not feel comfortable when I have to go to the managers' offices. I do not like the feeling that I am not seen". Later, the same worker refers to her own participation in work change: "I just accept the situation. In general, the managers do not want to hear about things that do not work". A mental distance does not necessarily have to correspond to the actual distances, which can be both physical and hierarchical. However, at least at one of the companies, where the mental distances are regarded as long, the managers and workers are also physically located far from one another and in a hierarchical order, with the managers on the top floor.

Paper 4 concludes that perceived mental distances, particularly between workers and managers, can influence the workers' understanding of the MS. As strategic consensus builds on shared understanding, common perceptions and commitment to the company's MS, the perceived mental distances may result in low levels of strategic consensus. The inability to connect with the individuals who are supposed to share the MS might cause workers to neglect this type of information, hence influencing how the MS is perceived. This decreases the level of agreement within an organisation and works against strategic consensus on the MS.

5.3.2.4 Informal groupings

Paper 4 identifies the workers' identification with informal groupings – how they identify themselves and their roles in the operations function – as a factor influencing how the MS dimensions are perceived. These informal groupings are mainly related to how information is spread and how the workers assimilate the information from different channels. The group identity mainly seems to affect how workers relate to the management level and how workers of different groups relate to one another. For example, informal groups can be based on social groupings in the workers' spare time, such as a group of moose hunters. At some of the

companies, ethnicity and cultural background have also been observed as informal groupings that may influence how information is perceived and how the workers identify themselves and their roles within the company. This type of social group identity indicates that the sense of belonging to an informal group exceeds the identification with the organisational group. The social groupings affect how the workers group themselves during breaks and with whom they interact. The possibilities for strategic consensus are thereby not only influenced by the formal groupings and information channels but also by these informal groupings.

5.3.2.5 Labour union's role

In Paper 1, the commissions of trust related to labour market issues are considered as an important factor for the workers' understandings of the MS. This is further studied in Paper 4, where this factor is identified as the role the labour union plays in the MS formation process. While the company studied in Paper 1 lacks union representatives, its employees are organised into union-like groups (employee consultation, salary and health initiative groups), with an influence over salary and other union-related issues. The other SMEs studied all have labour union representatives in their organisations.

As pointed out in section 5.3.1.5, the commissions of trust are important from an individual perspective, where the workers with such responsibilities show a greater understanding of the MS dimensions and the overall structure of the organisation. However, this section emphasises a more aggregated level, taking an organisational perspective on the influence the presence of a labour union may have on the possibilities for strategic consensus. Particularly, the union representatives' role in relation to communicating the MS seems important. The individuals with these responsibilities can be viewed as a bridge between workers and managers. This implies that the labour union representatives' presence on the shop floor serves not only as the traditional counterpart to management decisions but also as a vital information channel. The union representatives often seem to be the carriers of important information from the management to the operational level. This implies that workers' perceptions and the possibility for strategic consensus among the individuals in the operations function are influenced by an information flow which is outside of the management's control.

However, it should also be noted that one of the main goals of the labour union is to keep workers equal to one another and to emphasise the collective before the individual. Such a collective viewpoint might work against the findings related to the individual contextual factors, that more emphasis needs to be placed on the individuals and their perceptions. Therefore, strategic directions given by the management may be communicated differently than intended if the labour union representatives are the only ones who direct information to the workers.

5.3.2.6 Company size

The findings in Paper 3 offer the insight that the nature of the organisation (in this case, the SME setting) and the company size might also influence the possibilities for strategic consensus. The paper argues that some of the findings can be described based on the SME characteristics, for example, the fire-fighting mentality and lack of long-term planning due to few customers. However, in Paper 1, it is argued that the company size does not seem to indicate that the findings are specific to an SME setting. On the contrary, the individual workers

primarily relate to their own immediate surroundings, and in such smaller work groups of 5–30 people, the perception and shared understanding of the MS must start. However, Paper 3 shows that for the managers, their physical location within the organisation seems to lead to differences in perceptions among them. Often, the production managers are located in close proximity to the shop floor and attend to it on a daily basis, while the CEOs have a more distant location. The production managers' and CEOs' different roles, which are also viewed as individual factors, can partly be explained by the flat organisations that often characterise SMEs. The smaller the company is and the closer the hierarchical levels are to one another, the greater is the span of responsibility for each individual. In such cases, the CEO's role often becomes that of a salesperson as well, involving close collaborations with customers. On the other hand, the flat organisations at small companies should also be able to enhance greater understanding of strategic considerations due to the shorter distances between hierarchical levels. However, such logical connections cannot be supported by the findings here.

The large company, Company 5, also showed differences in perceptions of the competitive priorities, not only among the hierarchical groups, but also within them. For example, despite the top management's daily visits to the shop floor through Gemba walks and their daily meetings concerning people, quality, delivery and cost, the three top managers participating in the study did not give a consistent picture of the ratings of the abilities under the competitive priorities. Nor did they rank the importance of the competitive priorities in the same way. This might depend on their physical locations within the organisation where they belong to different parts of the organisation, located in different buildings. The differences might also be explained by their different tasks, as they represent different areas of expertise.

5.3.3 External contextual factors

Paper 3 pays some attention to the companies' external context. The paper associates the studied companies' subcontractor relationship with external parties with a decrease in the company's control over long-term planning. It thereby concludes that the MSs of the subcontractor SMEs' are influenced by their major customers' strategies and planning. This situation indicates that the position in the supply chain affects the role of the MS in the organisation and thus its possibilities for strategic consensus. Having such an external force impacting the MS formation leads to an internal organisational context where adaptations to swift changes and strong interdependencies are essential to retain customers and remain competitive. This demanding environment seems to require even higher levels of strategic consensus among the individuals in the operations function at the subcontractor company since decisions and actions have to be guided not only by the firm's own MS but also explicitly by the customers' MS decisions. Extending this line of reasoning, the entire supply chain becomes a chain of interdependencies among the individual companies' MSs.

5.3.4 Contextual influence on the strategic consensus on MS

Figure 5.5 illustrates how the organisation's internal context, as well as the external context influence the level of strategic consensus on the MS among the individuals in the operations function. The overlap between the individual contextual factors and the organisational contextual factors intends to illustrate two important aspects. First, the internal context consists of both individual and organisational factors which shall be given comparable importance to

enable high levels of strategic consensus on MS. The organisational factors are often easier to perceive, especially for managers, but it is important that also the individual factors are taken into consideration. This implies that time and effort need to be allocated to ensure that individuals in the operations function know each other. That is, MS formation which builds on strategic consensus among individuals is dependent on these individuals having an understanding for other individuals' internal context. Second, the individual and organisational factors often are interrelated, such as for the individual commissions of trust and the organisational presence of a labour union. This implies that when changes are done to one set of factors it also affects the other. The external context is in Figure 5.5 positioned behind the internal context, primarily dependent on this research's focus. However, its position can also be viewed as the frame to which the internal context has to adhere. Without the external context, there is no point of having an internal context as no company survives without interactions with the external world.

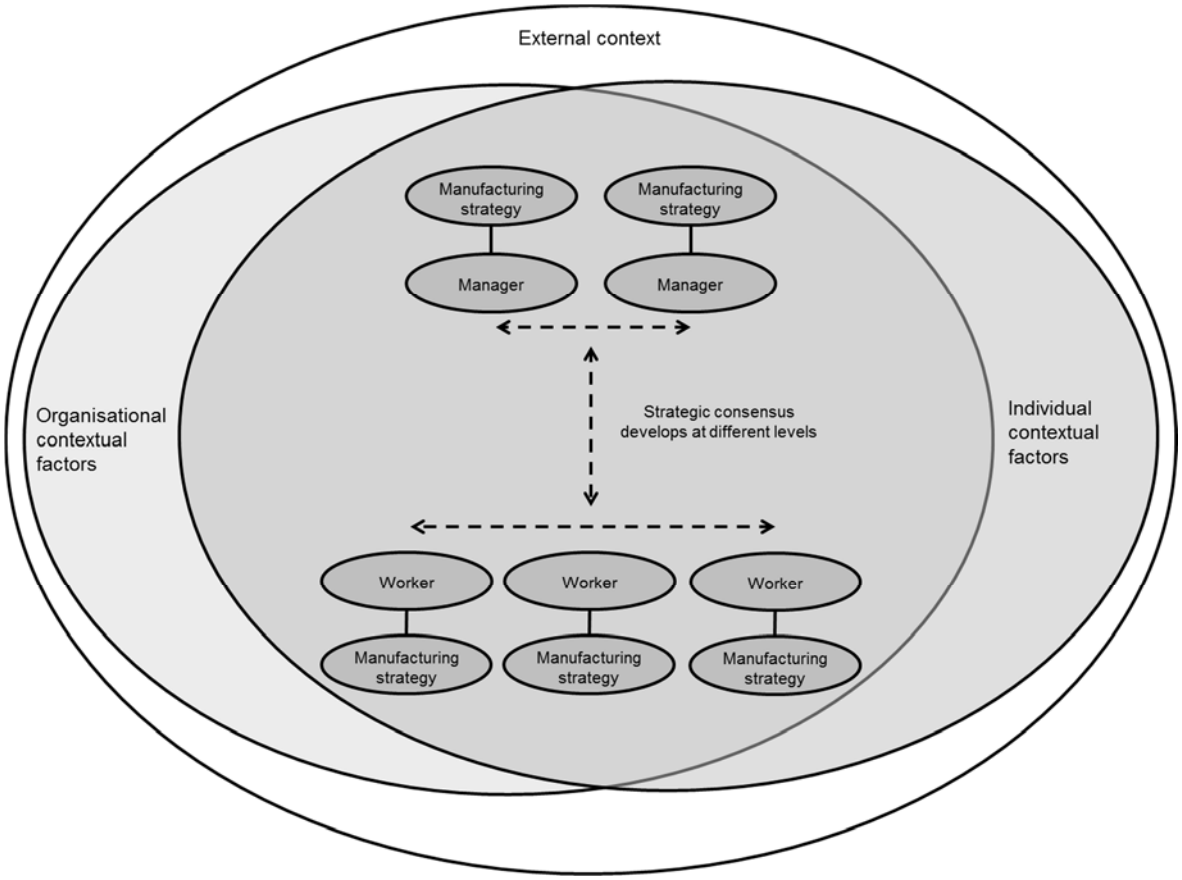

Figure 5.5 Contextual influence on strategic consensus on MS

5.4 RQ4: How does the formation of the manufacturing strategy emerge in the operations function?

By synthesising the six appended papers, particularly the five empirically based papers, patterns emerge, indicating that from both theoretical and empirical viewpoints, there are limitations on how the traditional MS literature has described the MS formation. In addition to the differences

in perceptions described in RQ2 and the contextual factors influencing the level of strategic consensus stated in RQ3, RQ4 further explores how the MS has emerged in the studied companies.

None of the four SMEs had a structured, formalised or formulated MS in place at the time of the studies. This resulted in many of the workers' perception of management decisions as short-term solutions, based on a fire-fighting mentality with no long-term perspective. Therefore, the empirical studies in this research show that how the MS emerges in companies does not always follow a structured manner (as suggested by the traditional MS literature, where the formulate-then-implement paradigm is prevalent) but can be related to ad-hoc procedures at both worker and management levels.

In such a context, the findings reported in Paper 3 emphasise that to reach strategic consensus in the MS formation, the presence of managers on the shop floor, who understand the complexities of everyday work there, is vital. Simply having the production manager and the CEO take a walk in the factory seems to decrease the mental distances, enable informal conversations and hence, increase the possibilities for strategic consensus. This can be related to the findings in Paper 1 and Paper 5 regarding the means of communication. Paper 1 (the explorative paper) identifies closed communication loops where workers only talk to their group leaders. Therefore, the information goes through many hierarchical levels, hindering the efficient communication of the MS. The findings in Paper 3 emphasise the communication channels' crucial role in creating possibilities for strategic consensus, but they also state that the three studied companies have problems with this issue. Either the quality of the information is poor or the ability to grasp the information varies among the workers. Paper 5 (the communications paper) indicates substantial similarities among the studied companies in relation to all communication elements: who communicates, through which channels and with what messages. All studied companies focus on the usage of verbal communication channels in the operations function, with weekly group meetings being the most prevalent.

One important aspect in the MS formation involves the communicated messages' time perspectives. This research finds that while the short-term perspective is brief and can consider issues that have to be addressed within minutes, the long-term perspective is also fairly short, often no longer than a few months. Hence, there seems to be no means of communication allowing for strategic perspectives in the message content. In Paper 3, this lack of strategic perspectives is linked to the absence of an explicit and documented MS. One of the studied companies' attempts to address strategic perspectives through semestral meetings, but their information is highly unilateral from the management to the workers and in the context of a social gathering, which does not allow for deep discussions or the usage of non-verbal illustrative channels. This unilateral link is not unique for this company but can also be found in Paper 5's analysis of the senders of information. The senders of information are the group leaders, production managers and CEOs. The workers cannot be considered senders as they are not the initiators; rather, if they send information to anyone else, they do so as responders who give feedback on received information.

Based on the findings in Paper 5, it can be concluded that the means of communication at the studied companies do not enable or support strategic consensus development within the operations function. Shared understanding and agreement on the MS content and the direction to be taken by decisions and actions are prohibited by an extensive focus on short-term planning and the lack of a dyadic communication relationship between the workers and the managers. Furthermore, the studied SMEs' lack of a formalised MS process or a clearly formulated MS makes it difficult for them to establish around what content the strategic consensus shall form.

How the MS emerges in these settings may be related to two other factors: (1) suggestions for improvement and (2) external (customer) requirements. On the shop floor, the decisions made and actions taken in relation to the workers' suggestions for improvement influence the MS formation. These decisions are often of a strategic nature and set the priorities for the organisation. With the shop-floor workforce's involvement in developing their own work conditions, it is easier to relate to the MS and its implications.

Furthermore, external demands – primarily from customers but also based on governmental jurisdiction or other external requirements – contribute to how the MS emerges since they dictate or enforce the formation of strategic priorities. These external demands are often related to customers who require new machinery or work procedures for the production of their products. Informal communication channels and informal groupings are also important for how the MS emerges. The way the MS emerges from the shop floor seems to rely on the strong individuals there. However, as described in Paper 3, the individuals' underlying reasons for the strategic priorities made vastly differ among them. Therefore, such dependence on individuals for the MS formation risks resulting in low levels of strategic consensus.

Figure 5.6 illustrates the MS formation process in the operations function. Based on the findings in this research the MS formation can be viewed as an emerging process. The managers' presence at the shop floor, informal conversations and ongoing work with improvement suggestions act as enablers for strategic consensus development in the MS formation. So does external (customer) requirements, as these force the organisation to act according to external demands. However, MS formation also faces several difficulties in organisational settings such as the ones studied here. The research shows that the closed communication loops and the short-term perspectives prevalent in the studied companies, together with the companies' un-formalised and un-formulated MSs hinder strategic consensus to develop. Hence, the MS formation is complex and dependent on strategic consensus to develop within the organisation.

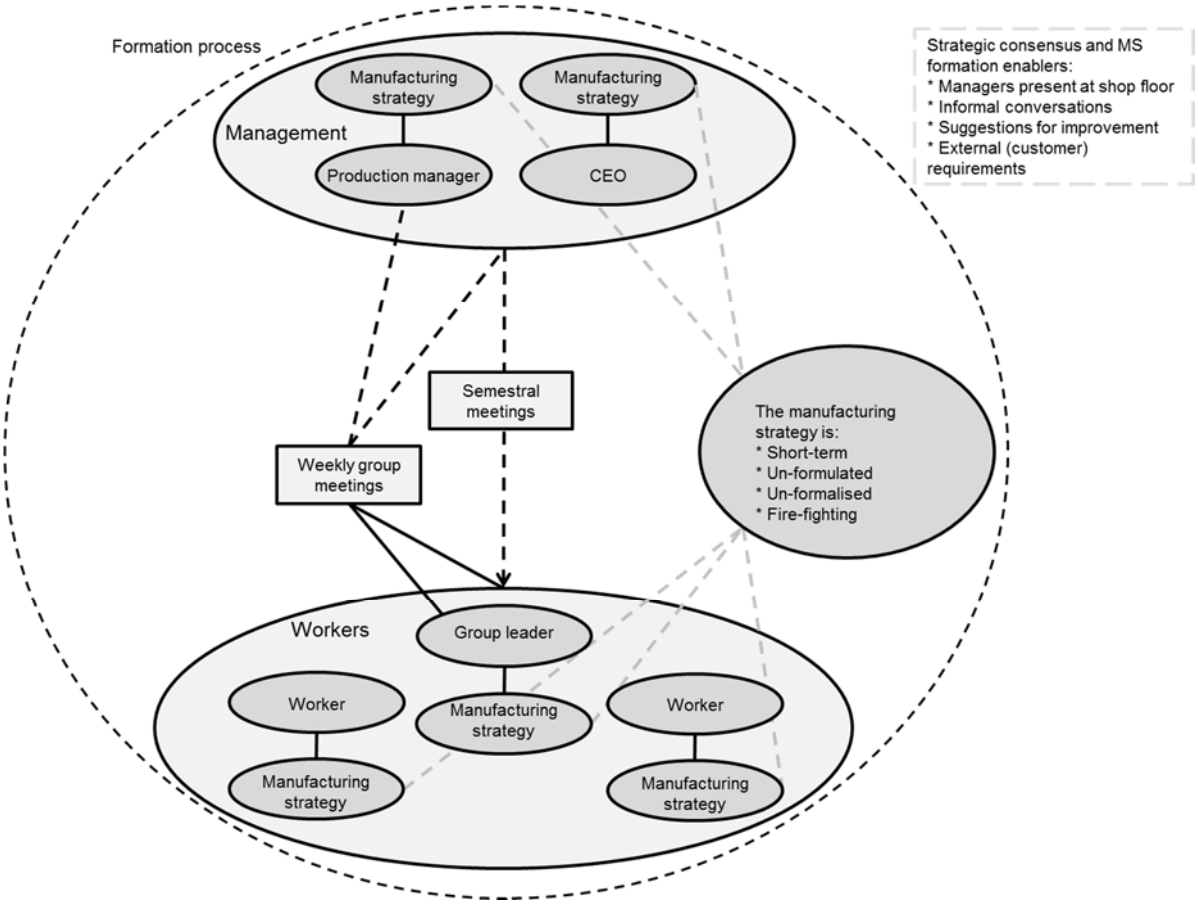

Figure 5.6 The MS formation process

6 Discussion

This chapter discusses the findings presented in chapter 5 and relates them to the theoretical background and frame of reference in chapter 2 and to the practical problem as identified in chapter 1. The purpose of this research has been *to investigate how the individuals in the operations function perceive the MS in order to understand how these individuals are involved in the MS formation*. This purpose can be considered twofold: first, it addresses individuals' perceptions; second, it addresses the MS formation. Based on this logic, this chapter starts by discussing the individuals, particularly by elaborating on the implications of adding the workers' perspective to the MS field. In relation to this focus on the individuals, it discusses the strategic consensus concept. The chapter continues by explaining the MS formation process within manufacturing companies and introducing the "patterning process". Finally, it discusses the managerial implications of this research.

6.1 Developing the focus on individuals in the operations function

This research has attempted to develop the perspective on the individuals in the operations function by incorporating the behavioural operations perspective (Croson et al., 2013) into the MS field. One of the main contributions offered here is thereby the focus on workers and managers as individuals, that is, a more human-centred view than what is typically the case in traditional MS literature. By adopting a human-centred view, particularly by focusing on the workers' perspective on the MS, this research has been able to dig deeper into the contingencies shaping the MS formation. The research thus shifts the focus on addressing these individuals from an aggregated group level to an individual level where their unique characteristics become an important factor for reaching strategic consensus on the MS in the operations function.

The individual perspective can be related to two aspects of the traditional MS literature:

(1) the link between workers and managers and
(2) the objective nature of the traditional literature.

First, the connection between the worker node and the manager node can be visualised and conceptualised by using the word "link", which is a common way to describe it in the MS literature (relate back to the "missing link" in Skinner, 1969). However, adding the individual perspective and identifying the factors relating to the workers and managers as individuals lead researchers a step closer to understanding the connection between the two nodes and possibly viewing it as a relationship. Such a relationship links not only the two nodes but also the personal relationships among the individuals constituting the nodes, hence a more reciprocal relationship evolves. From such a perspective, it is difficult to view some of these individuals as equal to machines (compare with the discussion on individuals as potentially non-hyper-rational actors (Croson et al., 2013)) . It is also difficult not to consider their opinions and experiences when the company's MS materialises. Hence, the focus on the individuals opens up a view of the MS where strategies are not only planned at the top and pushed down, as in the formulate-then-implement paradigm (Barnes, 2002), but also emerge through a realised pattern of strategic decisions (Mintzberg et al., 2009). Rather than a unilateral relationship, a

dyadic relationship starts to emerge as a prerequisite for a successful MS formation. Such a relationship is essential since the MS formation is an iterative process between workers and managers.

Second, this research aims to take a more voluntaristic view on human beings than what the traditional MS literature has done. Addressing the set of assumptions in Burrell and Morgan's (1985) analytical scheme makes it clear that the standpoint adopted in this research does not completely correlate with the one taken in the traditional MS literature. On the continuum between subjectivist and objectivist (Burrell & Morgan, 1985), the gap between the standpoints can be illustrated as the traditional view close to the right-hand side (the objectivist) and this research's aimed position towards the left (the subjectivist). This research is framed within the operations management domain and the MS field and is based on the presumptions within these bodies of knowledge. The traditional MS literature's strong emphasis on prescriptive models and frameworks has led to this research taking on a more objectivist approach than the focus on individuals might suggest within other theoretical fields. Further integration of the complementary concepts, including strategic consensus and the behavioural operations perspective, into the MS field "pulls" the field more to the left on the continuum. The move in this direction has not only been the outset for how this research is designed. It is also viewed as a necessary step for the research on the MS formation to bridge the missing link (Skinner, 1969) and to address the challenges faced by the European, particularly the Swedish, manufacturing industry. To increase the attractiveness of manufacturing tasks among the workforce and to face the demands placed by an increasingly knowledge-intensive manufacturing setting on its individual workers, it is essential to view them precisely as individuals. The human-centred view, which is implicit in the behavioural operations perspective, thereby responds well to the call for an enhanced conceptual understanding of the MS formation, characterised by a multi-dimensional approach (Barnes, 2002).

6.1.1 Awareness, perception and understanding

"Perception" is a core concept in this thesis. In section 2.5, "perceive" is defined as "the combined meaning of understand, grasp and comprehend". The usage of the perception concept is framed within operations management research and should be understood based on the behavioural operations perspective. "The goal of research in behavioral operations is not […] a deeper understanding of leadership, fairness, emotions or motivation. […] Rather, the goal […] is a deeper understanding of operations processes" (Croson et al., 2013, p. 1). In other words, rather than understanding the individual cognition, perception is used to understand the MS formation.

While the understanding of individual perceptions of MS dimensions has developed during this research process, so has the understanding of the concept of perception and how it links to similar entities, specifically, "awareness" and "understanding". Therefore, this section attempts to synthesise these entities. The analysis shows that while "awareness", "perception" and "understanding" may often be used interchangeably, there are differences among them. The entities do not differ in nature, but studying the interactions between managers and workers shows that the managers transfer information, thereby making the workers aware of it. Awareness characterises the explication of information. For example, a worker is aware of an

MS dimension when he or she has been informed about it. Once this initial step has occurred, the worker is given the possibility to internalise and interpret this information, thereby shaping a perception of the MS dimension. Hence, the perception takes place at the individual level. The understanding sequentially follows this internalisation. The worker should have been made aware of the dimension and have had a chance to develop his or her own perception of it before being expected to fully understand it. Furthermore, the understanding depends on the organisational context. The analysis in relation to RQ2 and RQ3 shows that, depending on the worker's location in the organisation, his or her understanding of the dimensions may vary. There is also a collective dimension to the understanding. This relates to the group understanding and to the influence of such overarching groupings, such as what the labour union may have. Therefore, understanding can be viewed as occurring at a more organisational level. The relationships among the three entities are framed within the interaction and communication between workers and managers (Figure 6.1). The figure illustrates how the individuals' understanding of the MS dimensions develops from their awareness, via their own perceptions.

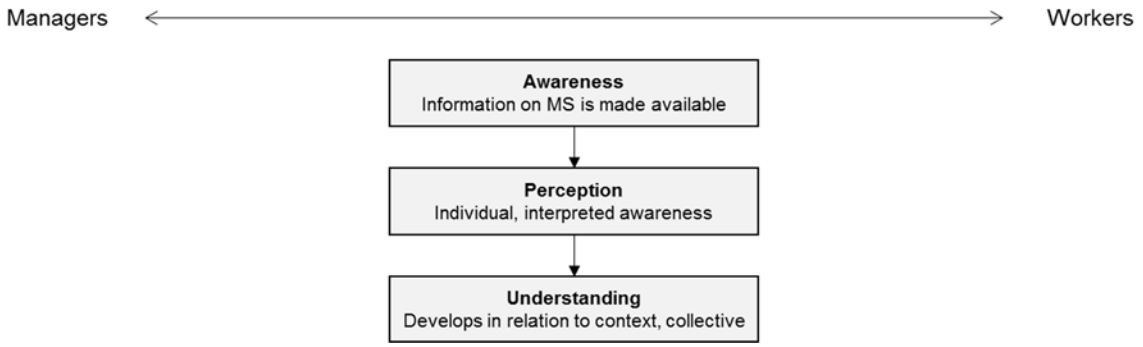

Figure 6.1. Awareness, perception and understanding

6.1.2 The complexity of the strategic consensus concept

Studying the level of strategic consensus concerning MS dimensions and connecting this to the context seems to be the first step to understanding the formation of the MS. The analysis shows that the concept of strategic consensus is more complex than what earlier research might indicate. Rather than being a static state, it is relatively dynamic and might be observed at different levels rather than as an either-or option. The nature of the strategic consensus concept is that in a company that shows high levels of strategic consensus, the individuals perceive a particular MS dimension in a similar way and assign it equal importance for the company. Hence, there is agreement within the organisation (Boyer & McDermott, 1999). The findings in this research support those of earlier studies (e.g., Boyer & McDermott, 1999; Sarmiento et al., 2008), specifically, strategic consensus is complicated to accomplish in the operations function. As this research has studied strategic consensus by also interviewing the individuals on the shop floor, a more detailed view on strategic consensus as a construct has emerged.

Even when strategic consensus seems to be present based on the interviewees' prioritisations as indicated on a Likert-type scale, their understanding of the underlying reasons for the

prioritisation is not shared. Hence, simply viewing the concept of strategic consensus as a static state will not capture the complexities associated with the individuals' underlying understanding of the MS dimension. If workers are made aware and understand the company's MS, the worker will more likely understand her or his impact on the company's competitiveness and endeavour to monitor that her or his decisions and actions are in line with the strategic direction agreed upon. Hence, as addressed by earlier research (e.g., Kellermanns et al., 2011), strategic consensus is based on the interrelations among the individual perceptions, the shared understanding and the commitment to which these lead.

To gain a deeper understanding of how the strategic consensus concept relates to the MS and supports the MS formation, this research has focused on two main areas:

(1) connecting the level of strategic consensus to individual perceptions of the MS dimensions and
(2) emphasising the contextual factors that may influence the level of strategic consensus.

Individual perceptions are central to strategic consensus. Boyer and McDermott (1999) are among the first to study this in an operations setting. The authors elaborate on the concept of strategic consensus in the operations function by comparing workers' and managers' perceptions of the MS. In relation to their findings, this research adds further empirical evidence to the concept of strategic consensus by adopting the workers on the shop floor as the unit of analysis. Rather than asking managers about workers' perceptions or using only quantitative methods to study the workers, the methodological choices here have aimed at acquiring a deeper understanding of the operating individuals. Patterns have thereby emerged where the perceptions are more closely related to, and differ among the different MS dimensions. The analysis indicates that the individual perceptions depend on how close an MS dimension is to the workers' daily tasks. In other words, the MS dimensions that are handled at the intra-organisational group level are easier for the workers to perceive.

Furthermore, the findings indicate that how workers and to some extent, managers, perceive the MS dimensions can be related to the influence of several contextual factors. This research has divided the context into a company's internal and external aspects. The primary focus has been on the internal context, which has been further divided into five individual contextual factors and six organisational contextual factors. The external context is mainly related to the interdependencies identified as related to the SMEs' position in the supply chain and dependence on their major customers' MS. Compared to earlier works (Barnes, 2002; Kellermanns et al., 2005; Kiridena et al., 2009; Mills et al., 1995; Pettigrew, 1992), this research has further elaborated on the contextual settings surrounding the individuals in the operations function. Earlier research has often focused simultaneously on the internal and external contexts, leading to somewhat narrow studies on the internal context in the operations function. The contextual factors have also most often been studied from a managerial perspective. In contrast to this traditional focus, this research has brought in the behavioural operations perspective and has viewed the individuals in the operations function as a heterogeneous group, enabling a deeper understanding of the individual contextual factors. The contextual factors have thereby not only been addressed at an organisational level, but they have also been related

to workers' characteristics as individuals. By adding this perspective, this research offers more tangible contextual factors for the managers to address in the MS formation process. For example, earlier research has focused in the individual's background, level of knowledge and work experiences as individual contextual factors (Barnes, 2002; Kellermanns et al., 2005; Pettigrew, 1992). This research has further developed these factors by emphasising that at the individual level not only the worker's willingness to learn is important to understand but also her or his formal group and position and informal group and sense of belonging in the organisation. These factors are also impacted by the possibilities for work enlargement provided by the company. The individuals background, knowledge and experiences are thereby partly shaped by the decisions made as to how the production system is organised, who is given the opportunity to develop their skills and how many of the workers are familiar with and can execute tasks throughout the entire production process.

6.2 Manufacturing strategy formation

Compared with earlier studies on the MS and strategic consensus, this research offers a different categorisation of the MS dimensions as belonging to three organisational levels:

- intra-organisational group level,
- inter-organisational level and
- upper intra-organisational level.

This division takes its starting point in how the MS dimensions are perceived by the individuals in the operations function, particularly by the workers on the shop floor. The logic is that the more closely related an MS dimension is to a worker's decisions made on a daily basis, the easier it is for the worker to understand the strategic implications of that dimension. This division significantly differs from the traditional division in the formulate-then-implement paradigm (Barnes, 2002), where the MS dimensions are structured according to competitive priorities and decision categories. The traditional division is primarily based on managerial structures at higher hierarchical levels in relation to the external environment, particularly the customer needs. Such a division of the MS dimensions does not necessarily offer the type of structure required to support the MS formation in the operations function.

The traditional MS often adheres to its implementation as a quick-fix final step that is made by introducing the strategy to the employees. For example, Skinner (1969) refers to the implementation as the introduction of programmes, indicating a view on strategies as intended (Mintzberg et al., 2009), as plans created by managers. Such implementation initiatives pose the risk that the workers may not develop enough awareness of the strategic goals set by the MS for them to gain a deep understanding. Rather than addressing the MS in detail and according to the structure suggested above, it is often introduced in the operations function through slogans, banners or pep talks (McDermott & Boyer, 1999), preventing the development of strategic consensus. Indeed, some of the MS process literature addresses the difficulties associated with the implementation phase (e.g., Marucheck et al., 1990; Mills, Neely, Platts, Richards, et al., 1998). However, this literature largely focuses on the importance of organisational culture and team work and to some extent, mentions the tools to use to communicate the MS. Such studies do not view the MS formation process from a holistic

standpoint that also incorporates the workers' difficulties in perceiving the different MS dimensions. In this research, the differences in how the dimensions are perceived also call attention to the differences in how the managers communicate them so that everyone in the operations function is given the possibility to understand and give her or his consent.

6.2.1 Materialisation of MS as a patterning process

This research offers a perspective on MS formation that suggests a more dynamic view on the materialisation, where MS is a "living document" based on an active development of strategic consensus. This perspective complements the emphasis made within the strategic management research as early as during the 1970s and 1980s. Particularly, Mintzberg (e.g., Mintzberg, 1978, 1987; Mintzberg & Waters, 1985) emphasised the need to view the strategy process from a "wider perspective" in order to incorporate how the strategies "actually take shape" into the understanding of strategy (Mintzberg & Waters, 1985, p. 257). According to Mintzberg (1978, p. 935), a strategy is considered to have formed when "a sequence of decisions in some area exhibits a consistency over time". Mintzberg (1987) and Mintzberg et al. (2009) referred to strategies in terms of being deliberate or emergent. Intended strategies or plans can result in either deliberate (i.e., realised) or unrealised strategies. However, there is also the third case of the emergent strategy in which a pattern is realised, leading to a realised strategy without originally being intended. Despite this reasoning in the strategic management literature, the MS literature has continued to miss out on the opportunities offered by the perspective where strategies are emergent, realised through patterns of decisions.

The perspective offered here thereby contrasts the traditional static view where the MS is given beforehand by managers and indicates how the individuals in the operations function are supposed to observe the world. For example, Skinner's (1969) view of MS as being implemented through programmes with managerial use of control functions assigns the responsibility for the MS to the delegating managers, not to the workers performing the tasks on the shop floor. This implies a one-sided view on the individuals in the operations function. The workers are not mentioned; they appear as neither important for the actual decision-making nor participants in or receivers of these implementation programmes. However, the analysis performed here indicates that the MS formation may be viewed from a more dynamic perspective, where the patterns in the decisions are central. Therefore, a "patterning process" is proposed. The chosen word, "patterning", is not completely comprehensive. During the research process, the usage of "materialisation" to describe this process has also been considered. However, such terminology cannot be grounded in theory, whereas "patterning" can be directly derived from the vocabulary associated with the emergence of "patterns" in the MS formation (e.g., Marucheck et al., 1990; Mintzberg, 1978).

The view offered here, of MS formation as a patterning process, is characterised by an interaction between the MS and strategic consensus (see Figure 6.2). In the patterning process, the MS is not necessarily formed through a management formulation which is later implemented on the shop floor through some workshops or information meetings. On the contrary, the MS is formed through the patterns that can be observed over time in the decisions made and actions taken by the individuals in the operations function, including the workers on the shop floor. The patterning process can be viewed as building further on the realised strategy

perspective by incorporating the emergent strategy perspective (Barnes, 2002; Mintzberg, 1978) to the MS formation. Furthermore, the patterning process builds on the assumption that companies and organisational structures do not only consist of assets and resources. Behind these concepts there are individuals with their own perceptions and beliefs that may influence the way they interpret strategic priorities and directions. Figure 6.2 illustrates how the patterning process forms in three "steps". First, the iterations between MS content and process. Second, the iterations between strategic consensus content and process. Third, the interrelationship between these two iterations, as illustrated by the infinity symbol.

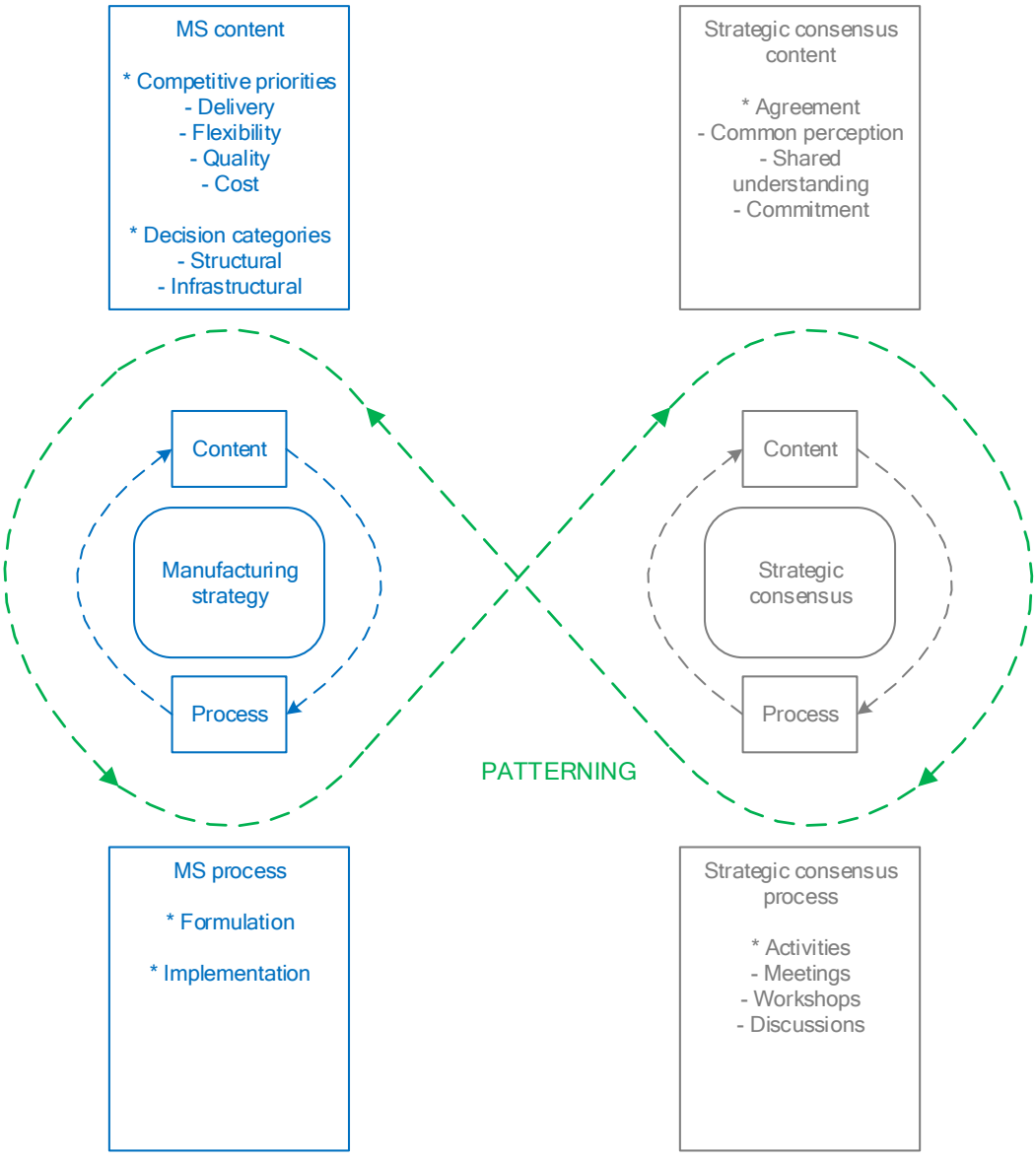

Figure 6.2 The patterning process based on traditional MS concepts

The patterning process as it is described in Figure 6.2, however, builds on earlier research's conceptualisation of MS and strategic consensus. This implies that the patterning process is based on concepts which traditionally do not explicate interactions or iterations as part of the MS formation. The conventional division of MS into content and process is not enough to allow

for an iterative process. Therefore, the findings in this research regarding the development of individuals' understanding of MS dimensions as being sequential and building on iterations among awareness, perception and understanding adds another layer to the patterning process. This layer is illustrated in Figure 6.3.

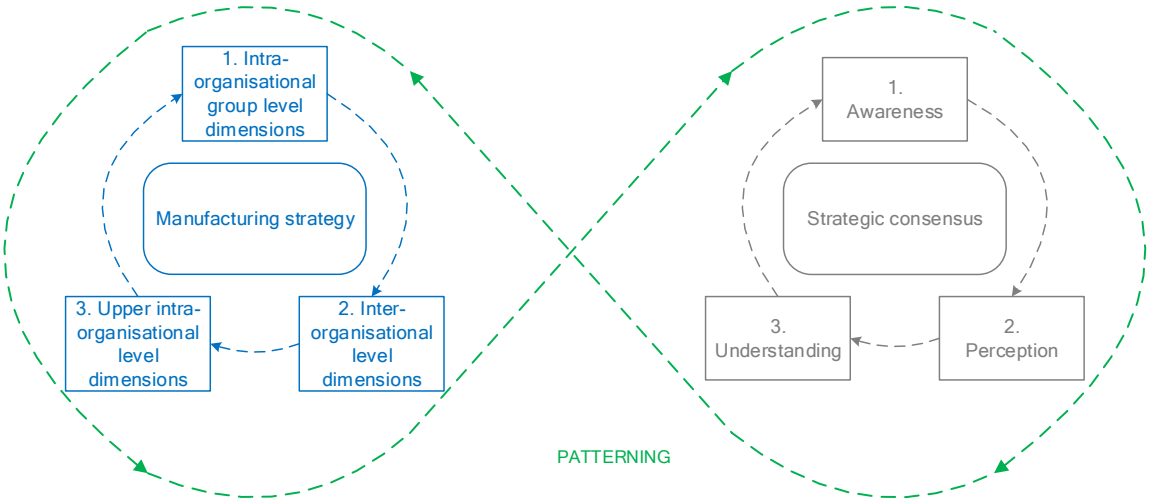

Figure 6.3. The patterning process based on the findings in this research

The patterning process as it is illustrated in Figure 6.3, based on the findings in this research, consists of four steps. First, the formation of the MS in the operations function is based on the proposed division of the MS dimensions into three main categories, depending on the organisational level (the left side of Figure 6.3). By starting with the dimensions with which the individuals are most familiar, high levels of strategic consensus are more easily arrived at as agreement is more easily reached on those MS dimensions where the workers already have a developed understanding. Second, the development of strategic consensus among the individuals in the operations function is based on the awareness-perception-understanding process (the right side of Figure 6.3) where strategic consensus is reached when the individuals have a shared understanding of the MS.

Third, the MS should form in the operations function by incorporating a perspective that considers strategic consensus and the MS as intertwined and part of one MS patterning process (illustrated by the infinity symbol in Figure 6.3), where strategic consensus is reached at each

"development stage". The strategic consensus development and the MS formation interact, where in each loop of the MS, strategic consensus "builds up", decreases and then builds up again. The development of strategic consensus "drives" the MS forward (from an internal perspective). As earlier research (e.g., Kellermanns et al., 2005) suggests, high levels of strategic consensus are not required at every step of the MS formation, but low levels of strategic consensus might occasionally be needed, such as in new developments of the production process. For example, it could be sufficient for the individuals in the operations function to have high levels of strategic consensus regarding how and when to work with continuous improvements and what role such efforts play in the MS formation. However, when improvement work is performed, the level of strategic consensus can be low to allow for the elaboration of diverse suggestions by the individuals. Related to the level of strategic consensus and how individual contextual factors influence this, the factor related to individual *personal interests and willingness to learn* is associated with a twofold problem. Some workers desire to learn more but are not pushed or helped in doing so. Other workers do not want to learn and are therefore unreceptive to the information presented. However, their actions on the shop floor and day-to-day decisions impact the MS formation and manufacturing execution. In this regard, the MS should form by considering individual characteristics and addressing these individuals differently. Even if some workers will always be willing to learn more and make sure to know more, there should be a minimum level of understanding for the MS and its implications throughout the shop floor.

Fourth, the MS should form in the operations function by focusing on a reciprocal (rather than unilateral) relationship between workers and managers. This logic is especially prevalent from a communication perspective where the means of communication are central enablers for consistent decision-making. It is important that all individuals in the operations function are aware of which channels are used for the MS communication to ensure that the same information is shared with everyone. From a communication perspective, senders and receivers should have a reciprocal view on what knowledge and personal experiences the other entity uses to encode and decode the messages. Such an approach, especially if it incorporates the behavioural operations perspective (Croson et al., 2013), calls for a dyadic relationship where the information flows among individuals, and workers and managers simultaneously engage in sending and receiving messages. A reciprocal relationship can only be achieved when the individuals' underlying reasons for the MS dimensions are understood among colleagues, both within and between hierarchical levels, and when the individuals are engaged in a dialogue-based approach. To accomplish this goal, the people should view one another as individuals, not as homogeneous groups.

The reciprocal view on the relationship between the workers and the managers in the operations function can be linked to the discussion about the top-down versus the bottom-up perspective on the MS formation. Rather than contradicting these two perspectives, the patterning process allows for an iterative process. Kim et al. (2014, p. 463) refer to such an iteration between the top and the bottom levels as "partly induced by top-down planning and partly emerg[ing] from bottom-up learning". This perspective on the hierarchical levels and on their responsibilities for the MS formation indicates that managers always have greater accountability than the workers

do. As the managers always bear the formal responsibility for the activities in the organisation, this division of responsibility is most often valid. However, this research and the introduction of the patterning process for the MS formation should be viewed as representing more informal responsibilities. The patterning process might be more "manager-led", as also indicated by the empirical evidence. On the other hand, it might also be "worker-led". With such a view, every individual in the operations function is equally important for a successful MS formation. The patterning process view presented in this research contributes in three ways to the research on the MS formation, as follows:

(1) *By explaining the perception range within the hierarchical levels*. This research has shown the range in perceptions among the individuals within the same hierarchical level. This empirical evidence emphasises the need for the MS formation to take place at an individual level, rather than at a group level, which indicates homogeneity among the members.
(2) *By re-defining the hierarchical levels included in the MS formation*. Compared with earlier research (cf. Skinner, 1969), the view presented in this research defines a different "bottom". Therefore, the missing link between the corporate and the manufacturing levels is expanded to include a new bottom – the workers instead of the manufacturing managers.

(3) *By detailing the activities in the MS formation*. This research has suggested that the development of patterns in decisions and actions be viewed as an activity in itself, that is, the actual "patterning". This implies an inclusive, iterative and informed process. Everyone in the operations function is included. The process happens over a period of time, and the individuals in the two hierarchical levels inform each other. This means that the managers acquire a greater understanding of what is happening on the shop floor, while the workers gain better understanding of the company's relation to the external environment.

6.3 Managerial implications

To improve the patterning process in the operations function, it is critical for managers to understand the complexities of everyday work on the shop floor and how difficult it is for workers to fully understand the company's MS. This research suggests three approaches that managers in the operations function can adopt to enhance the MS formation in their company:

(1) *MS formation should be driven by a dialogue-based approach*. Incorporating long-term perspectives into daily meetings will make it possible for the individuals in the operations function to comprehend and address other individuals' underlying reasoning. The formation then becomes dialogue-based. This requires the operations function to allow reciprocal relationships among the individuals working there.

(2) *In this dialogue-based approach managers must make use of a range of communication tactics*. The way the communication within the operations function occurs influences the MS formation. Many of the communication channels used in the studied companies

do not facilitate strategic discussions. Furthermore, given that workers seem to find it easier to perceive some MS dimensions (such as product quality and factory layout) than others (such as production costs and educational possibilities), manufacturing managers should consider changing their approach in developing and communicating their MS. This research calls for managers to direct their communication by using a variety of tactics, depending on which MS dimension is being addressed and which individuals need to perceive the information. Managers should therefore focus on building commitment to the MS dimensions where shared understanding already exists. Hopefully, this commitment can eventually incorporate the dimensions that still lack shared understanding. Group and monthly meetings may be more effective as the means of MS communication if they focus on "the bigger picture" and how individual efforts on the shop floor entail consequences for the entire company's competitive edge.

(3) *Further, the dialogue-based approach should not be bounded only to the internal perspective.* Managers of subcontractor SMEs encounter the additional challenge of constantly relating to external parties' changes of plans and strategic objectives. To manage these rapid shifts, it is even more important in this type of organisation to ensure that the individuals in the operations function have shared understanding, common perceptions and a mutual commitment to the MS. Therefore, managers should help workers understand the external context.

7 Conclusions

This research has developed the workers' perspective on the MS formation by *investigating how the individuals in the operations function perceive the MS in order to understand how these individuals are involved in the MS formation*. In the MS literature, there are indicators of a deterministic view of human nature. Due to this standpoint, individuals on the shop floor are often regarded as manufacturing resources. To address this and to further develop the focus on individuals within the operations function, this research has incorporated the behavioural operations perspective, strategic consensus concept and communications theory into the traditional MS literature. Through an analysis based on the Mintzbergian viewpoint (e.g., Mintzberg et al., 2009), the traditional MS literature has been positioned within a general strategic management framework. This positioning shows that many streams already exist within the strategic management literature, from which MS researchers could draw inspiration.

Four RQs have been used to capture the purpose of this research. The answers to these RQs reveal that (1) strategic consensus among the individuals in the operations function develops at different levels and can be described as a dynamic process, (2) the individuals have their own perceptions of the MS, but these perceptions follow a step-wise sequence of the MS dimensions where these are grouped according to their organisational level, (3) strategic consensus on MS is influenced by individual and organisational contextual factors as well as by the external context and (4) the formation of MS in the operations function might be hindered by closed communication loops and short-term perspectives, and enabled by work with improvement suggestions and managers' presence at the shop floor. By presenting empirical evidence that identifies the MS dimensions along organisational levels and emphasises the need for viewing strategic consensus at different levels, this research helps structure the MS formation in manufacturing companies. By introducing the "patterning process", the research illustrates the complexities involved with the MS formation and offers an alternative structure to the prevailing formulate-then-implement paradigm. The patterning process is characterised by a perspective on MS formation where strategic consensus and the MS are considered as intertwined and developing through iterations where strategic consensus "drives" the MS forward.

7.1 Limitations and implications for further research

The principal method of data collection was the semi-structured interview. This approach assured a certain depth in the data at the same time as it allowed for the study of several organisations. However, the relatively short time spent with the interviewees can be considered a drawback for capturing their perceptions of the MS. Using multiple in-depth interviews and direct observations for a longer time period would have captured more of the individuals' perceptions. As the theoretical underpinnings for the patterning process have been established through this research, further investigations on this process would benefit from applying a more ethnographic research approach. This implies that future research should focus on researchers being present at the shop floor, preferably through long time periods of participative observations.

Applying a workers' perspective to the research on MS is one of this research's main contributions. It has opened up for new perspective on how to approach MS formation at the shop floor. However, taking the workers' perspective, especially in an SME setting, also implies that some types of strategic decisions have not been taken into consideration, for example outsourcing or product mix decisions. These limitations to the scope of the research indicate that the research can be complemented with future studies of workers' perceptions of such strategic decisions on more "aggregated" levels. This implies that future research shall use a "wider" definition of MS, and also include the connection between the corporate strategy and the MS in the studied phenomenon.

Related to the companies' roles as subcontractor SMEs, there are some implications for the applicability of the findings. The initial idea of studying subcontractors to gain a clearer overview of the companies' MS is in some ways limiting since not having their own products decreases the company's control of the long-term planning. Hence, the MS becomes quite dependent on the major customers' strategies and planning. These interrelationships among the MSs existing in different companies in the same supply chain would be interesting to study in future research. Furthermore, the SME focus in the majority of the studies in this research might, similar to the workers' perspective, have limited the findings as SMEs and large companies have different "complexity levels" inherent in their MSs. This implies that further research shall focus on (1) the study of MS formation in the entire supply chain and (2) also target larger organisations.

References

Acur, N., Gertsen, F., Sun, H. and Frick, J. (2003), "The formalisation of manufacturing strategy and its influence on the relationship between competitive objectives, improvement goals, and action plans", *International Journal of Operations & Production Management,* Vol. 23, No. 10, pp. 1114-1141.

Anderson, J. C., Cleveland, G. and Schroeder, R. G. (1989), "Operations strategy: a literature review", *Journal of Operations Management,* Vol. 8, No. 2, pp. 133-158.

Barnes, D. (2002), "The complexities of the manufacturing strategy formation process in practice", *International Journal of Operations & Production Management,* Vol. 22, No. 10, pp. 1090-1111.

Barney, J. (1991), "Firm resources and sustained competitive advantage", *Journal of Management,* Vol. 17, No. 1, pp. 99-120.

Barney, J. (2001), "Resource-based theories of competitive advantage: A ten-year retrospective on the resource-based view", *Journal of Management,* Vol. 27, No. 6, pp. 643-650.

Barney, J., Wright, M. and Ketchen, D. J. (2001), "The resource-based view of the firm: Ten years after 1991", *Journal of Management,* Vol. 27, No. 6, pp. 625-641.

Bendoly, E., Donohue, K. and Schultz, K. L. (2006), "Behavior in operations management: Assessing recent findings and revisiting old assumptions", *Journal of Operations Management,* Vol. 24, No. 6, pp. 737-752.

Berlin, C., Dedering, C., Rist Jónsdóttir, G. and Stahre, J. (2013). *Social Sustainability Challenges for European Manufacturing Industry: Attract, Recruit and Sustain.* Paper presented at the Proceedings of the Advances in Production Management Systems conference (APMS), Penn State, PA, USA.

Berlo, D. K. (1960), *The Process of Communication: An introduction to theory and practice,* , Holt, Rinehart and Winston New York.

Bhat, J. S. and Kumar, V. (2004), "A structured approach to knowledge management in SMEs: towards a successful manufacturing strategy", *International Journal of Business Performance Management,* Vol. 6, No. 3, pp. 233-244.

Boyer, K. K. and Lewis, M. W. (2002), "Competitive priorities: investigating the need for trade‐offs in operations strategy", *Production and Operations Management,* Vol. 11, No. 1, pp. 9-20.

Boyer, K. K. and McDermott, C. (1999), "Strategic consensus in operations strategy", *Journal of Operations Management,* Vol. 17, No. 3, pp. 289-305.

Brown, S. and Blackmon, K. (2005), "Aligning manufacturing strategy and business‐level competitive strategy in new competitive environments: the case for strategic resonance", *Journal of Management Studies,* Vol. 42, No. 4, pp. 793-815.

Bryman, A. and Bell, E. (2011), *Business research methods*, Oxford University Press, New York, USA.

Burrell, G. and Morgan, G. (1985), *Sociological paradigms and organisational analysis* Ashgate Publishing Limited, Hampshire, England.

Cagliano, R. and Spina, G. (2002), "A comparison of practice-performance models between small manufacturers and subcontractors", *International Journal of Operations & Production Management,* Vol. 22, No. 12, pp. 1367-1388.

Conner, K. R. (1991), "A historical comparison of resource-based theory and five schools of thought within industrial organization economics: do we have a new theory of the firm?", *Journal of Management,* Vol. 17, No. 1, pp. 121-154.

Croson, R., Schultz, K., Siemsen, E. and Yeo, M. L. (2013), "Behavioral operations: the state of the field", *Journal of Operations Management,* Vol. 31, No. 1–2, pp. 1-5.

Dangayach, G. and Deshmukh, S. (2001), "Manufacturing strategy: literature review and some issues", *International Journal of Operations & Production Management,* Vol. 21, No. 7, pp. 884-932.

Dubois, A. and Gadde, L.-E. (2002), "Systematic combining: an abductive approach to case research", *Journal of Business Research,* Vol. 55, No. 7, pp. 553-560.

Ekonomifakta. (2013). Agricultural toward Industrial Retrieved 20150915, 2015, from http://www.ekonomifakta.se/en/Swedish-economic-history/Agricultural-toward-Industrial/

Ekonomifakta. (2015). Export och import över tid (Export and import over time) Retrieved 20150914, 2015, from http://www.ekonomifakta.se/sv/Fakta/Ekonomi/Utrikeshandel/Export-och-import-over-tid/

European Commission. (2005), *The new SME definition - User guide and model declaration*, Enterprise and Industry Publications.

Feger, A. L. R. (2014), "Creating cross-functional strategic consensus in manufacturing facilities", *International Journal of Operations & Production Management,* Vol. 34, No. 7, pp. 941-970.

Flick, U. (2009), *An introduction to qualitative research*, SAGE Publications Limited, London, England.

Floyd, S. W. and Wooldridge, B. (1992), "Managing strategic consensus: the foundation of effective implementation", *Academy of Management Executive,* Vol. 6, No. 4, pp. 27-39.

Furrer, O., Thomas, H. and Goussevskaia, A. (2008), "The structure and evolution of the strategic management field: A content analysis of 26 years of strategic management research", *International Journal of Management Reviews,* Vol. 10, No. 1, pp. 1-23.

Gagnon, M. A., Jansen, K. J. and Michael, J. H. (2008), "Employee alignment with strategic change: a study of strategy-supportive behavior among blue-collar employees", *Journal of Managerial Issues,* Vol. 20, No. 4, pp. 425-443.

Gino, F. and Pisano, G. (2008), "Toward a theory of behavioral operations", *Manufacturing & Service Operations Management,* Vol. 10, No. 4, pp. 676-691.

Halldórsson, Á. and Aastrup, J. (2003), "Quality criteria for qualitative inquiries in logistics", *European Journal of Operational Research,* Vol. 144, No. 2, pp. 321-332.

Hayes, R., Pisano, G., Upton, D. and Wheelwright, S. (2005), *Operations, strategy, and technology: pursuing the competitive edge*, Wiley Hoboken, NJ.

Hayes, R. and Wheelwright, S. (1984), *Restoring our competitive edge: competing through manufacturing*, John Wiley & Sons, USA.

Heizer, J. and Render, B. (2011), *Operations management, Global edition*, Pearson Education, Inc., New Jersey, USA.

Hill, A. and Hill, T. (2012), *Operations management* (Third edition ed.), Palgrave Macmillan, Hampshire, England.

Hill, T. (1986), "Teaching manufacturing strategy", *International Journal of Operations & Production Management,* Vol. 6, No. 3, pp. 10-20.

Hill, T. (1994), *Manufacturing strategy: text and cases* (2 ed.), Irwin/McGraw-Hill, Boston, Massachusetts, USA.

Ho, C.-F. (1996), "A contingency theoretical model of manufacturing strategy", *International Journal of Operations & Production Management,* Vol. 16, No. 5, pp. 74-98.

Holmberg, I. and Åkerblom, S. (2006), "Modelling leadership—Implicit leadership theories in Sweden", *Scandinavian journal of management,* Vol. 22, No. 4, pp. 307-329.

Hudson, M., Smart, A. and Bourne, M. (2001), "Theory and practice in SME performance measurement systems", *International Journal of Operations & Production Management,* Vol. 21, No. 8, pp. 1096-1115.

Hudson Smith, M. and Smith, D. (2007), "Implementing strategically aligned performance measurement in small firms", *International Journal of Production Economics,* Vol. 106, No. 2, pp. 393-408.

IMSS. (2015). The International Manufacturing Strategy Survey Retrieved 2015-10-29, from http://www.manufacturingstrategy.net/

Kathuria, R., Joshi, M. P. and Porth, S. J. (2007), "Organizational alignment and performance: past, present and future", *Management Decision,* Vol. 45, No. 3, pp. 503-517.

Kathuria, R., Porth, S. and Joshi, M. (1999), "Manufacturing priorities: do general managers and manufacturing managers agree?", *International Journal of Production Research,* Vol. 37, No. 9, pp. 2077-2092.

Kellermanns, F. W., Walter, J., Floyd, S. W., Lechner, C. and Shaw, J. C. (2011), "To agree or not to agree? A meta-analytical review of strategic consensus and organizational performance", *Journal of Business Research,* Vol. 64, No. 2, pp. 126-133.

Kellermanns, F. W., Walter, J., Lechner, C. and Floyd, S. W. (2005), "The lack of consensus about strategic consensus: advancing theory and research", *Journal of Management,* Vol. 31, No. 5, pp. 719-737.

Kim, Y. H., Sting, F. J. and Loch, C. (2014), "Top-down, bottom-up, or both? Toward an integrative perspective on operations strategy formation", *Journal of Operations Management,* Vol. 32, No. 7-8, pp. 462-474.

Kiridena, S., Hasan, M. and Kerr, R. (2009), "Exploring deeper structures in manufacturing strategy formation processes: a qualitative inquiry", *International Journal of Operations & Production Management,* Vol. 29, No. 4, pp. 386-417.

Kjellberg, A. (2015). Kollektivavtalens täckningsgrad samt organisationsgraden hos arbetsgivarförbund och fackförbund (Sociology, D. o., Trans.). Lund, Sweden: Lund University, Faculty of Social Sciences.

Kor, Y. Y. and Mahoney, J. T. (2004), "Edith Penrose's (1959) Contributions to the Resource‐based View of Strategic Management", *Journal of Management Studies,* Vol. 41, No. 1, pp. 183-191.

Leong, G. K., Snyder, D. and Ward, P. T. (1990), "Research in the process and content of manufacturing strategy", *Omega,* Vol. 18, No. 2, pp. 109-122.

Liker, J. K. and Meier, D. P. (2007), *Toyota talent: developing your people the Toyota way*, McGraw-Hill New York, USA.

Loch, C. H. and Wu, Y. (2007), *Behavioral operations management* (Vol. 1), Now Pub, Hanover, USA.

Lowendahl, B. R. and Haanes, K. (1997). The unit of activity: A new way to understand competence building and leveraging. In Sanchez, R. andHeene, A. (Eds.), *Strategic learning and knowledge management*: John Wiley & Sons Ltd.

Lowson, R. H. (2003), "The nature of an operations strategy: combining strategic decisions from the resource-based and market-driven viewpoints", *Management Decision,* Vol. 41, No. 6, pp. 538-549.

Löfving, M. (2009). *Enhancing competitiveness in small and medium-sized manufacturing enterprises-A study of the manufacturing situation of subcontractors in Sweden.* Licentiate, Chalmers University of Technology, Göteborg.

Marucheck, A., Pannesi, R. and Anderson, C. (1990), "An exploratory study of the manufacturing strategy process in practice", *Journal of Operations Management,* Vol. 9, No. 1, pp. 101-123.

Maxwell, J. A. (2005), *Qualitative research design: An interactive approach* (Vol. 42), Sage Publications Thousand Oaks, USA.

McDermott, C. and Boyer, K. K. (1999), "Strategic consensus: Marching to the beat of a different drummer?", *Business Horizons,* Vol. 42, No. 4, pp. 21-28.

Meredith, J. R. and Shafer, S. M. (2013), *Operations management: international student version* (Fifth edition ed.), John Wiley & Sons Singapore Pte. Ltd., Singapore.

Mills, J., Neely, A., Platts, K. and Gregory, M. (1998), "Manufacturing strategy: a pictorial representation", *International Journal of Operations & Production Management,* Vol. 18, No. 11, pp. 1067-1085.

Mills, J., Neely, A., Platts, K., Richards, H. and Gregory, M. (1998), "The manufacturing strategy process: incorporating a learning perspective", *Integrated Manufacturing Systems,* Vol. 9, No. 3, pp. 148-155.

Mills, J., Platts, K. and Gregory, M. (1995), "A framework for the design of manufacturing strategy processes: a contingency approach", *International Journal of Operations & Production Management,* Vol. 15, No. 4, pp. 17-49.

Miltenburg, J. (2005), *Manufacturing strategy: how to formulate and implement a winning plan*, Productivity Press, New York, USA.

Mintzberg, H. (1978), "Patterns in strategy formation", *Management Science,* Vol. 24, No. 9, pp. 934-948.

Mintzberg, H. (1987), "The Strategy Concept I: Five Ps For Strategy", *California Management Review,* Vol. 30, No. 1, pp. 11-24.

Mintzberg, H., Ahlstrand, B. and Lampel, J. (2009), *Strategy safari: the complete guide through the wilds of strategic management* Pearson, Harlow, UK.

Mintzberg, H., Lampel, J., Quinn, J. B. and Ghoshall, S. (2003), *The strategy process: concepts, contexts, cases*, Pearson Education, Harlow, England.

Mintzberg, H. and Waters, J. A. (1985), "Of strategies, deliberate and emergent", *Strategic Management Journal,* Vol. 6, No. 3, pp. 257-272.

Nag, R., Hambrick, D. C. and Chen, M. J. (2007), "What is strategic management, really? Inductive derivation of a consensus definition of the field", *Strategic Management Journal,* Vol. 28, No. 9, pp. 935-955.

Oxford Dictionary. (2015). Oxford Dictionaries: language matters Retrieved 20150417, 2015, from http://www.oxforddictionaries.com/definition/english/communication

Pettigrew, A. M. (1992), "The character and significance of strategy process research", *Strategic Management Journal,* Vol. 13, No. S2, pp. 5-16.

Pilkington, A. and Meredith, J. (2009), "The evolution of the intellectual structure of operations management—1980–2006: A citation/co-citation analysis", *Journal of Operations Management,* Vol. 27, No. 3, pp. 185-202.

Priem, R. L. and Butler, J. E. (2001), "Is the resource-based" view" a useful perspective for strategic management research?", *Academy of management review,* Vol. 26, No. 1, pp. 22-40.

Produktionslyftet. (2013a, 2013-11-29). Från kris och krig till värdefull samverkan (From crisis and war to valuable collaboration) Retrieved 2013-12-22, 2013, from http://www.produktionslyftet.se/news/fran-kris-och-krig-till-vardefull-samverkan1-1385710889.html

Produktionslyftet. (2013b). The production leap: an 18-month journey of change Retrieved 2013-12-22, 2013, from http://www.produktionslyftet.se/filer/docs/130326_presentation_eng.pdf

Rangone, A. (1999), "A resource-based approach to strategy analysis in small-medium sized enterprises", *Small Business Economics,* Vol. 12, No. 3, pp. 233-248.

Rapert, M. I., Velliquette, A. and Garretson, J. A. (2002), "The strategic implementation process: evoking strategic consensus through communication", *Journal of Business Research,* Vol. 55, No. 4, pp. 301-310.

Saad, G. H. and Siha, S. (2000), "Managing quality: critical links and a contingency model", *International Journal of Operations & Production Management,* Vol. 20, No. 10, pp. 1146-1164.

Santos, F. M. and Eisenhardt, K. M. (2005), "Organizational boundaries and theories of organization", *Organization Science,* Vol. 16, No. 5, pp. 491-508.

Sarmiento, R., Knowles, G. and Byrne, M. (2008), "Strategic consensus on manufacturing competitive priorities: a new methodology and proposals for research", *Journal of Manufacturing Technology Management,* Vol. 19, No. 7, pp. 830-843.

Schraeder, M., Swamidass, P. M. and Morrison, R. (2006), "Employee involvement, attitudes and reactions to technology changes", *Journal of Leadership & Organizational Studies,* Vol. 12, No. 3, pp. 85-100.

Shannon, C. E. and Weaver, W. (1949), *The mathematical theory of communication*, University of Illinois Press, Urbana.

Skinner, W. (1969), "Manufacturing - missing link in corporate strategy", *Harvard Business Review,* Vol. 47, No. 3, pp. 136-145.

Skinner, W. (1974), "The focused factory", *Harvard Business Review,* Vol. 52, No. 3, pp. 113-121.

Slack, N., Chambers, S. and Johnston, R. (2010), *Operations management* (6 ed.), Pearson Education, Harlow, England.
Slack, N. and Lewis, M. (2008), *Operations strategy* (2 ed.), Pearson Education, Harlow, England.
Slack, N. and Lewis, M. (2011), *Operations strategy* (3 ed.), Pearson Education, Harlow, England.
Sousa, R. and Voss, C. A. (2008), "Contingency research in operations management practices", *Journal of Operations Management,* Vol. 26, No. 6, pp. 697-713.
Stevenson, W. J. (2012), *Operations management: Theory and Practice, Global Edition*, McGraw-Hill Education, UK.
Swamidass, P. M. and Newell, W. T. (1987), "Manufacturing strategy, environmental uncertainty and performance: a path analytic model", *Management Science,* Vol. 33, No. 4, pp. 509-524.
Svenskt Näringsliv. (2003). Sökes: Attraktiva arbetsgivare (Wanted: attractive employers). Stockholm, Sweden: Svenskt Näringsliv.
Svenskt Näringsliv. (2010). Smått om små företag (Short information about small firms) (pp. 1-16). Stockholm.
Svenskt Näringsliv. (2015). About us: Svenskt Näringsliv.
Taylor, A. and Taylor, M. (2009), "Operations management research: contemporary themes, trends and potential future directions", *International Journal of Operations & Production Management,* Vol. 29, No. 12, pp. 1316-1340.
Vinnova. (2013, 2013-06-10). Management and work organisation renewal Retrieved 2013-12-22, 2013, from http://www.vinnova.se/en/Our-activities/Production-Materials-and-Natural-Resources/Management-and-Work-Organisation-Renewal/
Vinnova. (2015, 2015-05-20). Made in Sweden 2030: agenda Retrieved 2015-08-08, 2015, from http://www.vinnova.se/sv/Var-verksamhet/Gransoverskridande-samverkan/Samverkansprogram/Strategiska-innovationsomraden/Strategiska-innovationsagendor/Forteckning-agendor-2013/Produktion/
Voss, C. (1995), "Alternative paradigms for manufacturing strategy", *International Journal of Operations & Production Management,* Vol. 15, No. 4, pp. 5-16.
Yin, R. K. (2009), *Case study research: Design and methods* (Vol. 5), SAGE Publications, Thousand Oaks, USA.

Appendices

Appendix 1: Interview guide Study 1

Intervjuguide

Under observationerna

- Be att få förklarat hur produktionen ser ut, vad som är innan och vad som kommer efter.
- Vad det är för typ av produkt, vad den används till.
- Hur organisationen ser ut, vem som kommunicerar med vem.
- Om det uppstår problem, vem pratar man med då?
- Vet man vad de andra på företaget gör.

Bakgrundsfrågor

- Vilken är din nuvarande befattning?
- Vilken avdelning, grupp tillhör du?
- Hur länge har du varit anställd i företaget?
- Utbildning?
- Tidigare yrkeserfarenhet?

Konkurrensfaktorer

- Kvalitet
    - Vilka krav finns det på den här produkten?
    - Vem är slutkund? (Extern kund)
    - Hur pålitlig är den här maskinen, blir det ofta fel? (Conformance quality)
- Snabbhet
    - Vet du hur lång tid det tar för er att göra en produkt?
        - Från kundbehov till leverans
        - Från start produktion till färdig produkt
    - Hur lång tid tar det för dig att göra en produkt?
- Pålitlighet
    - Vet du vad ni har för leveranslöften?
        - Är de långa eller korta?
        - Håller ni dem ofta?
    - Har era kunder några särskilda krav på leveranstider? Vet du vad de kraven är?
    - Den som är efter dig i kedjan, vad har den för krav på leveranstid?
        - Har ni en buffert emellan er?
    - Ställer du några särskilda krav på den som är innan dig?

- Flexibilitet
    - Hur många olika produkter kan du göra här?
        - Hur många olika metoder kan du använda?
    - Hur lätt är det för dig att byta mellan olika metoder/produkter?
        - Går det fort?
        - Klarar du det själv?
    - Vet du hur ofta ni ändrar era produkter, eller tar fram nya?
    - Hur många olika varianter har ni?
        - Hur många olika varianter kan du göra?
    - Hur lätt är det för er att ändra batchstorlek/produktionsmängden?
    - Hur flexibla är ni i att ändra ett leveransdatum?
        - Om det är planerat?
        - Om produktion har börjat?
- Kostnad
    - Vad vet du om era kostnader?
        - För personal
        - För fastigheterna
        - För el, uppvärmning mm
        - För maskiner
        - För råmaterial
        - Företagets lån och finansiella situation

Beslutskategorier

- ”Capacity”
    - Hur ofta jobbar du över?
        - Vad beror det på?
    - Hur ofta får du göra andra arbetsuppgifter?
    - Händer det att ni har för lite att göra?
- ”Supply network”
    - Vart tar produkten vägen när du är klar med den? (Intern kund)
    - Går produkten till ett lager eller direkt till kund?
    - Vem är före dig i kedjan; vem får du material ifrån?
    - Får du rätt saker?
        - I rätt tid och med rätt kvalitet?
- ”Process technology”
    - Vet du hur den här maskinen fungerar?
        - Vet du hur andra maskiner fungerar här?
    - Vet du vem som har byggt maskinen?
    - Vem är det som sköter underhållet?
        - Kan du göra visst underhåll själv?
    - Utnyttjar ni all utrustning till max, eller kan man öka prestandan?
- ”Development and organization”

        - Hur länge har du arbetat här?
        - Har du någon formell utbildning?
        - Finns det något ”utbildningsprogram”?
            - Går ni kurser ibland?
    - *Sociala faktorer och trivsel (HR)*
        - Hur trivs du här?
        - Har ni sociala aktiviteter tillsammans?
            - På fritiden?
            - Organiserade av företaget?
    - *Information från ledning (Organisation)*
        - Hur får du information om vad som sker på företaget?
        - Har du daglig kontakt med arbetsledare/chef?
        - Vad vet du om långsiktiga planer för företaget?
    - *Förslagsverksamhet (Organisation)*
        - Om du vill förändra något hur går du då tillväga?
            - Vem pratar du med?
        - Hur bemöts den informationen?

Appendix 2: Literature searches in Study 2

Date	Database	Search criteria	Hits
2012-06-04	Emerald	Content = Journals Searchterm: people OR individ* OR actor* in all except full text AND "manufacturing strategy" in all except full text	17
2012-06-04	Scopus	Searchterm: people OR individ* OR actor* AND "manufacturing strategy" in article title, abstract, keywords in Social Sciences and Humanities	56, when limit to articles: 40
2012-08-31	Google Scholar	Going through articles which have cited Boyer & McDermott, 1999	94
2013-03	Emerald	"manufacturing strategy" in All fields AND "behavioral operations" in All fields	2
2013-03	Science Direct	"manufacturing strategy" AND "behavioral operations"	7
2013-03	Google Scholar	"manufacturing strategy" "behavioral operations"	8 (after taken away books and citations)
2013-03	ABI/INFORM Global	"manufacturing strategy" AND "behavioral operations"	3
2013-03	Science Direct	TITLE-ABSTR-KEY("manufacturing strategy") and TITLE-ABSTR-KEY(people OR individual* OR actor*)	20
2013-03	Science Direct	TITLE-ABSTR-KEY("manufacturing strategy") and TITLE-ABSTR-KEY("human*")	20
2013-03	Science Direct	TITLE-ABSTR-KEY("behavioral operations")	21
2013-03	Science Direct	TITLE("manufacturing strateg*") and TITLE-ABSTR-KEY(people* OR individual* OR actor* OR human* OR operator* OR manager*)	20
2013-03	ABI/INFORM Global	ti("manufacturing strateg*") AND ab(people* OR individual* OR actor* OR human* OR operator* OR manager*) Full text: Full text included Source type: Scholarly Journals Document type: Article	38

Appendix 3: Interview guide Study 3 and Study 4, workers

Intervjuguide – Operatörsnivå

Interview guide		
Category	**Worker**	**Svar**
1. Context		
	Namn	
	Ålder	
	Kön	
	Vilken avdelning, grupp tillhör du?	
	Vilken är din nuvarande befattning?	
	Vad har du för tidigare yrkeserfarenhet?	
	Hur länge har du varit anställd i företaget?	
	Har du haft andra jobb tidigare? Har det varit internt eller externt?	
	Vad har du för utbildning?	
	Hur ser ägandet av företaget ut? Familjeföretag?	
	Omsättningshastighet på ledningsgrupp? Ledningsgruppens storlek, positioner?	
	Har ni sociala aktiviteter tillsammans? - På fritiden? - Organiserade av företaget?	
	Har du några förtroendeuppdrag? (deltagande i facket, ledningsgrupp, friskvård mm)	
2. Manufacturing Strategy		
2.1 Background/General		
Layout (cellular, job shop, dedicated lines)	Vad för typ av layout har ni? Hur är produktionen organiserad?	
Process (batches, one of a kind, mass production)	Vad för typ av produktionsprocess har ni?	
Customer	Vem är slutkund (extern kund)?	
Plans	Vad vet du om långsiktiga planer för företaget?	
Competition	Vilka är era största konkurrenter?	
	På vilka faktorer är det ni konkurrerar?	
2.2 Information sharing, management, and development		

	Hur ofta har du kontakt med din arbetsledare/chef?	* Flera ggr/dag * 1 gång/dag * Några ggr/vecka * Mer sällan
	Hur ser relationerna mellan anställda och ledning ut?	
	Hur får du information om vad som sker på företaget?	
	I vilken utsträckning finns det möjligheter för dig att lära dig fler arbetsuppgifter?	* Inte alls 1-7 * Goda möjligheter/så mycket som önskas
	Hur lär du dig nya arbetsuppgifter? - Går ni kurser? (Internt eller externt)	
	I vilken utsträckning uppmuntrar företaget dig att ta större ansvar för inspektioner och kvalitet?	* Inte alls 1-7 * I hög grad
	Vilka möjligheter finns det för dig att styra detaljplaneringen?	* Inte alls 1-7 * I hög grad
	Om du har möjlighet, hur gör du? Vilka faktorer tar du hänsyn till?	
	I vilken utsträckning är du delaktig i förändringsarbete kopplat till produktion?	* Inte alls 1-7 * I hög grad
	Om du vill förändra något, hur går du då tillväga? - Vem pratar du med? - Hur bemöts den informationen?	
	I vilken utsträckning arbetar ert företag med teamarbete för att lösa problem?	* Inte alls 1-7 * I hög grad
	I vilken utsträckning är du delaktig i teamen?	* Inte alls 1-7 * I hög grad
	I vilken utsträckning leder förändringsarbete till förbättringar?	* Inte alls 1-7 * I hög grad
	Har ni något belöningssystem?	
2.3 Delivery/Speed/Dependability		
(quality conformance)	Vem är före dig i kedjan; vem får du material ifrån?	

(quality conformance)	Ställer du några särskilda krav på den som är före dig?	
Intern kund (quality conformance)	Vart tar produkten/detaljen vägen när du är klar med den?	
(quality conformance)	Ställer den som är efter dig några särskilda krav på dig?	
	Hur ofta får du rätt saker i rätt tid?	* Aldrig 1-7 * Alltid
	I vilken utsträckning använder ni er av buffertar mellan arbetsstationer?	* Inte alls 1-7 * I hög grad
Cykeltid	Hur lång tid tar det för dig att göra en produkt/artikel?	
Leveranstid/orderledtid	Hur lång orderledtid/leveranstid har ni? (tiden det tar från kundbehov till leverans)	
Produktionsledtid	Hur lång produktionsledtid har ni? (tiden det tar från start produktion till färdig produkt)	
Produktionsledtid	Hur viktigt är det för er att kunna minska produktionsledtiden?	* Inte alls 1-7 * I hög grad
Leveransledtid	Vad har era kunder för krav på leveranstider?	
	Hur upplever du era leveranstider?	* Väldigt korta 1-7 * Väldigt långa
	Hur upplever du säljavdelningens leveranslöften?	* Väldigt korta 1-7 * Väldigt långa
	I vilken utsträckning håller ni era leveranstider?	* Aldrig 1-7 * Alltid
	Går produkten till ett lager eller direkt till kund?	
2.2 Flexibility		
	Hur stor andel av de arbetsuppgifter som finns i produktion kan du utföra?	*Enbart en arbetsuppgift 1-7 *Alla
	Hur mycket av underhållet kan du göra själv?	*Inget 1-7 *Allt
	Om inte du gör underhållet, vem gör det då?	

	Hur mycket av ställarbetet kan du göra själv?	*Inget 1-7 *Allt
	Hur lång tid tar det att utföra ställarbetet?	
	Hur många olika produkter har ni? Har ni produktsegment?	
	Hur ofta återkommer samma produkter i produktionen?	* Aldrig 1-7 I hög grad
	Hur viktigt är det för er att kunna producera många olika sorters produkter?	* Inte alls 1-7 * I hög grad
	Hur viktigt är det för er att vara flexibla?	* Inte alls 1-7 * I hög grad
	Hur flexibla är ni med att ändra ett leveransdatum?	* Inte alls 1-7 * I hög grad
	Hur flexibla är ni med att ändra orderstorleken/ produktionsmängden/volymen?	* Inte alls 1-7 * I hög grad
	Hur viktigt är det för ert företag att kunna minska lagret?	* Inte alls 1-7 * I hög grad
	Hur ser er utnyttjandegrad ut?	
	Hur ofta jobbar du över?	* Varje dag * Varje vecka * Varje månad * Varje halvår * Mer sällan
	Vad beror övertiden på?	
	Hur ofta händer det att ni har för lite att göra?	* Varje dag * Varje vecka * Varje månad * Varje halvår * Mer sällan
	Vad beror det på?	
2.4 Quality		
	Vilka krav finns det på era produkter?	
	Hur ofta når du upp till dem?	* Aldrig 1-7 * Alltid

	Hur viktigt är det för ert företag att kunna följa ritningarna?	* Inte alls 1-7 * I hög grad
	Hur viktigt är det för ert företag att kunna erbjuda konsekvent, pålitlig kvalitet?	* Inte alls 1-7 * I hög grad
Conformance quality	Hur pålitlig är den här maskinen, blir det ofta fel på detaljerna?	* Aldrig 1-7 * Alltid
	Hur ofta får du rätt saker med rätt kvalitet?	* Aldrig 1-7 * Alltid
	I vilken utsträckning accepterar cheferna/arbetsledarna ansvaret för kvalitet?	* Inte alls 1-7 * I hög grad
2.5 Costs (Investments)		
Investments	Hur stora investeringar har ert företag i produktionsutrustning och stödsystem?	
Production costs	Hur ser era produktionskostnader ut? * För personal * För fastigheterna * För el, uppvärmning mm * För maskiner * För råmaterial * För avskrivningar	
	Hur viktigt är det för ert företag att kunna minska produktionskostnaderna?	* Inte alls 1-7 * I hög grad
Profitability	Hur lönsamma är ni?	

Appendix 4: Interview guide Study 3 and Study 4, managers

Intervjuguide – Ledningsnivå

Interview guide		
Category	**Manager**	**Svar**
1. Context		
	Namn	
	Ålder	
	Kön	
	Vilken avdelning, grupp tillhör du?	
	Vilken är din nuvarande befattning?	
	Vad har du för tidigare yrkeserfarenhet?	
	Hur länge har du varit anställd i företaget?	
	Har du haft andra jobb tidigare? Har det varit internt eller externt?	
	Vad har du för utbildning?	
	Hur ser ägandet av företaget ut? Familjeföretag?	
	Omsättningshastighet på ledningsgrupp? Ledningsgruppens storlek, positioner?	
	Har ni sociala aktiviteter tillsammans? - På fritiden? - Organiserade av företaget?	
	Har du några förtroendeuppdrag? (deltagande i facket, ledningsgrupp, friskvård mm)	
2. Manufacturing Strategy		
2.1 Background/ General		
Layout (cellular, job shop, dedicated lines)	Vad för typ av layout har ni? Hur är produktionen organiserad?	
Process (batches, one of a kind, mass production)	Vad för typ av produktionsprocess har ni?	
Customer	Vem är slutkund (extern kund)?	
Plans	Hur ser de långsiktiga planerna för företaget ut?	
Competition	Vilka är era största konkurrenter?	
	På vilka faktorer är det ni konkurrerar?	
2.2 Information sharing, management, and development		
	Hur ofta har operatörerna kontakt med sin arbetsledare/chef ?	* Flera ggr/dag * 1 gång/dag * Några ggr/vecka

		* Mer sällan
	Hur ser relationerna mellan anställda och ledning ut?	
	Hur informerar ni operatörerna om vad som sker på företaget?	
	I vilken utsträckning finns det möjligheter för operatörerna att lära sig fler arbetsuppgifter?	* Inte alls 1-7 * Goda möjligheter/så mycket som önskas
	Hur lär sig operatörerna nya arbetsuppgifter? - Går de kurser? (Internt eller externt)	
	I vilken utsträckning uppmuntrar företaget operatörerna att ta större ansvar för inspektioner och kvalitet?	* Inte alls 1-7 * I hög grad
	Vilka möjligheter finns det för operatörerna att styra detaljplaneringen?	* Inte alls 1-7 * I hög grad
	Om möjlighet ges, vilka faktorer tas då i beaktande?	
	I vilken utsträckning är operatörerna delaktiga i förändringsarbete kopplat till produktion?	* Inte alls 1-7 * I hög grad
	Om en operatör vill förändra något, hur går han/hon då tillväga? - Vem pratar han/hon med? - Hur bemöts den informationen?	
	I vilken utsträckning arbetar ert företag med teamarbete för att lösa problem?	* Inte alls 1-7 * I hög grad
	Är alla operatörer delaktiga i teamen?	* Inte alls 1-7 * I hög grad
	I vilken utsträckning leder förändringsarbete till förbättringar?	* Inte alls 1-7 * I hög grad
	Har ni något belöningssystem?	
2.3 Delivery/Speed/Dependability		
(quality conformance)	Hur ser den interna ”supply chain” ut? Är den tydlig för de som arbetar i den? Vem är den interna kunden?	
(quality conformance)	Finns det något sekvensberoende? (Ställs det särskilda krav på föregående och efterföljande operation?)	
	Hur ofta får operatörerna rätt saker i rätt tid?	* Aldrig

		1-7 * Alltid
	I vilken utsträckning använder ni er av buffertar mellan arbetsstationer?	* Inte alls 1-7 * I hög grad
Cykeltid	Hur lång tid tar det för en operatör att göra en produkt/artikel?	
Leveranstid/orderledtid	Hur lång orderledtid/leveranstid har ni? (tiden det tar från kundbehov till leverans)	
Produktionsledtid	Hur lång produktionsledtid har ni? (tiden det tar från start produktion till färdig produkt)	
Produktionsledtid	Hur viktigt är det för er att kunna minska produktionsledtiden?	* Inte alls 1-7 * I hög grad
Leveransledtid	Vad har era kunder för krav på leveranstider?	
	Hur upplever du era leveranstider?	* Väldigt korta 1-7 * Väldigt långa
	Hur upplever du säljavdelningens leveranslöften?	* Väldigt korta 1-7 * Väldigt långa
	I vilken utsträckning håller ni era leveranstider?	* Aldrig 1-7 * Alltid
	Går produkten till ett lager eller direkt till kund?	
2.2 Flexibility		
	Hur stor andel av de arbetsuppgifter som finns i produktion kan varje operatör utföra?	*Enbart en arbetsuppgift 1-7 *Alla
	Hur mycket av underhållet kan operatörerna göra själva?	*Inget 1-7 *Allt
	Om inte operatören gör underhållet, vem gör det då?	
	Hur mycket av ställarbetet kan operatörerna göra själva?	*Inget 1-7 *Allt
	Hur lång tid tar det att utföra ställarbetet?	
	Hur många olika produkter har ni? Har ni produktsegment?	
	Hur ofta återkommer samma produkter i produktionen?	* Aldrig 1-7 * I hög grad

	Hur viktigt är det för er att kunna producera många olika sorters produkter?	* Inte alls 1-7 * I hög grad
	Hur viktigt är det för er att vara flexibla?	* Inte alls 1-7 * I hög grad
	Hur flexibla är ni med att ändra ett leveransdatum?	* Inte alls 1-7 * I hög grad
	Hur flexibla är ni med att ändra orderstorleken/ produktionsmängden/volymen?	* Inte alls 1-7 * I hög grad
	Hur viktigt är det för ert företag att kunna minska lagret?	* Inte alls 1-7 * I hög grad
	Hur ser er utnyttjandegrad ut?	
	Hur ofta jobbar operatörerna över?	* Varje dag * Varje vecka * Varje månad * Varje halvår * Mer sällan
	Vad beror övertiden på?	
	Hur ofta händer det att ni har för lite att göra?	* Varje dag * Varje vecka * Varje månad * Varje halvår * Mer sällan
	Vad beror det på?	
2.4 Quality		
	Vilka krav finns det på era produkter?	
	Hur ofta når ni upp till dem?	* Aldrig 1-7 * Alltid
	Hur viktigt är det för ert företag att kunna följa ritningarna?	* Inte alls 1-7 * I hög grad
	Hur viktigt är det för ert företag att kunna erbjuda konsekvent, pålitlig kvalitet?	* Inte alls 1-7 * I hög grad
Conformance quality	Hur pålitliga är era maskiner/utrustning, blir det ofta fel på detaljerna?	* Aldrig 1-7 * Alltid

	Hur ofta får operatörerna rätt saker med rätt kvalitet?	* Aldrig 1-7 * Alltid
	I vilken utsträckning accepterar cheferna/arbetsledarna ansvaret för kvalitet?	* Inte alls 1-7 * I hög grad
2.5 Costs (Investments)		
Investments	Hur stora investeringar har ert företag i produktionsutrustning och stödsystem?	
Production costs	Hur ser era produktionskostnader ut? * För personal * För fastigheterna * För el, uppvärmning mm * För maskiner * För råmaterial * För avskrivningar	
	Hur viktigt är det för ert företag att kunna minska produktionskostnaderna?	* Inte alls 1-7 * I hög grad
Profitability	Hur lönsamma är ni?	

Appendix 5: Interview guide Study 3 and Study 4, workers

(The questions indicated with "Scale" used a Likert scale ranging from 1 = Not at all/Never, to 7 = To a large extent/Always)

Context/background information

- Name
- Age
- Gender
- Departmental/group belonging
- Current position
- Previous work experience
- Formal education
- Length of employment at the company?
- Who are the members of the management group?
- Who owns the company?
- Do you at the company have social activities together? Organized by whom?
- Is there any unions or other labour organisations? Are you a member of any such group?

Manufacturing strategy
Background/General

- What type of layout do you have? How is the production organized? Can you see a flow?
- What does the production process look like? Do you produce in batches?
- Who is the final/external customer?
- Who are the main competitors?
- Which factors do you compete with/on? What make you competitive?
- How do the long term plans for the company look?

Information sharing, management, and development

- How often do you have contact with your manager?
- What do the relationship between workers and managers look like?
- How do the workers receive information about what is happening at the company?
- To what extent is it possible for you to learn more work tasks?
  - Scale
  - How do you learn new work tasks? Do you attend courses? Internally or externally?
- To what extent does the company encourage you to take larger responsibility for inspections and quality?
  - Scale
- What possibilities do you have to control the production planning?
  - Scale
  - If you have the possibility, which factors do you then consider?
- To what extent do you take part in change work related to production?
  - Scale
- If you want to change something, how do you do that? Who do you talk to? How is that information received/handled?
- To what extent does your company work with team-work to solve problems?
  - Scale

- To what extent do you participate in such teams?
  - Scale
- To what extent does the change work lead to improvements?
  - Scale
- Is there any reward system?

Delivery/Speed/Dependability

- What does the internal supply chain look like? Who is your internal supplier?
  - Do you have any special demands on your internal supplier?
- Who is your internal customer?
  - Does the internal customer have any special demands on you?
- How often do you get the right products at the right time?
  - Scale
- To what extent do you use buffers between work stations?
  - Scale
- How long is the cycle time for one item?
- How long delivery lead time does your company have?
- How long production lead time does your company have?
- How important is it for your company to be able to decrease the production lead time?
  - Scale
- What are your customers' demands on the delivery lead time?
- How do you perceive the delivery lead time?
  - Scale: 1 = Very short, 7 = Very long
- To what extent does your company keep the delivery lead time?
  - Scale
- Does the product go to an inventory or direct to customers?

Flexibility

- How much of the work tasks in production can you perform?
  - Scale
- How much of the maintenance work can you perform yourself?
  - Scale
  - If you do not handle the maintenance work, who does it?
- How much of the set-up work can you perform yourself?
  - Scale
  - How long time does it take to do the set up?
- How many different products do you have? Do you have product segments?
- How frequently do the same products occur in production?
  - Scale
- How important is it for your company to be able to produce many different products?
  - Scale
- How important is it for your company to be flexible?
  - Scale
- How flexible is your company in changing a delivery date?
  - Scale
- How flexible is your company in changing the batch size/order size?
  - Scale
- How important is it for your company to be able to decrease the inventory/stock?
  - Scale

- What is your utilization rate?
- How often do you work overtime?
  - What causes the overtime?
- How often does it happen that you have too little to do?
  - What causes it?

Quality

- What are the product specifications?
  - How often do you fulfil them?
    - Scale
- How important is it for your company to be able to follow blueprints?
  - Scale
- How important is it for your company to be able to offer consistent, reliable quality?
  - Scale
- How often does your equipment cause faulty products?
  - Scale
- How often do you receive the right parts with the right quality?
  - Scale
- To what extent do the managers accept responsibility for quality?
  - Scale

Costs and investments

- How large investments does your company have in production equipment and support systems?
- What do your production costs look like?
  - For staff
  - For facilities
  - For electricity, heating, etc.
  - For equipment
  - For raw material and components
  - For depreciation
- How important is it for your company to be able to decrease the production costs?
  - Scale
- How profitable are you?

Appendix 6: Questionnaire Study 5

Enkätstudie produktionsstrategi

Hej!
Tack för att du tar dig tid att fylla i den här enkäten, din medverkan är viktig för oss! Enkäten är en del i ett större forskningsprojekt på Chalmers tekniska högskola, Göteborg, som syftar till att utreda produktionsnära personals förståelse för och kunskaper kring den egna organisationens produktionsstrategi. Enkäten tar cirka 15 minuter att fylla i och frågorna är av blandad karaktär. De berör dels sådant som du hanterar i ditt arbete varje dag, dels sådant som du kanske inte funderar så ofta på. Vi uppskattar att du tar dig tid att noga läsa igenom frågorna och att svara så gott du kan.

Tack på förhand!

Nina Edh Mirzaei
Doktorand, Chalmers

Del A: Bakgrundsfrågor

1. Kön
   - ☐ Kvinna
   - ☐ Man

2. Ålder

   _____

3. Civilstånd
   - ☐ Ensamstående
   - ☐ Ensamstående med hemmavarande barn
   - ☐ Sambo
   - ☐ Sambo med hemmavarande barn
   - ☐ Gift
   - ☐ Gift med hemmavarande barn

4. Vad är din position på företaget?
   - ☐ Kollektivanställd
   - ☐ Tjänsteman

5. Vilken avdelning tillhör du?

   _____

6. Vad har du för typ av arbetsuppgifter?

_____

_____

7. Vad är din högsta avslutade utbildning?

☐ Grundskola

☐ Gymnasium

☐ Högskola

8. Hur många år har du arbetat på företaget?

_____

9. Vad har du för arbetstider?

☐ Dagtid (7-16, 8-17)

☐ Tvåskift (byter mellan morgon och eftermiddag veckovis)

☐ Treskift

☐ Konstant nattskift

☐ Annat, var vänlig specificera _____

10. Är du medlem i facket?

☐ Ja

☐ Nej

11. Har du några förtroendeuppdrag?

☐ Ja

☐ Nej

12. Om du har svarat "Ja" på föregående fråga, var vänlig ange av vilken typ:

☐ Facket

Vilken typ av ansvar?_____

☐ Företagets styrelse

☐ Arbetsgrupp

☐ Hälsoinitiativsgrupp

☐ Annat, var vänlig specificera _____

Del B: Personlighetsfrågor

13. Var vänlig ange i vilken utsträckning följande påståenden överensstämmer med dig/din personlighet.

	Inte alls						I hög grad
• Jag gillar att samarbeta i team/grupp	1	2	3	4	5	6	7
• Jag är en välorganiserad person	1	2	3	4	5	6	7
• Jag kommer i tid till möten mm	1	2	3	4	5	6	7
• Jag gillar att ta ansvar	1	2	3	4	5	6	7
• Min arbetsplats är välstädad	1	2	3	4	5	6	7
• Jag gillar att äta min lunch eller fika själv	1	2	3	4	5	6	7
• Jag gillar att prova nya aktiviteter/saker/upplevelser	1	2	3	4	5	6	7
• Jag tar tag i saker när de dyker upp	1	2	3	4	5	6	7
• Jag påbörjar nya saker/projekt utan att ha avslutat gamla	1	2	3	4	5	6	7
• Jag gillar förändringar	1	2	3	4	5	6	7
• Jag känner mig stressad i vardagen	1	2	3	4	5	6	7
• Jag har lätt för att bli upprörd/ledsen/störd	1	2	3	4	5	6	7
• Jag gillar att t.ex. spela instrument, bygga om bilar, finsnickra, sjunga, dansa	1	2	3	4	5	6	7
• Jag är stolt över det jobb jag gör	1	2	3	4	5	6	7
• Jag trivs på det här företaget	1	2	3	4	5	6	7

Del C: Produktionsstrategiska frågor

14. För din produktionsanläggning, hur viktig är förmågan att:
(där 1 = Inte viktigt, 4 = Väldigt viktigt, och 7 = Absolut kritiskt)

	Inte viktigt						Absolut kritiskt
Kostnader							
• Minska lagernivåerna	1	2	3	4	5	6	7
• Öka kapacitetsutnyttjandet	1	2	3	4	5	6	7
• Minska produktionskostnaderna	1	2	3	4	5	6	7
• Öka arbetarnas produktivitet	1	2	3	4	5	6	7
Kvalitet							
• Erbjuda högpresterande produkter	1	2	3	4	5	6	7
• Erbjuda konsekvent, pålitlig kvalitet	1	2	3	4	5	6	7
• Förbättra överensstämmelsen med designspecifikationer/ritningar	1	2	3	4	5	6	7
Leveranssäkerhet							
• Erbjuda snabba leveranser	1	2	3	4	5	6	7
• Uppfylla leveranslöften	1	2	3	4	5	6	7
• Minska produktionsledtiden	1	2	3	4	5	6	7
Flexibilitet							
• Genomföra snabba design-/ritnings- ändringar/uppdateringar	1	2	3	4	5	6	7
• Snabbt anpassa kapacitet	1	2	3	4	5	6	7
• Göra/genomföra snabba volymförändringar	1	2	3	4	5	6	7
• Erbjuda stort antal produktegenskaper	1	2	3	4	5	6	7
• Erbjuda ett stort utbud av produktvarianter	1	2	3	4	5	6	7
• Anpassa produktmixen	1	2	3	4	5	6	7

15. Var vänlig ange i vilken utsträckning din produktionsanläggning poängterar betydelsen av följande aktiviteter
(där 1 = Ingen betydelse, 4 = Måttlig betydelse, och 7 = Högsta grad betydelse).

	Ingen betydelse			Måttlig betydelse			Högsta grad betydelse
• Ge anställda en bredare omfattning av uppgifter	1	2	3	4	5	6	7
• Ge anställda mer/större ansvar för planering	1	2	3	4	5	6	7
• Ge anställda mer/större ansvar för inspektioner/kvalitet	1	2	3	4	5	6	7
• Förbättra relationerna mellan anställda och ledning	1	2	3	4	5	6	7
• Förbättra medarbetarnas motivation	1	2	3	4	5	6	7
• Förbättra träning för förmän/handledare	1	2	3	4	5	6	7
• Förbättra träning för anställda	1	2	3	4	5	6	7
• Erbjuda fortbildning för anställda	1	2	3	4	5	6	7

16. Var vänlig ange i vilken utsträckning du håller med om följande påståenden
(där 1 = Håller inte alls med, 4 = Varken eller, 7 = Håller starkt med).

	Håller inte alls med			Varken eller			Håller starkt med
• Alla avdelningschefer i vår produktionsanläggning tar på sig ansvaret för kvalitet	1	2	3	4	5	6	7
• Fabriksledningen/ledningen för produktionsanläggningen ger personligt ledarskap för kvalitetsförbättringar	1	2	3	4	5	6	7
• Kvalitetsprestationen är högst prioriterad när fabriksledningen utvärderas	1	2	3	4	5	6	7
• Alla avdelningschefer i vår produktionsanläggning arbetar för att uppmuntra just-in-time produktion	1	2	3	4	5	6	7
• Vår högsta ledning uppmuntrar starkt till medarbetarnas delaktighet i produktionsprocessen	1	2	3	4	5	6	7

17. Var vänlig ta ställning till följande påståenden angående ”teams”/teamarbete i din produktionsanläggning
(där 1 = Håller inte alls med, 4 = Varken eller, 7 = Håller starkt med).

	Håller inte alls med			Varken eller			Håller starkt med
• Vår produktionsanläggning löser problem i team	1	2	3	4	5	6	7
• Under de senaste 3 åren har många problem lösts med hjälp av teamarbete	1	2	3	4	5	6	7
• Under problemlösningssessioner/-möten tar man alla teammedlemmars åsikter och idéer i beaktande innan man fattar ett beslut	1	2	3	4	5	6	7

18. Har ni något belöningssystem på din produktionsanläggning?

☐ Ja

Var vänlig beskriv belöningssystemet

_____

_____

☐ Nej

19. Vem vänder du dig till i första hand om du behöver hjälp med något som rör din arbetsuppgift?

☐ En kollega i min grupp/team/avdelning

☐ Min skiftledare/gruppledare

☐ Produktionschef

☐ VD

☐ Någon annan, var vänlig ange _____

20. Vem vänder du dig till i första hand om du behöver hjälp med något generellt på ditt företag?

☐ En kollega i min grupp/team/avdelning

☐ Min skiftledare/gruppledare

☐ Produktionschef

☐ VD

☐ Någon annan, var vänlig ange _____

21. Vilka kommunikationskanaler används för att sprida information på ditt företag?

- ☐ Intranet
- ☐ Nyhetsbrev
- ☐ Skärmar
- ☐ Dagliga möten. Med vem? _____
- ☐ Veckomöten. Med vem? _____
- ☐ Månadsmöten. Med vem?_____
- ☐ Halvårsmöten. Med vem?_____
- ☐ Från kollegor
- ☐ Annat, var vänlig ange _____

<u>Var vänlig svara på följande frågor angående informationsspridning/-delning på din produktions-anläggning.</u>

	Aldrig						Hela tiden/ konstant
22. Hur ofta har anställda på ditt företag kontakt med sin närmsta chef	1	2	3	4	5	6	7

23. Vilken typ av information får du från din närmsta chef?

_____

_____

	Aldrig						Hela tiden/ konstant
24. Hur ofta delar cheferna med sig av långsiktiga planer till de anställda?	1	2	3	4	5	6	7

25. Vad är en långsiktig plan för dig?

_____

_____

Tack för din medverkan!

"Done is better than perfect."

— Sheryl Sandberg

Paper 1

Production-related staff's perception of manufacturing strategy at a SMME

Edh, N., Winroth, M. and Säfsten, K. (2012)