

THESIS FOR THE DEGREE OF LICENTIATE OF ENGINEERING

Antecedents for Quality Management in Small and Medium Enterprises

MARCUS ASSARLIND

Department of Technology Management and Economics

CHALMERS UNIVERSITY OF TECHNOLOGY

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MARCUS ASSARLIND

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Division of Quality Sciences  
Department of Technology Management and Economics  
Chalmers University of Technology  
SE-412 96 Gothenburg  
Sweden  
Telephone + 46 (0)31-772 1000

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MARCUS ASSARLIND  
Division of Quality Sciences  
Department of Technology Management and Economics  
Chalmers University of Technology

## ABSTRACT

Small and medium sized enterprises (SMEs) are fundamental pillars of any national economy, often employing more people than large companies. Unlike larger companies, however, they often lack systematic ways to improve their operations. Quality Management (QM) has become recognised as a viable way to improve the quality of products and processes and large companies often use QM ideas as part of their operations. Historically, the main focus for QM research has been on larger organisations rather than SMEs. Since SMEs have their own set of strengths and weaknesses, such as their personalised management and lack of financial strength, respectively, it is not always possible to use traditional QM ideas in SMEs directly.

The purpose of this thesis is to investigate antecedents for QM ideas and practices in SMEs, thereby contributing to the knowledge on how to adopt QM in SMEs. Three papers are presented in order to achieve this aim. The first paper uses a case study to show a successful example of QM in a large company, which serves as a baseline for how a successful QM initiative may look. The paper also discusses the need to contextualise any improvement initiative in any company. The second paper is a literature review on the adoption of QM in SMEs. It synthesises and groups recommendations, creating a collection of important issues for SMEs to consider when adopting QM. The paper highlights the importance of external support for these endeavours and reinforces the idea that contextualisation is always important. The third paper is based on a case study in a small company, which successfully made crucial changes. The paper investigates this case in the light of Paper I and Paper II. Paper III reveals that although methods for small companies do not need to be very different from large ones, there can be some obstacles in the adoption process itself.

**Keywords:** Quality management, small and medium enterprises, implementation, operations improvement, process improvement



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Göteborg, January 2011  
Marcus Assarlind



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## LIST OF APPENDED PAPERS

With description of author contributions

**Paper I** Assarlind, M., Gremyr, I., & Bäckman, K. (2010). Multi-Faceted Views on a Lean Six Sigma Application. *International Journal of Quality & Reliability Management*.

The empirical data was collected jointly by Assarlind and Bäckman, who also drafted the first version together. Major refinements and further data collection was conducted jointly by Assarlind and Gremyr.

**Paper II** Assarlind, M., & Gremyr, I. (2009). *A Categorization of Implementation Advices for Quality Management in Small and Medium Sized Enterprises: A Literature Review*. An earlier version of this paper was presented and published in the Proceedings of the Irish Academy of Management 12<sup>th</sup> Annual Conference.

This paper was authored jointly by Assarlind and Gremyr.

**Paper III** Assarlind, M. (2010). *Exploring Quality Management implementation factors: In-depth study in one smaller company*. An earlier version of this paper was presented and published in the Proceedings of the 13<sup>th</sup> QMOD conference on Quality and Service Sciences.



# 1 INTRODUCTION

*The owner of the small suburban manufacturing company had just finished chopping the onions for the family dinner when his brother enthusiastically told him about some new methods of organising production. The more he heard, the more sceptical the owner became. When he finally learned that the ideas originated from Toyota, the gigantic Japanese car company, he said, "That's 'interesting' but we are not a big company and we don't build cars". Four years later, the owner has moved from being sceptical to passionate; 5S, Kanban and fishbone-diagram are now part of his daily vocabulary.*

## 1.1 BACKGROUND

In a climate of increasing globalisation, Swedish manufacturing industries are being threatened from nearby low-wage countries and from distant continents (Tekniska högskolan i Jönköping & Swerea Swecast AB, 2008). Producing a superior quality product at a lower price has been proven to be an effective competitive strategy (Ahire, Waller, & Golhar, 1996), which is exactly what the practitioners of Quality Management (QM) wish to achieve. The quality of a product can be defined as "its ability to satisfy, and preferably exceed, the needs and expectations of the customer" (Bergman & Klefsjö, 2010). QM, which moves beyond this definition, is "a philosophy or an approach to management" that aims to achieve higher product quality, often at the lowest cost (Bergman & Klefsjö, 2010; Dean & Bowen, 1994). However, QM ideas have not been widely adopted among smaller organisations (Achanga, Shehab, Roy, & Nelder, 2006). An American study of 500 firms that considered themselves as practising QM, approximately half of which were SMEs, showed that one-third experienced benefits while the other two thirds had failed (Ahire, et al., 1996).

Historically, the main focus for QM research has been on larger organisations (e.g. Beheshti & Lollar, 2003; Hansson, 2003; Kuratko, Goodale, & Hornsby, 2001; Thomas & Webb, 2003; Yusof & Aspinwall, 1999). While large enterprises are certainly important to the national economy, so too are SMEs (Gunasekaran, Forker, & Kobu, 2000). Even excluding micro-enterprises (fewer than 10 employees), SMEs constitute 37 percent of all European private-sector job opportunities, compared to 33 percent for larger companies (European Commission, 2008). Many SMEs exist in order to serve large organisations, which makes them crucial for the existence of the larger companies. In other words, successful SMEs are essential in national economies. Several researchers have argued that SMEs are usually anything but smaller versions of larger companies (e.g. Bridge, O'Neill, & Cromie, 2003; Storey, 1994; Welsh & White, 1981). Or, as Welsh and White put it in the title of their 1981 paper, "A small business is not a little big business". SMEs have their own strengths and weaknesses, particularly their personalised management and their lack of financial clout, respectively.

Large companies looking to succeed with a QM initiative cannot fully do so unless their small suppliers also do so (Danes, Loy, & Stafford, 2008); with competitive suppliers, the larger customer companies are strengthened (Ghobadian & Gallear, 1996). It is common for SMEs to serve as suppliers to large companies, which may require them to use certain QM initiatives (Ghobadian & Gallear, 1997; Sun & Cheng, 2002). The opposite also applies; when large companies streamline their operations and reduce their supplies, small suppliers might have to meet customer demands by maintaining larger stocks (Rantakyrö, 2004). In other words, "just-in-time" production for the large company may imply "just-in-

case” production for the small supplier (Rantakyrö, 2004, p. 93), at least as long as the supplier is unable to improve its own operations.

QM need not only apply to small companies that must adhere to the requirements of their larger customers. Ghobadian and Gallear (1997, p. 125) pointed out that “adoption of [QM] can help SMEs to manage the transfer from incubation stage to maturity stage effectively”. This allows the SME to maintain a customer focus, delivering high quality products and services while making more efficient processes (Ghobadian & Gallear, 1997). Brue (2006) argued that quality practices are even more important in smaller companies than in large ones. Large companies might rely on economies of scale or few competitors in areas with high entry costs, while small companies are rarely able to rely on such circumstances. For SMEs, defects can be a slow killer (Brue, 2006) that erodes margins and customer relations. A survey study by Ahire et al. (1996) suggested that organisations that embrace the QM philosophy, regardless of whether they call themselves a QM firm, achieve better performance than firms that do not. Ahire et al. emphasised the importance of looking at what the firms actually do, rather than applying labels.

In general, managers in small companies are not particularly comfortable with conventional management tools and prefer to act on their intuition and experience (Rantakyrö, 2004). In theory, there should be a great deal of potential for QM ideas in SMEs, for example in helping identify and eliminate hidden waste and costs (Antony, 2008; Brue, 2006). However, these ideas are mostly developed in the context of larger companies and translations to smaller companies are limited. “Differences exist in structure, policy making procedures, and utilizations of resources to the extent that the application of large business concepts directly to small businesses may border on the ridiculous” (Ghobadian & Gallear, 1996, p. 86). Several recent studies have suggested that modern initiatives, such as Lean and Six Sigma, can be adopted in smaller companies (Conner, 2009; Kumar & Antony, 2008) and offer promising financial results (Hansson, 2003). Conner (2009, p. 1) even claimed that some initiatives, like Lean, are specifically “directed to small businesses”. Ahire, Waller and Golhar (1996) found that organisations that adopt QM practices generally show beneficial results. It is suggested that QM adoption might require distinct treatment of SMEs due to its characteristics, which are fundamentally different from those of larger companies (Conner, 2009; Ghobadian & Gallear, 1997). Bessant et al. (2001) argued that it may only be a matter of solving the “contemporary QM puzzle”, namely that QM is “only for large organisations”. Examples of earlier puzzles, which have now been solved, include the contradiction between high quality and low cost and that QM could work “only in the Japanese culture” (Bessant, et al., 2001). Hansson and Klefsjö (2003) argued that the problems encountered in a QM adoption process reside not in the concept but in the adoption process, and that initiatives often fail due to the lack of commitment around the organisation (Hansson, 2003).

Danes et al. (2008) argued that research on QM in SME is scarce and is conceptual rather than empirical. Although some case studies do exist – for example, Rao, Bajpai and Verma (2009) realised a successful QM project in a SME setting – they only describe technical details and hardly promote an understanding of improvements in SMEs. Another example is the inspiring story by Nilsson (2005), directed at practitioners, which describes the vast improvement of the suggestion system in a medium sized production unit of a larger company. There are also theses in the vicinity of the topic area (Hansson, 2003; Rantakyrö, 2004). More case studies are needed, assuming different perspectives in different settings;

providing illustrative examples and offering an understanding of the mechanisms behind SME adoption of QM ideas.

## 1.2 PURPOSE

The purpose of this thesis is to investigate antecedents for QM ideas and practices in SMEs, thereby contributing to the knowledge on how to adopt QM in SMEs.

### 1.2.1 SCOPE

The SME notion is vast, containing companies from different parts on many scales: for example start-ups and mature, service-focused and research-focused, based in Gothenburg or Rio de Janeiro, small and substantial. It might be tempting, therefore, to enforce substantial delimitations in order to ensure that real contributions can be made in one small specific area rather than risk not contributing to a large one; for example, by concentrating on the usage of fish-bone diagrams in Swedish manufacturers of fishing equipment with 10–15 employees. However, it might also be beneficial not to make such delimitations. For one thing, it would require substantial research to even identify appropriate delimitations. Even more importantly, studying a smaller analytical span would obscure contrasts and similarities within the SME classification. Since this thesis is part of a larger project on enhancing the competitiveness of SMEs, it would also be impractical to not consider significant parts of the classification. For these reasons, this thesis will target companies with SME characteristics (refer to Section 2.2 for more on SME characteristics).

## 1.3 THESIS STRUCTURE

Chapter 1 provides the research background and problematises the area of Quality Management in SMEs. It presents the research purpose and sets the scene for the thesis.

Chapter 2 presents the theoretical background in three parts. The first two parts stem from the two fields upon which the research is based: Quality Management and SMEs. The third part discusses the literature on the adoption of QM in an SME context.

Chapter 3 presents the research method and the research approach. It reveals basic views on research and on what can be accomplished in the area. It discusses different data collection methods and also the trustworthiness of the research.

Chapter 4 contains summaries of the appended papers. The papers are the core of this thesis, laid out in order to treat the overall purpose.

Chapter 5 ties the papers together in a general discussion. As this is a licentiate thesis, with the goal of expanding the research into a doctoral thesis, there is a special emphasis on future studies. The chapter concludes with overall thesis conclusions.

These chapters and the reference list are followed by the appended papers.



## 2 THEORETICAL FRAMEWORK

This thesis builds on several different fields. It starts with an introduction to Quality Management and to SMEs, followed by issues on QM adoption in SMEs.

### 2.1 QUALITY MANAGEMENT

The literature uses terms such as QM (Quality Management), TQM (Total Quality Management) and TQ (Total Quality) (e.g. Ahire & Golhar, 1996; Dean & Bowen, 1994; Ghobadian & Gallea, 1996), all of which often seem to refer to similar ideas. Variations within the usage of any one of these notions can be as large as the variations between them. In most cases, they are all about organising and working for quality. Furthermore, singling out what is Quality Management and what is Operations Management, human resource management and so on can be a challenge. For the purposes of this thesis, notions such as Lean and Six Sigma, and Process Flow and Improvement Groups are all placed under the roof of QM. The notion of QM will be used and will refer to the area of adoptable ideas and concepts used to improve the quality of products and processes: quality ideas. The thesis takes its roots in the theory field of QM – that is, ideas labelled as quality ideas – but does not bother to untangle any concept confusion or single out certain good quality ideas, perhaps named Quality Management ideas, from other good quality ideas, perhaps named Operations Management ideas.

QM concerns the creation of an organisational system that fosters cooperation and learning and focuses process management practices, resulting in continuous improvement of processes, products and services affecting customer satisfaction and employee satisfaction (Anderson, Rungtusanatham, & Schroeder, 1994). QM has been defined as a “philosophy or an approach to management” based on reinforcing principles and related practices and techniques (Dean & Bowen, 1994). The principles are focus on customers, continuous improvements and everybody being committed/teamwork (Dean & Bowen, 1994). These principles, along with fact-based decisions, focus on processes and commitment from top management, add up to the cornerstone model shown in Figure 1 (Bergman & Klefsjö, 2010; Hansson & Klefsjö, 2003).

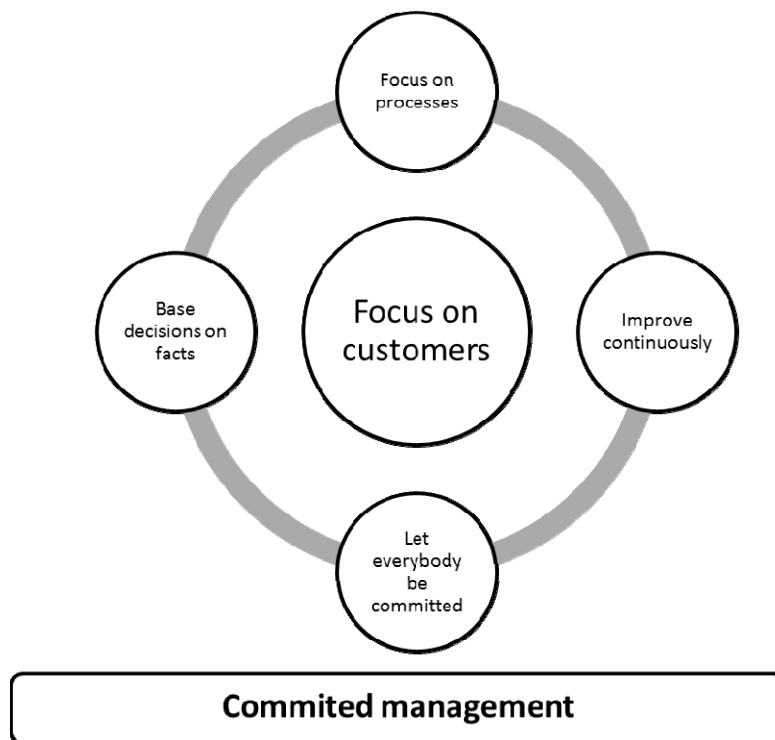


FIGURE 1: THE CORNERSTONE MODEL (ADAPTED FROM BERGMAN & KLEFSJÖ, 2010)

Today, QM is well recognised and often incorporated, in some form or another, into the daily operations of larger companies (Sousa & Voss, 2002). The concept and its underlying principles can sometimes be observed as parts of or foundations for many other initiatives, such as Six Sigma, Lean, etc. Quality practices may also even exist within a company, without the company recognising it as such (Weick, 1999). Different industries and companies may view quality differently, as may different subgroups and individuals of a company (Hamada, 2000). The view also changes over time (Hamada, 2000). Since its fledgling beginnings several decades ago, QM has grown into a mature field (Sousa & Voss, 2002). Lengnick-Hall (1996) described this evolution from early Craftsmanship, to Inspection, Statistical Quality Control, Quality Assurance, Strategic Quality Management, and currently Sustainable Competitive Quality. The customer has become the focus of the quality activities, rather than simply being a buyer, and the view of quality has changed from subsequent adjustments to prevention and then to competitiveness (Lengnick-Hall, 1996). The areas for quality improvements are no longer specific products but the complete value chain, including suppliers and customers (Lengnick-Hall, 1996). This is arguably not only a journey in time and fashion but also a journey in organisational maturity. The journey that Lengnick-Hall described is certainly an overview of ideas rather than what actually is adopted in practice.

Dean and Bowen (1994) present a framework that can be used to operationalise concepts into components. The different components are defined as follows:

1. Principles – Axioms to support the philosophy/management strategy
2. Practices – Activities, such as information collection, that helps put the principles into practice
3. Techniques – Step-by-step methods intended to make the practices effective

Hellsten and Klefsjö (2000) presented a similar framework that was specifically aimed at QM but used different terminology: Values, Techniques and Tools. They emphasised the importance of seeing this framework as supporting a specific aim. Boaden (1997) discussed the critical distinction between principles – “beliefs or tenets” – and practices – “things that organisations do that display and embody their beliefs”. In line with this argument, Sousa and Voss (2002) argued that QM in practical applications can be difficult to assess if the assessments are based on observing the general principles or the detailed techniques. Instead, they recommended a focus on the more applied practices. While this seems viable in the assessment, it is important not to completely lose sight of the principles or the techniques. The techniques might be a considerable part of what is visible in the company and should be relatable to the practices. Similarly, it might be important to perform a “reality check”; that is, whether the adopted practices actually support the intended principles.

## 2.2 CHARACTERISING AND DEFINING SMEs

Husband and Mandal (1999) suggested that one of the reasons for the lack of good research in QM in relation to SMEs is the lack of a clear definition of an SME. For example, the European Commission defines an SME as a company with fewer than 250 employees, that is independent from larger companies and has an annual turnover of less than 50 million euro (OECD, 2004). The Japanese Ministry of Economy, Trade and Industry, on the other hand, uses a cut-off of fewer than 100 employees (OECD, 2004). In the United States, the upper limit is also 100, assuming it is in the wholesale trade sector, while a mining company is considered an SME as long as it has fewer than 500 employees (OECD, 2004). Furthermore, each of these definitions has large inherent variations. For example, the issues facing an organisation with 15 employees are quite different from those in an organisation with 90 employees, as they are for an advertising agency compared to a car-repair garage.

These issues regarding SME definitions raise the question of whether there is any reason to look into SMEs as a group. However, it is generally argued that there are fundamental operational differences between SMEs and larger companies (e.g. Ahire & Golhar, 1996; Bridge, et al., 2003; Hansson, 2003; Hudson, Smart, & Bourne, 2001; Rantakyrö, 2004). Hudson et al. (2001), summarise the key characteristics as follows:

- Personalised management, with little devolution of authority
- Severe resource limitations in terms of management, manpower and finance
- Reliance on a small number of customers and operating in limited markets
- Flat, flexible structures
- High innovatory potential
- Reactive, fire-fighting mentality
- Informal, dynamic strategies

Small companies are often owned and managed by a single individual. This means that the company’s treasury is the manager’s own money, which often leads to little money being spent on anything beyond the bare essentials. This simple relationship also means that success is not always measured in the same ways as it is for large companies. Instead, success may be measured in terms of maximised personal benefits for the owner-manager rather than in pure financial results. These might seem synonymous at first glance, but when business logic dictates an expansion for larger profits, personal logic may dictate a small, easily manageable business. For many small companies, the “owner *is* the company” (Rantakyrö, 2004, p.

58) and success may be defined as making a fair living, building self-esteem and/or earning high social status (Bridge, et al., 2003). (Bridge, et al., 2003)

Small company size also leads to issues that are lost in round-offs for large companies. In large companies, results are measured over an aggregated period of time, whereas liquidity is often crucial in smaller companies. There is a considerable difference between “money now” and “money in two months” (Welsh & White, 1981). Investment pay-offs are also less continuous with a small company size: even though a small department or set of machine needs additional resources, one more full unit might not be worth the extra cost (Bridge, et al., 2003). After all, one more machine or person for a task with only one machine or person to begin with represents a 100 percent increase in capacity, but also in cost.

Of course, these are generalisations. If one uses the European SME definition, a company with 20 employees probably shows “personalised management, with little devolution of authority”, while it is not as certain in a company with 200 employees. Furthermore, companies with similar external characteristics, such as industry, number of employees, etc., might not be similar on the inside. Some very small companies have complex hierarchical structures (Rantakyro, 2004) and it is not uncommon to find a reactive, fire-fighting mentality in many larger companies.

It is important to note that definitions might need to be different in order to serve different purposes. Quantitative definitions, such as that of the European Commission, are probably intended and are useful for national policy-makers deciding on qualification to SME support programmes. Storey (1994) noted that definitions such as the European Commission’s simplify international comparisons and are less ambiguous overall. However, he also acknowledges the need for researchers to use tailored definitions in order to have their research makes sense.

For the research presented in this thesis, the important notion is SME characteristics. Quantitative definitions are not appropriate to target this. For example, some companies with thousands of employees are still run in a personalised manner (Storey, 1994), which suggests that a definition based on the number of employees is unreliable. Another example is companies whose ownership structure is heavily dependent on other companies, while still functioning independently (Carter & Jones-Evans, 2006).

The research in this thesis adopted Hollander’s (1967) functional, analytical definition, which is as follows:

1. “Enterprises that are businesses, in the sense that they involve all or most of the business functions and decisions concerning production, marketing, financing and management; and
2. Do not exceed a size which, considering the nature of the business, permits personalised management in the hands of one or a few executives, as opposed to institutionalised management characteristic of larger enterprises.”

This definition does not exclude a subsidiary that, apart from being owned by a larger company, otherwise bears all the characteristics of an SME. It does, however, exclude organisations that “are small in structural size but are closely managed, controlled in detail or provided with exceptional external resources by mother companies” (Karlton, 2007). It should be noted, though, that Hollander used his definition for “small business” and denoted “medium business” as outside this definition. It may also be problematic to decide whether certain companies reside inside or outside this definition, particularly



without deeper study of them. This tighter definition helps make sense of the term “SME research”. This means delimiting the research to a reasonable sub-group with similar characteristics, rather than taking on the whole Quality Management field.

Due to analogous reasoning, it might be appropriate to exclude start-ups, and to some extent “micro-enterprises”, where research may be more focused through the entrepreneurial field. Empirical evidence suggests natural breakpoints for this, with organisations that use more than one organisational unit, at about 15 employees (Turner, Ledwith, & Kelly, 2009). The same research suggests a size breakpoint of around 50 employees, at which point many organisations feel a need for more formal structures and specialists. Having considered all of the above, the present study has adopted Hollander’s definition. However, as Section 3 argues, it is also up to the reader to value the parts they find valuable in the reader’s context. Hence, the adopted definition is used more as a guideline than a rule.

### 2.3 QM IN SMES

There is a common belief that many of the concepts designed for larger companies do not work for smaller ones. Other researchers argue that this is little more than a myth (e.g. Brue, 2006; Conner, 2009; Kumar & Antony, 2008). Ahire and Golhar (1996) reported that the size of a firm does not limit the possible achievements from QM adoption. Ghobadian and Gallear (1997, p. 161) stated that “the basic concepts of TQM were equally applicable in the SME context. However, the detail and method of implementation differed”. In line with this, Hansson and Klefsjö (2003) argued that QM failures are more the result of problems in adoption than the concept itself and that it is crucial to adapt QM to the context in which it will be used. Several authors (e.g. Conner, 2009; Hansson & Klefsjö, 2003) have stressed the need to acknowledge QM ideas as being context sensitive in any situation; that is, what works in one place does not necessarily need to work in another.

Nevertheless, there are differences between small and large companies (e.g. Ahire & Golhar, 1996; Hudson, et al., 2001), and the concepts might have to be adjusted accordingly. Some concepts, such as certain adaptations of Six Sigma, prescribe an extensive adoption with a substantial proportion of the workforce to be trained as improvement experts. Resource constraints and higher unit training costs for SMEs (Storey, 1994) may make this extensive training unfeasible for an SME. C. Y. Lee (2004) advised against any “all or nothing” approach and instead recommended sequential adoption in small chunks. In some vital QM aspects, the size of SMEs implies advantages. Examples include facilitating customer focus, due to closeness to the customer; and high employee commitment in the organisation, due to flat hierarchies (Hansson, 2003; Manoochehri, 1988; Sonfield, 1984). These flat hierarchies also mean that these companies may succeed with effective QM work, even without a formal structure for it (Hansson, 2003).

Conner (2009, p. 10) argued that small companies are lean and high quality per default. He considered that the main question was how to keep these advantageous features of small entrepreneurial firms when they are growing. Ahire and Golhar (1996) augmented this reasoning by concluding that QM can provide benefits regardless of company size, as long as relative strengths are exploited. In this case, relative refers to strengths in relation to large organisations but also to other SMEs.

Literature on QM in SMEs has focused on various aspects such as the specific characteristics of SMEs compared to large companies (Ghobadian & Gallear, 1997), the application of certain quality practices

(Kuratko, et al., 2001), and ideas for critical adoption factors (Yusof & Aspinwall, 2000). Several of these themes were also further explored in Assarlind and Gremyr (Assarlind & Gremyr, 2009), which is one of the appended papers of this thesis.

Ideas about what SMEs need for success do not always point in the same direction, presumably because of different views on QM itself. For example, Deleryd et al. (1999) stated that statistical methods must have a focus in QM. They argued that SMEs are generally poor at employing statistical methods and must therefore improve their processes through the use of statistical method such as SPC and DoE. Thomas and Lewis (2007), on the other hand, stated that managers and operators may even become frightened when statistical tools are discussed since SMEs lack the necessary theoretical knowledge to acknowledge the potential and the resources to appoint a coordinator; introducing such methods would then become counter-productive to introduce such methods. These contradictions do not necessarily imply that some people are wrong, just that different approaches may be feasible in different contexts.

### 3 RESEARCH METHOD

While the basic area for this thesis, Quality Management in SMEs, has been constant since the start of the research two years ago, the purpose, the methodological approach and the choices of theoretical framework have been co-evolving ever since. The theory has helped the probing of empirics but has also developed as a result of empirical awareness. Consequently, the theoretical framework was expected to evolve and has indeed done so during the research process (Bryman & Bell, 2007; Dubois & Gadde, 2002; Ragin, 1992). The same holds for the methodological approach; the final research has been affected by needs and gaps found in literature, practical limitations, and what the chosen research methods are able to achieve.

The purpose of this thesis is to investigate SME-specific antecedents for QM ideas and practices in SMEs, which will contribute to the knowledge on how to adopt QM in SMEs. This means that, ultimately, the study is about mechanisms that perhaps resemble a cause-and-effect relationship, however likely in a context-sensitive situation. Such relationships are very hard to establish in management sciences. The mechanisms that are being studied are part of complex social systems and consequences of management changes can take a long time to realise effects. This means that causal relationships are near impossible to prove, especially if the aim is to extrapolate the results to any other context. Naturally, this is something that affects the choices of methods, regarding both data collection and analysis. As this question is both complex and context sensitive, the chosen way to approach this is with context-sensitive qualitative studies. The rich descriptions of events that resulted are valuable in themselves.

At first glance, the formulation of the purpose might appear defensive. It does not promise a robust model or a statistically significant description of a cause-and-effect relation. Instead, it is fulfilled, technically, by any kind of contribution to the field. This requires more from the reader but may also generate high rewards. To some extent, it is up to the reader to decide what part of the results and the descriptions of the empirical material makes sense in the reader's particular context, whether it is for research or practice (Weick, 1989, 1999). In other words, it is up to the reader to decide on the value of this research. This kind of reasoning in itself makes much sense in this context. As the results show, it has been argued repeatedly that anyone looking to reap benefits from QM ideas in SMEs must look at what suits the specific context.

#### 3.1 RESEARCH APPROACH

According to Hamada (2000), company culture can be viewed as a collective phenomenon or as something ambiguous and fluid. If one takes the former perspective, research may be performed with methods such as interviews and observations. If one takes the latter perspective, cognitive confusion and people's individual histories are important components (Hamada, 2000). This thesis uses the first perspective, while acknowledging that the reality might be more complex. That is, interviews and observations are utilised for data collection but only while being aware of the imposed limitations. For example, the data from an interview contains what the interviewee said and is not necessarily an exact reflection of an objective truth.

There seems to be a consensus that qualitative methods are appropriate for *understanding* (interpreting and explaining) and *theory generation* (e.g. Bryman & Bell, 2007; Eisenhardt, 1989; Flick, 2006; T. W. Lee, 1999). It seems appropriate to use qualitative methods in this research since the area of focus is in

understanding a phenomenon in a scantily investigated area. Furthermore, QM is inherently an heuristic approach, meaning it is always possible to find even better ways, and cannot be used in the sense of optimisation (Winter, 1994). In other words, the thesis investigates opportunities for QM to function in SMEs and does not develop a model for statistical generalisation and calibration for different kinds of SMEs. That is not to say that the case study findings cannot be analytically generalised, which can prove to be more powerful (Flyvbjerg, 2006; Ruddin, 2006).

Several types of qualitative research strategy are found in the literature, including grounded theory, case study, action research and systematic combining (Bryman & Bell, 2007; Dubois & Gadde, 2002; Eisenhardt, 1989; T. W. Lee, 1999; Shani, David, & Willson, 2004). However, there are hardly any univocal definitions for any of these strategies. For example, while T. W. Lee (1999) made certain distinctions between case studies and grounded theory, the descriptions of case studies by Bryman and Bell (2007) or Eisenhardt (1989) are in many ways closer to grounded theory than case studies (according to Lee's criteria). Another example is the description of systematic combining, which essentially opens more doors than it closes (Dubois & Gadde, 2002). A common factor, though, is that most of the described strategies allow for the inclusion of different methods for data collection and, where mentioned at all, various methods for data analysis.

A synthesis of literature on research methodology reveals that *interviews*, *focus groups*, *observations* and *document review* are especially common methods for data collection (Bryman & Bell, 2007; Flick, 2006; T. W. Lee, 1999). Data analysis must be performed continuously and is tied to the type of data that is being gathered (T. W. Lee, 1999).

In relation to the topic of this thesis, one general problem with all qualitative methods concerning verbal data (such as focus groups and interviews) is the apparent gap between people's opinions and perceptions and the studied phenomenon. There are similar problems with observational data: what is observed is not necessarily the same as the reality that is hoped to be examined. Hence, there is a risk of a gap between the collected data/results and the conclusions. Figure 2 provides an example of potential gaps when using interviews in order to reach some "objective truth". In this way, the research for this thesis is fairly close to the domains of critical realism (Bryman & Bell, 2007). The author has been aware of these gaps, has taken care not to present anything as something other than it is and has presented interviewee views as views. The author has also attempted to bridge these gaps, both analytically and with triangulation, using methods such as multiple interviews and other data sources. It should be noted that while triangulation, in a traditional sense, often refers to validating results using different data sources, triangulation in qualitative research is more about expanding the dataset; increasing scope, depth and consistency (Flick, 2006).

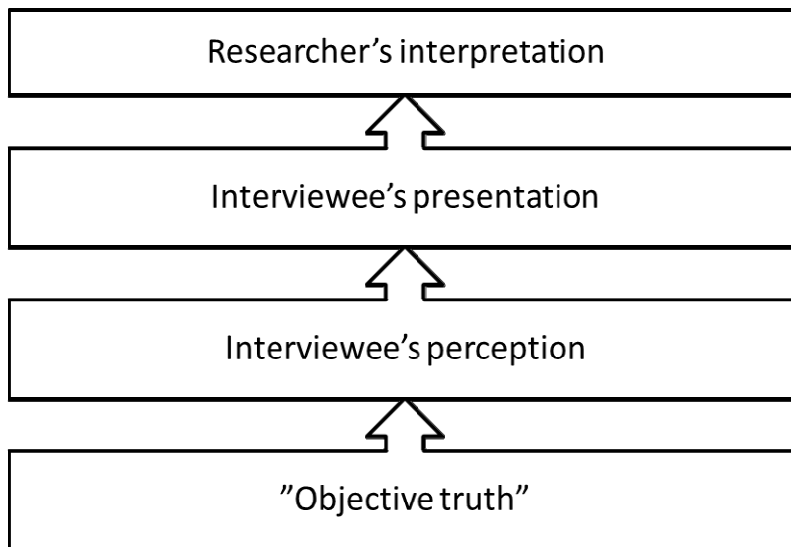


FIGURE 2: POTENTIAL GAPS IN DATA OBTAINED WITH INTERVIEWS, FROM “OBJECTIVE TRUTH” TO RESEARCHER INTERPRETATION

## 3.2 EMPIRICAL DATA COLLECTION

### 3.2.1 INTERVIEWS

Interviews are fairly standard for management studies and they can be categorised into unstructured, structured and semi-structured interviews (T. W. Lee, 1999). According to Bryman and Bell (2007), the lack of variation is a strength for structured interviews. However, this has not been a concern for the interviews conducted for this thesis, given that the aim has been to capture variation. In other words, with a more rigid approach, it is much harder to capture unexpected phenomena, and at least one of the papers in this thesis would have had a different, and arguably less interesting, focus. Semi-structured interviews were able to remain flexible enough to probe emerging subjects in the conversation as well as allowing the respondents to provide their full viewpoints (Flick, 2006; T. W. Lee, 1999). This method aligns well with the open-ended and probing purpose. More structured interviews could be beneficial in future studies, when more direct comparisons and aggregations are sought, perhaps between different organisations. Semi-structured interviews allow an underlying theme, making sure the most important questions are answered to some extent, while also guiding interviews with less talkative interviewees. The more leading questions stemming from this approach are asked towards the end of each interview.

Interviews have been the main method of data collection for this research. For Paper I, some interviews – mainly the one with operators – served several purposes. Together with direct questions concerning the purpose of that paper, the interviews also probed issues regarding suggestions for specific local improvements. This meant that the part directly related to the paper’s purpose had to be more efficient and, for this reason, these interviews tended towards the structured side. Some of the interviews, which were directly dedicated to probing the paper’s purpose, were less structured. The late complementing phone interviews covered specific unclear issues and can be considered as almost fully structured. For Paper II, most of the interviews tended towards the non-structured spectrum of semi-structured interviews. By this time, the purpose of that study had not yet been fully set and the more open nature of these

interviews allowed for the discovery of interesting themes, which would probably not have been discussed otherwise. In retrospect, a more structured approach could have been useful when interviewing operators who had not been with the company very long. As described, in one case this resulted in very little useful data, since the interviewee did not have much to say.

### 3.2.2 FOCUS GROUPS

T. W. Lee (1999) described focus groups rather generally, while Flick (2006) lets the denomination also include group interviews and group discussions. T. W. Lee (1999) emphasised the use of focus groups in settings such preparatory data collection. T. W. Lee (1999) singled out efficiency as the primary advantage of focus groups. However, Flick (2006) specifically stated that focus groups probably require more effort than interviews. The advantage of focus groups over multiple interviews is instead the stimulation of the respondents, which may lead to answers beyond those that other methods would have unlocked (Flick, 2006). The stimulation may also work as an incentive for the respondent to actually participate at all. A chance for discussions with similar-minded people from companies operating in similar environments, together with networking opportunities, may encourage respondents to spend resources in order to participate. Then again, one drawback of the method would be that the incentive can fail and that all the respondents cannot free resources to join a set occasion. This is probably easier with interviews, where the place and time is likely to be more flexible from the respondent's point of view; that is, short time commitment and on-site.

Having considered these aspects, the study opted to use group discussions, but only sparingly. For Paper I, for example, a group interview was used in order to see if the potential interviewee interactions would reveal new aspects. More emphasis has been placed on individual interviews.

### 3.2.3 OBSERVATIONS

Actual observation makes it possible to identify how something actually works or occurs in a way that is impossible with verbal data alone (Flick, 2006). According to T. W. Lee (1999), observations are the most common type of qualitative method. For this research, non-participant observations would not be feasible, since the researcher's presence would have to be clearly visible (Flick, 2006). With participant observations, however, data can be gathered while addressing an organisational problem (Flick, 2006). Gummesson (1985) said that the strategy allows for insight and trust that simply is not possible with fewer interactions. Of course, this comes at the expense of a bias and possibly less distanced (or less "objective") research. Then again, if one epistemologically believes in the trustworthiness of qualitative studies, then objectivity is probably more of a subjective notion.

This research has used observations to varying extents. Data was gathered for Paper I over a long period of time while participating in company projects. The observations made for Paper II took place over a short period while attending the company for the interviews. Therefore, Paper I is more of a participation study and the observations made in Paper III are more along the lines of study visits.

### 3.2.4 DOCUMENTS

There are two main types of documents: solicited and unsolicited; that is, those that are made for the research and those that are not. Documents have the potential to offer relatively unfiltered information. Unsolicited documents are those for which the presence of the researcher has not affected the data. This does not necessarily mean they are unbiased, however; it is important to ask the question of "who has

produced this document for which purpose and for whom” (Flick, 2006, p. 246). Documents are often studied as communicative devices rather than for their contents. (Flick, 2006)

The study of company communications can be a valuable way of triangulating and expanding the data set, as well as talking with employees and management. Documents have been used to some extent throughout the research for this thesis. For Paper I, the company intranet was scrutinised for relevant internal communications, as were other materials, such as posters. For the study in Paper II, documents compiled for external distribution allowed for further understanding, as well as an understanding of the image that the company was actively trying to disseminate.

### 3.2.5 COMBINATION OF METHODS

It is common for a qualitative study to include multiple techniques; for example, empirical data in a case study can comprise both interviews and observations (T. W. Lee, 1999). In qualitative research, neither the methods of observation nor analysis are standardised (T. W. Lee, 1999). As Flick suggested, “perhaps qualitative research should be understood as art *and* method” (2006, p. 408).

Furthermore, qualitative and quantitative research methods may be used in the same study (Bryman & Bell, 2007; Flick, 2006). Flick (2006) described different combinations of qualitative and quantitative studies, such as continuous and simultaneous or iterative. A possible first step could be to explore the area by using repeated company visits (small case studies), including continuous dialogues with a small set of SMEs, and then expanding the horizon with a larger survey and finally using more field studies to deepen the understanding and ensure the trustworthiness of the results. T. W. Lee (1999) advocated the continuous utilisation of qualitative and quantitative methods, wherever deemed appropriate. Lee said that “methods of categorical analyses can and should be employed when feasible” and that it is important to always “count the countable” (pp. 81, 126). However, it is also important to be aware of the limitations of the different methods, to avoid falling into quasi-quantities traps such as recounting “3 out of 4 respondents state that ...”, which implies some statistical significance (Czaja & Blair, 1995). Another obvious risk with combining any methods is a loss of focus, which can result in using a lot of resources and space without saying anything. This risk is even larger with the combination of qualitative and quantitative methods since it challenges fundamental points of view. If a researcher claims that everything is case-specific and needs to be interpreted as such, and then tries to generalise through statistical analysis, this combination would, at best, be confusing for the uninitiated and, at worst, could destroy the research logic.

For this thesis, a broad knowledge of methods has been maintained, and combined when deemed appropriate. However, no quantitative research methods have been used.

### 3.2.6 RESEARCH TRUSTWORTHINESS

The empirical data from Paper I was collected over an extended period of time, during which two of the authors spent hundreds of hours at the company’s site, actively collaborating with company staff. This action research approach allowed for initiated observations, which means that the research does not fully rely on what interviewees chose to communicate. It also allowed for a mixed insider/outsider image in communications with company employees, including interviews. The employees knew that the researchers were insiders entrusted with company secrets and they frequently had friendly chats while also viewing company particulars from an academic perspective. Potential issues in these kinds of studies are that the researchers become overly familiar with the setting and lose their “objective” perspective. However, being

aware of this issue makes it likely that it will be averted. Also, the involvement of the third author and the journal review process help avoid this potential pitfall. Furthermore, there is never any guarantee that any empirical data is “true”. However, because of the length and depth of involvement, including the many people that were met, as well as triangulation from different data sources, the picture presented in Paper I is believed to be reasonable.

Paper II is a literature review and therefore requires different kinds of trustworthy reasoning than the other papers. The selection of papers to include in the study is described in a dedicated section of the paper, as is the rationale for the selection of what to include in these papers. The paper builds upon a categorisation on recommendations for QM adoption in SMEs and categorisations are inherently arbitrary. In this matter, it helps that two authors have actively discussed this categorisation and agreed on its form. Also, the categorisation is transparent to the reader, who can decide on its rationale. One pitfall for this kind of study is that important works and factors are omitted. What contradicts this concern is that papers that were scrutinised and added to the review in the later stages of the research process did not produce any major new findings, which increases the chance of saturation.

Paper III mainly builds on interviews performed in one day. This data is complemented by contacts before and after this date, as well as with company documents. The data sources are consistent with each other, which bodes well for the reliability of the picture presented in the paper. One concern with the study is that the paper describes company events and relays interviewees’ views on something close to a cause-and-effect relationship between a new way of working and financial results. The paper presents the views of the interviewees, not an objective truth. Another point of interest is the paper’s efforts at analytical generalisation. For this, the reader is presented with enough material to decide whether the results are fair. Also, as is argued in the start of Section 3, it must be up to the reader to make final sense of the offered material and results.

### 3.3 RESEARCH PROCESS

The research for this thesis was initiated by the division’s involvement in a European Framework Seven research project entitled Future SME ([www.futuresme.eu](http://www.futuresme.eu)). Prior to this, there had not been a great deal of research specifically concerning SMEs at the division at which this research has been carried out.

The connection to the Future SME project has been advantageous in that it has given direction and help in terms of tying the research to useful practice. It has been challenging at times, particularly when the synergy effects between project and research have not always been clear. It has also been a struggle to meet tight practice-based deadlines for the project while still maintaining a high level of research.

The original plan was to base the empirical data collection on a relatively large SME. At the time, the company in question was just about to start working towards a considerable QM initiative. From the beginning, the change leader for this initiative was enthusiastic towards the collaboration, which was only lacking final approval from senior management. Two years later, this approval has still not arrived, which shows that even SMEs can have complex hierarchical decision making. The collaboration is still on the agenda but is obviously outside the research scope for this thesis.

Instead, the case company in Paper III appeared more by chance. One of the graduate courses required the collection of empirical data. An employee from ‘WashCo’ – anonymized company name – had previously participated in a Six Sigma Black Belt course at the division, together with the thesis author. This made



him a natural, and in many ways practical, contact. The original idea behind the study was to obtain a general feeling of a small company's view on quality. Instead, it resulted in an interesting view of how the processes behind simple changes are not always so simple.

By this time, following empirical investigations and illuminating department courses on the subject, the author started to grasp the nature and value of single-case studies. Being an engineering student, the author thought along the lines of statistical generalisation being the mother of all valid research. However, a researcher can do only so much with statistics that claim something works in a set percentage, say 80 percent, of all cases; a practitioner can achieve even less. If the practitioner tries to implement something like this and just happens to be in 20 percent where it does not work, he or she will not care if most other people succeed. Besides, who can define a precise group to aim for when making statistical generalisations in the management sciences? This is not to say a statistical approach would not be viable; on the contrary, Section 5.2 contains several ideas for such studies. A large part of this thesis, however, has turned out to be about contextualisation, and so has the research method. Therefore, illustrative case studies are needed, because they provide good examples, the researcher can contribute with analytical generalisation and, even more importantly, the reader can form their own thoughts and adopt the pieces that fit their own context.

Figure 3 provides a snapshot of the timeline of research process, showing the main tollgates and efforts towards the different papers.

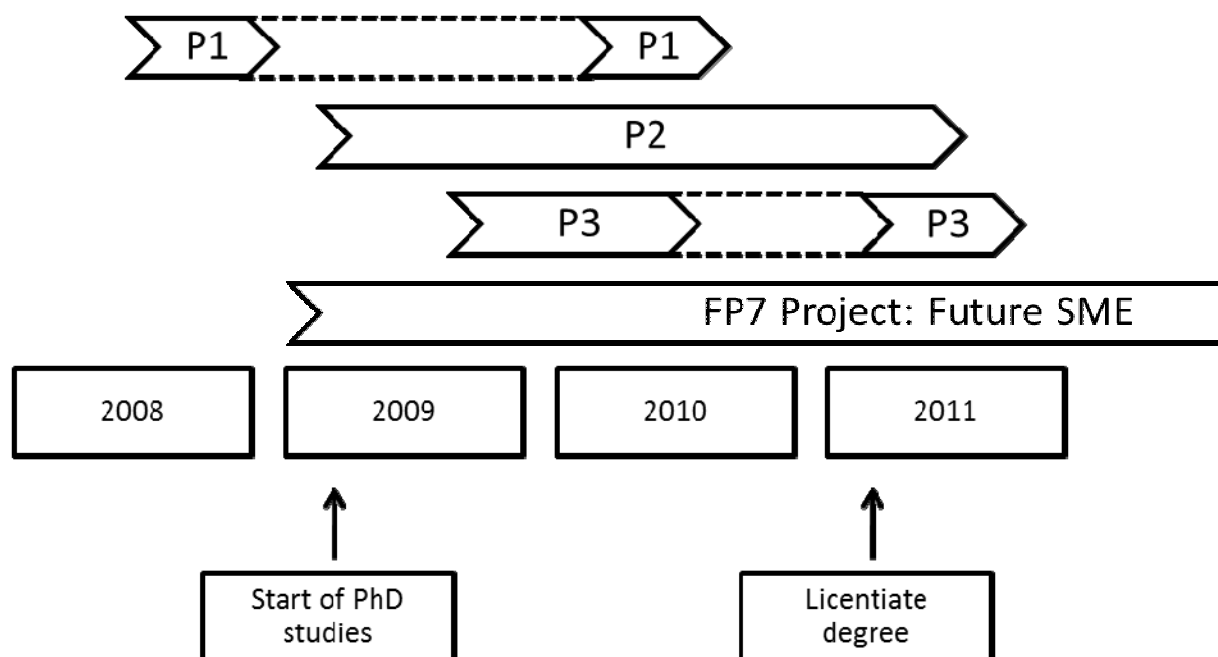


FIGURE 3: TIMELINE, SHOWING WORK ON PAPERS AND PROJECT



## 4 SUMMARY OF APPENDED PAPERS

This thesis is a compilation of research papers, which are appendices to the thesis. This chapter summarises these papers, which helps focus the discussions that follow and, to some degree, also allows the thesis stay independent of the full papers.

### 4.1 PAPER I: MULTI-FACETED VIEWS ON A LEAN SIX SIGMA APPLICATION

Lean and Six Sigma are two contemporary concepts used by many companies that are working to improve their operations (Arnheiter & Maleyeff, 2005). These methodologies have common roots in the Japanese quality revolution (Byrne, Lubowe, & Blitz, 2007; Dahlgard & Dahlgard-Park, 2006) and an explicit merger of the two – often referred to as Lean Six Sigma (LSS) or Lean Sigma – could be beneficial (Antony, Escamilla, & Caine, 2003; Van Den Heuvel, Does, & De Koning, 2006). Proponents often stress the complementary benefits of combining the pragmatic and value-centred Lean with the data-driven Six Sigma (Arnheiter & Maleyeff, 2005; Kumar, Antony, Madu, Montgomery, & Park, 2008). There are different ideas regarding the complementary nature of these concepts, one being that Lean can contribute with strategy while Six Sigma contains tools for effective improvements (Pepper & Spedding, 2010; Ricondo & Viles, 2005). Six Sigma and Lean can ultimately be seen as having the same goals (Nave, 2002). While the literature seems to be mainly positive towards the combination, some observers do feel that there are inherent conflicts between the two systems (Bendell, 2006).

To date, academic discussions on the synergies of Lean and Six Sigma have mostly been conceptual. While this is a necessary starting point, it means that less attention has been devoted to how they actually work in practice. Paper I considers an application of Lean Six Sigma in practical improvement work, providing inspiration and identifying important factors for successful Lean Six Sigma applications. The research for the paper was conducted in an action research manner, working together with the employees of a production facility of a large Swedish manufacturing company.

The history of Six Sigma at this company dates back to the mid-1990s. At that time, the company investigated Six Sigma ideas in order to address product quality issues in production. The system was adopted on a bottom-up basis; spreading on success, work unit to work unit. It started in assembly only and has today been adopted as a unit-wide initiative that continues to spread throughout the company. Over time, however, the company's management was not certain that the large improvement projects generated by the Six Sigma ideas would be enough to secure successful positions in the future. Looking at Toyota and Scania for inspiration, they recently adopted Lean as a way of involving all members of the company in continuous improvements. A new Company Production System was launched, within which Lean and Six Sigma had important roles.

Within the company, Lean was seen as providing the benefits of continuous improvements, while Six Sigma provided structure for breakthrough improvements. Both systems have now been integrated in the company, although not always in individual projects. However, the system is more multifaceted than such a simple description implies. Instead of discussing how to implement “Lean Six Sigma”, the company has selected the parts of Lean and Six Sigma that are most appropriate for its business and adopted them for its production system. The company uses different approaches for incremental micro-projects performed at the lowest level by small improvement teams and for extensive projects performed by highly trained improvement experts. Small improvement teams are mostly inspired by Lean, while larger projects are

most often structured according to Six Sigma. In this way, the methodologies complement each other. However, there are also examples of more synergetic parts of the integration. For example, the Six Sigma DMAIC approach is always used, in its normal full approach for large projects and in a lighter version for smaller projects.

The Lean Six Sigma application in the company studied here does not point towards a specific, well defined Lean Six Sigma approach. The case company does not implement any fixed outside ideas and is instead influenced by external ideas and adopts them to the company context. Similarly, there are no fixed specifics for other companies to blindly copy but there are several good examples to consider. The case company ultimately supports the integration of the concept by ensuring that their improvement specialists are widely trained in both Lean and Six Sigma, leaving integration at this level up to the skilled individuals.

#### 4.2 PAPER II: A CATEGORIZATION OF IMPLEMENTATION ADVICES FOR QUALITY MANAGEMENT IN SMALL AND MEDIUM SIZED ENTERPRISES: A LITERATURE REVIEW

Paper II provides a synthesis of recommendations from the literature on QM adoption in SMEs. The implementation of these recommendations has been synthesised into six main categories: Involve external support, Involve and train employees, Implement gradually with realistic goals, Involve management, Track performance and benchmark, and Contextualize to the organization.

Involve external support: SMEs are often short on resources, namely money and time (Jones, Knotts, & Brown, 2005), the latter of which applies to both management and employees (Yusof & Aspinwall, 2000). Suggestions for solutions include seeking support from governing bodies (G. L. Lee & Oakes, 1995; Rahman & Tannock, 2005) and universities, sharing through company networks (Ahlström-Söderling, 2003; Thomas & Webb, 2003) and using consultants (Thomas & Webb, 2003).

Involve and train employees: There is general agreement about the importance of involving all employees (Beheshti & Lollar, 2003; Salaheldin, 2009; Van der Wiele & Brown, 1998). SMEs rarely have a great deal of distance between employees and management (Ahire & Golhar, 1996; Ghobadian & Gallear, 1997), which means that employee involvement may be easier to accomplish in an SME than in a larger company. However, active communication should not be seen as a given. Even if it may be easier than in large companies, efforts must still be made to ensure information reaches everyone (Kumar & Antony, 2008; Rahman & Tannock, 2005) and that everyone strives towards the same goals (Rahman & Tannock, 2005). Employee training is crucial (Davig, Brown, Friel, & Tabibzadeh, 2003) but decisions regarding it must be made sensibly and must consider the high costs (Hodgetts, Kuratko, & Hornsby, 1999).

Implement gradually with realistic goals: It can be counter-productive to try and change everything, everywhere, all at once (Ghobadian & Gallear, 1997; Struebing & Klaus, 1997; Yusof & Aspinwall, 2000). Instead, the first projects should be chosen in order to show early profits (Yusof & Aspinwall, 2000). This may be achieved through pilot projects that show the potential of QM ideas and work. Nonetheless, some good changes can produce good results early, while others may take longer. It is important to have realistic goals and expectations and not expect too much too quickly (Ghobadian & Gallear, 1997; Struebing & Klaus, 1997).

Involve management: Involving management is generally seen as an important factor (Ahire & Golhar, 1996; Jones, et al., 2005; Yusof & Aspinwall, 2000). This helps ensure sufficient resources (Beheshti & Lollar, 2003; Tannock, Krasachol, & Ruangpermpool, 2002) and also a personal involvement in the activities (Beheshti & Lollar, 2003; Hodgetts, et al., 1999; Tannock, et al., 2002). It is important that managers ensure that QM activities are aligned with the company's goals (Hansson & Klefsjö, 2003). High management visibility is one of the potential strengths of an SME, so demonstrating commitment can be easier in an SME than in a larger company (Ghobadian & Gallear, 1997), which can make it easier for the company to realise change (Ghobadian & Gallear, 1996). On the other hand, sceptical senior management can effectively block progress (Ghobadian & Gallear, 1996).

Track performance and benchmark: Data collection is an integral part of being able to base decisions on fact and is therefore important (Kuratko, et al., 2001; Salaheldin, 2009). Preferably, the data collected should focus on basic data, such as sales and customer satisfaction, and more detailed data should only be collected if handled properly (Hodgetts, et al., 1999; Kuratko, et al., 2001). Also, many interesting examples and solutions are readily available outside the company explaining why benchmarking is an effective practice (Salaheldin, 2009; Struebing & Klaus, 1997; Tannock, et al., 2002).

Contextualise to the organisation: QM ideas should not be embraced blindly. The first step towards successful usage is to identify the needs of the company (Ghobadian & Gallear, 1997; Hansson & Klefsjö, 2003; Tannock, et al., 2002). In other words, the need should come before the solution. Instead of replacing everything old, new methods should innovate and improve (Hodgetts, et al., 1999). Some company practices or behaviours may need to be completely changed (Ghobadian & Gallear, 1997), creating a need to balance new practices with old.

The paper also compares the literature on QM in SMEs with more “generic” QM frameworks (Bergman & Klefsjö, 2010; Dean & Bowen, 1994) and finds the following distinguishing features:

- A larger focus on how to support initiatives in terms of money and time
  - Ideas for “solutions” include heavy involvement by government and academia, as well as business networks for SMEs that share and pool QM resources.
- A larger focus on contextualisation to individual companies
  - There are many ideas about QM, most of which are developed in the context of larger companies. Even though all companies must always consider what fits in their companies, this might be even truer for small companies. However, it requires extensive knowledge of management ideas.
- A lack of explicit customer focus.
  - It has been argued that small organisations possess strong implicit customer focus (Rantakyrö, 2004). They are established with the purpose of serving the customer and have yet to lose this in hierarchy and bureaucracy, which may be why it is not necessary to express this explicitly.

The paper discusses the need for individual, contextualised, approaches for each SME when designing an improvement programme, as well as the feasibility of a general approach when compared to larger organisations.

SMEs are not a completely homogenous group and the same ideas and suggestions cannot be used for all SMEs. The differences in areas such as size, turn-over, company culture, national culture and business area (e.g., service/production) are so great that no conclusions can be universal for this vast group. In QM implementation, it is important to consider variation between SMEs, and therefore contextualisation must occur not only at the level of SMEs, as opposed to large companies, but also to the specific organisation. There is a need for sensible and educated judgement regarding what fits and how QM can be implemented in any organisation. For example, a larger medium-sized company might have no problem sponsoring a full-time position for a person leading the QM implementation and related training, which means there is little sense in focusing heavily on solving these issues by, for example, sharing resources with other organisations.

#### 4.3 PAPER III: EXPLORING QUALITY MANAGEMENT IMPLEMENTATION FACTORS: IN-DEPTH STUDY AT ONE SMALLER COMPANY

Paper III is based upon semi-structured interviews at the case company, here named WashCo. The original purpose of the study was to investigate the company view on quality, covering topics such as how they viewed ISO9000 certifications and how they related their processes to customer expectations. During the interviews, however, it soon became apparent that this was not what was interesting in this case. Instead, this case could reveal some interesting issues regarding the process of adopting new ways of working.

In early 2000, John took over a small business that specialised in washing small industrial containers. The six operators in the production area collected a container, brought it to their individual work area, performed all procedures in the cleaning process and then returned the container. At that time, the production floor resembled a job-shop and there were moving forklifts everywhere. Over the next few years, the business expanded, with a lot of hard work and overtime for everyone. By 2005, the business had reached capacity; there was simply not enough room in the production areas to perform all the work. John realised that something had to be done, even though he could not decide what that would be. He considered faster trucks, ways to unload the trailers faster and stronger water pumps. In 2005, quite by chance, his brother Peter ended up working for John. Peter had some training in business and process management and realised there was room for improvement in his brother's business. Peter tried for a long time to convince John about new ways of working, essentially working smarter rather than harder. His suggestions were not very controversial and revolved around basic process management ideas. However, to someone unfamiliar with basic process management ideas, they seemed quite radical. The employees, and certainly John, refused to listen. After a long time, Peter finally gained their attention and four years since Peter started, the company's turnover has doubled and its capacity has tripled. All interviewees are certain that this progress is largely due to the new ways of working.

This case suggests the importance of improvement methods. Ideas from methodologies that have proven valuable in large companies, such as Six Sigma and Lean, can certainly aid smaller companies. If the new methods do not yield any results, however, such initiatives would and should diminish and disappear; the same idea could work in one context and fail in another. Experiences from this case show that broad knowledge of improvement methodologies is needed in order to identify what fits where and when. In companies where this knowledge cannot be found internally, it must come from the outside.

However, committed management is perhaps an even more pressing issue, since it is a prerequisite to working with any new ideas. In a small company, the owner-manager ultimately decides what should and

should not be used. The owner-manager can stop or, to some extent, force any idea. The most difficult part in the transformation process of a small company may relate to management’s acceptance. Despite this, most current QM research on the development of SMEs has centred on operational details. There seems to be a general need for research on the specific topic of adoption of QM in SMEs. This implies a specific need for research on how to reach and convey information to owner-managers to enable better ways to operate their companies.

#### 4.4 RESEARCH RATIONALE

So far, this thesis has argued extensively that many larger companies have effectively exploited the benefits of QM (e.g. Beheshti & Lollar, 2003; Hansson, 2003; Kuratko, et al., 2001; Thomas & Webb, 2003; Yusof & Aspinwall, 1999). Because this thesis revolves around the feasibility of ideas developed in the context of larger companies, a study on good practice in such a company is needed as a baseline for further studies. Lean and Six Sigma are popular contemporary process improvement methodologies for companies that seek operational excellence (Arnheiter & Maleyeff, 2005) and, fittingly, represents QM ideas. Paper I is an investigation into the organisation of an initiative based on Lean and Six Sigma in a successful large company, which is also deemed successful in terms of this work. Consequently, this paper meets the abovementioned need and investigates how such an initiative can be organised.

The second paper reviews literature on critical success factors for adopting QM in SMEs. It synthesises and groups recommendations, describing a framework of important issues to consider when adopting QM in SMEs.

As Paper II shows, there are myriad ideas regarding the adoption of QM in SMEs. However, most of these are largely conceptually based and there is a lack of rich empirical descriptions. Paper III explores a specific adoption process in one smaller company – WashCo – and analyses the findings through the model described in Paper II. As such, Paper III is a test of the framework described in Paper II and also highlights important issues beyond this framework.

Table 1 lists the important attributes of each of the papers, including the purposes.

**TABLE 1: SUMMARY OF APPENDED PAPERS**

	<b>Paper I</b>	<b>Paper II</b>	<b>Paper III</b>
<b>Area</b>	Lean and Six Sigma	QM in SME	QM adoption in one SME
<b>Purpose</b>	- Understanding of how modern QM works in a large and acknowledged skilled company - Serves as a baseline for idea development	- Investigates literature ideas on QM adoption in SMEs	- Example of adoption in a small company, evaluating the framework of Paper II - Highlights adoption issues
<b>Theoretical area</b>	Lean/Six Sigma	QM-related management concepts in an SME perspective	QM adoption in SMEs
<b>Background</b>	Much has been written about theoretical combination, but few examples of practical applications	QM described thoroughly in area of large companies, but few extensive studies in smaller perspective	Few case studies on QM in SMEs

<b>Main empirical data</b>	Interviews Observations	No empirical data	Interviews
<b>Scientific contribution</b>	Described LSS case / Emphasis on contextualisation	Synthesis of existing literature on QM in SMEs	Described SME case / Process of adoption is important factor
<b>Method</b>	Semi structured inter- views / Action research approach	Literature review	Probing semi- unstructured interviews
<b>Co-author</b>	Gremyr, I; Bäckman, K	Gremyr, I	-
<b>Contribution by thesis author</b>	50%	50%	Full



## 5 DISCUSSION AND CONCLUSIONS

Paper II uses a literature review to identify the following critical adoption factors for QM in SMEs: Involve external support, Involve and train employees, Implement gradually with realistic goals, Involve management, Track performance and benchmark, and Contextualise to the organisation. By comparing these factors with what has traditionally been emphasised in QM work (Bergman & Klefsjö, 2010; Dean & Bowen, 1994), there are three deviating issues, namely the large focus on contextualisation to individual companies, focus on how to support the initiatives in terms of money and time, and a lack of explicit customer focus. SMEs usually have an inherent and implicit focus on the customer (Rantakyrö, 2004), with which the relative lack of customer focus can feasibly be explained.

### 5.1.1 ON CONTEXTUALISATION

Paper I suggests that all existing “pre-packaged methodologies” are to be used as inspiration, with companies choosing the appropriate parts for their own production system. This idea converges with propositions from Conner (2009) and Hansson and Klefsjö (2003), among others, that all QM ideas not only need to be contextualised to the SME context but also to the level of specific situations. This idea is also apparent in Paper II, reinforcing the idea that any QM adoption must be contextualised. Companies should be learning from “best practices, and applying them in an intelligent way within a strategic framework” (Brown & Maylor, 2005 on product innovativeness).

Paper III shows that a broad knowledge of QM ideas was needed in order to find out what worked in the context described in this paper. Furthermore, by studying insights from Paper I in the context of Paper III, it appears certain that ideas from the case company in Paper I would be more or less immediately applicable. After all, although a large company is a large company, it is made up many small parts. An example of this is the use of “DMAIC light”, which helps ensure that projects are effected in a systematic manner. Other aspects, such as the use of relatively advanced statistics and advanced toll gate systems, are outside the scope for WashCo. However, there is no evidence that the same suggestions would be reasonable for all SMEs.

The issue of contextualisation can also be highlighted by the seemingly contradictory advice that can be found in literature (see e.g. Deleryd, et al., 1999; Thomas & Lewis, 2007 on the issue of statistical methods in SMEs). Apparently, different things fit in different contexts, whether it is different industries, company sizes, locations, sectors, maturity levels, time, or simply different people. There is no provision in either the literature review or the empirical studies that QM ideas would not work in SMEs. If anything, these suggest that they can help in most situations, even if different ideas are suitable in different contexts. Working from this assumption, a broad range of knowledge is needed for this contextualisation. Beyond the adoption recommendations in Paper 2, and the limited translation of ideas from Paper I to the context of Paper III, this research does not offer any definitive insight into whether some QM ideas work well more often than others.

### 5.1.2 ON SCARCE RESOURCES

The research for Paper I is conducted in the context of a larger company and depicts a situation in which, due to resource characteristics, it is relatively easy to acquire the necessary competence and devote energy towards systematic adoption. For smaller companies, where individual salaries may constitute a significant dent in the balance sheet, this may not be as easy (Hudson, et al., 2001). This proposition is

further supported by Paper III, which shows that acquiring and maintaining competence may be difficult for a small company. Generally, monetary resources in a small company equate to the resources of the owner-manager, which are not spent lightly (Bridge, et al., 2003). In the case of Paper III, it was difficult to convince the owner of the idea of borrowing and spending money on something abstract. Later, once the owner-manager was convinced, the bank still had to be convinced of the same, and apparently some banks are not familiar with the value of modern management ideas.

Therefore, the resource barrier for SMEs embarking on the realisation of QM ideas is based on owner mindset issues, issues in acquiring the funds, as well as issues in employee and competence resources. The lack of employee and competence resources is manifested in issues with acquiring knowledge but also in the lack of available personnel for crucial activities. In an SME, people are often fully occupied with current operations and fire-fighting activities (Hudson, et al., 2001), and employing additional personnel for small task areas often implies a disproportionately large cost (Bridge, et al., 2003).

### 5.1.3 ON THE ADOPTION PROCESS

Moving beyond the framework described in Paper II, Paper III identifies one of the major parts in that particular change process as convincing the owner-manager. The literature on QM in SMEs certainly addresses the importance of committed leadership (e.g. Beheshti & Lollar, 2003; Hansson & Klefsjö, 2003; Tannock, et al., 2002) but most literature assumes that the management does not actively resist the change. As noted by Ghobadian and Gallear (1996), change is much harder when the management is actively sceptical. This raises the important issue that the adoption of QM in SMEs is not only about *what* and *where* but also about *who*. If positive changes should be made, and the owner-manager is not interested, someone else has to drive it.

## 5.2 FUTURE STUDIES

This thesis is a work at the licentiate level, with the intention of continuing it to doctorate level. Hence, an important piece of this presentation is to prepare the groundwork for the continuation.

The discussion above showed that the study in Paper III is valuable in relation to Papers I and II. As only one study in one context, the value that can be drawn from this approach is likely to be far from exhausted. More studies similar to that in Paper III, either at similar companies or at companies far from WashCo, according to the broad SME definition, are likely to also provide further ideas on what parts from the large company example in Paper I may fit in SMEs, by providing further illustrative examples and possibly also by a degree analytical generalisation. In addition, such studies would likely continue to evaluate and expand the framework described in the literature review in Paper II. Furthermore, such studies would also be valuable if considered from a change management perspective.

Combining the literature on QM adoption in SMEs with theory on Change Management and Management Innovations (e.g. Alänge, Jacobsson, & Jarnehammar, 1998; Birkinshaw, Hamel, & Mol, 2008; Juran, 1964; Leonard-Barton, 1988; Rogers, 1995) has the potential to provide new views on QM adoption processes. For the further study of success cases, it would be intriguing to focus on how change started, and especially when, how and why the owners realised that QM ideas were worth trying. As interesting as it would be to study less successful, or even failed, cases, these are much harder to study, for obvious practical reasons.

Lastly, there are also many opportunities for quantitative approaches. For example, a better understanding of what the adoption process can look like could allow more focused data collection from a considerably large sample; for example, by surveys or more structured interviews. These kinds of alternative approaches, involving use of different methods, can also be motivated by the research process involving not only research, but also being part of a doctoral education.

### 5.3 CONCLUSIONS

The purpose of this thesis is to investigate antecedents for QM ideas and practices in SMEs, thereby contributing to the knowledge on how to adopt QM in SMEs.

As could be expected from only studying the theory of how SMEs are different from large companies, QM adoption involves a considerable focus on how to overcome the barrier of scarce resources in SMEs. This barrier appears both internally, as mindsets and employee shortage, and externally, in the form of funding difficulties.

Another important aspect from this categorisation is that contextualisation is a keyword in the adoption of QM in SMEs. What works in one context does not necessarily need to work in another, regardless of whether the difference is between large companies and SME or between seemingly similar companies. However, the present research has suggested that some QM ideas could be utilised in SMEs, even if the feasible ideas are different in different contexts. This calls for broad knowledge in order to identify good ideas for specific situations.

Furthermore, the research in this thesis highlights the fact that antecedents for QM adoption in SMEs are not only questions of *what* and *where*, but also of *who* and *how*. Good ideas do not appear at the right place by themselves and, even then, it is not even enough to have good ideas at the right place. Decisions in SMEs are highly dependent on the owner-managers and the involvement of management must be seen as one of the key issues – perhaps even the main one – to consider when adopting QM in SMEs.



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