

## Adoption of quality management in SMEs

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THESIS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

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Model for adoption of quality management in SMEs (see also Figure 10, page 43). Illustration by Åsa Palholmen.

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## ABSTRACT

Since its dawn several decades ago, quality management (QM) has become established as a concept for improving organisations. It is often manifested in companies today in various initiatives, such as “lean”, “Six Sigma” or “the Company Production System”. However, adoptions of QM are scarce in small and medium-sized enterprises (SMEs). Historically, some research has considered QM as universally applicable. This thesis demonstrates how characteristics of individual organisations, and different parts of QM adoption processes, influence what practices that are favourably applicable in SMEs. Furthermore, because of resource and competence scarcity, external interventions have been suggested as being valuable for supporting the adoption processes of QM in SMEs. The purpose of this thesis is to identify critical factors of, and functions of external interventions in, QM adoption in SMEs.

The results of the thesis are based on six research papers: one literature review, three company cases and two external intervention programme cases. These studies have helped identify a number of important stages of the QM adoption process: awareness and need, competence, adaptation, implementation, study, and action. Importantly, adoption processes should be viewed as complex and iterative in nature. In order to understand adoption processes, it is critical to recognise them as non-linear, and that they are not exclusively progressing but may also regress. These findings are further synthesised into a model that may provide practical guidance and inspiration for planning an adoption, as well as structure for analysing adoption processes.

Six categories of factors are identified as critical for adoption: gradual implementation using realistic goals, involvement and training of employees, involvement of external support, management involvement, and fact-based follow-up. Perhaps the most common characteristic of the SME context seems to be the need for external support, as many SMEs demonstrate a scarcity with resources, both financial and competence in adopting QM. It is also noted that publically financed improvement programmes can support in these regards, as well as in ensuring structure, and long-term planning.

Keywords: Quality management, continuous improvement, SMEs, adoption process, six sigma, lean production, implementation, interventions, literature review

## LIST OF APPENDED PAPERS

**Paper I** Assarlind, M., & Gremyr, I. (2014). Critical factors for quality management initiatives in small and medium-sized enterprises. *Total Quality Management & Business Excellence*, <http://dx.doi.org/10.1080/14783363.2013.851330>, 1-15.

Authored jointly by Assarlind and Gremyr.

**Paper II** Assarlind, M., & Gremyr, I. (2014). Initiating quality management in a small company. *Paper under first round of reviews for journal publication*.

Empirical material collected by Assarlind, who also drafted the first version. Revised jointly by Assarlind and Gremyr.

**Paper III** Assarlind, M., & Aaboen, L. (2014). An analysis of stagnated Lean Six Sigma adoption. *Paper under second round of reviews for journal publication*.

Empirical material collected by Assarlind. Authored jointly by Assarlind and Aaboen.

**Paper IV** Assarlind, M., Gremyr, I., & Bäckman, K. (2013). Multi-faceted views on a Lean Six Sigma application. *International Journal of Quality & Reliability Management*, 30(4), 387-402.

Empirical material collected jointly by Assarlind and Bäckman, who also jointly drafted the first version. Revised jointly by Assarlind and Gremyr.

**Paper V** Assarlind, M. (2014). Analysis of an improvement programme for MMEs. *Paper under second round of reviews for journal publication*.

**Paper VI** Assarlind, M., Eriksson, H., Gremyr, I., & Jakobsson, T. (2013). Adopting new ways of working in SMEs: Findings from interventions in 12 European companies. *Total Quality Management & Business Excellence*, 24(8), 945-958.

Authored jointly by Assarlind, Eriksson, and Gremyr. Jakobsson compiled table 3.

## ADDITIONAL PUBLICATIONS

Assarlind, M. (2010). *Exploring quality management implementation factors: In-depth study in one smaller company: "WashCo"*. Paper presented at the 13th QMOD conference on Quality and Service Sciences, Cottbus. This is an earlier version of Paper II.

Assarlind, M. (2011). *Antecedents for Quality Management in Small and Medium Enterprises*, Licentiate Dissertation, Chalmers University of Technology, Gothenburg.

Assarlind, M., Aaboen, L. and Arvidsson, M. (2013). *A process analysis of an implementation of Lean Six Sigma in a manufacturing medium-sized enterprise*. Paper presented at the 20th EurOMA Conference, Dublin. This is an earlier version of Paper III.

Assarlind, M., Eriksson, H., Gremyr, I. and Jakobsson, T. (2012). *Designing interventions in SMEs: Experiences from a pan-European multiple case study*. Paper presented at the 15th QMOD conference on Quality and Service Sciences, Poznan. This is an earlier version of Paper VI, and was appointed *Best Paper Award* at the conference.

Assarlind, M. and Gremyr, I. (2009). *Quality management in small and medium sized enterprises*. Paper presented at the Irish Academy of Management 12th Annual Conference, Conference Proceedings, Galway. Based on partly the same material as Paper I.

Assarlind, M. and Mellby, C. (2011). *Combining mechanistic and organic approaches to change: A case study on a Swedish national transformation program for medium sized enterprises*. Paper presented at the 14th QMOD conference on Quality and Service Sciences, San Sebastian. Based on partly the same empirical material as Paper V.

Ates, A., Assarlind, M., Maguire, C., Bititci, U. and MacBryde, J. (2011). *Enabling factors of adaptive capability in small and medium enterprises*. Paper presented at the 18th EurOMA Conference, Cambridge.

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Marcus Assarlind  
Gothenburg, January 2014



*To Dad*

*You are a part of me now*



# 1 INTRODUCTION

Constant changes in the business environment, such as new technology, competitors or ways of operating, have made it crucial for companies to be able to change and become better in order to sustain their business (Fine, 1998). As part of their work towards sustained business, many large organisations have adopted quality management (QM) (Sousa & Voss, 2002). QM can be seen as number of principles with connected practices and techniques (Dean & Bowen, 1994). Customer focus, continuous improvement, and teamwork are seen as core principles of QM (Dean & Bowen, 1994) and can be viewed as providing parts of the answers to organisations in terms of what to change and how. Core to the customer focus concept is finding out who the customers are, identifying their needs and expectations, and then fulfilling or exceeding these needs and expectations (Bergman & Klefsjö, 2010). Consequently, continuous improvements are central for reducing current waste and meeting future changes (Bergman & Klefsjö, 2010).

QM in large companies is often adopted in the form of various initiatives such as “lean” (e.g. Modig & Åhlström, 2012), “Six Sigma” (e.g. Schroeder et al., 2008), or perhaps “the Company Production System” (e.g. Netland, 2012). While QM has been widely adopted in large organisations, it is not as common in small and medium enterprises (SMEs) (Done et al., 2011), which can be defined quantitatively as companies with fewer than 250 employees (European Commission, 2005), or qualitatively as companies that include complete business functions and decision makings, while still being small enough to be managed by one or a few executives (Hollander, 1967). This thesis considers the adoption of QM in SMEs. In particular, the thesis shows that difficulties in adopting QM in SMEs are caused less by content (in the form of practices and techniques) than by process of adoption (Hansson & Klefsjö, 2003). Therefore, to support the further development of QM in SMEs, this thesis focuses on the process of adoption. Such a contribution has relevance for both practice and research.

## 1.1 RELEVANCE FOR PRACTICE

Increased competition has placed demands on SMEs to improve their operations (Yusof & Aspinwall, 2000b). Furthermore, not since the Second World War have times been as economically challenging for SMEs as they have since 2008 (Carson, 2012). With rapidly changing conditions, SMEs must be able to monitor, understand and react to changes in their business environment (Grundström et al., 2012). Large organisations are demanding that their SME suppliers work with systematic ways to improve their business and delivery precision (van der Wiele & Brown, 1998). Many authors (e.g., Ahire & Golhar, 1996; Brue, 2006; Conner, 2009; Kumar & Antony, 2008) have maintained that QM would be valuable for SMEs as a way of improving, but that many attempts have failed. For example, an American study was conducted of 500 firms that considered themselves as practising QM, approximately half of which were SMEs. Of these, one-third experienced benefits from QM while the other two-thirds had come to a halt before effecting much change (Ahire et al., 1996).

It has been argued that some organisations have rhetorically claimed to work with QM but have not actually adopted any of the related practices and have therefore failed to reap any benefits (Zbaracki, 1998). Another offered explanation of why adoption attempts fail is that while practitioners and researchers have treated QM as universally applicable, QM would benefit from a more context-based approach (Sousa & Voss, 2002).

Ahire and Golhar (1996) noted that SMEs cannot “blindly copy” QM work in large organisations, and that individual SMEs’ relative strengths must instead be exploited in the adoptions. Hansson and Klefsjö (2003) claimed that basic ideas of QM that work in large companies also work in SMEs, and that failed adoption attempts can mainly be attributed to poor adoption efforts rather than flaws in the concept’s content.

One of the general difficulties for SMEs is the scarcity of resources (financially, but also in competences; see also e.g., Bridge et al., 2003; Rahman & Tannock, 2005). Consequently, external support (in the form of programmes, for example) has been suggested as a potential solution for some SMEs aspiring to adopt QM (Done et al., 2011; G.L. Lee & Oakes, 1995). In summary, SMEs need better advice regarding how to adopt and adapt QM in their specific contexts. Therefore, there seems to be a practical need for better advice on how to succeed with adoption of QM in SMEs, including how external interventions can support such processes.

## **1.2 RELEVANCE FOR RESEARCH**

Unfortunately, while large companies have received the bulk of research attention, there is a general dearth of literature focusing on SMEs (Done et al., 2011; Prater & Ghosh, 2006), and therefore also of QM in SMEs (Ryan & Moss, 2005; Yusof & Aspinwall, 2000b). The literature on QM in SMEs has tended to focus on aspects such as specific characteristics of SMEs compared to large companies (Ghobadian & Gallea, 1997), the application of certain quality practices (Kuratko et al., 2001), and ideas for critical adoption factors (Yusof & Aspinwall, 2000b). Some studies have been generic, suggesting important factors with little regard for different organisational contexts (Assarlind & Gremyr, 2014). This could be partly explained by the fact that most of these previous studies have been conceptual or survey-based (Assarlind & Gremyr, 2014), with a lack of case studies (Achanga et al., 2006). This is unfortunate, since in-depth studies are crucial for understanding adoption processes in different contexts, which is something that survey studies cannot achieve (Rogers, 2003; Wolfe, 1994).

There is a need to understand the different needs of an organisation during the different parts of an adoption process. Many extant studies have discussed critical factors in terms of *what* is seen as important in an adoption process, but there is also merit in discussing *when* and *where* these factors are important. Sousa and Voss (2002, p. 105) made a similar argument in claiming that what research on QM “has as yet failed to produce are guidelines on what practices should be emphasized by organizations at difference stages of QM maturity and on what might be the best QM practice implementation sequence to reach the end result. On the other hand, the ‘how to do it’ research stream has taken for granted that all QM practices are universally applicable.” They

further maintained that there is a need to “contribute to structuring the current chaotic wealth of QM implementation advice and to producing more solid and useful advice to managers” (Sousa & Voss, 2002, p. 106). Therefore, there seems to be an academic need to better understand the QM adoption process and to structure and contextualise research on adoption of QM in SMEs.

### 1.3 PURPOSE

This thesis studies the adoption of QM in SMEs from the perspective of individual organisations, but also from a programme perspective (that is, programmes designed to support QM in SMEs).

*The purpose of this thesis is to identify critical factors of, and functions of external interventions in, QM adoption in SMEs.*

Much of the current advice regarding the adoption of QM in SMEs is unstructured and may be critical in certain contexts but not all. This suggests a need for structures based on what adoption processes look like. The first research question will lead to a description, and model, of the various elements and characteristics of a QM adoption process in SMEs:

*RQ1: What can processes of QM adoption in the SME context look like?*

Inspired by Damanpour (1991), this thesis defines the QM adoption process as *a process that includes events through which an organisation gains initial knowledge of QM, through which it is put to use, and through which it become an integral part of the organisation*. This process is investigated by identifying which components are important in the processes in the studied cases. These findings will be synthesised into a model.

This thesis not only considers the process of adoption, but also which factors are critical for this process:

*RQ2: What are the critical factors for adoption of QM in SMEs?*

A critical factor for QM is defined here as an *area of managerial planning and action that should be considered in order to achieve effective QM in a company* (Assarlind & Gremyr, 2014). The thesis will also contribute to discussions on *where* and *when* critical factors are relevant.

Since external interventions, including programmes, have been identified as potentially important support to SMEs’ adoptions of QM (Done et al., 2011), the final research question will specifically address the influence of such endeavours:

*RQ3: In what ways can external interventions influence QM adoption processes in SMEs?*

It is hypothesised that programmes can help in the form of financial and knowledge resources, an idea that is investigated further in this thesis. I will also look at additional functions that programmes can potentially have in adoption processes.

In the long term, this thesis should contribute by increasing the number of successful adoptions of QM in SMEs.

#### **1.4 DELIMITATIONS**

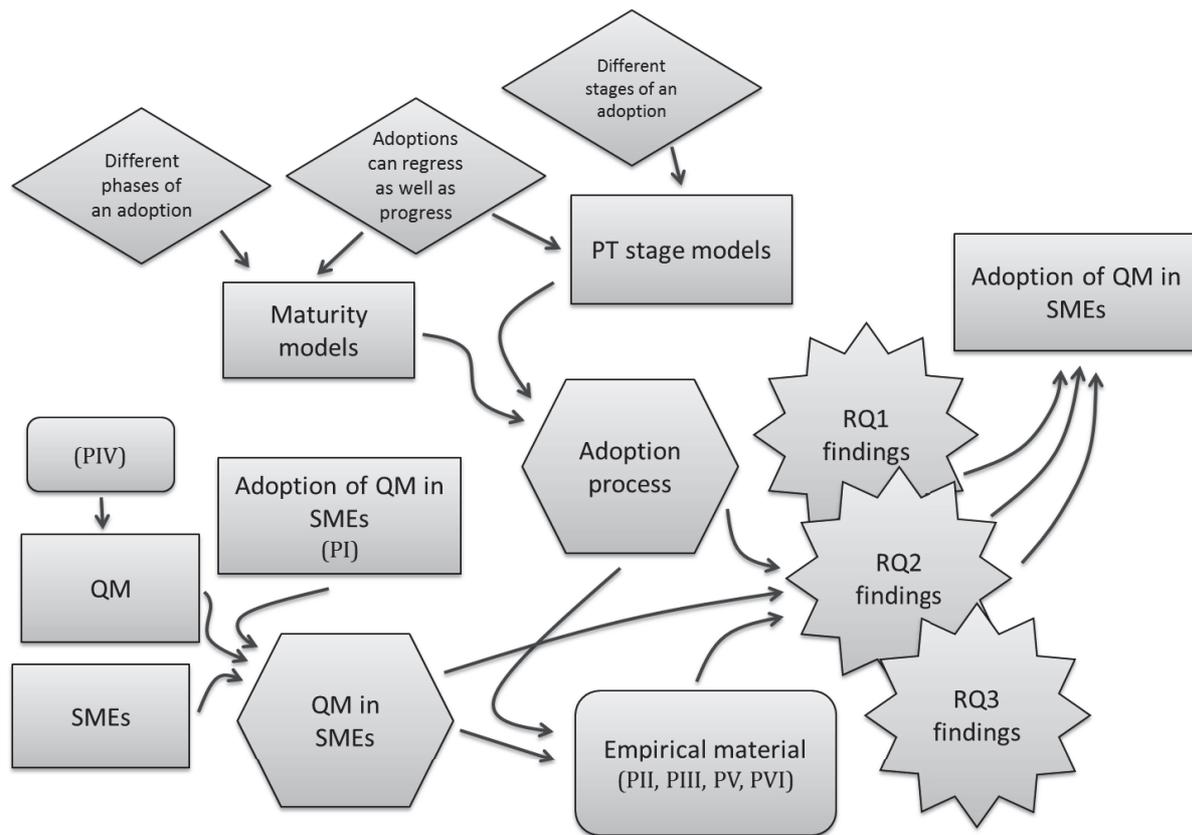
The term SME comprises everything from a manufacturing company with hundreds of employees to a service organisation with a handful of staff or even a one-person operation (European Commission, 2008). Therefore, in order to delimit the research, this thesis discusses the manufacturing context since this is the context in which QM has been most explored thus far. Furthermore, start-ups are excluded since such companies often face quite different issues than more mature companies. The companies studied in this thesis have all been around for a few years and have established business relationships.

#### **1.5 THESIS DESIGN**

This thesis presents case studies conducted at two SMEs, one small (SE) and one medium-sized (ME), as well as a case study that benchmarks QM work in a large company renowned for its QM work. I also present a cross-case analysis of 12 organisations that participated in an international transformation program for SMEs (the Future SME project), as well as the design of a well-recognized national transformation programme for medium-sized manufacturing enterprises (MMEs) (the Production Leap programme). The frame of this thesis considers these empirical studies jointly.

Figure 1 provides a graphical overview of the thesis. The overall view of the literature on QM, SMEs, and adoption of QM in SMEs, as well as on the empirical material, suggested that there were certain characteristics of adoption processes that could not be explained by this literature alone. It was noted that (a) there were different phases of adoption in an organisation depending on how developed the QM work was; (b) adoptions could regress and halt as well as progress; and (c) there were different stages of an adoption. In order to respond to and help explain these phenomena, additional theory was consulted – namely process theory (PT) and maturity models – which have helped provide a process view on QM adoption.

PT has a strong tradition in analysing adoption processes, but chiefly for technological innovations. QM, on the other hand, should be viewed as a management innovation (Alänge et al., 1998; Birkinshaw et al., 2008), of which the adoption process is generally seen not as linear but as considerably more complex (Alänge et al., 1998; Zbaracki, 1998), and with different levels of maturity. To account for these circumstances, the maturity perspective (e.g., Bessant & Caffyn, 1997; Lockamy III & McCormack, 2004) is used to discuss the role of different maturity models. The findings of the thesis include a model for adoption of QM in SMEs and contribute to the understanding of QM adoption in SMEs.



**Figure 1 – Overview of the thesis; showing connections between characteristics of processes (diamonds), literature fields (rectangles), literature syntheses (hexagons), empirical material (rounded rectangles), and thesis findings (stars).**

Chapter 1 introduces the subject, background and purpose of the thesis. Chapter 2 provides some theoretical background on the SME context for this thesis, while Chapter 3 provides the theoretical background on the other mentioned theoretical fields; divided into SMEs, QM and process view. Chapter 4 explicates the research methodology, both on an overall level as well as for each individual paper, complementing the method sections of each paper. In Chapter 5, the theoretical lenses are applied on the empirical material from the papers and analysing common themes from these. The findings are further discussed in Chapter 6, including how they relate to earlier research. Chapter 7 contains main conclusions, reflections and ideas for future research. The six papers are appended at the end of the thesis.

## 2 THE SME CONTEXT

This thesis considers adoption of QM, from the perspective of SMEs. This chapter examines literature on SMEs, regarding definitions and characteristics.

### 2.1 CHARACTERISTICS OF SMES

It is generally agreed that there are fundamental operational differences between SMEs and larger companies (e.g., Ahire & Golhar, 1996; Bridge et al., 2003; Hansson, 2003; Hudson et al., 2001; Rantakyrö, 2004). Hudson et al. (2001) summarised the key characteristics of SMEs 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 innovation potential
- Reactive, fire-fighting mentality
- Informal, dynamic strategies

Of course, these characteristics are only generalisations and may also change over time in an organisation. For example, one of the aims of working with QM is to get away from the fire-fighting mentality. Some SMEs spend so much time fighting fires that they fail to capitalise on any innovatory potential, while some large companies (such as Google) are known to have retained a high rate of innovations. Other characteristics are probably changing over time. The Internet as a means of communication has enabled small organisations, and even individuals, to instantly reach all corners of the world.

SEs are often owned and managed by a single individual. This means that the treasury is the manager's own money, which might mean that minimal funds are 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 SEs, 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).

Perhaps the most commonly cited characteristic of SMEs regards resource limitations. It is often said that it is harder for SMEs to dedicate resources (including for improvement efforts) than it is for large companies (e.g., Bridge et al., 2003; Hudson et al., 2001; Jones et al., 2005; Rahman & Tannock, 2005). However, Ghobadian and Gallear (1996) claimed that such concerns are

overemphasised and are usually merely a matter of management mind-set, while Beheshti and Lollar (2003) maintained that this scarcity of resources in a company may be beneficial if it forces an improvement initiative to focus on what is important for them. Still, it is a reality that many companies feel that they lack room for investments, which may hinder the start of a QM initiative due to the fear of costs associated with consultancy services, employee training and potential production stops (Achanga et al., 2006).

The size of an SME can also lead 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 when a company is small: even if the current number of specialised employees or machines are insufficient, one more full unit might not be worth the extra cost (Bridge et al., 2003). One more person or machine for a task that started with only one person or machine represents a 100 percent increase in capacity, but also in cost.

Again, these characteristics are generalisations. Using the European SME definition (European Commission, 2005), a company with 20 employees probably shows “personalised management, with little devolution of authority”, while this is not as likely in a company with 200 employees. Furthermore, companies that have similar external characteristics, such as industry and number of employees, might not be similar internally. Some very SEs have complex hierarchical structures (Rantakyro, 2004) and it is not uncommon to find a reactive, fire-fighting mentality in many larger companies.

## **2.2 DEFINING SMES**

O'Regan and Ghobadian (2004) conducted a survey study of 1000 SMEs in the UK, and found that the size variable (stratifying the data between 1–19 employee companies and 100–250 employee companies) could only explain a small proportion of the differences in terms of managerial and organizational processes. They concluded that the SME group is so heterogeneous that “terms such as micro, small and medium-sized firms fulfill administrative purposes only” (O'Regan & Ghobadian, 2004, p. 77). Even if this is accurate, it does not mean that SME research is not worthwhile, although it may suggest that care is needed when discussing the generalisability of results.

The European Commission has defined an SME as a company with fewer than 250 employees (fewer than 50 employees for an SE) that is independent of larger companies and has an annual turnover of less than 50 million euro (European Commission, 2005). 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 in the wholesale trade sector, while a mining company is considered an SME as long as it has fewer than 500 employees (OECD, 2004). Organisations within each of these definitions are inherently different. For

example, the issues facing an organisation with 15 employees differ greatly from those in an organisation with 90 employees, as they do for an advertising agency compared to a car-repair garage. The European Commission's definition further divides SMEs into micro-enterprises (fewer than 10 employees), small enterprises (11–50 employees), and medium-sized enterprises (51–250 employees). Empirical evidence supports this division with natural breakpoints: organisations that use more than one organisational unit; at approximately 15 employees (Turner et al., 2009); and at around 50 employees, at which point many organisations feel a need for more formal structures and specialists.

Furthermore, 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 mostly intended and 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 have limited room for ambiguity. Husband and Mandal (1999) suggested that one of the reasons for the lack of good QM research regarding SMEs is the lack of a clear definition of an SME. However, Storey (1994) also acknowledged the need for researchers to use tailored definitions in order for their research to make sense.

For the research presented in this thesis, the important notion is SME characteristics. Only 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 that function independently but have ownership structures that formally are heavily dependent on other companies (Carter & Jones-Evans, 2006).

To “complement” the quantitative definitions (e.g., European Commission, 2005), this thesis also uses reasoning from the functional, analytical definitions. One such definition was that of Hollander (1967), below:

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).

Such qualitative definitions are not without fault either. In particular, it may be problematic to determine whether certain companies reside inside or outside this definition, especially without deeper study of them, which makes it difficult to use them for quantitative studies.

In essence, quantitative definitions are easier to apply (and thus often reasonable for quantitative studies), and qualitative definitions consider individual context (and thus often make more sense for qualitative studies).

This thesis aims to support the use of QM in organisations. It particularly considers SMEs because adoption of QM has been shown to be harder in such organisations given today's knowledge. It has been argued that this is due to characteristics of SMEs such as resource scarcity (Bridge et al., 2003) and personalized management (Hudson et al., 2001). Hence, the target audience are people who work with organisations with critical characteristics of SMEs, and not necessarily depending on criteria such as the number of employees. Therefore, Hollander's (1967) qualitative definition has been of most use in the writing of this thesis. However, there is no intention to exclude findings from being valuable also in non-SME organisations (regardless of SME definition).

## 3 THEORETICAL FRAMEWORK

This thesis discusses the adoption of quality management in SMEs. This chapter is divided into two parts (see also Figure 1). The first part discusses the background and central themes of QM together with the literature on the adoption of QM in SMEs. The second part investigates PT and maturity models in order to form a better understanding of adoption processes – an area that has arguably been a traditionally weak aspect of QM research.

### 3.1 QUALITY MANAGEMENT IN SMEs

This section provides an overview of what QM is, how it has evolved over time, and also what has been written about the adoption of QM, both in general and in SMEs. Hackman and Wageman (1995) considered that all work with QM stems from the three quality “gurus” Edwards Deming, Joseph Juran and Kaoru Ishikawa. Having considered works by these gurus (Deming, 1986, 1993; Ishikawa, 1985; Juran, 1964), Hackman and Wageman summarised that the foundation of QM builds on four assumptions. First, the costs of poor quality (for example, rework, inspection, lost customers) are larger than the costs of developing processes to ensure that poor quality is avoided in the first place. Second, employees are intrinsically motivated to do a good job. Third, problems that are central to an organisation cross traditional functional lines and must be addressed cross-functionally. Fourth, since top management design the organisational systems that determine how work is carried out, all quality work must start with the commitment of the top management.

Since these early beginnings, QM has grown into a mature field and is now often incorporated, in varying forms, into the daily operations of many large companies (Sousa & Voss, 2002). QM as a concept is constantly changing and its underlying principles can sometimes be observed as foundations for such initiatives as Six Sigma and lean, among others (Brown, 2013; Flynn et al., 1995; Shah & Ward, 2003). QM practices may even exist within a company without the company recognising it as such (Weick, 2000). Furthermore, different industries and companies may view quality differently, as may different subgroups and individuals within a company (Hamada, 2000).

#### *From product quality to organisational system*

One view is that quality is the “performance of products [and] presence of features” (Dean & Bowen, 1994, p. 404), and it can also be defined more broadly as in the “ability to satisfy, and preferably exceed, the needs and expectations of the customers” (Bergman & Klefsjö, 2010, p. 23). Lengnick-Hall (1996) described an evolution from a narrow view of quality to a broader view; from early craftsmanship, to inspection, statistical quality control, quality assurance, strategic quality management, and sustainable competitive quality. The customer has moved from simply being a buyer to being the focus of the quality activities, and the view of quality has changed from subsequent adjustments to prevention and then to competitiveness (Lengnick-Hall,

1996). The areas for quality work are no longer specific products but the complete value chain, including suppliers and customers (Lengnick-Hall, 1996). Therefore, the view on quality appears to have moved overall from a narrow definition to a broader one. If one accepts the broader definition (e.g., Bergman & Klefsjö, 2010), it comes as no surprise that managing quality would necessitate work virtually throughout an organisation. Anderson et al. (1994, p. 473) seemed to agree with a broader view when they wrote that the core of QM is “the creation of an organisational system that fosters cooperation and learning for facilitating the implementation of process management practices, which, in turn, leads to continuous improvement of processes, products, and services, and to employee fulfilment, both of which are critical to customer satisfaction, and, ultimately, to firm survival”. It is also in this broad sense that QM is discussed in this thesis.

### ***Quality management as principles, practices and techniques***

Dean and Bowen (1994) operationalised the QM concept by breaking it down into principles (which can be seen as axioms to support the QM approach), practices (activities, such as information collection, that help put the principles into practice) and techniques (step-by-step methods intended to make the practices effective); see Table 1. The three principles are customer focus, continuous improvement (CI), and teamwork; Dean and Bowen (1994) considered the first of these to be the most important. Thus, customer focus sets the strategic direction towards which an organisation should strive. This idea is based on the belief that, in the long run, increased customer satisfaction positively affects an organisation’s bottom line.

The function of CI is to support customer focus. This principle expresses the idea of “always improve”, which explains why QM can help meet the new challenges presented by changing environments. CI can be seen as “an organization-wide process of focused and sustained incremental innovation” (Bessant & Caffyn, 1997, p. 10). While such a process can support breakthrough improvements, Bessant and Caffyn (1997) argued that it is the never-ending stream of incremental improvements that really makes the difference; necessitating sustained and focused work with CI. Teece et al. (1997) pointed out that changes to these processes are about long-term changes to organisational culture and cannot be achieved as a quick fix.

A practice that is central to the CI principle is the PDSA (plan-do-study-act) cycle, which was originally devised by Shewhart (1986) and further developed by Deming (1993). Essentially, the PDSA cycle dictates that any change work should go through four steps: planning, including deciding on the root cause; performing changes; evaluating whether changes produce desirable effects and ensuring that effects will be maintained in the future; and learning from the project to benefit future projects, including deciding on follow-up projects (Bergman & Klefsjö, 2010; Deming, 1993). One reason why adherence to the cycle is necessary is that people have a tendency to focus on doing rather than planning and follow-up activities (Deming, 1993; Walley & Gowland, 2004).

The more mature an organisation is, the more likely it is that quality issues need to be solved cross-departmentally (Dean & Bowen, 1994). Studies have also shown that teamwork and group problem solving decentralises decisions and improve product quality (Flynn et al., 1994). It has been argued (e.g., Pink, 2010; Robinson & Schroeder, 2006) that individual rewards in almost all contexts are detrimental to motivation and output. One component of this is that individual rewards punish teamwork. Organisations that have experience with QM work also tend to move away from individual rewards and towards group or organisation-wide rewards (Flynn et al., 1994; Hackman & Wageman, 1995).

**Table 1 – Principles, practices, techniques in QM (adapted from Dean & Bowen, 1994).**

<b>Principles</b>	<b>Customer Focus</b>	<b>Continuous improvement</b>	<b>Teamwork</b>
<b>Description of principle</b>	Importance of providing products and services that fulfil customer needs; requires organisation-wide focus on customers	Relentless improvement of processes; to support customer satisfaction	Collaboration (throughout an organisation as well as with customer and suppliers); to support customer focus and continuous improvement
<b>Related practices</b>	- Direct customer contact - Collect information - Use information in design and delivery	- Process analysis - Problem solving - Plan-Do-Study-Act	- Arrangements that benefit all - Various types of teams - Group skills training
<b>Examples on related techniques/tools</b>	- Customer surveys - QFD	- Flowcharts - Pareto analysis - SPC	- Nominal group technique - Group feedback

Boaden (1997, p. 165) explained the distinction between principles and practices as “beliefs or tenets” and “things that organisations do that display and embody their beliefs”, respectively. Sousa and Voss (2002) further argued that it can be difficult to assess QM in practical applications if the assessments are based on observing the general principles or the detailed techniques. Instead, they recommended a focus on the applied practices. While this seems viable in the assessment, it is important not to lose sight of the principles or the techniques. The techniques might form a considerable part of what is visible in the company and should be possible to relate to the practices. Similarly, it might be important to perform a “reality check”; that is, whether the adopted practices actually support the intended principles.

### ***Adoption of quality management***

Zbaracki (1998) claimed that there are two archetypes of QM adoptions: one technical (honest, makes real changes in the operations), and one rhetorical (“fake”, made up of words only). For example, Westphal et al. (1997) described how TQM gained popularity among early adopters for its technical merits decades ago, and how late adopters would increasingly claim that they

practice TQM. These late adopters were sometimes more interested in the rhetoric of claiming to practice TQM than in actual organisational changes. This could mean anything from cosmetic changes to narrow implementation of only a subset of techniques (thus missing “the big picture”), to simply naïve adoptions (that is, not understanding that it is a long process and not quick fix) (Westphal et al., 1997). It should also be reiterated that SMEs are often suppliers to powerful customers (Ghobadian & Gallear, 1996). However, pressure from large companies to adopt QM can lead to dangers in such motives for adoption. An external mandate for adoption means that there is an increased risk of rhetorical adoptions (Zbaracki, 1998), and that organisations try to satisfy the bare essential demands (in, for example, achieving a certificate) and nothing more (Marcus & Weber, 2000; van der Wiele & Brown, 1998). It has been observed that QM as a rhetorical concept and buzzword has diminished in the last decades, arguably because of failures stemming from abundance of such rhetorical TQM ventures (Zbaracki, 1998).

However, it is an over-simplification to say that every practical application must adhere strictly to the classical ideas as summarized by, for example, Hackman and Wageman (1995). QM is a concept that stands on empirical ground and what “works in organisations”, which means that it must be continuously improved and updated to maintain relevance. Furthermore, it has been argued that a QM adoption must be adapted to the context in which it will be used to be successful (Assarlind, Gremyr, et al., 2013; Sousa & Voss, 2002). This argument for contextualisation is also valid for more contemporarily popular concepts, such as lean production and Six Sigma, both of which can be said to be versions of QM (Brown, 2013; Dahlgaard & Dahlgaard-Park, 2006). Brown (2013, p. 587) stated that many people view Six Sigma as a “statistically based ‘hard’ form” of QM, while Schroeder et al. (2008) viewed it in a similar manner, but with an added project structure. Wiklund and Wiklund (2002) maintain that many Six Sigma initiatives end up with experts working on technical problems in isolation, and that these only yield short-term benefits. Wiklund and Wiklund (2002) instead advocate Six Sigma projects which involve many employees, and where soft issues (such as leadership and learning aspects) are core in employee educations on Six Sigma methodology.

While there is no standard definition for lean, it can be described as a strategy to reach flow and resource efficiency, prioritizing the former (Modig & Åhlström, 2012). Although there are contrasting main goals (customer satisfaction versus flow efficiency), there are more similarities than differences between QM and lean (Flynn et al., 1995; Shah & Ward, 2003). Both heavily emphasise the importance of continuous improvements, by involving all employees. Further, one could argue that lean is customer-focused when considering its relentless principle of reducing all waste (defined as everything that does not add value to the customer). Näslund (2008) further pointed out that literature recommendations for implementation of lean and QM are nearly identical (which can also be seen by comparing, for example, Achanga et al., 2006; Done et al., 2011; Yusof & Aspinwall, 2000a).

***Adoption of quality management in SMEs***

Ahire and Golhar (1996) reported that the size of a firm does not hinder the possible achievements from QM adoption. Ghobadian and Gallear (1997, p. 161) argued that the basics of QM are the same in SMEs as in large companies, but that “the detail and method of implementation differed. For example, the size of organisation influenced the type of strategies adopted for obtaining greater cross-functional integration, nature and substance of management leadership, communication methods, the content and extent of training programmes, or the nature and extent of the organizational changes”. Several authors (e.g., Conner, 2009; Hansson & Klefsjö, 2003; Sousa & Voss, 2002) have stressed the need to acknowledge that QM ideas are context-sensitive in any situation; that is, what works in one place will not necessarily work in another.

Nevertheless, there are differences between small and large companies, and the concepts might have to be adjusted accordingly (e.g., Ahire & Golhar, 1996; Hudson et al., 2001). Some concepts, such as certain adaptations of Six Sigma, prescribe an extensive adoption that involves training a substantial proportion of the workforce 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 an “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). It has been speculated that these flat hierarchies also mean that the relatively simple communication and feedback may help these organisations succeed with effective QM work, even without a formal structure for it (Hansson, 2003).

Since SMEs often lack the appropriate competence and/or resources for starting QM work (Jones et al., 2005), it has been suggested that external interventions can be useful (Done et al., 2011). In this context, *intervention* was by Done et al. (2011, p. 500) defined as “an activity designed to introduce new practices through a series of short focused activities in the organization”. Pettigrew (1987) argued that, in the analysis of change, it is important to consider not only the content (the *what* of change), but also the process (the *how* of change), and the internal and external context (the *why* of change). Done et al. (2011) further suggested grouped a framework of critical factors into intervention context, intervention design and implementation, and change agent approach. Whereas the factors in the two first groups are fairly general and similar to factors discussed by authors on QM adoption (e.g., Ghobadian & Gallear, 1997; Yusof & Aspinwall, 2000a), the factors in the latter group are exclusive to the intervention context. For the change agent approach, Done et al. (2011) discuss the criticality of competence of the external change agent, as well as of planning for continued activities after the end of an intervention. In their work on interventions, Herron and Hicks (2008) emphasise especially the importance of involving the senior management, and the development and education of an internal change agent.

Ideas about what SMEs need in order to succeed with QM adoption do not always point in the same direction, presumably because of differing views about QM itself. For example, Deleryd et al. (1999) stated that statistical methods, such as statistical process control (e.g., Oakland, 2008) and design of experiments (e.g., Box et al., 2005), are important in most improvement work, and that SMEs must be better in employing such methods. 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 theoretical knowledge necessary to acknowledge the potential and the resources to appoint a coordinator; introducing such methods would become counter-productive. These seemingly conflicting pieces of advice do not necessarily imply that one of these authors is wrong, just that different approaches may be feasible in different contexts.

### **3.2 ADOPTION PROCESS**

Literature on the adoption of QM may be confusing, with a wealth of different factors and advice (Sousa & Voss, 2002). This section introduces structure and vocabulary from the areas of management innovations and PT, including stage models, which will aid in describing different parts of QM adoption. QM adoption can be seen as an iterative process (Zbaracki, 1998), which is why these views are also complemented by an introduction to maturity models. These models are used to describe different levels of adoption as well as the transition between these levels.

#### ***Organisational innovations***

Schumpeter (1934, in Carlgren, 2013) viewed innovation as something new (a novel or new combination of knowledge) that can also create value. Organisations generally develop and adopt innovations with the intention “to contribute to the performance or effectiveness of the adopting organization. Innovation is a means of changing an organization, whether as a response to changes in its internal or external environment or as a pre-emptive action taken to influence an environment” (Damanpour, 1991, p. 556).

On a basic level, what qualifies as an innovation can be defined in two different ways: either as new-to-market (or new to the state of art; as used by Birkinshaw et al., 2008) or as new-to-organisation (as used by Damanpour, 1991; OECD, 2004). This thesis, which discusses the pre-existing concept QM and its adoption in SMEs, clearly emphasises the latter definition. However, adoption of pre-existing (new-to-organisation) does not mean that it is a matter of simply implementing anything one-to-one. As discussed earlier in this thesis, it can be said that QM needs to be contextualised and uniquely adopted in individual organisations.

There are several dimensions on which to classify innovations, one of which is incremental innovation (small changes that often improves on something that already exists) versus radical innovation (completely new ideas) (Narayanan & O'Connor, 2010). More important for this thesis is the division into technical versus management innovations. The first type refers to innovations that build on new technologies or hands-on techniques, while the second builds on conceptual ideas. Unfortunately, there is little agreement in the literature on how to define these

types, and even less on what to call them. One basic division is that technical innovations is “the production focus of the organization”, while management innovations “is required to bring new performance levels to the organizational structure set for fulfilling the production focus” (Narayanan & O'Connor, 2010, p. 93).

Some authors choose to have technical innovations refer to both product and process type innovations (e.g., Drury & Farhoomand, 1999; Mol & Birkinshaw, 2009), while others choose to make product innovations separate (e.g., Damanpour, 1987). A product innovation is “the market introduction of a new good or service or a significantly improved good or service” that is new to the organisation but not necessarily the market, developed either by the organisation or somewhere else (Mol & Birkinshaw, 2012, p. 19), while a process innovation is “the use of new or significantly improved methods for the production or supply of goods and services” (Mol & Birkinshaw, 2012, p. 20). Some refer to this type as technical innovations (e.g., Alänge et al., 1998; Damanpour, 1992), while others refer to them as technological innovations (e.g., Kimberly & Evanisko, 1981; Mol & Birkinshaw, 2009).

A common alternative to the use of the notion management innovations is administrative innovations (Damanpour, 1991; Kimberly & Evanisko, 1981; van de Ven et al., 2000; Wolfe, 1994). While administrative innovations can be used synonymously with management innovations (Westphal et al., 1997), Birkinshaw et al. (2008) argued for the use of management innovations rather than administrative innovations, since the latter do not always involve management changes at the operations level. Another alternative to management innovations is the use of organisational innovations (Alänge et al., 1998). However, this notion is more commonly used to denote any innovations within an organisation (as it is used in this thesis). A further argument against the use of organisational innovations as a synonym to management innovations is the closely related notion of organisational innovativeness (van de Ven & Rogers, 1988), which generally refers to what makes certain organisations more innovative. In the present thesis, new technologies and new techniques are seen as innovations, which are referred to here as technical innovations. On the other hand, conceptual ideas for bringing new performance levels to the organisation structure are referred to as management innovations.

### ***Management innovations compared to technical innovations***

Management innovations implies the introduction of novelties in an organisation; in the form of differences in form, quality, or state of management activities (Birkinshaw et al., 2008). Management innovations can be viewed from different levels of abstraction (Birkinshaw et al., 2008). On the highest level of abstraction, they can be seen as “fairly stable bodies of knowledge about what managers ought to do” (Huczynski, 1994, p. 23) with “a system of assumptions, accepted principles and rules of procedure” (Birkinshaw et al., 2008, p. 828; Kipping & Clark, 2012). This can be exemplified by quality circles (Mol & Birkinshaw, 2012), scientific management, QM (Birkinshaw et al., 2008), or lean (as defined by Modig & Åhlström, 2012). In contrast to the abstract level, Birkinshaw et al. (2008, p. 828) noted that management innovations

often also have a “more operational level [with] management practices, management processes, management techniques, and organizational structures”, which is similar to how Dean and Bowen (1994) operationalised QM.

Although there are similarities in the adoption of technical and management innovations, there are also substantial differences (Mol & Birkinshaw, 2012; Teece, 1980). For example, management innovations are more tacit (Teece, 1980). In particular, prior to the implementation of new practices stemming from a management innovation “there is only verbiage, subject to change and renegotiation” (van de Ven et al., 2000, p. 299). Management innovations are often harder to evaluate; both before, during all stages, and after adoption (Alänge et al., 1998). Whereas technical innovations often do not require major restructuring and can therefore be adopted without internal friction, administrative innovations usually involve more people (Alänge et al., 1998) and require major reassignments of tasks and responsibilities, thereby implying social and political implications (Mol & Birkinshaw, 2012; Teece, 1980). Large companies often have several scientists and engineers with competence to adopt technological innovations, but considerably fewer, if any, experts in management innovation (Birkinshaw et al., 2008). Even if the company does have such experts, they are often harder to locate (Mol & Birkinshaw, 2012). This lack of identifiable management innovation experts is even more accentuated in SMEs, which rarely employ any such people. There are also generally higher levels of uncertainty in the adoption of a management innovation, which makes it more difficult to achieve (Mol & Birkinshaw, 2012). Furthermore, with the adoption process being harder to define, it may be difficult to say when an innovation can be considered to have been adopted (Alänge et al., 1998).

In summary, management innovations are often more complex to adopt than technical innovations. This thesis focuses more on principles and practices than techniques, which is why it mostly discusses the adoption of management innovations.

### ***Process theory***

Wolfe (1994) identified three separate streams within the field of organisational innovation: diffusion of innovation, organisational innovativeness, and PT. The first stream addresses patterns in the diffusion of an innovation to a population of organisations (for example, *who in an organisation is the most likely to first hear of new innovations?*). Diffusion can be seen basically as the communication (either planned or spontaneous) of innovations among a social system (Rogers, 2003). The second stream discusses which organisational characteristics affect innovativeness (for example, *what distinguishes early adopters of lean from late adopters?*). In recent years, this type of study has become more rare because of problems with internal and construct validity (Rogers, 2003). The third stream considers individual organisations and what the mechanisms are in adopting an innovation (for example, *what stages are there in an adoption?*).

This thesis mainly considers how QM can be effected in SMEs; or, in other words, PT. Process<sup>1</sup> in this context refers to “the progression (that is, the order and sequence) of events in an organizational entity's existence over time” (van de Ven & Poole, 1995, p. 512). PT can be seen “as an explanation of how and why an organizational entity changes and develops. This explanation should identify the generative mechanisms that cause observed events to happen and the particular circumstances or contingencies behind these causal mechanisms” (van de Ven & Poole, 1995, p. 512). Furthermore, while “innovation is defined as the introduction of a new idea, the process of innovation refers to the temporal sequence of events that occur as people interact with others to develop and implement their innovation ideas within an institutional context” (van de Ven & Poole, 2000, p. 32).

Process studies increased in popularity after the so-called Minnesota studies in which the adoption processes of 14 technical innovations were studied in-depth using a common research framework (van de Ven et al., 2000), which showed the potential of such studies (Rogers, 2003). Part of the research in PT focuses on so-called stage models, aiming to outline the general stages through which an organisation passes in the adoption process. Such research is often conducted by cross-sectional retrospective surveys (Wolfe, 1994). However, there is also another generation of PT research that eschews broad perspectives in favour of more in-depth field studies. Such studies of the adoption process are preferably done by studying single innovation adoption processes (Damanpour, 1992). These can be purely descriptive; however, while this characteristic is valuable, one could argue that there is additional value in also suggesting explanations as to why events in these processes happened as they did (van de Ven & Rogers, 1988).

Before venturing further down the path of exploring *adoption*, it should be noted that this term may symbolise different phenomena (Wolfe, 1994). It is sometimes used for an management commitment to an innovation (e.g., Ettlie, 1980; Kimberly & Evanisko, 1981; Lambright, 1980), but is also used for the entire innovation adoption process (as defined in the introduction) (e.g., Damanpour, 1992; Frambach & Schillewaert, 2002; Wolfe, 1994). In the present thesis, adoption refers to the entire adoption process; when the adoption decision needs to be discussed, it is referred to as the adoption decision. This choice is motivated by the fact that the adoption decision is not the only part to consider in an adoption of QM (Zbaracki, 1998).

### ***Stage models of adoption processes***

Zaltman et al. (1973) divided the adoption process into two main parts – initiation and implementation – separated by the adoption decision. During the initiation, awareness is generated and attitudes are formed, leading to an adoption decision. During the implementation, the innovation is put into initial use (by modifying both the innovation and the organisation) and also continued use until it becomes a routine for the organisation (Damanpour, 1992). Frambach

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<sup>1</sup> This use of the notion *process* should not be confused with other uses (incidentally also in this thesis), such as process as “a network of interrelated activities that are repeated in time, whose objectives is to create value to external or internal customers” (Bergman & Klefsjö, 2010, p. 42).

and Schillewaert (2002) argued that in order for an innovation to be truly adopted at the organisational level, all affected individuals must have adopted it.

A number of authors have compiled stage models (e.g., R.B. Cooper & Zmud, 1990; Ettlie, 1980; Rogers, 2003), which are often based on methods such as telephone interviews (e.g., Pelz, 1983) or questionnaires (e.g., Ettlie, 1980). Wolfe (1994, p. 411) synthesised several stage models and identified some general patterns: “a decision-making unit becomes *aware* of an innovation’s existence, a problem or opportunity is *matched* to the innovation, the innovation’s costs and benefits are *appraised*, sources of support and/or opposition attempt to *influence* the process, a decision is made to *adopt(reject)* the innovation, the innovation is *implemented*, the innovation decision is reviewed and *confirmed (reversed)*, the innovation becomes accepted as *routine*, and the innovation is *infused*, i.e. is applied to its fullest potential.”

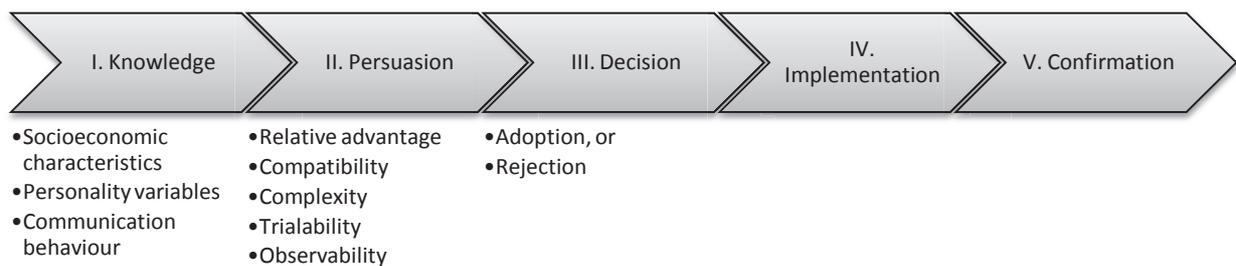
Common issues regarding most stage models are that they convey an overly linear model of an adoption process (Hislop et al., 1997) and fail to accurately describe more complex processes (Wolfe, 1994). Furthermore, these stage models are primarily developed for technical innovations. As previously discussed, there are decisive differences to management innovations, which amplify these shortcomings if used to describe management innovations (Birkinshaw et al., 2008; Zbaracki, 1998). Birkinshaw et al. (2008) outlined a “management innovation process framework”. However, this framework deals with development of new-to-market innovations (rather than how new-to-organisation innovations are adopted). In that framework, it is investigated how external and internal change agents interact in terms of moving from motivation (what leads to individuals considering development of a new management innovation) to invention (first experimentation), implementation (trying out in real setting), and theorisation and labelling (externally and internally validating the legitimacy of the new innovation).

Zbaracki (1998) emphasised the complex and iterative nature of a QM adoption, specifically of what he referred to as cycles of variation (variation of organisational procedures induced by entry of QM), selection (occurs when individuals encounter specific practices) and retention (occurs when individuals alter their routines and rhetoric). These cycles can be iterative within an entity in an organisation, but also nested or sequential between different entities; examples being that one part of the cycle on an organisational level might contain sub-cycles at individuals’ levels, and the initiation of a cycle in one division might be fully inspired by a previous cycle in another division (Zbaracki, 1998).

The present thesis will look closely at Rogers’ (2003) stage models. In particular, he constructed two models for the adoption of innovations. The difference between the two models is that the first one focuses on the decision process of key decision-makers within an organisation. The second model describes the process of integrating an innovation into an organisation, from the perspective of the organisation. Rogers’ (2003) models were chosen partly because they are carefully described from early to late stages, but also since some authors within management

innovations have started to recognize them (e.g., Hellström, 2007; Newell et al., 2001; Young et al., 2001).

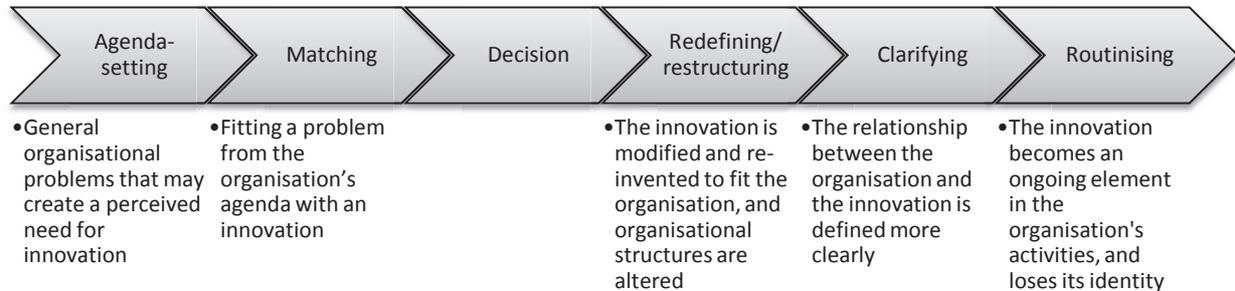
The first stage of the first model (see Figure 2) is knowledge (or awareness), which occurs when an individual learns of a new idea. The felt need sometimes precedes the knowledge of a new idea, and sometimes it is the other way around. If the individual cannot match this new knowledge with a felt need, and therefore does not see the relevance of the innovation, the process is unlikely to pass this stage. During the second stage (persuasion), an individual forms an opinion about the idea; potentially by mentally applying it to his or her own situation. An individual can actively seek information, for example by asking his or her peers for opinions. During the persuasion stage, individuals are often influenced by the perception of the innovation's relative advantage, compatibility, complexity, trialability, and observability. The third stage (decision) can lead either to adoption with an intention to try an idea, or to rejection (both of which can be reversed later on). The fourth stage (implementation) follows quite directly and occurs when an individual puts an innovation to use. In the fifth and final stage (confirmation; or maintenance), an individual seeks confirmation that the decision was correct, and may very well reverse the decision.



**Figure 2 – The Innovation-Decision Process (adapted from Rogers, 2003).**

The second model (see Figure 3) consists of five stages. The first two (agenda-setting and matching) form the initiation part, and the latter three (redefining/restructuring, clarifying, and routinising) form the implementation part. Rogers (2003) has placed the decision point between these two parts. The agenda setting occurs when members of an organisation perceive a need for an innovation, for example due to the realisation that the organisation performs below expectations. However, the organisation may also find out about an innovation and detect a potential need for it. Matching is when members of an organisation decide whether or not a proposed innovation could be the solution to the identified need. At the end of this stage, decision-makers decide whether to adopt the innovation. Redefining/restructuring is a stage at which the innovation and an organisation's structures are aligned, potentially by changing both. In the clarifying stage, individuals in an organisation form a view about what a specific innovation is and how it will affect the organisation and themselves. Routinising occurs when an innovation is no longer perceived as anything different, but part of the regular activities of an organisation, which also marks the end of the innovation process. Rogers (2003) further

commented that the degree of re-invention may be positively correlated with how sustainable an innovation will be in an organisation since members of an organisation feel greater ownership of the idea if they have participated in modifying it.



**Figure 3 – The innovation process (adapted from Rogers, 2003).**

Rogers (2003, p. 168) defined this innovation-decision process as “the process through which an individual (or other decision-making unit) passes from gaining initial knowledge of an innovation, to forming an attitude toward the innovation, to making a decision to adopt or reject, to implementation of the new idea, and to confirmation of this decision”. Damanpour (1991, p. 562), on the other hand, described innovation adoption as “a process that includes activities that lead to a decision to adopt as well as activities that facilitate putting an innovation into use and continuing to use it.” In the procedure of adapting this reasoning to the organisational adoption of management innovations, the *QM adoption process* is defined in the present thesis as “a process that includes events through which an organisation gain initial knowledge of QM, through which it is put to use, and through which it become an integral part of the organisation”.

### ***Studying maturity and progression and regression of QM processes***

It is hard to tell when a management innovation, such as QM, is considered to have been adopted (Alänge et al., 1998). Therefore, it can be argued that QM can never actually be fully adopted; that is, that it is an unreachable goal. Luckily, QM does not need to be fully adopted in order for organisations to reap benefits from it. To measure and distinguish between different levels of adoption, qualitative maturity levels may be useful, with the basic idea being that higher levels of maturity results will contribute towards a more positive business performance (Lockamy III & McCormack, 2004). Generally, higher levels of maturity imply that the topical concept is more institutionalised by policies, standards and organisational structure (Lockamy III & McCormack, 2004). One example of maturity models is the Lean Enterprise Self-Assessment Tool, which was developed for the aerospace industry (Nightingale & Mize, 2002). This model evaluates 54 different criteria in an organisation on the following five levels: “some awareness”, “general awareness”, “systematic approach”, “on-going refinement”, and “fully deployed across enterprise” (Nightingale & Mize, 2002, p. 23). Another example of a maturity model that instead considers the overall picture of an organisation is that of Lascelles and Dale (1993), who divided

maturity levels into “uncommitted”, “drifters”, “tool-pushers”, “improvers”, “award winners”, and “world class”.

Upton (1996) further argued that it is not only about how far one has gotten into the QM efforts, but the approach one is using. He distinguishes between three archetypical approaches to continuous improvements. In the first approach, an organisation goes for easy gains and simple projects. Such adoptions show early results that soon diminish. The second approach implies an organisation that has succeeded in establishing a shared understanding that hard work will be needed and maintains a “faith in ‘getting better every day’ and [... people that] are prepared to put relentless effort into overcoming increasingly difficult obstacles” (Upton, 1996, p. 224). According to Upton, sustaining this approach leads to linear or constant results. Finally the third approach, which is seen as “the best” by these authors, in which the most important aspect of projects is that they generate future opportunities for improvement. Such an approach is seen as slow starting, but with accelerating results (Upton, 1996).

This thesis uses an adaptation of a maturity level index, originally developed by Bessant and Caffyn (1997), to measure continuous improvements adoptions (that is, one of the principles of QM). This model has subsequently been refined in Bessant and Francis (1999), as well as in Chapman and Hyland (2000). The index ranges from no substantial activity (level 0: randomness) to the initiative being an integral part of a company (level 5: learning organisation); see Table 2.

**Table 2 – Quality management maturity levels (adapted from Bessant & Caffyn, 1997; Bessant & Francis, 1999; Chapman & Hyland, 2000).**

Level	Description	Typical characteristics
0	Randomness	Random, no formal efforts, occasional bursts punctuated by inactivity.
1	Trying out	Occurs due to special problem, inspiration from training intervention. Often local and short-lived.
2	Structured	Formal attempts, some training, not (yet) integrated with company strategy.
3	Strategic	Efforts connected to strategic goals, measuring against these goals.
4	Empowered	Top-down focus complemented with bottom-up actions as emergent strategic processes.
5	Learning organisation	Sharing of learnings, “how we do business around here”.

Since QM can be seen as systematic work that is based on principles, practices and techniques, it is worth noting that the first two steps of the maturity model arguably are not possible to classify as QM in themselves. Lascelles and Dale (1993) maintained that it is first at the improvers phase (roughly equal to level 2: structured) that any real adoption can be said to be achieved.

Moving from level 0 to level 5 is not a fast process. For example, achieving level 2 would require a systematic approach to problem localising and problem solving behaviours, which are far from trivial to set up (Imai, 1986). Reaching the highest level would require dramatic changes in all parts of organisational culture.

In the study of adoption, various authors have identified ways to describe factors that aid or hinder the development. For example, Bateman and Rich (2003) used enablers and inhibitors in their study of process improvements in British automotive component manufacturers. Similarly, Garcia-Sabater et al. (2012) discussed enablers and barriers in their study on automotive suppliers in Spain. Analyses such as these assume that a process can only move in one direction (that is, forward). There are two main problems with such a view. While it has already been argued that adoption processes often are more complex than can be illustrated by linear models (Sørensen et al., 2010; Wolfe, 1994), processes can also regress (Edvardsson et al., 2008). Batonda and Perry (2003) also argued that it is inappropriate to call something that is complex and non-linear for stages as it signals separation in time, and also that it is only possible to progress. Still, “stages” is used in this thesis, with the reservation that QM adoption processes are complex and non-linear.

To take complexity into account, Edvardsson et al. (2008) developed an analysis model with converters and inhibitors. This was done to investigate the process of business relationships, but the same logic regarding processes still applies for adoption of management innovations. In Edvardsson et al. (2008) model, converters are events that provide energy for a process to move (forwards or backwards), while inhibitors are events that quash momentum and cause a process to halt. This means that this analysis model not only takes into account what happens, but also in what context. In other words, it considers that something that may be a converter in one specific place in time or space may potentially not be so in another.

In summary, the first part of this chapter has brought a background of QM and, together with Paper I, delivered a framework on critical factors for adoption of QM in SMEs. The second part of the chapter specifically accounts for the lack of process perspective in the first part. It shows that there are stage models that can be useful in the analysis of adoption of QM that chiefly describe the adoption of technical innovations. However, since management innovations, such as QM, are inherently more complex and less linear than technical innovations, these models will need to be contextualised to the investigated area. To help in this adaptation, theory discussing maturity levels and the dynamics of processes are also discussed.

## 4 RESEARCH METHODOLOGY

This chapter starts by describing the background and the qualitative approach to research in this thesis. It discusses some general considerations regarding materials collection and analysis, particularly in relation to semi-structured interviews, and also provides an overview of the research process. The methods applied in each paper are discussed in separate sections. The chapter concludes with some reflections.

The basic subject of this thesis (quality management in small and medium-sized enterprises) has been the same since I started the research for this thesis more than four years ago. However, my understanding has evolved during this time, and with it my theoretical references and my way of doing research. The better I have understood the literature, the better I have been able to collect new empirical material and interpret old material. The better I have understood the empirical material, the better I have been at directing literature searches and re-interpreting my earlier research. In this way, research has been iterated between empirical material and theory. Several authors have recommended such an *abductive* approach of allowing theory to guide the probing of empirics, and developing the theoretical framework based on empirical awareness (Bryman & Bell, 2007; Dubois & Gadde, 2002; Ragin, 1992).

### 4.1 RESEARCH APPROACH

This thesis investigates QM adoption in SMEs and will aid QM practice in SMEs, both directly, by inspiring practitioners to better understand the adoption process, and in the long run by aiding additional research or other proxies. The mechanisms being studied are part of complex social systems. The consequences of changes to management practices can take a long time to realise, which makes it difficult to unequivocally establish cause-and-effect relationships. While there are some powerful and standardised methods for conducting variance studies (for example, correlations and regressions), methods for studying how phenomena develop over time (that is, process studies) are not yet as developed and standardised (van de Ven & Poole, 2000). However, the aim of the present thesis is to achieve broad insights, including “capturing the unexpected”, which cannot be captured by an overly rigid approach. Furthermore, QM is inherently an heuristic approach, which means there is no such thing as “an optimal approach” and that is always possible to find even better ways to do things (Winter, 1994).

There seems to be 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). Case studies are suitable for examining contemporary phenomenon in a certain context, such as the adoption of QM in SMEs (Eisenhardt, 1989), and descriptive research is suitable to define it more fully (Dane, 1990). Therefore, it seems appropriate to use qualitative methods in this research since the focus is on understanding a

phenomenon in an area in which it is not understood, and rich descriptions of empirical events can be seen as valuable in themselves.

Several types of qualitative research strategy are present 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 et al., 2004). Systematic combining is particularly interesting for explorative research because it can be described as “a nonlinear, path-dependent process of combining efforts with the ultimate objective of matching theory and reality” (Dubois & Gadde, 2002, p. 556). Alvesson and Sandberg (2013) maintained that, in most management research, a complete view of the empirical material is needed before the final purpose may be constructed.

## 4.2 EMPIRICAL MATERIAL

A synthesis of the literature on qualitative research methodology reveals that *interviews*, *focus groups*, *observations* and *document review* are especially common methods for material collection (Bryman & Bell, 2007; Flick, 2006; T.W. Lee, 1999).

In qualitative research, neither the methods of observation nor analysis are standardised (T.W. Lee, 1999). As Flick (2006, p. 408) suggested, “perhaps qualitative research should be understood as art *and* method”. Interviews were the main material collection method for the present research. Interviews are fairly standard for management studies and can be categorised as unstructured, structured and semi-structured (T.W. Lee, 1999). According to Bryman and Bell (2007), the lack of variation is a strength of structured interviews, which can almost be considered as oral surveys. Most of the interviews in this thesis have been semi-structured, and were able to remain flexible enough to probe emerging subjects in the conversation, while also allowing the respondents to provide their full viewpoints (as discussed by Flick, 2006; T.W. Lee, 1999). More structured interviews could be beneficial in future studies, when more direct comparisons and aggregations might be sought, perhaps between different organisations. Semi-structured interviews allow an underlying theme, ensuring that the most important questions are answered to some extent, while also guiding interviews with less talkative interviewees. The general approach during most interviews was to pose the more detailed, and potentially leading, questions towards the end of the interview.

Table 3 provides an overview of the material collected for the studies.

**Table 3 – Material for the studies**

<b>Paper</b>	<b>Literature review</b>		
<b>I</b>	59 papers: 511 search engine hits -> 67 kept based on abstracts -> 49 kept based on full papers. Additional 10 identified outside search engine hits.		
<b>Paper</b>	<b>Interviews</b>	<b>Observations</b>	<b>Documents</b>
<b>II</b>	6: First round 2009: Owner-manager, improvement expert, production leader, operator Second round 2012: Owner-manager, “handy guy”	Shop floor tours	
<b>III</b>	13 during 2010–2012: Production manager, IT manager, development manager, improvement expert, black belts	External mentoring for three Black Belt projects, shop floor tours	Internal educational material
<b>IV</b>	10: improvement manager, black belt, seven representatives of each important function, including one two-person group interview (focus group)	Participative work employed at company for five months	Internal work descriptions, and internal promotional material for initiative
<b>V</b>	11: Director, chairman, head of consultants, three consultants, five with financiers and others	Full-day programme internal planning conference, including numerous meetings	Internal documents and external promotional material
<b>VI</b>	12: Representative from each company discussing the benefits of the programme	Participation in project over four years, including seven partner meetings	Project reports from 12 companies

Analysis is tied to the type of material that is being gathered, and has been performed continuously (as suggested by T.W. Lee, 1999). Most of the empirical material in this thesis comes from interviews. Further details are found in method descriptions for the respective studies, but the general approach has been to record interviews, transcribe the recording and “meaning condense” the transcription (Kvale & Brinkmann, 2009). Notes were also taken during the interviews to capture immediate thoughts and reflections; this has been especially helpful, for example, when multiple interviews were conducted close together in terms of time. This has allowed for alterations of subsequent interviews in order to follow up on interesting findings. The recording also fulfilled an important role of developing my personal interview skills. For example, when listening to recordings, I learned that, without being aware of it, I had a tendency to cut interviewees off when they started to stray from my interpretation of the questions I had posed to them. This is a problem, of course, if the aim of the interviews is to capture the unexpected. This realisation led me to be more liberal in letting interviewees stray.

### 4.3 METHOD REFLECTIONS ON PAPERS

This section describes the collection of materials for each paper in the thesis. These discussions are intended to complement the method sections found in each paper.

Figure 4 provides a snapshot of the timeline of the research process, showing the main efforts regarding the various papers. Future SME was a research project, funded through the European Framework Programme Seven. I was being recruited for the division’s involvement in this project.

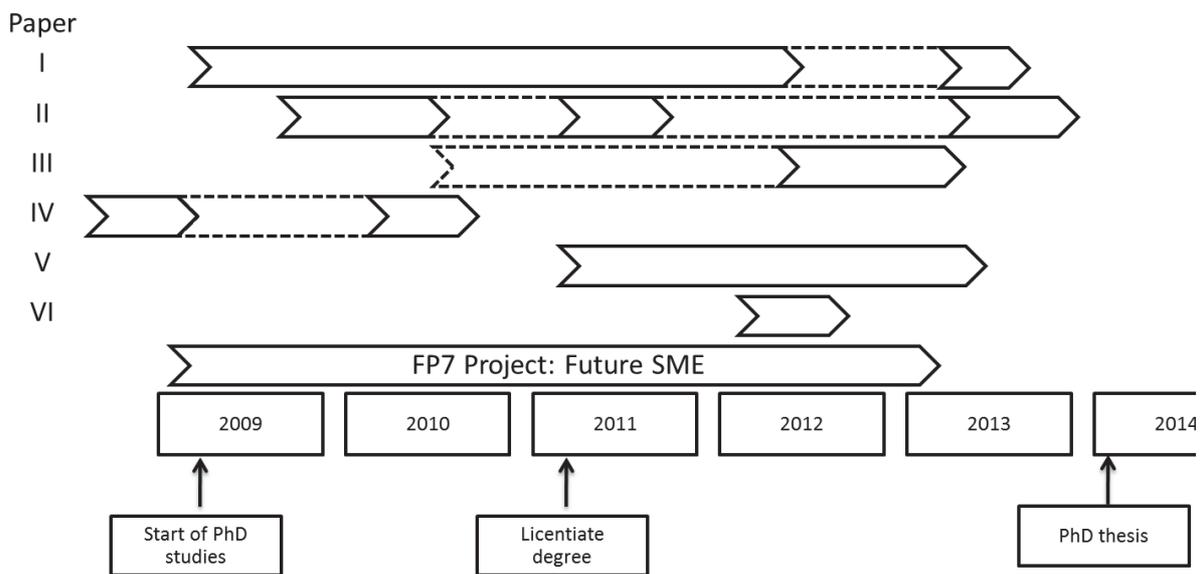


Figure 4 – Timeline, showing work on papers and project.

#### *Paper I – Critical factors for quality management initiatives in small and medium-sized enterprises*

According to Hart (1998), main reasons for conducting a literature review of a particular science area are to see what has been done, to gain new insights, and to point out directions for future research. Literature reviews require different kinds of reasoning on trustworthiness than other studies. A literature review paper should be comprehensive in terms of the sources it examines (MacInnis, 2011). Papers were included based on literature searches in three databases, complemented with the “snowball technique” (that is, including more references based on the reference lists of already included papers). When selecting sources from the searches to include in a literature review, it is important that two different researchers would select essentially the same papers (Randolph, 2009), which was done with the two authors of Paper I. In case of doubt, the two authors conferred until consensus was reached. The paper includes a categorisation on recommendations for QM adoption in SMEs. Once selected, the papers were coded (Randolph, 2009) in a manner similar to the selection of papers: criteria were discussed, the papers were

coded according to the criteria, and any doubts were resolved by discussions between the two authors. Categorisations are inherently arbitrary and partially depend on previous comprehensions; however, the two authors actively discussed this categorisation and used techniques such as affinity diagrams (see Shahin et al., 2010) to enhance the usability of the categories. The categorisation is further transparent to the reader, who can decide on its rationale and theoretically come to the same findings (H. Cooper, 2010; Randolph, 2009). For more information on selection and coding criteria, see the full paper. One pitfall of this kind of study is that important works and factors are omitted (H. Cooper, 2010). However, since papers that were added in the later stages of the research process did not produce any new major findings, the findings may be saturated, which alleviate the risk that major factors are omitted. Another important aspect of a literature review is that it should provide clear and relevant conclusions (MacInnis, 2011); Paper I offers such conclusions aimed towards academics and practitioners.

### ***Paper II – Initiating quality management in a small company***

As mentioned, one of the selection criteria for the cases was the possibility of having good access. For this study, one of the employees of the small manufacturing company WashCo (the improvement expert Peter) happened to have attended the same university course as me. From what he told me during classes, I felt that the company could be identified as a potential place for a study. This company met the criteria for an SME, in that it was an established company with between 8 and 17 employees during the studied time period, and was fully owned and managed by one person.

I made two visits to WashCo; one in 2009 and one in 2012. During the first visit, I conducted four interviews: with the owner-manager, the improvement expert, the production leader, and an operator. As with most other interviews for this thesis, these were semi-structured (T.W. Lee, 1999). The original idea behind the study was to discuss an SE's view on QM and quality. However, when talking to employees (other than the improvement expert), it seemed as though they did not have any notional knowledge of QM principles and practices. Instead, the study resulted in a view on how changes that may appear simple from a theoretical standpoint may not be so simple to adopt in a small organisation. This change of research direction was made possible by the use of explorative semi-structured interviews (Flick, 2006), as discussed above.

The three first interviewees were quite talkative and the main challenge was to keep the conversation to relevant topics. However, the operator had not been with the company very long and was not very talkative, which caught me by surprise somewhat and little useful material came out of this interview. Still, it was also valuable from a learning perspective. Today, with the benefit of experience, I would likely have been able to adapt the interview style at the time to make it more structured. In connection to the visits, the factory floor was visited in a way that could be seen as similar to study visits, which helped me understand their manufacturing processes in a way that is not possible with verbal material alone (Flick, 2006).

Three years after the first visit, I revisited the company to follow up on the potential progress. Before the visit, I had a quick telephone conversation with Peter. He no longer worked at the company, but still had some contact and insight, and he conveyed the image that not much had happened at WashCo since my last visit. Because of this, the hypothesis before the second visit was that the adoption process would have come to a complete halt, and I wished to explore why. As the result shows, this hypothesis proved wrong. Although WashCo had not accomplished further radical operational improvement, the company had undergone some structural and mind-set changes. For this visit, the owner-manager and a person who could best be described as a “handy-guy” (working with everything from maintenance, to collecting employee suggestions, to constructing new machinery) were interviewed. Unfortunately, the production leader was on parental leave at the time.

Following meaning condensation (Kvale & Brinkmann, 2009), the material was arranged chronologically and into a narrative. Everything up until now had been performed by me alone, but the remainder of the paper production involved the second author as well. The condensed material was at this point compared with literature advice on the adoption of QM (from Assarlind & Gremyr, 2014). Because several of the critical events took place early in the process, additional theory was consulted, from Rogers (2003), among others.

Although the results are built on relatively few interviews, I believe they are robust since the interviewees conveyed trustworthy and honest impressions, with no contradictions regarding the WashCo timeline. 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. However, the opinions of the interviewees are presented as “views”, not necessarily as “truths”.

### ***Paper III – An analysis of stagnated Lean Six Sigma adoption***

The improvement expert at the medium-sized manufacturing company PeakTech had earlier been a contact of one of my thesis advisors. PeakTech is not necessarily an SME, especially seeing as it is owned by a large company, which violates the quantitative definition of an SME (European Commission, 2005). However, the company is managed independently (conforming to the qualitative definition by Hollander [1967]) and findings are seen as valuable for discussions on SMEs.

At the start of my PhD studies, PeakTech was about to start systematic Lean Six Sigma work under the direction of the improvement expert. This sounded to me, and the improvement expert, like a perfect opportunity for a SME study; however, the collaboration needed to be signed off by the managing director, something that did not happen until 2012, more than three years later. Fortunately, it was possible to conduct key interviews with the improvement expert and the production manager in 2010, which allowed for a partly longitudinal perspective. In studies like this one, which discuss past events, there is always the risk of intentional or unintentional bias from the interviewees regarding what they say (Hoholm & Araujo, 2011). Therefore, longitudinal

elements help counter such tendencies. Also in 2010, the company decided to send three of its employees to a university course in Six Sigma. As part of their education, these employees conducted three Six Sigma projects in their company, and I functioned as their advisor for these projects. This allowed me to gain additional initial insight into PeakTech's adoption process.

By 2012, a few years into the Lean Six Sigma (LSS) adoption, the collaboration could be pitched to the company as an opportunity for an evaluation of the improvement initiative. Basically, I was allowed to freely conduct research interviews with employees in exchange for a presentation of my views on what had worked well for them and what could benefit from change. The interviews were conducted with people from most levels of the organisation, from senior management to the operator level. I found considerable differences in the perceptions of the LSS initiative. However, rather than indicating that there was anything wrong with the validity of the material, these differences were interesting findings that are discussed in length in the paper. I used triangulation in this context, more to expand the dataset than for verification (Flick, 2006). After the first 10 interviews, my view seemed to become saturated, with few surprises in later interviews. Consequently, I presented my findings to the company senior management in the agreed upon meeting, which also served as an additional opportunity for empirical material collection; functioning as a source of triangulation and verification (Voss et al., 2002).

By this time I had a fair idea of what had happened at PeakTech; however, all the interviewees so far had been chosen by the improvement expert. Without doubting his intentions, I saw this as a potential source of bias. For this reason, we decided that I could have a list of employees from which I could randomly pick an additional three interviewees. For these last few interviews, I, along with the company sponsor, decided that 30-minute interviews would have to suffice, rather than the hour-plus ones duration of the previous interviews. This meant that, in order to cover all parts of the interview, I had to alter my general laissez-faire interviewing style to a more directing one. However, I did not feel this was a problem since the main function of these last interviews was to confirm, or detect discrepancies from, earlier interviews.

With all interviews conducted, the reduced materials (Miles & Huberman, 1994) were combined chronologically. This new document underlined, and subsequently grouped, events and episodes that could be related to a converter or inhibitor of the adoption process.

#### ***Paper IV – Multi-faceted views on a Lean Six Sigma application***

Paper IV was researched at a unit of a large company (referred to in this thesis as LCAB). The unit in itself had more than 500 employees, with considerable support and influence from company headquarters, and could not be considered an SME. It has been extensively argued that many larger companies have been successful at exploiting benefits from QM adoptions (e.g. Beheshti & Lollar, 2003; Hansson, 2003; Kuratko et al., 2001; Thomas & Webb, 2003; Yusof & Aspinwall, 1999). The unit under study is renowned for being skilled at exploiting QM ideas, and the study was able to describe outcomes of a seemingly efficient adoption of QM. Therefore, the

findings of Paper IV act as a baseline for good QM practice. In retrospect, it would also have been interesting to study the adoption process of this case, but this was not done.

Material was gathered over a period of four months. During this time, I (together with the third author of the paper) worked on local improvement projects. We spent hundreds of hours at the site, actively collaborating with company staff. During this time we were considered employees, which means the study can be seen as participative action research, regarding access to material (see also the discussion by Gummesson, 1985). With participant observations, material can be gathered while addressing an organisational problem (Flick, 2006). 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 we were insiders entrusted with internal company information. In studies of this type, potential issues include the researchers becoming overly familiar with the setting and losing their “objective” perspective (Gummesson, 1985). However, being aware of this issue makes it more likely that it will be averted. The involvement of the third author helped to further avoid this potential pitfall (Eisenhardt, 1989).

Some of the interviews, particularly those 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 that was directly related to the paper’s purpose had to be more efficient; 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. One of the interviews was set up as a group interview in order to see if the potential interviewee interactions would reveal new aspects. It did seem as though the interviewees triggered each other and built on each other’s reasoning, similar to the suggestion of Flick (2006). The observations and interviews were complemented with internal documentation. In this, the company intranet was scrutinised for relevant communications. After we had submitted the paper for review to an academic journal, the reviewers requested additional information, which I collected by conducting a complementary phone interview that could be considered as structured.

### ***Paper V – Analysis of an improvement programme for MMEs***

Since the start of my research, I had heard from various people about a programme called Production Leap (PL) that helped SMEs improve their operations. The general impression of the programme seemed to be significantly positive, an impression that was supported by, among others, the independent reports by Olsson and Hellsmark (2012) and Ramböll (2009), who respectively reported on financial data of, and interviews with, participating companies. By this point in my studies, I had not seen any research in an academic publication that described practical approaches to QM programmes. Therefore, a study of this “good practice” programme, framed by literature, seemed a good contribution. This represented the start of a cooperation

between myself and an individual in the programme, which resulted in a conference paper (Assarlind & Mellby, 2011). The material from that article was expanded upon and framed differently for the paper in this thesis.

While technically a single case study, PL has worked with 160 companies, and the study reveals how the programme has changed based on this extensive experience. The target group for PL is manufacturing companies with approximately 30–250 employees. Most of the empirical material for Paper V came from interviews with staff within the programme. When discussing the design of the paper, there were no real contradictions in terms of how it was described by the interviewees, and the picture was further supported by documentation. Since most of the material came from insiders, there is a risk of bias. However, the purpose of the paper is to describe how the programme is designed, it is not to evaluate its performance. Nevertheless, five external stakeholders were contacted in order to expand the view. These stakeholders were representatives of the three financiers of the programme, a trade union, and a labour union. It can be argued that these stakeholders could potentially provide excessively biased information. However, all of these organisations are large and well regarded with little to gain from misleading discussions. Nonetheless, these interviews were advantageous in that they allowed further insights in addition to the staff interviews. In particular, while the staff had been focused on the operational details of the programme, the stakeholder interviewees focused on factors related to the programme structure, such as the potential for endorsements to employees, and research possibilities.

Furthermore, I was allowed to participate in one internal full-day planning workshop, during which the design and potential weaknesses of the programme were discussed at length. This provided me with unique and uncensored insight into how the programme staff discussed the programme. The different types of interviewees, the attendance at the workshop and the documents were used to triangulate (Flick, 2006) the results in this study.

#### ***Paper VI – Adopting new ways of working in SMEs: Findings from interventions in 12 European companies***

Paper VI is an investigation during the Future SME project. The companies are, or were at the time of application, SMEs according to the quantitative EC definition (European Commission, 2005) since they were selected for inclusion based on that criterion. This study considers material from 12 organisations from the Czech Republic, Ireland, Italy, Poland, Scotland, and Turkey. During the analysis, we considered whether it was possible to identify subgroups based on aspects such as relative size, but it was not. The findings of the paper have a high level of abstraction, with findings that are argued to be reasonable for many SMEs.

For Paper VI, the most important material is the reports that each company compiled. The companies were asked to put together structured information in so-called “A3 reports”, but also more subjective information in the so-called “case essays”. These documents were made for multiple purposes: reporting to the financier, case studies for the project website describing to other companies how the method works, and finally for this research. However, it was the paper’s

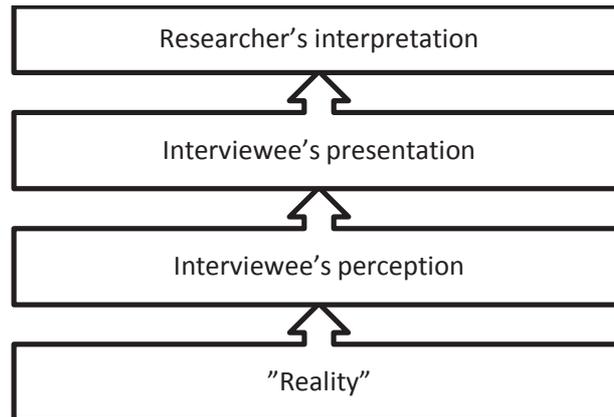
authors who set the guidelines for, and supported the companies in, the compilation of the documents. This material can therefore be considered to have been solicited, or made for the research purpose (Flick, 2006). However, these documents are only a part of our understanding of these companies. Although we did no work directly with most of them, we were part of the same project for four years and met them at the regular project meetings. Consequently, all material for each sub-case (company) was cross-analysed, and patterns from the empirical material were compared with predicted patterns from the literature (Yin, 2009).

#### **4.4 REFLECTIONS ON TRUSTWORTHINESS**

This thesis builds on a number of case studies, and the generalisations drawn for the findings are analytical (Flyvbjerg, 2006; Ruddin, 2006). Mir and Watson (2000) argued that a careful approach that discusses the context of the research is often preferable before attempting (over-) generalisation. In fact, Gibbert et al. (2008) stated that while external validity (generalisation) might be important, it is always subordinate to internal validity (logical and plausible reasoning) and construct validity (that is, that a study in fact investigates what it claims to be investigating); this is simply because the former cannot exist without the latter. In this spirit, I have in the individual papers aimed to achieve internal validity by, for example, relating results to previous research, and looking to different theory fields for explaining potential. I have aimed for construct validity by, for example, triangulating empirical material, and consistently seeking feedback through peer reviews from, among others, advisors, journal reviews, conferences, and workshops. I have also, in general, aimed to provide rich empirical descriptions and good stories (Dyer & Wilkins, 1991) to allow readers to draw their own conclusions. It is therefore up to the readers to decide which parts of the descriptions of the empirical material make sense in their particular context, whether it is for research or practice (Weick, 1989, 2000). At the same time, additional value is provided by suggesting explanations of why events in these processes happened as they did (van de Ven & Rogers, 1988). When considering all of the studies together, as I do in this thesis frame, I suggest a model for the adoption of QM in SMEs.

This thesis is in good company in suffering from pro-innovation bias (Rogers, 2003). While it offers critical perspectives, such as the questionable outlooks for continued development in the case of PeakTech, it certainly implicitly favours change. The WashCo case, for example, is a story about how something almost did not happen but ultimately did. If it had not happened, it would probably not have found its way into this thesis. Similarly, the Production Leap case discusses how a programme supports its participating companies but it does not discuss companies that silently rejected the offer. There could be several reasons for this. First, I believe that everything can get better, and I therefore reject the notion of the status quo being desirable for the long term. More importantly though, it is difficult to identify cases where new ideas have been rejected early since “an unsuccessful diffusion effort does not leave visible traces” (Rogers, 1995, p. 104). Even if they would be identified, they would probably be difficult to access since members of these companies might not have been willing to discuss their “failures”, and potential gaps between what is perceived by interviewees and what is said could be even larger.

This leads to one concern with qualitative methods concerning verbal material (such as focus groups and interviews), which is the apparent gap between people's opinions and perceptions and the studied phenomenon. For example, material from an interview contains what the interviewee said and is not necessarily an exact reflection of any reality. There are similar problems with observational material: what is observed is not necessarily the same as the reality that is hoped to be examined. Figure 5 illustrates my view of potential gaps when using interviews in order to reach some underlying "reality".



***Figure 5 – Potential gaps in material obtained with interviews, from “reality” to researcher interpretation.***

In my research, I have been aware of the abovementioned gaps and I have, to the best of my ability, taken care not to present anything as something other than it is. Moreover, I have generally attempted to bridge these gaps, both analytically and with triangulation, using methods such as multiple interviews and other sources. While triangulation, in a traditional sense, often refers to validating results using different data sources, in qualitative research it is more about expanding the dataset, increasing scope, depth and consistency (Flick, 2006).

## 5 THE DIFFERENT ADOPTION PROCESSES OF FOUR CASES

This section investigates the various adoption processes accounted for in the studies of this thesis. Table 4 provides a summary of the background, purpose, and main findings of all six of the papers. Four of these cases are analysed in this section: two from the perspectives of individual companies, and two from programme perspectives in the two programme cases. Apart from the literature review, the case described in Paper IV is exempt because the adoption process was not studied in that particular case.

*Table 4 – Summary of appended papers.*

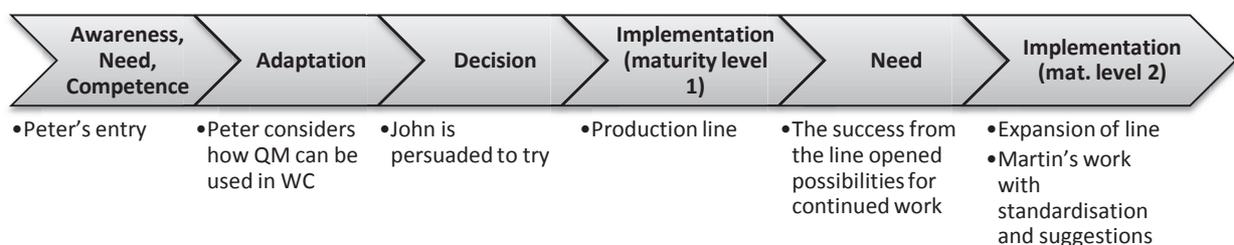
	<b>Paper I</b>	<b>Paper II</b>	<b>Paper III</b>
	Literature review	WashCo company	PeakTech company
<b>Research Background</b>	QM described in context of large companies, but few extensive studies in SME perspective	Lack of qualitative understanding of adoption of QM in SMEs	Lack of case studies on LSS adoption in SMEs
<b>Purpose</b>	Identify the critical factors for QM initiatives in SMEs	Understand critical aspects of a QM initiative in an SE during an adoption process	Study the gradual adoption of LSS in a medium-sized Swedish manufacturing company
<b>Main findings</b>	<ul style="list-style-type: none"> <li>- Need for contextualisation</li> <li>- Need for external support</li> <li>- Research need of case studies</li> <li>- Factors similar (with some exceptions) to traditional QM frameworks</li> </ul>	<ul style="list-style-type: none"> <li>- Early stages crucial in QM adoption in SEs</li> <li>- Owner-managers consent crucial in SEs</li> <li>- Basic QM knowledge is enough to develop appropriate content</li> </ul>	<ul style="list-style-type: none"> <li>- Need for contextualisation to both company and different maturity</li> <li>- Strategic maturity requires management commitment and aligned goals</li> <li>- Focus on wide training</li> </ul>
	<b>Paper IV</b>	<b>Paper V</b>	<b>Paper VI</b>
	LCAB company	Production Leap programme	Future SME programme
<b>Research Background</b>	Lack of descriptions of practical applications of LSS work	External support important in adoption of QM in SMEs	External support important in adoption of QM in SMEs
<b>Purpose</b>	Explore an application of LSS in practical improvement work, identifying important factors for improving work with LSS	Identify functions of intervention programmes that support SMEs in the adoption of operations improvements	Describe how interventions can be carried out in order for SMEs to adopt new ways of working by understanding the context, process and content of an intervention
<b>Main findings</b>	<ul style="list-style-type: none"> <li>- Need for contextualisation</li> <li>- Common structure and vocabulary for projects</li> <li>- Widely trained individuals lead integration of LSS</li> </ul>	<ul style="list-style-type: none"> <li>- Long-term commitment by companies enables planning</li> <li>- Third parties, e.g. labour unions, broker relationships</li> <li>- Results depends on preconditions</li> </ul>	<ul style="list-style-type: none"> <li>- Results depend on knowledge of own goals</li> <li>- Dialogue during planning critical to common views</li> </ul>

The analysis of the empirical material builds on the theoretical framework accounted for in chapter 3. In particular, different stages (see Figure 1, Figure 2, and Rogers, 2003; Wolfe, 1994), different phases (see Table 2, and Bessant & Francis, 1999), and main converters and inhibitors (see Edvardsson et al., 2008) are identified for each adoption process. Each subsection ends with a figure that provides an overview of the process. Of course, these overviews are simplified in that they disregard some of the complexity involved; but they do indicate what activities took place, or are intended in the case of programmes.

### 5.1 THE ADOPTION PROCESS AT WASHCO (PAPER II)

In 2000, John took over the SE WashCo, which specialised in the washing of industrial containers. Before Peter entered the picture in 2005, WashCo had seemingly not worked with QM at all. Peter brought a set of QM knowledge, and also identified the need for this competence in WC; initiating the QM adoption process and working as a strong converter forwards. Without the consent of the owner-manager John, Peter independently used his competence and worked on how to adapt his knowledge to the context of WC. Referring to the innovation-decision model by Rogers (2003), one would likely identify the owner-manager as the key decision maker in this company. However, John repeatedly decided against any adoption of QM, as he did not see the relative advantage or the compatibility (or simply put, the applicability) of it, and he therefore functioned as a potent inhibitor. It took several years of more or less active persuasion before John agreed. However, when he did, all employees felt obliged to follow suit, and John decision therefore acted as a strong converter.

With the first implementation of the production line, the company was near maturity level 1 (trying out), with a solution to a special problem. This implementation was in itself a major converter towards the continued work. Around this time, Peter had already staked out the path he wished WC to take and filled a binder with suggestions and ideas. After the success with the production line, and after Peter's exit, there has been continued work. For example, John independently expanded the line idea to other parts of the shop floor. Perhaps even more importantly, in terms of WC's QM journey, Martin was assigned to work with standardisation and maintenance. Martin took Peter's binder and started working with the contents, including the systematic collection of ideas from employees, which moved the organisation to level 2 ("structured"). See Figure 6 for an overview of the WashCo adoption process.



**Figure 6 – WashCo QM adoption process**

If the adoption at WashCo had stopped after the installation of the production line, it would have been a stretch to call it QM work (as the first maturity steps imply no real adoption according to Lascelles & Dale, 1993). However, that was only the start of a chain of events that is now more of a systematic effort, but it was nevertheless a critical start. It is doubtful that any of the following events would have transpired without those first steps. At this point, the QM adoption can be seen as having started. While John chose to see a consultant for regular idea infusion, he leaves most of the systematic work to Martin, who remains dependent on Peter’s old efforts. Therefore, John does not currently function as a converter for the process, although everyone knows that Martin have his blessing in his improvement efforts. For the future, there is a possibility that the current efforts will show enough results for the improvement work to continue. However, there is also a risk that the lack of QM competence will bring development to a halt, which may cause the whole process to regress to lower maturity levels again.

**5.2 THE ADOPTION PROCESS AT PEAKTECH (PAPER III)**

PeakTech was founded in 1999, and by 2005 when it was bought by its current owner it was still managed as a start-up company. From this time and until 2012, it grew from 65 employees to 200 employees. In 2006, a new production manager was employed; this person was knowledgeable about the automotive industry and identified that PeakTech could benefit from some of the ideas from his old industry. While the company was profitable, the new manager recognised that a considerable portion of the workforce was committed to repairs on products that had not even left the facility yet. Towards the goal of improving, he also recruited previous colleagues, who started to apply their knowledge of lean in order to improve capacity of production, albeit in occasional bursts (maturity level 0: randomness). None of these individuals were directly skilled at adopting ideas on lean, and took courses to advance their competence. One of the teachers on one of these courses, the improvement expert, was recruited to conduct certain delimited technical projects with Six Sigma methodology (maturity level 1). However, the improvement expert and the managers together decided they could expand this to a formal initiative under the lead of the improvement expert. This new initiative was based on having employees attend (mostly internal) courses, primarily so-called green belt courses, and conducting projects in conjunction with these courses. This approach worked well at a start; numerous successful projects were conducted and individual employees learned “an improvement vocabulary”, which eased the internal communication in the matter. This helped PeakTech to eventually reach maturity level 2 (structured). See Figure 7 for an overview of the PeakTech adoption process.

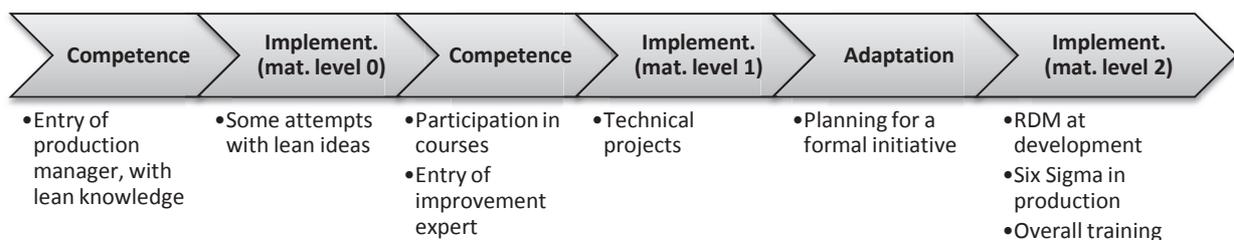


Figure 7 – PeakTech QM adoption process

Despite the ambitions, the process seemed to have stagnated at maturity level 2. While the continued education of employees created change projects and a shared vocabulary to inhibit regression, factors that were converters in the early stages of the adoption process did not seem to be enough to advance it further. The company had not been able to make the initiative part of the organisation; instead, the improvement expert was the key figure and the “embodiment” of the initiative. Real management commitment would be necessary to advance to “strategic” maturity, and the lack thereof is a strong inhibitor. The lack of explicit structures and communication of the work also worked as inhibitors, and even converters backwards, when people did not see the results of all the efforts. Another strong inhibitor was that PeakTech failed to capitalise on already educated employees, in that employees are not asked to continue doing projects after their first project, which is part of all employee training (so-called belt projects).

### **5.3 THE ADOPTION PROCESS DESIGNED BY THE PRODUCTION LEAP PROGRAMME (PAPER V)**

The Production Leap case is different to the company cases. Rather than being an ex-post analysis of an adoption process, it is an analysis of a package of activities that aims to facilitate adoption processes in other organisations. Like change processes, programmes are in constant change (Steiber & Alänge, 2013). This is also the case with the Production Leap programme, which since its start has worked with hundreds of companies, and has consequently been iteratively altered.

As a means of marketing its programme, Production Leap organises so-called “insight seminars” for company representatives. These seminars, together with word-of-mouth marketing, increase awareness of the programme and some of the support it can provide. Following discussions, each company must formally decide to participate and sign up for a period of 18 months. With the official start of an intervention, each company is assigned two consultants, who are also supported by educational material. In addition, competence is also generated by compulsory education of at least two employees, one of which is meant to take on the role of “lean coordinator” and progressively assume more of a leading role in the QM initiative.

The long-term commitment is viewed in the programme as a “key success factor” (that is, a converter forwards), since companies cannot easily retract their decision, which allows time for the planning process. The first six months are spent exclusively in the so-called steering group, which is typically made up of management, lean coordinator, union representatives, and the consultants. During these six months, members of the steering groups are educated on QM principles and practices, and a plan for the continued initiative is being developed, actively adapted to each specific organisation. It is argued that these first six months lead to stronger management commitment and to being a strong converter in their process. Several interviewees have viewed this understanding of the major criticality of management commitment as something that has developed over time, and greater emphasis has been placed on these earlier parts than

previously in the programme. Subsequently, the first visible changes within operations are performed during the pilot period (that is, after the planning months and up until 18 months have passed in total). See Figure 8 for an overview of how the Production Leap adoption process is meant to facilitate the adoption process in participating organisations.



**Figure 8 – Production Leap designed QM adoption process**

Production Leap aims to have its companies reach strategic integration, with both top management commitment and emerging bottom-up actions throughout the whole company (maturity level 5). However, it is commonly agreed within the programme that this is a long-term goal, and the PL intervention is only the start of this journey. PL interviewees have stated that actual interventions end up as everything from “half-failed” to “excellent”, depending on many factors (such as previous experiences or previous company culture). It is then up to each company to take full responsibility for the continued development. It is argued that this is not only due to resource restrictions, but also because the companies need to take responsibility to make the initiatives their own. It has been stated that some attempts that may have been branded half-failures by the time the programme intervention concluded have appeared successful when the programme direction made visits a few years later. It could be seen as unfortunate that PL does not take the opportunity to continue acting as a converter for the continued development, for example by organising “alumni meetings” where representatives from previous PL companies could exchange experiences and ideas.

#### **5.4 THE ADOPTION PROCESS IN THE FUTURE SME PROJECT (PAPER VI)**

Future SME was also a programme, but was different from Production Leap in that it was not a commercial programme. Instead it was an international project that developed methods and processes for SMEs. Rather than reporting on the design of the programme, the Future SME study reports on factors that are important to interventions in 12 participating companies’ adoption processes. All of the companies had participated as “testing partners” in the four-year Future SME project. All of the companies were manufacturers or developers of physical goods, but came from a wide range of different industries (for example, manufacturing of pallet components and development of unmanned aircrafts) and sizes (from fewer than 20 employees up to 300 employees).

Some of the companies participated in the project mainly because contacts of theirs (such as research partners in the project) encouraged them to. The companies likely considered participant

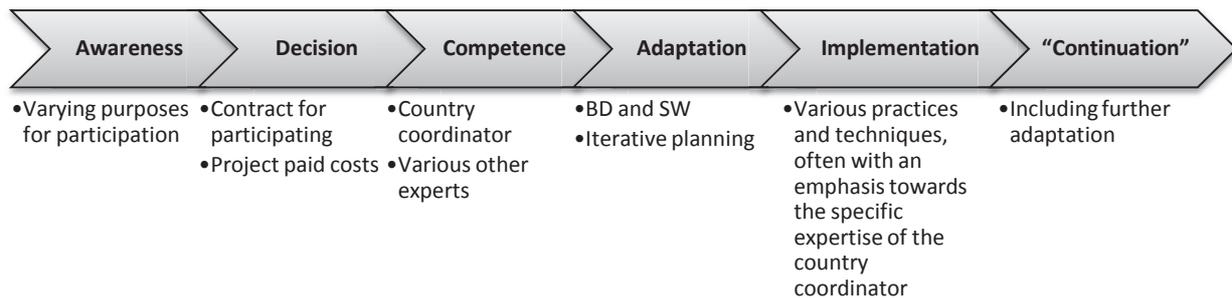
as a good opportunity since they also were partly compensated for their costs, including salaries. Therefore, it was not obvious to all the participating companies why they were participating, and those that did have this insight, or acquired it during the project, did better than the ones that did not. Thus, the lack or presence of commitment and goals acted as inhibitors and converters, respectively.

Each company in the project had been part of testing two methods that were being developed in the project: the “Business Diagnostics” (BD) and the “Strategy Wall” (SW). The BD is a sort of self-evaluation technique that is intended to act as a platform for discussing many different parts of a company, such as leadership and operations. The SW is used to articulate the strategy, and subsequently connect to concrete contextualised actions. Both of these methods enabled dialogue and common understanding, which had previously often been lacking. These could be seen as converters forward in these companies. Furthermore, iterative use of these techniques was encouraged in order to capture the progressively increasing maturity and provide a better foundation for further activities. In fact, the performance “scoring” from BD was often seen to decrease in subsequent iterations, something that can be seen as increasing understanding rather than decreasing performance. This iterative use enabled both continued planning and attention to the adoption processes, and can also be seen as a converter. As a third converter forwards, it proved useful to base the methods on real data from the companies; that is, to relate to their reality when discussing and formulating goals.

Conducting the BD and SW were compulsory for all participating organisations. However, rather than being intended as an end goal, they were meant diagnosing what to do next. Some organisations went on to work with environmental issues, others identified a need to further concentrate on their development of business strategy, while others improved the flow in their manufacturing.

In the beginning of the project, each company was assigned a person to help them in their change work. However, this person was assigned primarily based on geography, and language, rather than competence area, which was also reflected in the title of “country coordinator”. This was also partly reflected in the work done in each company: for example, for those organisations with a country coordinator whose competence was primarily in leadership, much of the work was done in leadership development (see also discussions by Done et al., 2011 on criticality on external change agent competence).

Figure 9 provides an overview of the commonalities of the adoption processes in the Future SME cases. Although the adoption processes of individual companies were quite dissimilar, the figure points to their common start, as well to the iterative nature of the adaptation with BD and SW.



**Figure 9 – Future SME QM adoption process**

Similar to the Production Leap processes, participation in the FSME project can only be seen as the starting point of a QM journey. Done et al. (2011) proposed that planning for continued activities after an intervention is critical to the overall success. In this project, it was also seen that companies that stepped up towards the end of the project and assumed control of the adoption process fared better than companies that did not do this. Therefore, this behaviour can be seen as a converter forwards, while being overly dependent on the external change agent towards the end of the intervention acted as an inhibitor.

## 5.5 COMMON THEMES AND A MODEL FOR ADOPTION OF QM IN SMEs

Throughout these cases, the following critical stages have been identified:

- *Awareness & Need* – When an organisation is made aware of the existence of an innovation, and when an organisation identifies a need (or potential) that the innovation can potentially aid in addressing. There is often some sort of awareness and need (or potential) identified in the beginning of an adoption process, but this can also happen later. In the cases studied, this could happen quite gradually. In WashCo, for example, a need for the production line was first identified, and it was after the implementation of the same that most people in the organisation identified need of further improvements. It was also seen that programmes could help promote such awareness.
- *Decision* – When a decision-making individual decides to continue adoption of an innovation. Decisions can be prerequisites for adoption, as in the Production Leap process, where senior management must sign off before any adoption occurs. It can also be more complex, such as in the PeakTech case with multiple decisions for the adoption. Two examples were the decision to recruit an improvement expert for technical projects and the decision to expand it to a full initiative.
- *Competence* – When an organisation acquires technical as well as management competence necessary to adopt an innovation. This stage implies knowledge of methods (both technical and soft skills) that are needed to adopt QM. Competence can often be infused from outside through recruiting or interventions, or it can be discovered from within or developed through training. One of the virtues of programmes was bringing in external competences that the participating organisations did not have on their own;

sometimes as an answer to an identified need from organisations, and sometimes the competence could bring about awareness and identify the need. In WashCo, on the other hand, competence entered by chance in the form of Peter; at PeakTech, the competence of the production manager also entered as happenstance, while the competence of the improvement expert entered as the answer to a need.

- *Adaptation* – When plans are made regarding how to modify and redefine an innovation to fit an organisation, and how organisational structures need to be altered to fit the innovation. It is the adaptation of QM ideas to an organisation’s specific context, in the form of conscious planning. Examples are Peter’s idea binder in WashCo, the months dedicated to planning in the Production Leap process, and consistent use of BD and SW in the Future SME process.
- *Implementation* – When actual changes are made visible in an organisation. It is the “active” part of the adoption, in that artefacts (such as new investments) or new procedures are appearing in the organisation.

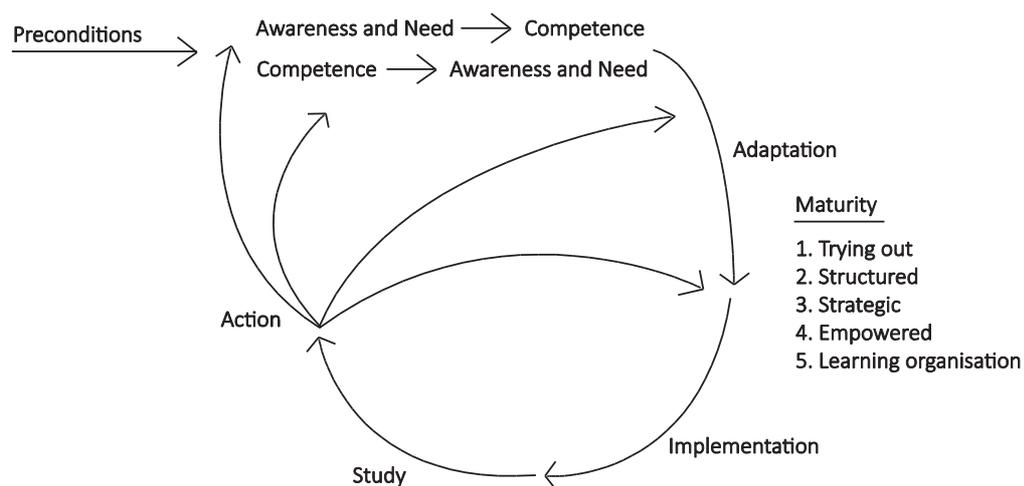
In addition to stages, a number of significant common themes were identified. First, it was seen that varying starting points (or preconditions) matter. It is arguably the case that organisations seldom start from scratch with improvement work. For example, Production Leap interviewees stated that the “end” state after the 18 months of the intervention depended to some extent on how mature the organisation was before their entry. Similarly, in the Future SMEs cases, it was concluded that the starting points of each company had a major effect on the result at the end of the interventions. The WashCo case, which was relatively unaffected by QM ideas before Peter’s entry, is potentially more of an exception than the rule.

Second, as already discussed above, some of the stages were reiterated during an adoption process. For example, it was demonstrated that awareness of different practices and techniques led to further awareness. Another example is that a core component of the Future SME programme was the iterative planning and evaluation process. While none of the cases demonstrated any “full adoption”, as in reaching the highest maturity levels, they could certainly be considered to have adopted QM to some degrees. In other words, the QM adoption process could be seen as an iterative process, with each iteration hopefully advancing the adoption process and the maturity of an organisation.

Third, an adoption attempt may of course be ended. While it can appear as if there is one way in but no way out, this does not mean that an adoption that has been started will continue on its own. It can certainly halt or regress, either by active decisions or simply by a lack of continued attention. For example, PeakTech risked destroying the advancements already achieved by failing to communicate the results of its improvement work. This not only hindered advancement of the process, but could also push it backwards if employees started to feel that all their efforts did not lead anywhere. Thus, there are different phases of a QM adoption, which are described here in terms of different maturity levels. It was also seen that different phases may require different converters to push forward. One that acts as a converter in one phase – such as strong centralised

improvement expertise – may be an inhibitor in another phase. A strong centralised improvement expertise may perhaps affect education and improvement projects and push adoption to a structured level, but it cannot make a quality management culture ubiquitous, which may be needed in order to reach the higher levels of maturity.

The model in Figure 10 is articulated based on the studies in this thesis and depicts the adoption of QM from an organisation's perspective.



**Figure 10 – Model for the QM Adoption process.**

Note: Illustration by Caroline Örmgård and Annica Eijlinder.

This model contains the stages addressed above, including preconditions. This model clearly emphasises the iterative nature of QM adoption processes. It includes conscious evaluation by including the two stages of *study* and *action*, inspired by the PDSA cycle (Bergman & Klefsjö, 2010; Deming, 1993). Although conscious re-evaluation is part of the programmes, it is not necessarily part of all actual adoption processes. After implementation activities, however, it seems suitable to reflect on the adoption so far. For example, an organisation can decide that more adaptation is needed before continued implementation, or that further competence is needed and perhaps to recruit, hire consultants, or train employees.

This model does not explicitly address decision activities. While these are certainly relevant to the process, it is hard to put them in any kind of order. This is natural since this new model considers the process from the point of view of the organisation and the persuasion and decision activities are often some form of top management decision. While it can, in many ways, be beneficial with a top management decision, especially in strictly controlled SMEs, a decision is not strictly *needed* before any of the stages in a company. Decisions can be made very early, as is required in the Production Leap organisations. They can also occur later in the process, as in the case of WashCo, where considerable work was done before any formal decision (or more accurately: a decision was made early *against* an adoption, which did not stop the adaptation).

## 6 DISCUSSION

Some authors have argued that SMEs could benefit from adopting QM (Brue, 2006; Conner, 2009; Kumar & Antony, 2008). Indeed, the cases in this thesis indicate positive effects of QM adoption. However, it has also been argued that many attempts to adopt QM in SMEs have failed (Ahire & Golhar, 1996). Sousa and Voss (2002) highlighted two problems with the adoption of QM. First, QM is often seen as a universal approach that can be applied identically in all companies. The literature review in Paper I and the study at a large company (LCAB) in Paper IV, for example, support this claim by suggesting a need for contextualisation of QM. Second, advice for successful adoption of QM is said to often lack structure, making it difficult to see what advice is valid where and when. Consequently, this thesis has aimed to provide structure to the QM adoption process in SMEs. To accomplish this, ideas from other literature fields are incorporated, leading to the notions of different stages and phases of an adoption. These ideas are synthesised in the model for QM adoption in SMEs that is presented in this thesis.

When considering the cases in this thesis, it becomes obvious that SMEs are far from a homogenous group. One factor is the relatively large range in sizes; from zero up to 250 employees if using a quantitative definition (European Commission, 2005). It seems likely that many SEs may have a flat organisational structure as WashCo, while few MEs would be as flat. PeakTech demonstrates a clear pursuit for structure in its QM adoption and can be inspired by applications at LCAB (such as a high-level structure for project execution and improvement hierarchies of trained individuals), while such inspiration would be out of place for WashCo. Scarcity of funds is not a major issue at either LCAB or PeakTech, but it certainly is at WashCo. On the other hand, WashCo has limited access to competence, and little structure. While some findings from LCAB may be applicable in both other cases (such as the virtues of establishing a common improvement vocabulary), it seems evident that different approaches are needed in the different companies. The programme cases also demonstrate this need for contextualisation, as they both emphasise planning and have few standardised ‘must-do’ methods.

### **6.1 RQ1: WHAT CAN PROCESSES OF QM ADOPTION IN THE SME CONTEXT LOOK LIKE?**

It has been said that linear stage models are unsuitable to describe more complex processes (Hislop et al., 1997; Wolfe, 1994), such as QM adoption, which raises the question of whether it is possible to develop any model for QM adoption in SMEs. The present thesis accounts for this complexity by making the iterative nature a central part of the model. Still, there is a risk that the model does not capture the complexity of QM adoption processes. In particular, it places the level of analysis at the organisation, which is made up of a number of individuals with their own processes (Frambach & Schillewaert, 2002). Some of the stages can be seen from different perspectives for a single case. For example, in the case of WashCo (Paper II), when Peter identified a need early, it took longer for John to identify similar needs. While Peter soon

identified a need for a production line and a system for continuous improvements, the production line had to prove its worth before John also could accept work with continuous improvements. There are certainly also intra-organisational differences. In the case of WashCo, which basically had a single working group, the process and maturity levels can be argued to be relatively straight-forward. In contrast, the adoption process in PeakTech can be seen at an overall level, but also at levels of different units. For example, while the development department might receive more attention and practice, other departments, such as production, may be less mature in their QM work.

Naturally, the presented model cannot be used to accurately describe any and all adoption processes. For example, the reflection activities (study and action) are not necessarily present in all processes, but they are present in the model because reflection is necessary for effective QM work (Deming, 1993) and should therefore be present for all adoption processes. The model is simplified, of course, and there are no waterproof barriers between the activities. However, while there is no such thing as a flawless model, there are useful models. The model presented here is useful in that it provides a language with which QM researchers can better contextualise findings to different stages and phases (maturity levels) of adoption. Furthermore, it provides practitioners with inspiration for planning and understanding of adoption as a process with different stages and phases.

If the cases in this thesis had been analysed exclusively with QM literature, it would have been hard to differentiate between the different stages of the processes. For example, in the study of the SE in Paper II, many of the important events occurred in initiation (Zaltman et al., 1973) before any of the actual implementation of practices and techniques, whereas factors discussed in the literature on QM adoption (as accounted for in Paper I, for example) do not address this. Another important aspect is that while contextualisation between different companies is given some weight in the literature (primarily corresponding to external maturity; see Pettigrew, 1987), it is even rarer to consider contextualisation between different levels of maturity (that is, accounting for the fact that the adoption process in itself changes the internal context).

Furthermore, if the cases had been analysed with classical stage models alone such as that of Rogers (2003), significant aspects would still have been neglected. In particular, such models do not capture the iterative nature of QM adoption processes. While classical stage models depict linear processes, with a start and an end, the cases in this thesis have a more iterative and complex nature, where the process could move forwards as well as backwards (see also Edvardsson et al., 2008). This is not surprising since these stage models are primarily constructed to support the adoption of technical innovations, which may arguably be relatively straightforward (Birkinshaw et al., 2008). QM, in contrast, can more accurately be described as a management innovation, and a broad one at that, implying the “creation of an organisational system (Anderson et al., 1994). Authors such as Zbaracki (1998) agree that management innovations cannot be treated as technical innovations. For example, it may be difficult to determine when an adoption of a management innovation is “finished” (Alänge et al., 1998).

## **6.2 RQ2: WHAT ARE THE CRITICAL FACTORS FOR ADOPTION OF QM IN SMEs?**

As shown in Paper I, critical factors for the adoption of QM in SMEs can be divided into certain categories: contextualisation, gradual implementation using realistic goals, involvement and training of employees, involvement of external support, management involvement, and fact-based follow-up. Paper I shows that contextualisation, gradual implementation, and involvement of external support are more emphasised in studies about adoption of QM in SMEs than in classical frameworks for QM (such as Bergman & Klefsjö, 2010; Dean & Bowen, 1994). At the same time, focus on customers was not as widely discussed in the literature on QM in SMEs, potentially because the customer is inherently in focus in SMEs.

When findings are compared to the stages described by, for example, Rogers (2003) or Wolfe (1994), competence may be seen as perhaps the most distinctive stage for the cases in this study. In fact, all of the stages have implied some sort of entrance of external competence. This can be seen as a symptom of QM being best described as a management innovation, which many companies inherently do not have competence to adopt (Mol & Birkinshaw, 2012). This could also be symptomatic of the SME setting, in which organisations often lack ample resources and competence on how to change (Hudson et al., 2001; Rahman & Tannock, 2005); this is also seen in Paper I with regard to the factor on engaging external support. It was learnt from the studies in this thesis that it is not always the case that competence in QM adoption is sought as a consequence of having identified a need; it was also evident that competence that just “happened” to enter an organisation. This could lead to identification of need to change and also act as a major converter for the process.

Regarding contextualisation, Paper IV show how a large company that is renowned for its QM work, consciously and constantly evaluates exactly what new influences are appropriate for it to use and how. In contrast, Rogers (2003) discussed the question of whether contextualisation (re-invention) of technical innovations is always bad (and concluded that it is *not always* bad); the present thesis shows that contextualisation of management innovations is a necessity. On the other hand, findings in this thesis, such as the model for adoption, are being presented as valuable for most organisations. This thesis does not argue that advice that works in one context can never work in another; instead, it argues that it cannot be taken for granted. All of the suggestions presented in this thesis should be seen as being for consideration, rather than prescriptive.

Findings from Paper II further demonstrate the need for external support, as well as contextualisation. However, this study also highlights some important factors that have not been strongly emphasised in the previous literature. In particular, it demonstrates the iterative nature of QM adoption and highlights the importance of the early parts of QM adoption (for initiation, see Zaltman et al., 1973).

Regarding gradual implementation, other researchers have debated whether to launch company-wide initiatives with full-scale training (Davig et al., 2003) or to limit the amount of early training and applications (Hodgetts et al., 1999). The cases in this thesis have all pointed towards

a more gradual adoption. Some of the first steps in both SME company cases (for example, only the introduction of a production line at WashCo, or the improvement expert's technical projects at PeakTech) could, if they had stopped there, have been difficult to argue as attempts at QM adoption. However, from a wider perspective, these steps were critical towards these companies' work to establish continuous improvements and full-fledged QM initiatives. Both of these cases have gone on to reach structured maturity, which can be seen as the minimum for actually being involved in an adoption process (Lascelles & Dale, 1993). Both of the cases also seem not to be able, at least temporarily, to integrate QM work with company strategy and progress to strategic maturity. In both company cases, the lack of management commitment is identified as an inhibitor forwards. In contrast, both programme cases aim to start with strategic alignment of QM initiatives, albeit with subsequent gradual implementation. Paper VI shows that organisations that have a clear strategic picture of what they aim to accomplish with their QM work, or at least work with developing a strategic picture early on, benefits more than organisations that do not.

### **6.3 RQ3: IN WHAT WAYS CAN EXTERNAL INTERVENTIONS INFLUENCE QM ADOPTION PROCESSES IN SMES?**

There is an ongoing discussion in the literature about external support, which is focused on securing financing and expert knowledge for QM work (e.g., Rahman & Tannock, 2005; Thomas & Webb, 2003). Such external support may come in the form of external interventions. The present thesis shows that the influx of competence may be more important than financial backing.

A programme can also help bring structure to a QM initiative by helping practitioners become aware of the process of adoption. The study found that rigorous planning processes are focal in the study programmes, which of course helps plan for better implementation stages. In both programmes, few methods were compulsory, but it has to be decided during the planning which methods to work with. However, this planning can also be seen as way to involve the management. Alstrup (2000) discussed that senior management initially often are unaware that they need to be involved in the process, but that they need to learn that. The sheer length of a programme intervention may also make sure that organisations do not expect too much too soon, and be put off by the lack of immediate gains.

Considering the company cases, particularly the one in Paper III, it is evident that companies may have a hard time progressing by structured maturity in their QM initiative. To reach strategic maturity, they would need to have an involved management and connect the initiative's goals to the company's overall goals, which can otherwise be powerful inhibitors. While this company has certainly come a long way without considerable management involvement, it may have been easier for them to progress further had they been in a programme that had emphasised this from the start. A programme can have an organisation realise the need of early focus on management commitment and strategic alignment in an adaptation stage. In fact, Herron and Hicks (2008) maintained that management commitment is perhaps the most important factor to consider in a programme. Similarly, it was also seen in the company cases that most contemplation was glossed over in the pursuit of further improvements. Programmes may, with their outside

perspectives, help companies ensure that time and efforts are spent on reflections and re-planning (in study and action stages, as well as iterations of adaptation).

Done et al. (2011) emphasised stakeholder management and included all management and employees. However, it was also evident in Paper III that this attention was expanded to include more external stakeholders. In particular, the PL programme actively works with labour unions and trade organisations. By involving these stakeholders, and addressing their concerns within the programme, these organisations are able to endorse the programme to their members. Parker (2003) concluded that having numerous improvement initiatives actually leads to less-motivated employees. These relations to external stakeholders seem to aid in (a) addressing concerns about making the results from programme intervention more motivating, and (b) reassuring potentially worried employees and companies (thereby removing this potential inhibitor).

It is also seen that the functions of programmes, particularly the external change agents, change during an intervention. In early parts of an intervention, these may be quite directive, while it appears beneficial later if organisations internally take ownership of the adoption process (as particularly seen in Paper VI). One key component of this process of progressively more autonomy for the companies in the adoption process is the conscious development of internal change agents (see also Done et al., 2011; Herron & Hicks, 2008). Done et al. (2011) further emphasised the importance of planning for activities after the end of interventions. While both the programmes acknowledge this, neither does anything other in terms of post-intervention activities than to develop internal change agents. This does not mean that programmes may not also be more supportive after concluded interventions, for example by providing discussion forums for SME managers.

Finally, it should be mentioned that the studies revealed further values of the programme format than simply direct support of adoption processes; values that would have been harder to achieve had it been smaller isolated consultancy efforts. The relations to external stakeholders are one such factor. First, it seems easier to attract public funding through such programmes. Second, programmes imply opportunities for research due to the package of a multitude of “similar” interventions. Third, a number of organisations will have similar experiences and perhaps even some sense of belonging. This implies opportunities to build networks and provide continued support after the completion of individual interventions (although this potential was not realised by any of the studied programmes).

## 7 CONCLUSIONS AND REFLECTIONS

The findings of the thesis are based on six different research papers. Paper I is a literature review. Papers II, III and IV are case studies from an SE, an ME and a large company, respectively. Papers V and VI provide the perspectives of external interventions programmes. The purpose of this thesis is to identify critical factors of, and functions of external interventions in, QM adoption in SMEs. The purpose was subsequently refined into three research questions.

The aim of the case studies has been to provide rich empirical descriptions and good stories, to allow readers to draw their own conclusions based on the particular context. At the same time, additional value is provided by suggesting explanations for the results, as well as suggesting implications for both practice and research.

### 7.1 RESEARCH QUESTIONS

The purpose was decomposed into the following three research questions.

#### ***RQ1: What can processes of QM adoption in the SME context look like?***

It was seen that a QM adoption process can be divided into different stages and phases. The stages that were identified as important in this thesis are awareness and need, competence, adaptation, implementation, and study, and action. The adoption process should not be viewed as linear, but as a complex and iterative process. For example, early adoption cycles can lead to awareness of new aspects, which may lead to new competence and further adaptations and implementations. It was seen that an adoption process is not limited to only progressing, but can halt or regress as well; such dynamics can be analysed by identification and analysis of converters and inhibitors.

These findings are synthesised in a model presented in this thesis (see Figure 10). The main elements of this model are a PDSA-inspired (Deming, 1993) iterative wheel containing the identified stages, together with an illustration of different QM maturity levels.

#### ***RQ2: What are the critical factors for adoption of QM in SMEs?***

Six categories of factors were conceptually constructed from a review of literature: gradual implementation using realistic goals, involvement and training of employees, involvement of external support, management involvement, and fact-based follow-up. Some of these categories are similar to what is presented in traditional QM frameworks (e.g., Bergman & Klefsjö, 2010; Dean & Bowen, 1994), while a few (in particular, contextualisation, gradual implementation and external support) appears more emphasised for the SME context. It was seen in the thesis that QM cannot be applied in a one-size-fits-all approach in SMEs; practices and techniques that work in one context do not necessarily work in another. Conversely, some factors are given less weight in the literature on QM in SMEs than they are in a traditional QM framework. In particular,

customer focus is not given the central focus that it is often given otherwise; this could be because SMEs are often very customer-centric by nature (Danes et al., 2008; Rantakyrö, 2004).

Most of the literature on QM in SMEs focuses on factors in later stages, particularly in the implementation stage. In the present study, however, it was seen that early stages can be equally, or even more, important. In fact, QM work may need to be pedagogically set clearly in an organisation's context in order for its management to even consider that it could be applicable. Many SMEs may simply not have inherent awareness of QM methods or competence to identify whether QM work could be beneficial in their operations. While the need for competence may be identified subsequent to the realisation that QM work may help, it may also be the case that the happenstance entry of competence may help identify the potential for QM.

***RQ3: In what ways can external interventions influence QM adoption processes in SMEs?***

The need for external support is another category of critical factors that is especially emphasised for SMEs. This implies access to funds for QM work, but also competence. The studied programmes could help in both these regards by providing subsidised expert knowledge. Perhaps even more important is that programmes may provide a structured approach, ensuring that stages which otherwise are easily neglected – such as adaptation, study and action – are effected. By requiring long-term commitment from organisations, adoption can be planned for longer term, and QM work can be mapped to organisation strategy. Thus, this commitment could decrease the risk of initiatives failing because of unrealistic expectations and improve the likelihood that work will continue until results can be realised. This front-heavy loading of management involvement may also ensure more management attention to the initiative overall. While management attention is not always necessary to start QM work, it is needed to progress an adoption process, particularly past structured maturity.

Programmes can help organisations to understand that an adoption is complex and will require a great deal of iteration to reach extensive maturity in the work. External interventionists should also progressively distance themselves from practical interventions. It has been shown that in cases in which individuals from organisations step up and get the organisations to take ownership of the process, these organisations benefit more from interventions. It has also been hypothesised that programmes may continue to support organisations even beyond the end of interventions; for example, by providing common meeting places for managers to discuss and exchange experiences. Therefore, the function of external programmes in a QM adoption process is to provide competence, funding and structure, and also to facilitate the work.

However, programmes as such also have other features worth mentioning. For example, they can more easily attract public funding, their relationships with third parties can broker trust with companies and employees, and they can provide foundation for research due to their multiple similar interventions.

## **7.2 IMPLICATIONS FOR PRACTICE**

As suggested by Ahire and Golhar (1996) and Conner (2009), among others, adoption of QM seem to have the potential to improve the operations of SMEs. For some managers, the idea that changing organisational structures and ways of working may be a way of improving a business is foreign and may need to be demonstrated before any more strategic work can be performed. This was demonstrated in Paper II, where the management, before making the initial improvements, believed that changes could only be done with more and faster machines. Furthermore, it seems evident that management may occupy an even more critical role in SMEs than in large organisations.

In the research for this thesis, nothing was found that contradicted claims that basic practices or techniques (Dean & Bowen, 1994; Hackman & Wageman, 1995) that are shown to work in large companies would work in SMEs as well (e.g., Hansson & Klefsjö, 2003). Instead, basic ideas that are being taught within contemporary courses on QM proved valuable in the cases. However, the SME category is vast and varied, and practices and techniques that work in one context may not necessarily work in another. The literature review and programmes place considerable emphasis on starting QM work by defining what an organisation is actually trying to accomplish and the reason for its existence, and from there discussing what can be done to improve the situation.

As has been discussed at length, resources are generally scarce for SMEs (e.g., Bridge et al., 2003). Competence in adopting comprehensive management innovations, such as QM, is generally seen as scarce in large organisations (Birkinshaw et al., 2008), and even scarcer in SMEs. This means that one of the vital points in any QM adoption is how competence can be acquired into a company, which is also reflected in the model proposed in this thesis. Programmes can also be part of an answer to this question, in the form of providing funding and competence to support an adoption process.

The model developed in this thesis can act as inspiration for anyone planning an adoption of QM in an SME. It illuminates the existence of different stages and phases of a QM adoption. One of the core principles behind QM is continuous improvements, and a QM adoption should itself be continuously improved. The proposed model captures this philosophy by explicating that implementation is only one stage of adoption; it is also beneficial to plan ahead, evaluate changes, and be aware that processes are iterative. The model also explicates different phases, or levels of maturity.

In summary, anyone preparing to adopt QM in an SME should consider the following points: (1) adoption of QM is gradual, not binary; (2) different maturity levels may demand different approaches; (3) adoption is not a quick fix, but long-term commitment is key to success; (4) progression is not assured – adoption can halt or regress; (5) management involvement and clear connections to overall strategy are needed to reach high levels of maturity; and (6) external interventions can aid with needed competence, but also with structure.

### **7.3 IMPLICATIONS FOR RESEARCH**

One important impression from this thesis is that individual SMEs are vastly different from each other. Although this heterogeneity of SMEs may seem self-apparent, it is common, when considering research, that SMEs are treated as a homogenous group. With the need for contextualisation of QM adoption in mind, it is difficult to always motivate a single approach to defining all SMEs in research. However, this heterogeneity does not mean that less research effort should be spent on SMEs; instead, it implies a considerable need for further research. Traditionally, research in adoption of QM in SMEs has not considered context to any great extent (Sousa & Voss, 2002). One aim of the present thesis is to disjoin from this trend and clearly discuss the contexts under which my results are valid, where applicable and possible. For example, Papers III and V both discuss the background context as MMEs, rather than the entire SME group. Furthermore, the context is both outer and inner factors (Pettigrew, 1987). This means that it is not enough to consider which organisation is studied, but also what happens inside the organisation. It was seen in this thesis that different phases of an adoption may require different approaches. These dynamics of inner context are reflected in the proposed model through the discussions on maturity levels.

It has been argued that the literature on QM adoption has largely lacked structure and vocabulary (Sousa & Voss, 2002). With the aim of “structuring the current chaotic wealth of QM implementation advice and to producing more solid and useful advice to managers” (Sousa & Voss, 2002, p. 106), future research may discuss factors and advice from the perspective of different stages (e.g., adaptation and implementation), as well as different maturity levels (e.g., structured and empowered), as presented in the model proposed in this thesis. For example, while the literature contains extensive discussions of the importance of management commitment, organisations can do without such commitment, even up to a structured maturity. However, in order to reach a level of strategic maturity, it appears necessary to have management commitment and a clear connection of the initiative to company overall goals.

Furthermore, a plurality of factors found in the literature focus on the implementation stage, while little research has been done on earlier stages. For example, it is unlikely that any adoption can be started if an owner-manager does not understand the applicability of QM in the own context. Factors that are to be discussed for the initiation include how to reach management.

In conclusion, researchers can use the model proposed in this thesis can to understand what happens or happened in an adoptions process. In particular, the model can be used as a way of structuring current and future advice for the adoption of QM, thereby avoiding a “chaotic wealth of QM implementation advice” (Sousa & Voss, 2002, p. 106).

### **7.4 LIMITATIONS AND FUTURE RESEARCH**

First, the *what* of critical factors for adoption of QM in SMEs can be seen as having an answer, as seen from the findings in Paper I. The *when* and *where* are yet to be fully answered. However, this thesis has contributed to answers to the latter and has provided tools for future research to

further these answers, in the vocabulary of different stages and maturities. The *when* would be more visible in advice for adoption if future research explicitly considers different stages and phases of an adoption process. The *where* would in turn be more visible if future research explicitly address the specific contexts (inner *and* outer) the research is supposed to contribute to.

Second, some of the main findings of this thesis are synthesised in the proposed model for QM adoption in SMEs, which should be useful for planning and understanding in practice, and for analysis in research of QM adoptions. This would be interesting with applications of the model, evaluating and validating its usability in practice and research. Furthermore, the thesis was set to be delimited to manufacturing settings, but it would be interesting to also see applications in other settings, such as services, public administration and health care. After all, observations by Sousa and Voss (2002) made adoption a general difficulty, not only in the SME context; perhaps the findings in this thesis could serve as inspiration in other fields as well.

Third, all of the cases in this thesis have been organisations at the lower half of the maturity scale in terms of QM adoption. It could be the case that most adoption processes worldwide have not passed structured or strategic maturity, and that those stages are therefore the most important to study. Nevertheless, it would be interesting to have more studies of QM adoption in SMEs in organisations that are nearing empowered or learning organisations.

Fourth, both of the programmes that have represented external interventions in this thesis were publically funded. From these, functions were identified that could be valid for most external interventions, and yet others that are specific to programmes (for example, the relations to labour unions). It could be interesting to investigate if other types of external interventions, such as management consultancies, provide other functions (such as more flexible approaches that can cater better to specific needs).

Fifth, the processes described in this thesis have not been unreservedly successful – they have had strong points as well and deficiencies. However, they have all progressed somewhere and are still progressing. At the same time, it would be interesting to investigate “failed cases” (that is, cases in which QM has not contributed with significant benefits and adoption been terminated) to learn how *not* to do certain things. A hypothetical scenario would be to follow a programme during recruiting activities, contacting opt-outs. Another alternative would be to simply phone or visiting randomly selected organisations and inquire if they have heard about lean or Six Sigma and, if so, if and how they have acted on it.

Sixth, it was identified that while customers are in central focus in traditional QM literature, they are not featured prominently in literature on QM in SMEs. It has been suggested that this could be because this principle is intrinsically central in these companies (Danes et al., 2008; Rantakyrö, 2004). It would be interesting to see studies that specifically address how customer involvement and focus is practiced in SMEs.

If one is truly to succeed in leading a person to a specific place, one must first and foremost take care to find him where he is and begin there. This is the secret in the entire art of helping.

Anyone who cannot do this is himself under a delusion if he thinks he is able to help someone else. In order truly to help someone else, I must understand more than he –but certainly first and foremost understand what he understands.

– Søren Kirkegaard –

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The appended papers (106 pages) are, for copyright reasons, removed from this electronic version of the thesis.

For the full-text papers, please consult the printed version or the information below. Papers II, III, and V were not yet journal published by the publication of this thesis. The versions found below may thus reflect later revisions of these papers.

**Paper I** Assarlind, M., & Gremyr, I. (2014). Critical factors for quality management initiatives in small and medium-sized enterprises. *Total Quality Management & Business Excellence*, 25(3-4), 397-411.

<https://publications.lib.chalmers.se/publication/186970-critical-factors-for-quality-management-initiatives-in-small-and-medium-sized-enterprises>

**Paper II** Assarlind, M., & Gremyr, I. (2016). Initiating quality management in a small company. *The TQM Journal*, 28(2), 166-179.

<https://publications.lib.chalmers.se/publication/214047-initiating-quality-management-in-a-small-company>

**Paper III** Assarlind, M., & Aaboen, L. (2014). Forces affecting one Lean Six Sigma adoption process [earlier title: An analysis of stagnated Lean Six Sigma adoption]. *International Journal of Lean Six Sigma*, 5(3), 324-340.

<https://publications.lib.chalmers.se/publication/195135-forces-affecting-one-lean-six-sigma-adoption-process>

**Paper IV** Assarlind, M., Gremyr, I., & Bäckman, K. (2013). Multi-faceted views on a Lean Six Sigma application. *International Journal of Quality & Reliability Management*, 30(4), 387-402.

<https://publications.lib.chalmers.se/publication/175799-multi-faceted-views-on-a-lean-six-sigma-application>

**Paper V** Assarlind, M. (2015). Analysis of an improvement programme for MMEs. *Journal of Manufacturing Technology Management*, 26(8), 1107-1125.

<https://publications.lib.chalmers.se/publication/214045-analysis-of-an-improvement-programme-for-mmes>

**Paper VI** Assarlind, M., Eriksson, H., Gremyr, I., & Jakobsson, T. (2013). Adopting new ways of working in SMEs: Findings from interventions in 12 European companies. *Total Quality Management & Business Excellence*, 24(8), 945-958.

<https://publications.lib.chalmers.se/publication/179066-adopting-new-ways-of-working-in-small-and-medium-sized-enterprises-findings-from-interventions-in-12>





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