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Introducing Integrated Performance Measurement into Small and Medium Sized Enterprises

by

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Introducing Integrated Performance Measurement into Small and Medium Sized Enterprises

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Abstract

The thesis extends current knowledge and understanding of integrated performance measurement (PM) development into the context of small and medium sized enterprises (SMEs). The research builds on existing knowledge of integrated PM development approaches and identifies the context-specific factors which affect its introduction into SMEs. These are used to design, develop and validate a new, continuous improvement based approach for the development of integrated PM systems, which is specifically designed for use in SMEs.

First, a conceptual model of criteria for integrated PM development is synthesised from the literature and the characteristics of SMEs are established. An evaluation of current approaches for the development of integrated PM is undertaken and an approach which conforms to the conceptual model is selected for an empirical study in a SME. Along with a set of interviews examining the state of PM in SMEs, this study identifies several factors which affect integrated PM introduction in this environment. These factors enhance the conceptual model and indicate the need for a more effective development approach for SMEs. Design theory is used to inform and structure the design of the new approach, which is developed and refined for practical use through a SME case study. Two further cases are carried out to validate the new approach, in which cross-case comparisons are made. The results indicate the validity of both the new approach and the enhanced conceptual model.

The formulation of an enhanced conceptual model of integrated PM development, detailing the context specific criteria for effective in use in SMEs, together with the validation of a new, continuous improvement based, approach for integrated PM system development in SMEs that conforms to the conceptual model, represents a significant contribution to both theory and practice from this research.
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Author’s Declaration

At no time during the registration for the degree of Doctor of Philosophy has the author been registered for any other University award.

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Relevant conferences and workshops were regularly attended and a number of external establishments were visited for guidance and consultation. Publications resulting from the research can be found in the appendices and are as follows:


Signed....................................

Date.........................................
Chapter 1: Introduction

1.0 Overview

This thesis documents the work undertaken on a three year research project, which aimed to extend current knowledge and understanding of integrated performance measurement development into the context of small and medium sized enterprises.

This chapter begins by providing an explanation of the rationale for the research. This underpins the gap in current knowledge which this project fills and also establishes the context and timeliness of the research. A description of the research questions and a summary of the contribution to knowledge provided by the research follows. The chapter concludes with a description of the thesis, providing a chapter-by-chapter overview, which explains how the research progressed through the three phases of Investigation, Innovation and Application.

1.1 Background to the Research

Small businesses are big news. Current figures show that companies with fewer than 250 employees (commonly termed ‘small and medium sized enterprises’ or SMEs) account for 99.8% of all businesses within the UK (Small Business Service, 2000). This equates to 3.75 million UK SMEs, which employ 55.5% of the private sector workforce and account for 44.7% of business turnover and 40% of GDP (CBI, 2001). Even removing micro businesses, including sole traders and partnerships, from the equation, SMEs still account for 96.5% of British companies employing 10 people or more. The increasing importance on SMEs was highlighted in April 2000 with the launch of the Government’s Small Business Service. This has an explicit “think small first” strategy, aimed at persuading
governmental decision-makers to consider the implications of new policies and regulations for SMEs.

With SMEs forming such a critical part of the economy, it is unsurprising that more and more investment is being ploughed into this area through research and development programmes. However, the outputs of research programmes do not always easily translate into useful solutions for SMEs. As Childe (2000) points out

*For example, production planning and control is not the same for SMEs as in larger companies. Although the principles of good delivery, high quality, low cost and low inventory are still applicable in theory, the practice of operating the small company is in many ways different. The same kind of difference exists in other areas such as manufacturing strategy, the management of change and the relationship with other companies in supply chains or supply networks.*

The reason for this is that business research generally provides solutions that have been developed both in and for large companies. This means that effective use in SMEs often requires a fundamental rethink of the way the research is presented. This has led Nelder and Willcock (2000) to assert that:

*A key requirement for the research community is translation of their investigations and work into a format that is not only acceptable to, but seen as helpful by the SME. Issues here include:* 

1. *The problem of raising awareness and gaining SME commitment to implement the knowledge and best practice that already exists and is available in a SME context.*
2. *The problem of converting or scaling knowledge and best practice that already exists in contexts other than SMEs, so that is adapted to the SME contexts.*
3. *Adapting outputs into off-the-shelf formats to support the SME at the point of change.*
4. *Finally there is the problem of supporting innovation in SMEs by the creation of new knowledge and solutions to SME problems for which there is no prior knowledge or best practice.*

A key improvement initiative which received much attention throughout the 1990’s and continues to do so today, is in the area of performance measurement (PM). According to
Neely (1999) the interest in PM has been stimulated by the recognition that the changing nature of work and the competitive environment make traditional, financially-based performance measures alone hopelessly inadequate. This was highlighted initially by authors such as Eccles (1991), who talked of a ‘revolution’ in PM that was due to the decision to

\[
\text{shift from treating financial figures as the foundation for performance measurement to treating them as one among a broader set of measures.}
\]

This shift led to the term *integrated (or strategic) PM* being introduced into the vocabulary of researchers as they began to identify frameworks and methodologies for developing a more balanced set of measurements for businesses. However, this effort was typically focused towards the needs of large companies, with various approaches being developed successfully by Lynch and Cross (1991), Kaplan and Norton (1992), Neely et al (1996a) and Bititci et al (1997), amongst others.

Unfortunately, despite success in large companies the majority of these approaches have been, at best, only theoretically evaluated for use in SMEs (e.g. Hvolby and Thorstenson, 2000; Andersen et al, 2001). There appears to be a dearth of empirical studies exploring how these approaches actually work in a SME context. Therefore, despite a thorough understanding of the field of integrated PM, there is a need for more research to investigate appropriate methods of translating the outputs of PM research into useful and usable approaches for SMEs.

### 1.2 Aims of the Research

The overall aim of this research is to extend current knowledge and understanding of integrated PM development into a SME context. Initially, this will involve defining, in
detail, what is meant by the terms *integrated PM* and *SMEs*. The way that PM is currently used in SMEs will then be established, along with the appropriateness of current approaches for introducing integrated PM in SMEs. A set of requirements for a SME focused integrated PM development approach will be identified and a new approach developed to conform to these requirements. The new approach will be applied in SMEs to establish its usefulness and to allow a more detailed understanding of how integrated PM can be introduced effectively in SMEs.

### 1.3 The Research Questions

Two key research questions were identified to guide the research. The first asked:

*Are current integrated PM development approaches appropriate for use in SMEs?*

Four initial research sub-questions helped to investigate this question, by providing a clear understanding of the problem area:

*What is integrated PM?*

*What SME characteristics affect the introduction of integrated PM?*

*How do SMEs use and understand integrated PM?*

*Are there barriers to integrated PM development in SMEs?*

The findings from investigations addressing the first research question prompted the development of the second question, which asked:

*How can integrated PM be introduced effectively into SMEs?*

The rest of this chapter will focus on demonstrating how the research undertaken to address these questions make a contribution to knowledge. It will also explain the structure of the thesis.
1.4 Contribution to Knowledge

Existing research has established methods for developing and implementing integrated PM in larger organisations. However, very little research has focused on its introduction into SMEs. The major contribution of this research is the identification of the context-specific factors that affect integrated PM development in SMEs. Along with a number of criteria derived from existing literature, these factors provide a conceptual model of integrated PM development for SMEs.

The new conceptual model is developed from both theory and practice. First, theory is used to establish a general conceptual model, representing a consensus of academic opinion on integrated PM development. This model is then supplemented by practical investigations in SMEs, which identify the context-specific requirements for the effective introduction of integrated PM in this environment. These additional requirements enhance the conceptual model and are used as the basis for the design, development and validation of a new, continuous improvement approach to introducing integrated PM systems in SMEs. Applying the new approach in SMEs enables the enhanced conceptual model for integrated PM development in SMEs to be validated.

In summary, the research presented in this thesis contributes to knowledge through:

- establishing a set of context-specific requirements for the introduction of integrated PM into SMEs;
- adding these requirements to criteria identified from existing academic literature, to form a conceptual model of integrated PM development specifically aimed at SMEs;
- designing and validating a new, continuous improvement approach to the development of integrated PM systems in SMEs, which conforms to the conceptual model;
- providing new insights into how SMEs understand and use PM.
1.5  Thesis Structure

The research was conducted in three distinct phases; Investigation, Innovation and Application. The first research question was addressed through the Investigation Phase of the research, with the second research question being investigated through the Innovation and Application phases.

1.5.1  Research Design

Chapter 2 describes how the research was conducted. This chapter identifies an appropriate research paradigm which takes into account the nature of the research and the epistemological perspective of the researcher. It then describes the specific research methods used throughout the project and provides an explanation of their relevance. Finally, the overall research framework is described, showing a logical progression through the study and illustrating how each phase builds on its predecessors to create a cohesive understanding of the research project as a whole.

1.5.2  Investigation Phase

The Investigation Phase of the research is presented in Chapters 3, 4, 5 and 6, with each chapter corresponding to one of the four initial research questions.

Chapter 3 explores the question What is integrated PM? It introduces the concept of integrated PM and provides a brief history of the subject area, to illustrate its evolution. A conceptual model is developed from the literature which details the criteria for effective development of integrated PM. The conceptual model is used as a basis for reviewing a number of current approaches for designing and implementing integrated PM. This review
identifies a comprehensive development approach, based on its adherence to the conceptual model.

Chapter 4 examines the literature on SMEs, considering the question *What SME characteristics affect the introduction of integrated PM?* A comprehensive overview of SME characteristics is gained. This is used to establish a set of SME characteristics for the purposes of this research project. An evaluation of the appropriateness of integrated PM in these companies is then given.

Chapter 5 illustrates how SMEs understand and use PM. A broad picture of the way PM is used in SMEs is gained through available literature, which is then supplemented by an empirical study. This provides the data to enable the development of a model, which describes the PM systems that might be found in SMEs. A gap analysis reveals that SME PM development differs significantly from that advocated in the conceptual model developed in Chapter 3.

Chapter 6 investigates the barriers to integrated PM development in SMEs. It builds on Chapter 5 and attempts to introduce integrated PM into a SME, using a comprehensive development approach. Previous research is examined to identify existing knowledge in this area and then an in-depth case study is carried out to investigate the implications of developing and implementing integrated PM systems in SMEs using a structured approach.

1.5.3 Innovation Phase

The Investigation Phase of the research provided a clear and detailed understanding of the problem area. The Innovation Phase builds on this foundation to consider the second
research question. Chapter 7 describes the design of a new approach for introducing integrated PM more effectively in SMEs. An appropriate design process is identified and, using the knowledge of integrated PM and SMEs from chapters 3, 4, 5 and 6, a set of requirements are established. The requirements form the basis for a new development approach and are used to formulate an enhanced conceptual model of SME focused integrated PM development.

Chapter 8 details the practical development of the new integrated PM development approach in a SME environment. The purpose of this is to ensure that it is relevant and usable in a SME context. This is the final stage of the design process, where practical refinements are made to ensure that the each stage of the new approach is usable and flows logically into the next stage.

1.5.4 Application Phase

Having designed and developed the new approach, the Application Phase details the results of its validation in SMEs. Chapter 9 identifies appropriate validation criteria and assesses two practical applications of the process. Each application is analysed individually and assessed against the validation criteria. In addition, cross-case analysis is carried out to establish the similarities and differences between each application, from which some conclusions are drawn. The results of the case analyses enable the validation of the new conceptual model from which the new approach was developed.

Chapter 10 draws the thesis together, formulating appropriate conclusions and highlighting the key elements of the research. The contribution to both knowledge and practice is then clearly explained. The thesis ends with a brief discussion of the difficulties
encountered throughout the research and the identification of a number of areas for future research.

1.6 Summary

This chapter has provided a brief background of the need for research into PM development in SMEs. It has given an overview of the aims of the research and identified the research questions to be investigated. The contribution to knowledge has been clearly explained and a chapter-by-chapter breakdown of the thesis has highlighted the key elements of the research process. The rest of this thesis describes the research undertaken starting, in Chapter 2, with a detailed account of the research design and the explicit research methods used throughout this project.
Chapter 2: Research Design

2.0 Introduction

This chapter will explain the approach adopted in undertaking the research presented in the thesis. First, an overview of the research is given. This comprises setting the research in context, identifying an appropriate research paradigm and developing the research questions. The specific methods adopted throughout the project are then described and the rationale for their use is given. Finally, the overall research framework is described, showing a logical progression through the study and illustrating how each phase builds to create a cohesive understanding of the research project as a whole.

2.1 Purpose, Scope and Context of the Research

Before undertaking a research project, a researcher makes a number of assumptions from their personal and academic experiences to establish the potential value of the research. This is known as the “preunderstanding” of the researcher (Gummesson, 1991). In this case, the preunderstanding of the researcher included a basic knowledge of the benefits of introducing integrated PM into large companies and that the characteristics of SMEs differ from those of large companies.

2.1.1 Purpose

The purpose of the research is to extend current knowledge and understanding of integrated PM development into a SME context. This is novel because there appears to be a dearth of information regarding the development of integrated PM in SMEs, despite the numerous studies investigating it in larger companies (e.g. Kaplan and Norton, 1993; Letza, 1996).
2.1.2 Scope

To ensure focus throughout the project, the scope of the research was specifically limited to investigating integrated PM development in SMEs. Therefore, two areas were investigated in detail; integrated PM and SMEs. Chapter 3 provides a comprehensive overview of integrated PM, which results in the development of a conceptual model. This conceptual model characterises effective integrated PM development from the literature. Similarly, the characteristics of SMEs are identified in Chapter 4. In addition, recognising their heterogeneous nature, the type of SMEs which are the specific target of this research are also described. These research boundaries limit the scope of the research to ensure that the findings will be both coherent and of practical value to the target audience.

2.2 The Research Paradigm

The work reported in this thesis falls into the domain of management research. In this field, both qualitative and quantitative studies are common. Therefore, the research paradigm selected is based both on the nature of the study itself and on the epistemological perspective of the researcher.

2.2.1 The Epistemological Perspective of the Researcher

Epistemology refers to the grounds of knowledge (Hassard, 1991). According to Meredith et al (1989) there is an epistemological continuum which has at each of its extremes pure existentialism and pure rational logic:

At one extreme is rationalism, which uses a formal structure and pure logic as the ultimate measure of truth. At the other extreme is existentialism, the stance that knowledge is acquired through the human process of interacting with the environment. Thus, in existentialism an individual’s unique capabilities, in concert with the environment, are regarded as the basis of
The researcher’s own perspective is that knowledge is acquired through interaction with the environment, although there is also some sympathy with the notion of objective truth, derived from logic. Therefore, the researcher’s epistemological perspective would be towards the middle of the continuum, but tending towards the existential perspective.

Meredith et al (1989) suggest that research carried out from this perspective is typically more inductive, less structured, more subjective and requires more interaction with the environment than that carried out from the rational pole. In addition, they find that the researchers are more likely to be concerned about linking their findings to the real world than with existing theories or laws.

2.2.2 The Nature of the Study

The research paradigm associated with an existentialist philosophical stance is labelled the interpretative, or hermeneutic, paradigm by Gummesson (1991), derived from the Greek word ‘hermeneuein,’ – to interpret. It differs from the rational, positivist paradigm associated with the natural sciences because it accepts the possibility of researcher bias and, instead of trying to find objective cause and effect relationships, looks to interpret the available evidence in order to gain an understanding of a given situation (Gummesson, 1991). The philosopher Dilthey (1976) described the process of hermeneutic investigation as a circle, whereby understanding a phenomenon in its natural context is considered an iterative process through which enhanced understanding is gained incrementally.

The nature of hermeneutics means that conventional, positivist research methods are inappropriate, as Checkland (1981) notes;
Clearly in this tradition it is believed that special methods, not simply those of natural science, are required to understand such uniquely human processes.

For this reason, the hermeneutic paradigm is closely associated with case-based research methods, whereby a relatively small number of in-depth studies are carried out to gain a deep understanding of the problem area in specific contexts. This makes it well suited to exploratory research, or where there is a lack of a theoretical base for the study (Creswell, 1994).

2.3  Research Questions

Before embarking on the research, appropriate research questions needed to be developed in order to focus the work. Initial research sub-questions were aimed at understanding the problem area and asked:

What is integrated PM?

What SME characteristics affect the introduction of integrated PM?

How do SMEs use and understand integrated PM?

Are there barriers to integrated PM development in SMEs?

These provided a focus for the investigation of the first main research question:

Research question 1: Are current Integrated PM development approaches appropriate for use in SMEs?

The investigation into question 1 developed the necessary knowledge and understanding of the subject area, which prompted the development and investigation of the second research question:

Research question 2: How can Integrated PM be introduced effectively into SMEs?

The rest of this chapter explains the research methods used, along with the way the research was structured, to explore these questions effectively.
2.4 Research Methods

The literature reveals that there is a lack of existing knowledge in the area of integrated PM introduction into SMEs. However, to understand how integrated PM can be introduced effectively into SMEs requires an in-depth understanding of the SME context in which it will be applied. As Meredith (1998) points out, in all research

*qualitative understanding is required for drawing research conclusions and communicating the importance of the results.*

Therefore, for this research project, the case-based research methods associated with the hermeneutic paradigm are appropriate. This is because qualitative research focuses on gaining a deep contextual understanding of the selected environment, which is necessary for the development of practical and relevant management research. This is highlighted by Meredith et al (1989) who note

*In general, the newer, more interrelated, more situation or people-dependent topics in operations require the additional perspective afforded through the natural and existential methodologies.*

2.4.1 Case Studies

The rationale for using a case study approach is given by Yin (1984), who states:

*A case study is an empirical enquiry that:
- investigates a contemporary phenomenon within its real-life context; when
- the boundaries between phenomenon and context are not clearly evident; and in which
- multiple sources of evidence are used.*

As the empirical studies in this research project are primarily concerned with introducing integrated PM systems into SMEs, it is essential that they are conducted within these boundaries if a true image of SME PM is to be identified.

The role of the researcher in case studies can take several forms. Gummesson (1991) identifies two primary roles for researchers in case study situations; *participant*
observation and action research. Both of these roles involve some form of active intervention on behalf of the researcher, which is upheld as being the only way of gaining access to the relevant information:

A thorough analysis of a particular process will require the use of the researchers’ personal observations that result from their presence, participation, or even intervention in the actual process to be examined (Gummesson, 1991).

Participant observation and action research are used, along with interview techniques, as the primary methods of data collection for this research project. Therefore, each of these will now be discussed.

### 2.4.1.1 Participant Observation

One method of conducting a case study is to become a ‘participant observer’ of the phenomenon under investigation. According to Flick (1998), this should be viewed as a process whereby the researcher first simply describes everything that is noticed about the environment. This gradually becomes more focused on the specific phenomenon under investigation until, eventually, the researcher becomes selective in what is described, aiming to find further examples of specific aspects of the phenomenon.

The main advantage of this approach is that first-hand interaction with the object of the research in a natural environment is prolonged, which facilitates a greatly increased understanding of complex phenomena. In addition, observations can easily be complemented by the collection of other appropriate evidence to support the case, providing a valid method of triangulation. This evidence might include interviews, either informal or formal, physical artefacts and formal documents and records (Gillham, 2000b). Overall, this method is particularly applicable when there is an emphasis on describing and interpreting complex phenomena, making it highly appropriate for investigating PM development in a SME context.
2.4.1.2 Action Research

The term ‘action research’ was coined by Lewin (1946). It represents a radical way of carrying out research, which is aimed at generating new knowledge through the researcher actively changing the system under investigation (Warmington, 1980). This differs from participant observation in that it entails the researcher taking a more active role in bringing about specific changes in the environment. As Raimond (1993) states:

*Action research holds that it is possible for the researcher to take an active part in the organisation and, at the same time, observe the organisation.*

The primary benefits of action research are that it enables the development of practical techniques for improvement, where the researcher provides the basis for the development of competencies in others (Susman and Evered, 1978). It is this collaborative relationship, whereby the researcher investigates the change situation whilst the participants in the research learn new methods for change, which makes action research appropriate for transferring new methods of introducing PM into SMEs.

2.4.1.3 Interviews

Face-to-face interviews are considered appropriate methods of investigation when the researcher is attempting to gain insights and depth of meaning and understanding about specific phenomena (Gillham, 2000a). They can range from highly formalised questionnaire-style interviews, to totally unstructured discussions, depending on the type of data required. Semi-structured interviews are interviews that are characterised by having a relatively small number of key, open-ended, questions which interviewees are encouraged to expand upon through the use of probes from the interviewer. As Ackroyd and Hughes (1992) note, in semi-structured interviews

*the interviewer is normally required to ask specific questions but is free to probe beyond them if necessary.*
This technique was considered the most appropriate for the purposes of this research, where interviews were used to gain a detailed understanding of the problem area. This is because it combines the advantages of unstructured interviews in collecting all seemingly relevant data without restriction, with an overall structure that helps to ensure that all relevant areas of investigation are covered in the interview situation.

2.5 Research Structure

This section will explain how the foundations of the research, along with the research methods used, link together to develop into a logical, coherent structure for the research.

Addressing the research questions fell into three distinct phases; Investigation, Innovation and Application. The first phase aimed to investigate research question 1, whilst the other phases attempted to address research question 2. Figure 2a illustrates the overall research structure and depicts the relationship between the research questions and each phase of the research.

2.5.1 Phase 1: Investigation

This was the largest and most complex phase of the research. This was because, in order to address research question 1, the four initial research sub-questions needed to be studied. Each initial question was investigated through an iterative cycle of exploration, understanding, interpretation and explanation. This enabled the synthesis of the knowledge and understanding gained from each question into a detailed description of the current situation regarding the introduction of integrated PM into SMEs. From this, the appropriateness of existing integrated PM development approaches for use in SMEs was assessed. A set of requirements for a SME focused integrated PM development approach were then identified, which fed into Phase 2 of the research (see figure 2a).
Initially, a thorough review of the literature concerning integrated PM and SMEs was carried out. This provided a definition of what is meant by these terms for the purposes of this research. This led to the development of a conceptual model of integrated PM development, which embodied the findings of previous research. The integrated PM development approaches identified in the literature were then reviewed against the conceptual model in order to establish a comprehensive approach. This review resulted in the selection of a comprehensive process, which was then used as the basis for an investigative case study.

A review of the literature on SMEs was then undertaken to establish a set of defining characteristics for the SMEs which were the target of this study. These characteristics formed the basis of an assessment of the appropriateness of integrated PM in a SME context. However, a lack of information regarding integrated PM in SMEs meant that an exploratory empirical study was also required. This consisted of a set of semi-structured interviews (cases A-H) being carried out with SME managers, to establish the nature and extent of integrated PM in a SME context. Each interview was taped, transcribed and summarised. The summaries were then verified and validated by the interviewees and an additional manager, enabling multiple source triangulation (Denzin, 1978). Interview analysis was carried out using thematic coding (Flick, 1998) and then a gap analysis highlighted the differences between the conceptual model of PM systems and SME PM. A complete description of this investigation can be found in Chapter 5.

A case study (case I) was also undertaken, which examined how a comprehensive integrated PM development process worked within a SME context (see Chapter 6 for full details). Data collection was based on participant observation and face-to-face interviews, along with the collection of documentation arising from the process. This enabled the
accumulation of both processual and behavioural data from the study. The study was analysed using Creswell’s (1998) case study procedures and data triangulation was achieved through multiple methods, multiple data sources and multiple researcher involvement (Denzin, 1978).

### 2.5.2 Phase 2: Innovation

The investigative phase of the research illustrated the difficulties involved in introducing integrated PM into SMEs using current methods. The Innovation Phase of the research focused on addressing the second research question. This was achieved through the design and development of a new approach, aimed specifically at the target SMEs, for the effective introduction of integrated PM in this context.

Phase 1 of the research provided the knowledge and understanding of SMEs and integrated PM, from which a number of specific requirements were developed to make PM systems more appropriate for SMEs. These requirements were used to enhance the conceptual model of integrated PM development, which was then used as the basis for designing a new SME focused development approach. Design literature was consulted to gain an understanding of the process of design and a suitable process was identified, comprising three phases; analysis, synthesis and evaluation. This process was used to develop the new approach for introducing integrated PM into SMEs. An integral stage in developing the new approach was to apply it in a practical SME setting. Therefore a developmental case study (case J) was undertaken, in order to examine how it worked in the real world and to identify improvements.

The case study was carried out using action research, enabling the researcher to get actively involved in the application of the new integrated PM development approach for
SMEs, to gain an in-depth understanding of the contextual issues surrounding its application in a SME. For triangulation purposes, active data collection was supplemented by observations, documentation and informal discussions. To further strengthen the validity of the data, an additional researcher observed the intervention. The data was analysed to establish how closely the approach conformed to the enhanced conceptual model and a number of improvements were identified. These improvements contributed to the production of an updated version of the SME integrated PM development approach. Chapter 8 provides the full details of this case study.

2.5.3 Phase 3: Application

Having refined the SME integrated PM development approach, it was necessary to apply it in SMEs to gain an in-depth understanding of how it worked in this environment. This would help to validate the conceptual model and the new approach and would also facilitate further insights into how SMEs understand and use PM. Therefore, two validation case studies (cases K and L) were conducted in SMEs (see Chapter 9 for full details). In these studies the researcher again used action research to facilitate and participate in the development of the new integrated PM system, using the new approach. As in the developmental case study, first-hand experience was supplemented by observations, documentation and discussions, to build a rich picture of each application. Within-case and cross-case analysis (Eisenhardt, 1989) was carried out on the data. This involved assessing individual case data against predetermined validation criteria and then analysing the similarities and differences between each case. The results from the validation cases were used to inform theory and draw some conclusions about integrated PM usage in SMEs.
2.6 Sampling Strategy

The applied nature of the research meant that it was necessary to identify an appropriate sample of SMEs that were willing to participate in the research. This required an overall sampling strategy to be developed, which was used for all the empirical work undertaken throughout the research project.

2.6.1 Initial Sample Constraints

The heterogeneity of SMEs meant that general constraints regarding case selection were required throughout the research project. Therefore, all the case companies had to fall within the definition of a SME, as described and explained in Chapter 4. This meant that all the case companies employed less than 250 staff and all exhibited similar characteristics in terms of management and operating practices. Due to the subjective and often sensitive nature of some of the characteristics, it was not possible to fully assess the eligibility of each company in advance. Therefore, selected companies were assumed to have fulfilled all the criteria, unless evidence to the contrary emerged during observations and discussions throughout each intervention.

An additional sampling constraint was that, due to practical limitations on sample size, all the companies selected were manufacturers, based primarily in the South West of England. All the constraints were designed to give a strict focus to the research regarding target companies, to ensure that the outputs of the research are valid in terms of their usefulness to the target practitioners.

2.6.2 Types of sampling

There are three primary methods of sampling. These are: probability sampling, convenience sampling and purposeful sampling (Maxwell, 1996). Probability sampling
relies on all elements of the population having a known chance or probability of being selected as sample subjects, which makes it mathematically possible to generalise the results of the sample (Sekaran, 1992). For this reason, probability sampling is usually associated with quantitative studies.

Convenience sampling is a non-probability sampling technique. It is so called because it relies on conveniently available subjects, rather than those who would be most appropriate, to form the sample. This type of sampling has given non-probability sampling a bad reputation amongst quantitative researchers, since it is entirely non-scientific, very often inappropriate and certainly non-generalisable (Maxwell, 1996; Berg, 2001). However, the other non-probability sampling technique, purposive sampling, is very often the most appropriate method for qualitative studies and it is this method which was used in this research project.

There are a number of different methods of identifying a purposeful sample. According to Flick (1998), the important aspect in choosing an appropriate purposive sampling strategy is to identify cases which are rich in relevant information. As he notes

\[
\text{Sampling decisions always fluctuate between the aims of covering as wide a field as possible and of doing analyses which are as deep as possible. The former strategy seeks to represent the field in its diversity by using as many different cases as possible in order to be able to present evidence on the distribution of ways of seeing or experiencing certain things. The latter strategy, on the other hand, seeks to further permeate the field and its structure by concentrating on single examples or certain sectors of the field. Considering limited resources (manpower, money, time etc) these aims should be seen as alternatives rather than projects to combine.}
\]

For the purposes of this research, where a high proportion of the cases were each studied over several months, it was appropriate to concentrate on a purposive sample which selected fewer cases, with the aim of gaining deeper insights into the issues, rather than aiming for maximum diversity. Information about the selection of specific cases are given in the chapters in which they appear.
2.7 Generalisability and Relevance

As the research reported in this thesis is of an applied nature, there is a need to ensure that the outputs of the research are relevant to management practitioners. This requires that any tools and techniques developed or modified throughout this research project, are generalisable across the SMEs which are the target of this research. Thomas and Tymon (1982) provide a framework which specifically focuses on ensuring that the outputs of management research are useful to practitioners. This is achieved through; descriptive relevance, goal relevance, operational validity, non-obviousness and timeliness. A description of how each aspect of the framework is used to ensure the relevance of the research and facilitate generalisability will now be given.

2.7.1 Descriptive Relevance

Descriptive Relevance is concerned with establishing the accuracy of the research findings in capturing the phenomenon under investigation. Good descriptive relevance forms the basis for generalising the research findings and is concerned with ensuring both methodological rigour and contextual relevance. The balance between these aims is found by using research methods that are able to capture important contextual information, whilst also providing a strong theoretical argument regarding their validity. The theoretical validity of the case-based approach to this study has already been described, along with the relevance of the data collection techniques for enabling the assimilation of contextual data. In addition, the validity of the data at each stage of the empirical investigation has been ensured through the use of thorough and reliable methods of data collection, triangulation and analysis.
2.7.2 Goal Relevance

Goal relevance aims to establish whether the outputs of the research are useful to practitioners. This aspect is addressed initially through a thorough investigation into the characteristics and needs of SMEs regarding integrated PM. The results of this investigation are used as the foundations for the formulation of a new SME integrated PM development approach. Specific validation criteria, focusing on the usefulness of the new approach in a SME environment, are then identified to evaluate the usefulness of the final outputs of the research to practitioners.

2.7.3 Operational Validity

Operational validity complements goal relevance by seeking to ensure that the outputs of the research are usable by practitioners. This affects both generalisability and practitioner relevance, as it requires the scope of any claimed usability to be determined in terms of the type of practitioners at whom it is targeted. The purpose of the research is to establish an effective method of introducing integrated PM into SMEs. Therefore, a conscious effort has been made throughout the research project to ensure that the outputs will be usable by the targeted practitioners. Specifically, this occurred throughout the development and validation of the new integrated PM development approach for SMEs. For this reason, the usability of the new approach is sought only for practitioners in the target SMEs.

2.7.4 Non-obviousness

Non-obviousness aims to identify the degree to which the outputs of the research really say anything new and original. The research specifically set out to fill a gap in current knowledge and practice, regarding the use of integrated PM in SMEs. Although this gap was initially identified from published research, interviews and case studies confirmed that the research being carried out was novel. The results of the validation cases also confirmed
that the new approach by which integrated PM could now be introduced to SMEs was both new and appropriate.

2.7.5 Timeliness

Timeliness establishes whether the outputs of the research are timely and relevant to practitioners. SMEs currently account for 55.4% of employment and 50.9% of total business turnover in the UK (DTI, 2000), highlighting their economic importance to the country as a whole. To help ensure the sustained competitiveness of SMEs, it is vital that they have access to the same innovative management techniques, such as integrated PM, as their larger counterparts. However, despite the benefits of integrated PM identified in larger organisations, there appears to be a distinct lack of research investigating how it can be effectively introduced into SMEs. Therefore filling this gap in knowledge and management practice would appear to be both timely and relevant to UK SMEs.

2.8 Conclusion

This chapter has explained the rationale for the research and described the philosophical stance of the researcher, noting how this affected the project in terms of the research methods used. The research structure has been described and each phase of the research has been explained in detail, to provide a comprehensive and coherent picture of the scope of the research and the research activities undertaken. The rest of the thesis will provide a full explanation of each phase of the research, providing further detail on the specific research methods used as they arise.
Chapter 3: Integrated Performance Measurement

3.0 Introduction

This chapter introduces the concept of integrated PM. A brief history of the subject area illustrates its evolution. A conceptual model is then developed from the literature illustrating the criteria for effective integrated PM development. The conceptual model is used as a basis for evaluating existing approaches for designing and implementing integrated PM systems. Finally, a comprehensive PM development approach is identified, based on its adherence to the conceptual model.

3.1 The Need for Integrated Performance Measurement

Assessing the performance of business has traditionally been accomplished using a variety of cost accounting techniques developed well before the second world war (Bititci, 1994). These tended to focus on direct labour as the primary cost (Hayes and Jaikumar, 1988), which was appropriate in the 1950’s when it typically accounted for around 50% of total costs. However, in today’s environment, direct labour costs might account for just 5% of total costs (Miller and Vollman, 1985). Therefore, costings based primarily on direct labour might now produce erroneous results and lead managers to make wrong decisions (Neely, 1999). This problem was recognised in the late 1980’s, with the development of Activity Based Costing (ABC) (Cooper, 1988). ABC works by identifying the activities within the production process that cause indirect costs to be incurred. The primary cost drivers can then be highlighted and eliminated, thereby increasing efficiency (Frey and Gordon, 1999).
In order to remain viable in the ever-more competitive modern environment, businesses have had to refine not only their cost accounting systems, but also the way they run their operations (Wheelwright, 1981). This has led to many companies striving to be ‘world class’ and adopting management techniques and philosophies such as total quality management (TQM), just-in-time (JIT), flexible manufacturing systems (FMS), business process reengineering (BPR) and lean manufacturing (Hayes and Pisano, 1994). According to Barker (1995) these innovations require more detailed measurement information than can be provided by even the most sophisticated cost accounting techniques. This is attributed to the constraints inherent in measurement systems with a purely financial focus (Kaplan, 1983; Hayes et al, 1988).

Although this view was not universally held (Bromwich and Bhimani, 1989), a notable body of research developed throughout the late 1980’s and 1990’s highlighting the limitations of financially-focused measurement systems. Eccles (1991) argues that financial measurements encourage short-term thinking, thereby opposing strategic development. He also points out that they are historically oriented, focusing on past performance, rather than predicting future performance. These shortcomings are echoed by Chakravarthy (1995) and Ghalayini and Noble (1996), the latter adding that financial measures are also often irrelevant, due to the difficulty in quantifying many aspects of operational performance (e.g. quality or delivery performance) in financial terms. In addition, Johnson and Kaplan (1987) suggest that financial measures are too insular, ignoring both the competition and customer needs.

The growing number of criticisms of pure financial measurement led to the concept of integrated PM being developed to alleviate the problems (Gregory, 1993). The purpose of integrated PM is to identify the critical measures, whether these are financial, operational or
‘soft’ measures such as customer satisfaction, which are critical to enable the company to reach its strategic goals. This represents a significant shift in the emphasis of PM, from being oriented towards the end results, towards being a proactive tool to facilitate the identification of opportunities for future business improvement. According to Neely (1999) this change in emphasis represents a revolution in the field of PM, evidenced by the increasing body of research which has been developed over the last decade. This plethora of information has included many different proposals and guidelines that attempt to explain the characteristics of integrated PM. These may be divided into two broad categories: the dimensions of performance for which measures should be developed, and the characteristics that measures in an integrated PM system should display.

3.2 Integrated PM Characteristics

To understand the complex nature of integrated PM development, a conceptual model has been developed from the literature. The model examines what performance measures should look like (the characteristics of performance measures) and what should be measured (the dimensions of performance). In addition, criteria for effective development are established.

3.2.1 Characteristics of Performance measures

Globerson (1985) and Maskell (1989) presented sets of guidelines detailing the characteristics of performance measures, which have often been reiterated, developed and added to in more recent studies (e.g. Dixon et al, 1990; Lynch & Cross, 1991; Wisner & Fawcett, 1991; Neely et al, 1996a). Neely et al (1997) then undertook a study in this area, drawing together the literature from eleven different authors to identify and verify a set of thirteen performance
measure characteristics. However, to ensure that the conceptual model provides a consensus of academic opinion on the characteristics of performance measures, only those characteristics which have been cited by two or more authors are included. In addition characteristics have been linked, where appropriate, to retain clarity. This resulted in the development of the following set of performance measure characteristics (Table 3.1).

<table>
<thead>
<tr>
<th>Performance Measure Characteristics</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measures should be derived from strategy</td>
<td>Globerson, 1985; Maskell, 1989; Dixon et al, 1990; Lynch &amp; Cross, 1991; Wisner &amp; Fawcett, 1991; Neely et al, 1996a; Globerson, 1985; Neely et al, 1996a;</td>
</tr>
<tr>
<td>Measures should be clearly defined, with an explicit purpose</td>
<td>Maskell, 1989; Lynch and Cross, 1991;</td>
</tr>
<tr>
<td>Measures should be relevant and easy to maintain</td>
<td>Maskell, 1989; Lynch &amp; Cross, 1991; Neely et al, 1996a;</td>
</tr>
<tr>
<td>Measures should be simple to understand and use</td>
<td></td>
</tr>
<tr>
<td>Measures should provide fast and accurate feedback</td>
<td>Globerson, 1985; Dixon et al, 1990; Maskell, 1989; Neely et al, 1996a;</td>
</tr>
<tr>
<td>Measures should link operations to strategic goals</td>
<td>Lynch &amp; Cross, 1991; Wisner &amp; Fawcett, 1991;</td>
</tr>
<tr>
<td>Measures should stimulate continuous improvement</td>
<td>Lynch &amp; Cross, 1991; Maskell, 1989; Wisner &amp; Fawcett, 1991; Neely et al, 1996a;</td>
</tr>
</tbody>
</table>

Table 3.1: Critical Characteristics of Performance Measures

These characteristics provide a generic overview of the performance measures that an integrated PM system should be comprised of, in terms of how they should be derived, how they should work and what they should achieve. However, they are insufficient for specifying what should be measured. Therefore, the appropriate dimensions of performance for which measures in an integrated PM system should be developed, will now be identified.
3.2.2 Dimensions of Performance

Dimensions of performance have been defined in various terms in the literature. Time, Cost, Quality and Flexibility are repeatedly cited as the primary operational dimensions (Kaplan, 1983; Lynch and Cross, 1991; Meyer, 1994; Neely et al, 1995; Collier, 1995; White, 1996; Laitinen, 1996; Slack et al, 1998; Medori, 1998), whilst Finance and Customer Satisfaction are also considered to be critical measurement areas (Keegan et al, 1989; Eccles, 1991; Jones et al, 1993; Schmenner and Vollmann, 1994; Bititci, 1994; Ghalayini et al, 1997). In addition, Stakeholders, including Employees, Investors and Suppliers, along with wider societal considerations such as the Community and the Environment, are increasingly being recognised as important dimensions of performance (Sink and Tuttle, 1989; Kaplan and Norton, 1992; Fitzgerald and Moon, 1996; EFQM, 1999; Waggoner et al, 1999; Neely and Adams, 2000).

The plethora of performance dimensions identified from the literature were categorised to establish potential links between them. The result of this was to establish a hierarchy of performance dimensions, sub-dimensions and measurements, with a number of horizontal relationships between each. A matrix depicting these relationships can be seen in Figure 3a, illustrating the four overall dimensions of performance under which the sub-dimensions and measures sit:

1. Stakeholder Satisfaction
2. Customer Satisfaction
3. Operational Effectiveness
4. Supplier Effectiveness
These four primary dimensions of performance are shown to allow the holistic consideration of both the internal and external aspects of business, ensuring smooth operations and production internally, whilst making the goodwill and loyalty of all the people who have an interest in the company, both internally and externally, a high priority. It is important to note, however, that these dimensions are not intended to be prescriptive. Instead, their purpose is to encourage consideration of all these areas when developing performance measures that support company strategy.

![Figure 3a: Relationships Between Dimensions and Sub-Dimensions of Performance](image)

3.3 PM Development Process Characteristics

The previous section focused solely on the content of integrated PM systems, rather than identifying the requirements of effective processes for developing them. From the available
literature, it appears that previous research has largely failed to address explicitly the process of how integrated PM should be introduced into companies. However, as this research is specifically concerned with integrated PM development into SMEs, a knowledge of potential development processes is critically important. This problem has been addressed by the identification of features of process methodologies, which can be applied to the PM development process.

3.3.1 Development process requirements

Without an effective development process for introducing an integrated PM system, there can be no practical value for businesses from the concept of integrated PM. As the PM literature is deficient in addressing this issue, a wider review was undertaken looking at process methodologies. The objective of this review was to identify general principles of effective development and implementation, which could be applied to integrated PM system development processes.

Mills et al (1995) suggest that

*To be useful, a process should specify how an organisation might be attracted to implement the process; who should participate in the process and how the project of implementing the process should be managed.*

Their subsequent examination of the manufacturing strategy development process used the generic process components identified by Platts (1990; 1994):

- *point of entry* – the method of ensuring the participants understand and agree with the purpose of the process;

- *participation* – identifying who should be involved with the process;
• procedure – establishing how the process will work;

• project management – ensuring that the process is implemented smoothly.

Applying this framework to PM development, an effective point of entry would involve the identification of the need for improvements to the existing system. Participation in the process, according to the PM literature, should include the staff who will be the key users of the performance measures developed (Globerson, 1985; Lynch & Cross, 1991; Neely et al, 1996a). The identification of procedures for developing integrated PM systems is rather more problematic, as these will vary between companies. However, to ensure that the measures are derived from strategy, a procedure for identifying strategic objectives should be included. In addition, a method for developing the measures is necessary, along with a procedure for maintaining the new PM system.

The application of the Platts (1994) framework to the process of developing integrated PM has identified the following requirements for PM development processes:

• Need evaluation / rationale – assessing the need for developing an integrated PM system helps promote buy-in from the key players;

• Key user involvement – those people who will be directly affected by the introduction of new measures should be involved in their development;

• Strategic objective identification – to ensure that any measures developed are aligned to strategic objectives, it is necessary to establish a unified understanding of what they are;

• Performance measure development – the purpose of the process is to develop appropriate measures;
• Periodic maintenance structure – to ensure measures remain useful and relevant, regular updating is required.

In addition to these elements, however, the project management of the process also needs to be considered. This entailed the identification of a generic set of process management guidelines, which could be applied to the management of a PM development process. Two sets of guidelines were identified; Slack et al (1998) identify nine rules for the effective project management of strategy implementation. In addition, Smith & Tranfield (1989) present a similar set of guidelines for the effective implementation of Advanced Manufacturing technology (AMT). The overlaps between the two sets were considered to be the generic process management guidelines, which could be applied to the management of a PM development process. These were as follows:

• Top management support – to ensure ongoing commitment to the process;

• Full employee support – to ensure buy-in at all levels of the company;

• Clear and explicit objectives – so everyone knows what needs to be achieved;

• Set time-scales – to keep the process on course and ensure timely completion.

3.3.2 A Conceptual Model of an Integrated PM System Development Process

Table 3.1 illustrated the contributions of previous researchers to the development of the key characteristics of performance measures. In addition, Section 3.2.2 identified the various dimensions of performance from the literature, along with how they link together in a hierarchical relationship. This information, together with the characteristics of effective development processes, just discussed, can be synthesised into a conceptual model of
integrated PM development (Table 3.2). As all the criteria for this model have been derived directly from the academic literature, it may be said to represent a consensus of academic opinion on the key criteria for integrated PM development. An evaluation of existing approaches for the development of integrated PM systems against the conceptual model will now be undertaken, to identify one approach which conforms to this benchmark.

<table>
<thead>
<tr>
<th>Performance Measure Characteristics</th>
<th>Dimensions of performance</th>
<th>Development process requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Derived from strategy</td>
<td>Customer Satisfaction</td>
<td>Need evaluation / rationale</td>
</tr>
<tr>
<td>Clearly defined / explicit purpose</td>
<td>Operational</td>
<td>Key user involvement</td>
</tr>
<tr>
<td>Relevant and easy to maintain</td>
<td>Effectiveness</td>
<td>Strategic objective identification</td>
</tr>
<tr>
<td>Simple to understand and use</td>
<td>Stakeholder</td>
<td>Performance measure development</td>
</tr>
<tr>
<td>Provide fast, accurate feedback</td>
<td>Satisfaction</td>
<td>Periodic maintenance structure</td>
</tr>
<tr>
<td>Link operations to strategic goals</td>
<td>Supplier Effectiveness</td>
<td>Top management support</td>
</tr>
<tr>
<td>Stimulate continuous improvement</td>
<td></td>
<td>Full employee support</td>
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<tr>
<td></td>
<td></td>
<td>Clear and explicit objectives</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Set time-scales</td>
</tr>
</tbody>
</table>

Table 3.2 – Conceptual Model for the Evaluation of Integrated PM Development Approaches

3.4 Evaluation of Current Frameworks and Methodologies

Using the conceptual model as a basis for analysis, existing approaches for developing integrated PM systems, which were identified in the literature, were evaluated. The objective of this analysis was to identify an existing approach which was considered ‘complete’ with respect to the conceptual model. The evaluation was carried out from the literature available for each approach. Ten approaches were identified which were sufficiently detailed in the literature to evaluate them against the elements of the conceptual model. Table 3.3 illustrates the outcomes of this process and shows that while the majority of the approaches evaluated covered all the dimensions of performance, few exhibited properties that also mapped to the
characteristics of performance measures and to the characteristics of an effective development process.

3.4.1 The Balanced Scorecard and The Performance Pyramid

The Balanced Scorecard was developed by Kaplan & Norton (1992) to improve PM by focusing on four performance perspectives; customers, finance, internal business processes and learning and future growth. This approach has good coverage of dimensions of performance, but provides no mechanism for maintaining the relevance of defined measures. An additional deficiency of this approach is the lack of integration between the top level, strategic scorecard, and operational-level measures (Ballantine and Brignall, 1994), potentially making execution of strategy problematic. Furthermore, it fails to specify a user-centred development process.

In contrast, the Performance Pyramid (Lynch & Cross, 1991) provides an explicit link between strategy and operations, and also encourages a user-centred design. This approach illustrates the hierarchical relationships between key internal and external business objectives as a pyramid, thereby demonstrating how operational measures can link to corporate vision. The key problem with this approach, however, is that it fails to specify, in any detail, either the form of the measures or the process for developing them.
3.4.2 The Results and Determinants Matrix, Integrated Dynamic PM and Integrated PM Framework

The Results and Determinants Matrix (Fitzgerald et al, 1991) is a framework which explicitly distinguishes measures which can only report results from those which are capable of driving performance. The main strength of the Results and Determinants Matrix is that it specifies, in reasonable detail, what the measures should look like and provides a useful development process. However, it does not include customers or a complete set of stakeholders as dimensions of performance and cannot, therefore, give a truly balanced view of performance. Ghalayini and Noble (1997), in their framework for Integrated Dynamic PM, build on several different concepts to develop a system which has an explicit mechanism for maintenance and for ensuring fast and accurate feedback. The use of a PM Questionnaire, as an initial audit tool, also ensures that the dimensions of performance are adequately covered. However, as this approach consists of several different tools it is potentially complicated to understand and use. In addition, it fails to give explicit guidance on how the PM system should be developed. This is also the main failing of the Integrated PM Framework (Medori, 1998) which views PM from the perspective of six competitive priorities: quality / customer satisfaction, time, cost, delivery, flexibility and future growth. Although it provides a step-by-step guide to the development of individual performance measures, it specifically omits any mention of the people who should, or could be involved in the development of the new system.

3.4.3 The Integrated PM System and The Cambridge PM Process

The Integrated PM System methodology (Bititci et al, 1997) divides the organisation into four levels; the business, business units, business processes and activities. At each level, stakeholder requirements are identified, along with appropriate objectives and performance measures, and an external monitor. This model covers many of the required criteria for a
comprehensive PM system. However, the method fails to provide a structured process that specifies objectives and time-scales for development and implementation.

<table>
<thead>
<tr>
<th>Conceptual Model</th>
<th>BSC</th>
<th>PP</th>
<th>R&amp;D DM</th>
<th>ID PMS</th>
<th>IP MF</th>
<th>IP MS</th>
<th>CP MP</th>
<th>IM M</th>
<th>CP MS</th>
<th>FSB PM</th>
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</thead>
<tbody>
<tr>
<td><strong>A PM system should measure:</strong></td>
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<tr>
<td>Customer Satisfaction</td>
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<td>Operational Effectiveness</td>
<td>✓</td>
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<tr>
<td>Stakeholder Satisfaction</td>
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<tr>
<td>Supplier Effectiveness</td>
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<td><strong>Measures in a PM system should be:</strong></td>
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<tr>
<td>Derived from strategy</td>
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<tr>
<td>Clearly defined &amp; have an explicit purpose</td>
<td>✓</td>
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<td>Relevant &amp; easy to maintain</td>
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<td>Simple to understand &amp; use</td>
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<tr>
<td>Give fast, accurate feedback</td>
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<tr>
<td>Link ops to strategic goals</td>
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<td>Stimulate continuous improvement</td>
<td>✓</td>
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<td><strong>The development process should:</strong></td>
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<tr>
<td>Provide a need evaluation</td>
<td>✓</td>
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<td>Enable strategic objective identification</td>
<td>✓</td>
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<tr>
<td>Facilitate performance measure development</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Provide a maintenance structure</td>
<td>✓</td>
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<tr>
<td>Involve key users</td>
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<tr>
<td>Have top management support</td>
<td>✓</td>
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<tr>
<td>Have full employee support</td>
<td>✓</td>
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<tr>
<td>Have clear and explicit objectives</td>
<td>✓</td>
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<tr>
<td>Have set timescales</td>
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**KEY:**

- **BSC** = Balanced Scorecard (Kaplan & Norton, 1992; 1993; 1996)
- **PP** = Performance Pyramid (Lynch & Cross, 1991)
- **R+DM** = Results and Determinants Matrix (Fitzgerald et al, 1991; Fitzgerald & Moon, 1996)
- **IDPMS** = Integrated Dynamic Performance Measurement Systems (Ghalayini et al, 1997)
- **IPMS** = Integrated PM Systems (Bititci, 1994; 1995; Bititci et al, 1997; 1998)
- **CPMP** = Cambridge PM Process (Neely et al, 1996a+b, 1997; Bourne et al, 1998a+b)
- **IMM** = Integrated Measurement Model (Oliver & Palmer, 1998)
- **CPMS** = Consistent PM Systems (Flapper et al, 1996)
- **FSBPM** = Framework for Small Business Performance Measurement (Laitinen, 1996)

Table 3.3: Analysis of Current PM Approaches
The Cambridge PM Process (Neely et al, 1996a) is based on the Balanced Scorecard, but provides a comprehensive structure for developing the Scorecard measures at both the strategic and operational levels of the business. Therefore, this process fulfils all the criteria in the conceptual model and may be classified as a comprehensive process for the development of integrated PM systems. The development of operational measures, however, is described as an optional process. For it to be comprehensive, both strategic and operational measures need to be developed.

3.4.4 The Integrated Measurement Model, Consistent PM System and Framework for Small Business PM

Oliver & Palmer’s (1998) Integrated Measurement Model is also a comprehensive approach, defining the dimensions of performance in terms of cost, quality, flexibility, delivery and service, whilst also providing a mechanism for developing the measures. The unsatisfactory aspect of this approach is the lack of a structured development process. In contrast to this, the Consistent PM System (Flapper et al, 1996) gives a very detailed description of the stages involved in developing and implementing an integrated PM system, but fails to specify a balanced approach for critical dimensions of performance. Finally, the Framework for Small Business PM (Laitinen, 1996), differs from all the other frameworks in that it is based on Activity Based Costing (ABC) and adopts a purely bottom-up perspective on performance. This means that, although the framework is useful for measuring and improving performance, there is no requirement for them to be strategically derived.
3.5 A Comprehensive Integrated PM Development Approach

Most of the frameworks and processes analysed against the conceptual model provide explicit guidance about what to measure, along with varying amounts of information about how to design the measures. The Cambridge PM Process (Neely et al, 1996a), along with the Integrated PM System (Bititci et al, 1997) and the Integrated Measurement Model (Oliver and Palmer, 1998), conformed to all the elements of the conceptual model regarding the description of what to measure and what the measures should look like. However, conformance to the development process characteristics in the conceptual model was less consistent. From the literature on each approach which was used for the assessment, only the Cambridge PM Process clearly fulfilled all the criteria identified in the conceptual model for the development process. Therefore, from the information available, this is the only process which offers explicit guidance on both what to measure and how to develop and implement an integrated PM system effectively.

3.6 Conclusion

This chapter has briefly charted the history of PM, illustrating why and how it has changed over the years, from its roots in financial accounting to its current, more holistic and integrated format. A conceptual model of integrated PM development has been formulated, which represents the consensus of current academic theory. 10 existing approaches for developing integrated PM systems have been reviewed against the conceptual model, from the available literature. This enabled the identification of a comprehensive integrated PM development approach. The following chapters will evaluate how PM is used in SMEs and whether integrated PM is appropriate for use in this environment.
Chapter 4: Small and Medium Sized Enterprises

4.0 Introduction

The comprehensive approach, identified in Chapter 3, for developing integrated PM systems was originally designed and tested for use in large organisations. This chapter will, therefore, evaluate the appropriateness of introducing integrated PM in a SME environment. This will be achieved through a review of the relevant literature, focusing on establishing the characteristics of SMEs. Then an evaluation of how these characteristics might inhibit or promote integrated PM introduction will be carried out. The purpose of this is to give an overview of how SMEs function, in order to evaluate how appropriate the introduction of integrated PM systems would be in such companies.

4.1 What is a SME?

Small and medium sized enterprises are notoriously difficult to define, due to their disparate nature and the numerous factors that are involved. The complexity of such a definition was illustrated in the Bolton Report (1971), which attempted to classify small firms in a number of different sectors. This involved using employees, turnover, or assets to define size, depending on business type. Therefore, small manufacturing firms had fewer than 200 employees, whereas retailers had a turnover of £50,000 or less. However, several criticisms have been levelled at this form of classification, primarily because it is difficult to make comparisons when different units of measurement are being used. In addition, the use of monetary units makes time-based comparisons difficult due to differences in real-term value (Storey, 1994).
Medium sized companies have been defined by the UK government for the purposes of the 1989 Companies Act. This identified three criteria, of which qualifying companies had to meet at least two. These were that the company employed less than 250 people, had a turnover not exceeding £8 million and a balance sheet of under £3.8 million. Burns (1996) transposed these figures, taking into account inflation, to levels appropriate for the mid 1990s, giving figures of £12 million maximum turnover and £5 million balance sheet totals, with the maximum number of employees remaining constant at 250.

The European Commission also attempted to define ‘smallness’, in order to establish the qualifying terms for the provision of aid to companies. To achieve this, the Commission coined the term Small and Medium sized Enterprise (SME), which was split into three components: micro companies, small companies and medium companies. Until 1995 the definitions for each were based solely on number of employees, with 9 or less comprising a micro enterprise, small companies being 10-99 employees and medium enterprises comprising 100-499 employees (European Network for SME Research, 1995). This definition was commonly adopted by researchers (Hyvarinen, 1990; Storey, 1994; The CIM Institute, 1995) although additional constraints were also often adopted for the particular purposes of the research.

In 1996 the European Commission updated its definition of what constituted a SME, bringing the upper limit down from 499 employees to 249 employees. The new structure saw no change for micro enterprises, but small companies were now defined as having 10-49 employees, with medium sized companies having 50-249 employees (European Network for SME Research, 1996). In addition, to be classified as a SME, one of two financial criteria had to be satisfied; a balance sheet total of less than €27 million, or a turnover of under €40
million and the company also had to be independently owned. Revisions to the financial data were set to occur approximately every four years, to take account of changing economic needs (European Commission, 1996).

Despite the effort that has been put into identifying an appropriate definition of SMEs, researchers still continue to adopt their own frameworks. These are generally based on an amalgamation of various definitions that satisfy their particular research needs (e.g. Miller and Askey, 1997). The reason for this is that the definitions so far described in this chapter have been developed either for legal reasons (as in the Companies Act, 1989), or as methods of limiting access to funding and aid packages (as in the EC definition). Therefore, the definitions are simply arbitrary cut-off points in company size, whereas in reality “such clear ‘breaks’ are rare, and size appears to be a continuous rather than a discrete variable” (Storey, 1994). This has led to the idea that a more qualitative approach to defining SMEs, through characteristics rather than statistics, should be adopted for research purposes:

*In short, ‘size’ measured in terms of number of employees, turnover level, market share or whatever, does not provide a sufficiently robust criterion to isolate ‘small firms’ for the purpose of theory and analysis. What is needed, therefore, is an alternative approach to identifying what small business research is concerned with which will rescue it from an arid search for magic numbers (Curran and Burrows, 1993).*

Therefore, although numeric values may broadly be used to identify whether a company is relatively small or medium in size, this should be supplemented by a set of characteristics which enable a fuller definition of the term SME. The following section will attempt to identify such a set of characteristics, in order to provide a definition of what constitutes a SME for the purposes of this research project.
4.2 SME Characteristics

Much of the research that has been carried out in SMEs has described certain characteristics of these companies which either affected the research design, or were deemed to have been a causal factor in the results. Despite the recognised heterogeneity of SMEs, there appears to be a consensus from researchers in this field that many SMEs share a number of general characteristics. There have been several attempts to categorise these characteristics into broad themes (Vianen, 1993; Yusof and Aspinwall, 2000; Ghobadian and Gallear, 1997; Gunesekaran et al, 1999). However, these are different in each case, reflecting the particular interests of the researchers and the fact that there appears to be no commonly accepted framework for such categorisation. Therefore, the framework used here consists of the categories which were considered to cover all the relevant perspectives for this research, namely: Competitive Environment; Organisational Environment and Management Practices.

4.2.1 Competitive Environment

SMEs are considered to be flexible and adaptable to market changes (Ghobadian and Gallear, 2000; Yusof and Aspinwall, 2000). This responsiveness is generally viewed as a positive characteristic. However, the root cause of this attribute is that many SMEs have no control over the markets in which they operate. They are unable to drive the market but, instead, must react and adapt to the changes that occur over which they have no influence (Burns, 1996; Storey and Sykes, 1996; Hyvarinen, 1990). This problem is exacerbated by the fact that few SMEs have more than a limited overview of their target market (Wiklund and Wiklund, 1999; Huang and Brown, 1999; Pelham, 1999).
SMEs’ relationships with their customers are also highly uncertain. There is an acknowledged advantage in that small firms are closer to the customer, enabling more personal relationships to develop (McAdam, 2000). However, this is tempered by the danger that having a limited customer base (Ghobadian and Gallear, 1997; Yusof and Aspinwall, 2000) facilitates the development of deferential supplier-customer relationships. Rainnie (1991) categorised SMEs into groups, according to their relationships with larger companies:

- **Dependent** firms – existing only to serve their larger counterparts;
- **Dominated** firms – competing with large firms, but only through sheer hard work and effort;
- **Staid** firms – finding a safe market niche from which to operate; and
- **Innovative** firms – pioneering new opportunities, but vulnerable to take-overs if successful.

It is interesting to note that, with the exception of Staid firms which operate only in very low profit or niche markets, SMEs are consistently viewed as being subservient to their larger counterparts. This view is supported by Oakes and Lee (1999) who suggest that SMEs have a lack of control over their futures because of demands made by stronger customers throughout the supply chain. An additional burden for SMEs is a lack of power to leverage payment of debts from these customers, as noted by McCulloch and Lewis (1986), who point out that many smaller firms are “afraid to press customers too hard for payment for fear of loss of future business.” It is this scenario which most severely affects SMEs as their limited resources cannot cope with the fluctuations in cash flow that late payment inevitably brings.

The overall effect of the fiercely competitive environment in which SMEs operate is that, very often, strategic planning becomes a seemingly pointless exercise. Pelham (1999) points out
that unless the internal structures and the external competitive environment of the SME are effectively aligned with its strategy, it is unlikely that it will ever be implemented successfully. The difficulties associated with aligning strategy to the external competitive environment led Argument et al (1997) to conclude that the majority of SMEs in the automotive sector are not concerned about future strategic developments, as survival in the supply chain requires them only to maintain a reactive strategy. In addition, Harris and Ogbonna (1999) found that it is not unusual to find firms which have never updated their strategy since it was originally developed by the founder, thereby leading to a “strategic hangover,” which, if the competitive environment or the company structure have changed, may be detrimental to future business success.

There is also evidence to suggest that many established SMEs rely solely on internal or financial planning as their main approach to preparing for the future (Waalewijn and Segar, 1993; O’Regan et al, 1998). This might be due to the fact that accountancy information has been shown to be the most important factor in determining survival or failure in SMEs (O’Neill and Duker, 1986). However, financial information alone is limited as it fails to give a true overview of the competitive environment in which the SME operates. Furthermore there is evidence to show that companies which make strategic, rather than just financial, business plans perform significantly better, financially, than those which do not (Smith, 1998).

4.2.2 Organisational Environment

The most widely acknowledged factor that distinguishes SMEs from larger companies is the organisational environment in which they operate. They are considered to have flat structures with few management layers, to be flexible and adaptable to changing market needs and to have a high potential for innovation (Ghobadian and Gallear, 1997; McAdam, 2000; Yusof
and Aspinwall, 2000; Wiklund and Wiklund, 1999; DTI, 1994; Jennings and Beaver, 1997; Burns, 1996; Gunasekaran et al, 2000). However, they are also seen as suffering from “resource poverty” (Welsh and White, 1981), both in terms of human resources and financial stability and security (Abdul-Nour et al, 1998; Pelham, 1999).

It is commonly noted that SMEs are loosely structured, with informal operating practices and a lack of bureaucracy (Jennings and Beaver, 1997; Hyvarinen, 1990). This facilitates a high degree of personal authority among staff and management who are visible and involved in the operations of the company (Storey and Sykes, 1996; Jennings and Beaver, 1997). Conversely, there are also recognised skills shortages amongst staff, along with a deficit in management expertise (McAdam, 2000; Curran, 1987; Huang and Brown, 1999) and with highly personalised management styles common (Storey and Sykes, 1996).

4.2.3 Management Practices

The organisational environment in which many SMEs operate can have a profound effect on the way that they are managed. A key factor in this is the personalised management styles which are a feature of firms where control rests primarily with one person, usually either the owner-manager or a managing director.

According to Hannon and Atherton (2000) there are four types of owner-manager, with each type likely to have a distinct effect on the business. The first type have low strategic awareness and low planning capabilities. Companies managed by such people are termed ‘un-navigated ships’ and are likely to be poor performers. Where the owner-manager has good planning capabilities, but little strategic awareness, the company is seen as a ‘myopic innovator’, having potential but remaining vulnerable to unforeseen events. The ‘visionary
under-achiever’ is the term given to firms where the owner-manager has a high level of strategic awareness, but fails to plan well enough to see good ideas thrive. Finally, some firms are driven by people with good strategic awareness and effective planning capabilities. These firms are likely to be successful due to their ability to identify potential threats and act upon appropriate opportunities, they are therefore known as ‘successful orienteers’. Although this study focuses only on owner-managers, it seems likely that in any firm where the centre of control rests primarily with one person, this framework would be appropriate.

The idea that the driving force in a company significantly affects a company’s strategic success is echoed by Berry (1998). Her study of high tech firms concluded that

the technical entrepreneur’s strategic awareness will determine the nature of planning used within the firm.

In addition, Brouthers et al (1998) suggest that planning in SMEs is typically less political, less controlled, less rational and more intuitive than in large companies.

Frese et al (2000) take the link between managerial capabilities and business success one stage further. Their study investigates the link between the personal strategies of the managing director and the success or failure of the business strategy. They identify five personal strategic approaches:

- **Complete Planning** – where a comprehensive set of plans are produced which actively structure given situations;

- **Critical Point Planning** – which concentrates on one goal at a time, aiming to solve the most difficult problem first, thereby making strategy an iterative process (Zempel, 1994 cf. Frese et al, 2000);
• **Opportunistic Strategy** – where strategy is largely dictated by the new opportunities which arise and basic planning is easily sacrificed to them;

• **Reactive Strategy** – where no forward planning is undertaken, but the person simply reacts to current demands;

• **Routine / habit** – this is not actually a strategy at all, but simply a standard approach to problems, which has been used before and is therefore both familiar and undemanding.

From this typology, the Frese et al study illustrates that a combination of Critical Point and Opportunistic Strategies is most likely to bring business success, whereas Reactive / Opportunistic is the least successful combination. Interestingly, although the Reactive strategy was negatively correlated with business success, there was no evidence to support the idea that complete planners were any more likely to succeed.

In terms of management practice, a key feature of many SMEs is that they have fewer senior managers, meaning that the capabilities of just one person can have a profound effect. Perhaps it is due to a lack of management expertise that strategic business planning in SMEs appears to be generally limited and short term in focus, with strategies tending to follow a fire-fighting ‘react and adapt’ philosophy (Ghobadian and Gallear, 1997; McAdam, 2000; Yusof and Aspinwall, 2000; Burns, 1996; Oakes and Lee, 1999). This is summed up by Jennings and Beaver (1997):

> [In SMEs]...strategic management becomes primarily an adaptive process concerned with manipulating a limited amount of resources, usually, in order to gain the maximum immediate and short term advantage.
4.2.4 SME Defining Characteristics: A Summary

From this review of the literature, it can be seen that there are a number of key characteristics of SMEs which are not directly related to size. In conjunction with basic numeric definitions, these are able to provide a more accurate view of the particular group of firms that are termed SMEs and are the focus of this research. Therefore, for the purposes of this research project, a SME is classified as a company with fewer than 250 employees, which exhibits the characteristics identified in table 4.1.

<table>
<thead>
<tr>
<th>Competitive Environment</th>
<th>References</th>
</tr>
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<table>
<thead>
<tr>
<th>Organisational Environment</th>
<th></th>
</tr>
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<tbody>
<tr>
<td>Flat, flexible organisational structures with a high potential for innovation; Severe resource limitations in terms of manpower and finance; Skills shortages and lack of training;</td>
<td>Ghobadian &amp; Gallear, 1997; Burns, 1996; DTI, 1994; Wiklund &amp; Wiklund, 1999; McAdam, 2000; Yusof &amp; Aspinwall, 2000; Gunesekaran et al, 2000; Jennings &amp; Beaver, 1997. Welsh &amp; White, 1981; Abdul-Nour et al, 1998; Pelham, 1999.</td>
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<tr>
<th>Management Practices</th>
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Table 4.1: SME Characteristics as Defined for this Research Project

4.3 Is Integrated PM Appropriate for SMEs?

This section assesses whether the characteristics of SMEs, identified above, make the introduction of integrated PM appropriate in this environment. The assessment is carried out by analysing the criteria from the conceptual model of integrated PM development (as developed in Chapter 3), against the characteristics of SMEs already identified. The analysis is focused around establishing the characteristics that will either inhibit or promote the
development of integrated PM into SMEs. In addition, the importance of integrated PM for SMEs will be discussed. This will theoretically establish the appropriateness of integrated PM for use in SMEs, whilst also highlighting the key areas which should be taken into consideration when implementing integrated PM in SMEs.

4.3.1 SME Characteristics that Promote the Introduction of Integrated PM

The potential advantages of introducing integrated PM in a SME environment are that both management and process visibility is likely to be high, due to having fewer employees and generally flat structures within the company. These characteristics should simplify the communication process, helping to ensure that every employee is aware of what is happening and why. They also make it more likely that decisions will be made quickly and with less bureaucracy.

4.3.2 SME Characteristics that Inhibit the Introduction of Integrated PM

If the introduction of integrated PM is compared against other examples of change in SMEs, from the literature, there appears to be a common set of issues which are important in this process. As Wiele and Brown (1998) note:

*TQM [Total Quality Management] implementation has everything to do with organisational change. And every change in a SME is difficult because of the obstacles to be overcome [...] These obstacles are not only related to the implementation of a quality philosophy, but are difficulties encountered in any change a SME has to go through.*

Therefore, although the structure of SMEs potentially makes some aspects of implementing integrated PM easier, previous researcher’s experiences of implementing change in SMEs
indicate that that there are also likely to considerable disadvantages to contend with Ghobadian and Gallear (1996, 1997).

The characteristics that are likely to inhibit the introduction of integrated PM into SMEs are principally caused by the lack of resources which SMEs experience (for example management time, appropriate skills and money). Interestingly, one of the main findings from a case-based study of TQM implementation in SMEs described in Ghobadian and Gallear (1997) is that resource paucity – particularly that of management time – means that the implementation process is markedly more taxing for SMEs than larger companies, a view that is supported by other studies (Elmuti and Kathawala, 1999). An additional disadvantage is when customers or stakeholders apply pressure for internal improvements. This can lead SMEs to treat such initiatives as paper-based exercises, precluding them from gaining any real benefits. Careful management is seen as the key to ensuring this problem does not occur (Boon and Ram, 1998).

Findings from another study (Gulbro et al, 2000) show that there appears to be a direct link between the rate of change and the amount of effort and enthusiasm people are willing to put in to the change. This can be explained by Chapman and Sloan (1999), who conclude that there is a:

... greater degree of frustration in the smaller firms between the knowledge of CI (continuous improvement) mechanisms and the reality of their implementation. The greater pressure on all personnel in smaller firms to meet the ‘bottom line’ requirements probably accounts for this finding, at least in part.
In addition, Yusof and Aspinwall (2000a; 2000b) highlight the importance of first improving tangibles, rather than intangibles, in a change project to counteract this resource deficit. As they put it:

*Small businesses must be presented with a TQM approach which is attractive to them in the sense that it must not promise to improve anything or to solve every problem, but rather, it must be seen to help them to be better in a short time span, say three to six months, with a view to long-term sustainability.*

The implication here is that unless tangible benefits can be gained initially, enthusiasm for introducing integrated PM is likely to wane and resources redirected elsewhere. This view is echoed by McAdam (2000), who comments that it is difficult to convince SME managers about the long term benefits of change, when they live in constantly changing environments. His proposed solution to this problem is to ensure that improvement projects have adequate short-term benefits as well as long-term potential, and that they are capable of adapting to the rapidly changing environments which are a feature of SMEs.

### 4.3.4 Implications for Introducing Integrated PM into SMEs

The severe resource limitations facing SMEs, along with a general lack of skills and training, means that the introduction and use of any integrated PM system would have to be extremely well managed. According to the conceptual model of integrated PM development, this means that an appropriate approach would require a well designed development process, with a clear focus and effective project management. In addition, the measures produced would need to be clearly defined, have an explicit purpose, be relevant and easy to maintain, provide fast and accurate feedback and be simple to understand and use. These characteristics would ensure the efficiency of the PM system and increase the likelihood of successful implementation and use.
The informality and often reactive nature of SME strategies, along with their potential for fire-fighting, also means that it is likely to be considerably more difficult to develop a strategically oriented integrated PM system in SMEs than in large companies. However, several elements in the conceptual model of integrated PM might help alleviate this problem. For example, enabling strategic objective identification during the development phase would help to ensure that the performance measures would be derived from strategy and would help to link operations to strategic goals. An advantage of adopting this approach would be that the PM system would provide data that could input directly into the strategy formulation process. In addition, a periodic maintenance structure would ensure that the measurement system keeps track of changes in strategy and that measures remain relevant and appropriate.

4.3.3 The Importance of Integrated PM for SMEs

The reliance of SMEs on a small customer base suggests that, to remain competitive, SMEs must ensure that customer satisfaction remains high and that they can be flexible enough to respond rapidly to changes in the market. This can only happen effectively if the company is supplied with the right materials at the right time and if it is operationally effective. In addition, stakeholders, particularly those who have a financial interest in the firm, are critical to the success of both large and small companies. However, given the lack of any other monetary safety net to absorb the impact of short term fluctuations resulting from change, stakeholder satisfaction is of paramount importance in SMEs. Finally, effective operations are essential for all firms, particularly when resources are scarce. Therefore, measuring operational effectiveness is a key method of facilitating long term success.
4.4 Conclusion

This chapter set out to establish a definition of what constitutes a SME, in terms of their size and characteristics, for the purposes of this research. This working definition was necessary due to the heterogeneity of small firms in general, which would have made a more concrete definition impossible. An assessment has shown that the SME characteristics identified would, potentially, have a profound effect on the introduction of integrated PM systems in this environment. However, little empirical evidence currently exists which describes current PM practice in SMEs or which evaluates the appropriateness of current development approaches within this context. The following chapters focus explicitly on these issues. In Chapter 5, a survey of eight companies is described to establish how SMEs currently measure performance. Then, Chapter 6 presents a case study which describes, in detail, the application of the Cambridge PM Process in a SME.
Chapter 5: Performance Measurement in SMEs

5.0 Introduction

In Chapter 4, the distinctive characteristics of SMEs were identified and discussed. These characteristics were then mapped to the conceptual model of integrated PM development and a number of issues concerning the use of such a system in a SME environment were highlighted. This chapter begins by looking at the literature concerning the way SMEs use performance measures. An empirical study is then described which aims to widen current knowledge in this area. The data is then used to develop a model of the sort of PM systems that might be found in SMEs.

5.1 How SMEs Use Performance Measures

Although there has been a significant amount of research carried out into the needs and use of PM in large organisations, this is not reflected in the case of SMEs, where there is a distinct lack of published research on these issues. From the literature that is available, however, a broad picture of the way PM is used in SMEs can be gained.

5.1.1 Previous Research on PM in SMEs

According to Jarvis et al (2000) SMEs tend to adopt financially based performance measures, particularly focusing on cash, be it how much is in the bank, or how it flows through the company. This view is supported by Webb et al (1999), who carried out a study on the type of measures typically in use in manufacturing SMEs. This contrasts with the accepted wisdom in larger firms that the primary performance indicators should be focused on profit maximisation. However, a study carried out by CIMA (1993) found that
there were no significant differences between the way large and small companies measure performance. In addition, Masalla (1994) concluded that Italian SMEs paid little attention to management accounting information, instead confining their measurements almost exclusively to financial figures about income and sales. This leaves a confused picture about how SMEs typically measure business performance. However, all firms must provide standard financial figures for tax purposes and many are also encouraged to provide financial measurements for their external stakeholders (Walley et al, 1994).

Although business level PM in SMEs often seems to be minimal and financially focused, Hynes (1998) points out that SMEs cannot effectively manage performance on this basis. CIMA (1993) states that there is an increasing realisation of the importance of non-financial measurement among SMEs, although it concedes that there is still a disparity between practice and theory – which emphasises the use of non-financial measures – in this area. This disparity can be explained by the indistinct understanding of the importance of performance indicators in general, particularly operational indicators (Walley et al, 1994; Webb et al, 1999). As a result, it is not surprising to find that studies on the use of PM typically indicate that operational measures are ad-hoc and informal (Addy et al, 1994), with no real understanding of which measures drive performance (Greatbanks and Boaden, 1998). This might explain why SME PM systems are rarely structured to help them achieve their strategic goals (CIMA, 1993; Barnes et al, 1998; Veitch and Smith, 2000).

In cases where PM is used to drive performance, problems can also occur. Studies have shown that output volume is a very common operational measure in SMEs (Close et al, 1998; Webb et al, 1999). In some companies, this measure is perceived as being the primary performance measure amongst both staff and managers. However, having one
overriding measure driving performance can induce extremely strong behavioural responses in staff, which can inhibit the ability of a company to change (Close et al, 1998). This is because many firms do not change their performance measures when they change their strategies (Walley et al, 1994). This type of unstructured PM could not only make achieving strategic objectives difficult, but could also prevent any strategic development occurring within the company.

5.2 PM practice in SMEs

Although the literature highlighted a number of characteristics of SME PM systems, the paucity of in-depth studies on the way PM is used in SMEs indicated the need for an empirical study, which could be used to identify the characteristics of SME measurement systems. This took the form of a set of interviews with SME managers, which are examined in detail in this section.

5.2.1 Research Method

As the purpose of the interviews was to gain an understanding of the way PM is used in SMEs, semi-structured interviews appeared to be the most useful method of gaining access to this information. Therefore, a small number of exploratory questions were formulated, based on aspects of the conceptual model of integrated PM development. These questions were designed to ensure that all relevant areas were covered, but the interviewer and interviewee were free to explore and discuss beyond these boundaries wherever appropriate (see appendix 1 for a copy of the exploratory questions). Additionally, to help ensure that all the companies fitted the sampling criteria, a number of standard questions gathering basic information about the company were also required.
A sample of 8 SMEs were selected within the constraints identified, using a purposive sampling strategy (see Chapter 2, section 2.6 for details of sample selection and constraints). Patton (1990) describes various different types of purposeful sample, including critical case sampling, which enables the selection of cases that are critical to the understanding of a phenomenon. This appeared to be the most appropriate method for use in this situation. Saunders et al (1997) provide three exploratory questions which help identify critical cases:

- If it happens here, will it happen everywhere?
- If they are having problems, can you be sure that everyone will have problems?
- If they cannot understand the process is it likely that no one will be able to understand the process?

Answering ‘yes’ to these questions was achieved by selecting companies that had recently undertaken strategic improvement programmes. The rationale for the selection of this sample was that companies actively seeking strategic improvements would be most likely to be using integrated PM, or at least view it as a useful improvement tool. From the initial literature review on SMEs, there was a strong assumption that integrated PM would not be in use and that difficulties would be encountered when attempting to implement it in SMEs. Therefore, by selecting companies that were considered most likely to either already be using integrated PM, or be interested in implementing it, the results from a few cases would be significantly more generalisable than by selecting a representative sample of the same size.

An appropriate manager was contacted in each firm and invited to take part in an on-site interview. Each interview lasted approximately 1 hour. To ensure accurate data collection, permission was sought, and given, from all interviewees to have the interviews taped. To ensure that the interviewer had an accurate understanding of the issues covered, a summary of each interview was produced from the transcripts and verified by the
interviewee (see appendix 1 for copies of the interview summaries). Additionally, to eliminate the effects of interviewer bias, the summaries were validated by another manager, facilitating data triangulation.

5.2.2 Interview Analysis

Transcripts from the interviews were analysed using thematic coding (Flick, 1998). The themes were derived from the conceptual model of integrated PM development. An example of the coding procedure is given in Figure 5a. The analysis involved examining the data against the three primary headings: PM dimensions, PM characteristics and the PM development process. The purpose of this was to enable the identification of the performance measures that were used in each company, the characteristics of those measures and why and how the measures were developed.

<table>
<thead>
<tr>
<th>Codes</th>
<th>Transcript (excerpt from Company G)</th>
</tr>
</thead>
<tbody>
<tr>
<td>lead times</td>
<td>“When we receive an order we quote a delivery date. The customer gives a date that they would like it by and we give a realistic date that might be better or it might be worse. Then when we don’t reach that delivery date we have statistics that tell us how efficient we have been. So we can say “well 10% of what we have done has been delivered late”. Then we can look back and see what the cause was. Design new processes so it doesn’t happen again. That works best and that is as and when – that is not taken every month.”</td>
</tr>
<tr>
<td>delivery date</td>
<td></td>
</tr>
<tr>
<td>effectiveness</td>
<td></td>
</tr>
<tr>
<td>feedback</td>
<td></td>
</tr>
</tbody>
</table>

The analysis highlighted a number of common characteristics of the SME PM systems, which provided a model of the type of PM systems in use. This model was compared against the conceptual model and a gap analysis was used to facilitate the identification of discrepancies between the empirical and theoretical data. The results of this analysis will now be illustrated and discussed in detail.
5.2.3 Results

The results of the analysis provided some interesting insights into the way that SMEs use performance measures. In terms of what is measured, all interviewees reported a plethora of financial measurements in their respective companies, for example;

_We formally measure mainly financial indicators and really that is it as far as consistent measures are concerned._ (Company D)

This lack of appropriate, non-financial, measures was reflected across all the participant companies, with one company commenting;

_We are struggling because we don’t record the right, or sufficient, or even the right kind of data to make the right decisions._ (Company D)

This was the case in all but the smallest company, where there was a feeling that, with just 12 employees and £1 million turnover per annum, detailed financial data was sufficient for monitoring their performance:

_...production issues in terms of production efficiency are resolved very quickly because we cannot afford to waste time on the shop floor. Time is money. We have this specific recovery programme and if any job appears not to be making the appropriate amount it is monitored very, very quickly. It is noticed very, very quickly._ (Company E)

Despite the heavy emphasis on financial measurement, the company did recognise that it was very reliant on external suppliers to survive. Therefore, non-financial indicators were still seen as a requirement to reduce their external vulnerability.

_We have minimum standards of quality and some things that we can measure are consistency and quality of supplied product. Because we work just in time as much as possible we have to be sure of our suppliers. We make sure that they are flexible or their quality is outstanding._ (Company E)

The other, larger companies in the sample were more generous in their use of non-financial measures, with all of them having at least one measure in each principal measurement area (Stakeholder Satisfaction, Customer Satisfaction, Operational Effectiveness and Supplier Effectiveness).
Supplier measures were generally well developed, particularly in companies where quality was of paramount importance. One such company had established a relatively sophisticated system for ranking its suppliers against a number of criteria:

Each supplier is coded so if they are low down the scale then every time a product comes in we check it thoroughly – if they are high up the scale we do it occasionally or not at all, depending on what procedures they have in place or if they have ISO. (Company A)

Suppliers were also monitored retrospectively. One company included its suppliers in the feedback loop which was activated by product returns;

We measure returns on whether we have a problem or the supplier does. (Company B)

This arrangement demonstrates that feedback on performance measures is used, albeit in a fairly rudimentary way. It is interesting to note that the majority of measures with an explicit feedback loop focused primarily on reacting to problems that had already occurred, such as returns or late delivery, with very few companies having appropriate measures in place to pre-empt these issues.

So we can say – “well 10% of what we’ve done has been delivered late” – then we can look back and see what the cause of that was. Design new processes so it doesn’t happen again. (Company G)

However, even this basic feedback was something of a luxury in some of the companies, where information appeared difficult to come by;

I don’t think there is formal feedback”(Company A) or again “Its all very closed and the information only gets passed to those who actually ask for it. (Company C)

This somewhat ambivalent attitude is explained to some extent by the perceptions of the employees and even managers towards measurement in these companies. There was a distinct impression that it was low on the list of priorities for many people, with many comments such as;
Its all right designing the measures, its getting people to provide you with the information...(Company A)

A lot of the measures aren’t relevant to us (Company B)

Its just left up to the managers to provide the information that indicates what is produced in that department. (Company F)

It is not surprising, given these comments, that none of the companies had any strategy for measurement and that measures were generally developed by and for individual managers. Even where it was recognised that measures were obsolete, there seemed to be a lot of inertia in the system which prevented improvements taking place.

Monitoring the generation of leads, the conversion rates, that sort of thing, they are very important to the business – and I suspect that some of the other things that we do like measuring the productivity of the factory in terms of units per man really don’t do a lot for us. (Company H)

It seemed that the primary impetus for developing new performance measures was through explicit demands from either customers or higher management;

Demand from the managers for a clearer picture of what is going on. For customers as well – we get customers asking – monitoring our deliveries – checking things tally. (Company C)

However, despite the lack of internally devised measures to monitor performance, there was a genuine concern for customer satisfaction which was apparent in all the companies studied,

I think that for a lot of the people, fulfilment of the customers’ requirements is the thing they focus on. (Company A)

The perceptions of the interviewees seemed to be that this could be best achieved by getting on with the job of making good quality products, rather than wasting time measuring them. However, standard operational measures were in use, many of which were acknowledged to be very useful. It is interesting to note that the most useful of these measures were invariably described as informal or ad hoc, and typically covered areas
such as lead times or delivery performance, along with a number of quality measures. Again, all of the measures described were reactive, rather than proactive, showing only a rudimentary knowledge of how performance measures can be used. Table 5.1 provides a description of the type of measures found in these SMEs, along with the way they are developed and used.

<table>
<thead>
<tr>
<th>PM development approach</th>
<th>Performance measure characteristics</th>
<th>What is measured</th>
</tr>
</thead>
<tbody>
<tr>
<td>Codes &amp; Categories</td>
<td>How</td>
<td>Operational Effectiveness</td>
</tr>
<tr>
<td></td>
<td>-through brainstorming</td>
<td>-product quality</td>
</tr>
<tr>
<td></td>
<td>-through experience</td>
<td>-process quality</td>
</tr>
<tr>
<td>Who</td>
<td>-managers, some staff and customers</td>
<td>-defects</td>
</tr>
<tr>
<td></td>
<td>design measures</td>
<td>-scrub</td>
</tr>
<tr>
<td></td>
<td>-staff action measures</td>
<td>-work in progress</td>
</tr>
<tr>
<td>Issues</td>
<td>-lack of understanding of new</td>
<td>-output</td>
</tr>
<tr>
<td></td>
<td>measures</td>
<td>-lead times</td>
</tr>
<tr>
<td></td>
<td>-blame culture</td>
<td>-delivery time</td>
</tr>
<tr>
<td></td>
<td>-explanation essential to ensure</td>
<td>-inventory</td>
</tr>
<tr>
<td></td>
<td>support</td>
<td>-orders / receipts</td>
</tr>
<tr>
<td></td>
<td>-management support essential</td>
<td>-costs</td>
</tr>
<tr>
<td>Internal Triggers</td>
<td>-problem recurrence prevention</td>
<td>-cash flow</td>
</tr>
<tr>
<td></td>
<td>-for visibility</td>
<td>-quotes converted</td>
</tr>
<tr>
<td></td>
<td>-to gain control</td>
<td>-productivity</td>
</tr>
<tr>
<td></td>
<td>-for planning purposes</td>
<td></td>
</tr>
<tr>
<td>External Triggers</td>
<td>-customer requirements</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-government legislation</td>
<td></td>
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<tr>
<td></td>
<td>-national standards / awards</td>
<td></td>
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<tr>
<td></td>
<td>requirements</td>
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</tbody>
</table>

Table 5.1: Results of Coding and Categorising the Interview Data
5.2.4 Discussion

All the companies in the sample, except the smallest, had at least one measure in each of the overall dimensions of performance. However, it was interesting that the scope of measurement was limited in all the companies. An example of this is that none of the companies measured internal flexibility, although supplier flexibility was measured. Also, while three of the companies had employee measures, these were very rudimentary, covering only staff turnover and health and safety. In addition, societal measures were limited entirely to government environmental legislation. This lack of appropriate measures may be attributed to the perception that performance measures prevent people from carrying out their everyday tasks efficiently, adding another layer of paperwork and bureaucracy to already hectic daily routines.

Another factor might be that many of the measures in use in the companies were acknowledged to have significant flaws by all the interviewees. Analysis has shown that the most significant of these flaws was a lack of reference to strategy. The measures differed from company to company, with some maintaining a small number of simple and practical measures, and others having a majority of measures which were either obsolete, or designed essentially for monitoring historical data. This illustrates the heterogeneity of SMEs, even within a heavily constrained sample. Interestingly, however, all the interviewees complained that the measures produced an overload of data which was either too complex or outdated and therefore unusable. Even where the data was usable, only one SME reported a formal feedback system, via monthly review meetings, although informal feedback occurred in several companies.

The introduction of new performance measures in these companies was initiated both internally and externally. The main internal trigger was as a reaction to problems that had occurred. This supports the reactive management style found in the majority of SMEs.
(Oakes and Lee, 1999). Other internal triggers focused on attaining a greater level of control, particularly for resource planning. External triggers mainly originated from customers that requested or imposed specific measures. This coincides with the emergence of a number of supplier development programmes on the managerial agenda of large companies. A consequence of this has been the development of a limited number of measures imposed by the SMEs on their own suppliers.

Measures were usually developed in an ad hoc fashion, and difficulties were identified when staff were asked to start collecting data for which they could see no use. This would lead to poor quality data or, in certain circumstances, a culture of blame would develop in an attempt to rationalise poor performance. All the interviewees who experienced these problems advocated better communication as a potential method for resolution.

5.2.5 Gap Analysis
A gap analysis was carried out to compare the identified SME PM characteristics against those identified in the conceptual model. This analysis clearly illustrated a lack of congruence between the two models (Table 5.2). Discrepancies between theory and practice were identified in the development approaches employed. These included a lack of strategic forethought, a lack of communication between managers and the lack of a structured process for development. However, the majority of measures were developed by the people who would be expected to use them.

The characteristics of the measures in use in the SMEs were also dramatically different from those specified in the theoretical model. The only commonalties were that the useful measures were both simple and practical. However, in every other respect they failed to find any congruence with the conceptual model. Finally, the main gap identified in the
‘Dimensions of Performance’ category was Stakeholder Satisfaction. Although there were measures identified in this area, they were extremely limited, particularly when looking at non-financial aspects of performance. In addition, none of the Operational measures in use were pre-emptive. Instead, they were developed to highlight problems after they had occurred, to enable the company to react and improve. This was also a feature of Customer and Supplier measures, which were limited by their rudimentary and reactive nature.

<table>
<thead>
<tr>
<th>Theoretical Model</th>
<th>SME PM System Characteristics</th>
<th>Gaps</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>The strategic PM development process should:</strong></td>
<td><strong>Performance measures in SMEs are developed:</strong></td>
<td></td>
</tr>
<tr>
<td>Evaluate existing PM system</td>
<td>With little reference to any existing measures in place</td>
<td>x</td>
</tr>
<tr>
<td>Enable strategic objective identification</td>
<td>With no reference to strategy</td>
<td>x</td>
</tr>
<tr>
<td>Enable performance measure development</td>
<td>In an ad hoc fashion by individual managers / staff</td>
<td>x</td>
</tr>
<tr>
<td>Provide a maintenance structure</td>
<td>Without deleting obsolete measures</td>
<td>x</td>
</tr>
<tr>
<td>Involve key users</td>
<td>By Managers, occasionally staff &amp; customers</td>
<td></td>
</tr>
<tr>
<td>Have top management support</td>
<td>With management support</td>
<td>x</td>
</tr>
<tr>
<td>Have full employee support</td>
<td>With a lack of employee understanding of measures</td>
<td>x</td>
</tr>
<tr>
<td>Have clear and explicit objectives</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Have set time-scales</td>
<td></td>
<td>x</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Measures in a strategic PM system should be:</th>
<th>SME performance measures are:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Derived from strategy</td>
<td>Not strategic</td>
</tr>
<tr>
<td>Clearly defined / explicit purpose</td>
<td>Often unclear with complex or obsolete data produced</td>
</tr>
<tr>
<td>Relevant and easy to maintain</td>
<td>Historically focused with some outdated measures</td>
</tr>
<tr>
<td>Simple to understand and use</td>
<td>Small numbers of simple practical measures</td>
</tr>
<tr>
<td>Provide fast, accurate feedback</td>
<td>No formal feedback / non-specific informal feedback</td>
</tr>
<tr>
<td>Link operations to strategic goals</td>
<td></td>
</tr>
<tr>
<td>Stimulate continuous improvement</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>A strategic PM system should measure:</th>
<th>SME PM Systems measure:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operational Effectiveness</td>
<td>Operational Effectiveness (reactive)</td>
</tr>
<tr>
<td>Supplier Effectiveness</td>
<td>Supplier Effectiveness (reactive)</td>
</tr>
<tr>
<td>Customer Satisfaction</td>
<td>Customer Satisfaction (reactive)</td>
</tr>
<tr>
<td>Stakeholder Satisfaction</td>
<td>Stakeholder Satisfaction (limited non-financial info)</td>
</tr>
</tbody>
</table>

Table 5.2: Gap Analysis of SME PM against the Conceptual Model

5.3 Conclusion

In this chapter, the characteristics of performance measures commonly used in SMEs have been identified through the literature and an empirical study. The results show that SME PM differs significantly from the criteria established in the conceptual model of integrated
PM development. The primary reason for this is that SME managers have failed to co-ordinate the development performance measures in a structured and coherent way. The ad hoc introduction of new measures has only served to increase the number of irrelevant and complex measures in use. This has exacerbated the feeling that PM is a waste of precious time and resources. Chapter 6 will now investigate whether this situation can be improved through the use of a structured process for introducing integrated PM into SMEs. This will be achieved through examining the literature in this area and through a further empirical study.
Chapter 6: Structured PM System Development In SMEs

6.0 Introduction

This Chapter builds on Chapter 5 to establish whether SME PM systems might be improved by structuring PM system development. Previous research is examined to identify existing knowledge in this area and then an in-depth case study is described, the aim of which is to investigate the implications of developing and implementing integrated PM in a structured way in SMEs. From the evidence presented, a set of SME-specific requirements to enhance the conceptual model for PM development are identified.

6.1 Structured PM Approaches for SMEs

The gap analysis carried out in the previous Chapter identified that the PM systems in use in SMEs are very different to that advocated in the conceptual model. The evidence from the interviews showed that SME PM is often heavily financially focused, informal and unstructured. This approach is considered to have several drawbacks, the most important of which is that these performance measures are likely to inhibit, rather than to facilitate, the achievement of strategic objectives. To overcome this problem, a number of approaches for assessing and designing SME PM systems in a more structured way have been developed. A review will identify the strengths and weaknesses of each approach, and a set of requirements to enhance the conceptual model will be developed.
6.1.1 Single Perspective Measurement

Several studies have focused on a single measurement perspective in the SME sector. One such study presents a framework for auditing PM usage in small, growing firms (Hynes, 1998). The findings from this study show that firms with an explicit growth strategy are still likely to plan in an ad hoc and informal fashion, whilst relying primarily on financial measurements required by external stakeholders as their key measures of success. Other studies have examined the implications of customer orientation on performance (Appiah-Adu and Singh, 1998) and identified the types of quality models that are suitable for a number of different SME environments (Noci, 1995). Although none of these studies present integrated PM in SMEs, they do provide some useful guidelines for managing these specific issues in smaller firms. These guidelines include highlighting the importance of regular measurement and feedback to managers (Hynes, 1998) and introducing company changes on a gradual, incremental basis (Appiah-Adu and Singh, 1998).

6.1.2 SME PM Frameworks

There are also a number of studies which investigate appropriate methods of developing PM in SMEs. Barnes et al (1998) present the results of a number of PM audits carried out in SMEs. The key recommendations from this study were that structured PM and more formal business planning would increase managerial understanding and control of the business. A number of specific recommendations on developing such a system were also presented. These have been developed into a new PM framework (Chennell et al, 2000). However, although this framework has been tested successfully in the private and public
sectors, none of these tests appear to have been carried out in SMEs, making an evaluation of the framework in a SME context impossible.

Two studies evaluate the use of the Balanced Scorecard (BSC) for use in a SME context (Hvolby and Thorstenson 2000, McAdam 2000). The BSC was developed by Kaplan and Norton (1992) to improve measurement by focusing on four performance perspectives; customers, finance, internal business processes and learning and future growth. Both studies suggest the likelihood of significant difficulties implementing such a resource-intensive system in SMEs, which are recognised for their resource poverty. McAdam (2000) also comments on the fact that the BSC has a long-term focus, which conflicts with the need for many SMEs to remain flexible and adaptable to rapid market changes over which they have little control. Hvolby and Thorstenson (2000) advocate the adoption of Quick Response Manufacturing (QRM) as an alternative to the BSC. The advantage of this approach is that it is much simpler than the BSC, focusing on lead-time reduction as the only indicator of performance. The rationale for such an approach is that lead-times can be used to facilitate agility and lean production, whilst retaining a customer orientation. In addition, it can help to focus priorities and efforts for improvement. However, as discussed in the previous Chapter, there are significant behavioural drawbacks in implementing one overriding measure of performance, which makes it difficult to justify the focus on lead-time reduction as the only performance indicator.

Laitinen (1996) presents a framework specifically designed for developing structured PM systems in small companies. This framework is designed for the exclusive use of the Managing Director, implying that it is designed only for companies where the MD has complete control. The approach utilises Activity Based Costing (ABC) information to
improve the quality and usefulness of management accounting information. ABC has been advocated as a useful improvement tool in small companies in other studies (Gunesekaran et al, 2000). However, because it is primarily a cost-based decision making tool, the system has no flexibility in strategic orientation. Therefore, ABC cannot be used to introduce integrated PM, as it is unable to facilitate the achievement of non cost-based strategic goals.

6.1.3 A Process for PM Development

The Cambridge PM Process (Neely et al, 1996a) was found to be comprehensive when it was evaluated against the conceptual model of integrated PM development in Chapter 3. This Process, which was developed and tested originally in large companies, has also been applied in SMEs. Seven SMEs were studied (Bourne and Neely, 1998), with one company failing to complete the process, and a further three companies failing to implement the measures they had developed. The three successful companies took between nine and thirteen months to implement the measures they had developed (Bourne et al, 1998). This was identified as a potential reason why the implementation rate was so low (Bourne et al, 2000). According to Neely et al (2000), such implementation problems are the key reason why companies fail to use integrated PM effectively.

6.2 Testing a PM Development Process in a SME

Having examined the literature, it is clear that introducing integrated PM into SMEs is a complex process. Therefore, in order to build a rich picture of how the Cambridge PM Process works in a SME environment, a case study was undertaken. The purpose of the
study was to examine the benefits and drawbacks of integrated PM development when applied in a SME context.

The Cambridge PM Process differed from the other approaches described in the literature for three reasons: it is comprehensive – as defined by its congruence to the conceptual model of integrated PM; it provides a detailed and structured method for developing performance measures and it has already been applied in SMEs. Therefore, despite its recognised implementation problems, this process appeared to be the most appropriate method of examining the development of integrated PM in SMEs.

6.2.1 The Case Study

The Cambridge PM Process is presented as a structured workbook and is designed to be a facilitated process. The process has two distinct phases, with five stages in each phase. Phase One is concerned with the development of a set of top level, strategic performance measures, whilst Phase Two seeks to cascade the top-level measures down through the company to ensure that operational measures are strategically aligned.

The case study application focused specifically on the development of a set of top-level, strategically aligned performance measures. This correlates to Phase One of the Cambridge PM Process and was planned as a series of five workshops. To ensure that the process was applied accurately, a member of the original team who developed the process was contacted and agreed to act as process facilitator.
The case company was selected using the same critical case sampling criteria as for the interviews (see chapter 5). However, it was also considered important to secure commitment to the process from the company before undertaking the study, adding an additional criterion to the selection process. Hence, the company which was finally selected was a small manufacturer, based in the South West of the UK, where there was both the need and the management commitment required for improving their current measurement system (Company I).

6.2.2 Research Method

The study utilised a case study approach that focused on the accumulation and interpretation of qualitative data. As Gummesson (1991) states:

_The general reason for doing case study research is to better understand complex phenomena such as change processes. Innumerable factors, and entangled interconnections between them, do not allow simple unambiguous research designs and quantifications._

Data collection was primarily based on participant observation, supplemented by various forms of documentation and by face-to-face interviews. These techniques were identified as appropriate methods of collecting both the processual and behavioural data that would emerge from the application of the process. The interviews were undertaken in an attempt to overcome any observer bias. This included structured interviews with each of the participants at the beginning of the intervention, followed by a set of semi-structured interviews at the end of the intervention. Throughout the case study, efforts were made to ensure the validity of data through appropriate triangulation, which included multiple sources, multiple methods and multiple researcher involvement. As Sekaran (1992) states:
Because almost all data-collection methods have some biases associated with them, collecting data through multimethods and from multisources lends rigor to research.

6.2.3  Data Analysis

Data analysis was undertaken using the case study analysis techniques described in Creswell (1998). This was undertaken from two perspectives, with the initial focus on identifying the results of the process and then a further analysis of the behaviour of the participants. This approach facilitated the identification of a set of issues that were verified and validated with workshop participants and with the process facilitator.

Three broad patterns were developed to encompass the categories identified from the analysis of the process: the performance measures that were developed, their characteristics and the planned / actual development process. These patterns were derived from the conceptual model of integrated PM development. The distinction between what was planned and what was actually completed is important because, whereas the former highlights the dynamics of the methodology, its appropriateness for use in SMEs can only be assessed by the final output of the development process.

Further coding and categorisation was then carried out on the data to identify the assumptions that had been made by the participants at the beginning of the process and to establish how their perceptions and behaviour changed over the duration of the intervention. Once all the data had been analysed, the results were used to identify the benefits and drawbacks of the Cambridge PM Process from a SME perspective.
6.2.4 Results

The perception of PM as an under-utilised management tool was the driving force behind Company I’s participation in the development of an integrated PM system. However, this was not enough to prevent the eventual abandonment of the process.

<table>
<thead>
<tr>
<th>Performance Measure Development Process</th>
<th>Performance Measures</th>
<th>Performance Measure Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Planned</strong></td>
<td><strong>Achieved</strong></td>
<td><strong>Operational Effectiveness</strong></td>
</tr>
<tr>
<td>Workshop 1</td>
<td>-Workshop 1 completed 100%</td>
<td>-scrap levels</td>
</tr>
<tr>
<td>-introduction to the process</td>
<td></td>
<td>-actual vs planned performance</td>
</tr>
<tr>
<td>-business needs for a new PM system</td>
<td></td>
<td></td>
</tr>
<tr>
<td>identified</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Interviews</strong></td>
<td>-All interviews</td>
<td><strong>Customer Satisfaction</strong></td>
</tr>
<tr>
<td>-general manager</td>
<td>completed successfully</td>
<td>-contacts delivered on spec + on time</td>
</tr>
<tr>
<td>-operations manager</td>
<td></td>
<td>-service satisfaction</td>
</tr>
<tr>
<td>-marketing manager</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-manufacturing manager</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-production manager</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-quality assurance manager</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-finance manager</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Workshop 2</strong></td>
<td>-Workshop 2 completed 100%</td>
<td><strong>Stakeholder Satisfaction</strong></td>
</tr>
<tr>
<td>-ID product groups</td>
<td></td>
<td>-sales growth</td>
</tr>
<tr>
<td>-customer/ stakeholder needs analysis</td>
<td></td>
<td>-return on sales</td>
</tr>
<tr>
<td>carried out</td>
<td></td>
<td>-return on capital</td>
</tr>
<tr>
<td><strong>Workshop 3</strong></td>
<td>-Workshop 3 completed 100%</td>
<td>-employee/ manager satisfaction</td>
</tr>
<tr>
<td>-ID strategic objectives</td>
<td></td>
<td>-group contacts</td>
</tr>
<tr>
<td>-ID measure developers</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Performance Measure Development sessions</strong></td>
<td>-Only 5 development sessions completed</td>
<td><strong>Practical</strong></td>
</tr>
<tr>
<td><strong>Workshop 4</strong></td>
<td>-Workshop 4 cancelled</td>
<td>-explicit purpose</td>
</tr>
<tr>
<td>-agree measures</td>
<td></td>
<td>-set targets</td>
</tr>
<tr>
<td>-conflict analysis on new measures</td>
<td></td>
<td>-explicit formula</td>
</tr>
<tr>
<td><strong>Workshop 5</strong></td>
<td>-Workshop 5 cancelled</td>
<td>-feedback</td>
</tr>
<tr>
<td>-sign off measures</td>
<td>-Final development sessions held</td>
<td>-mechanism</td>
</tr>
<tr>
<td>-implement review mechanism</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Interviews</strong></td>
<td>-Four final interviews held with available managers</td>
<td><strong>Balanced</strong></td>
</tr>
<tr>
<td>-final interviews with all managers</td>
<td></td>
<td>-finances</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-customers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-internal / ops</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-innovation</td>
</tr>
</tbody>
</table>

Table 6.1: Results of the Processual Analysis

The application of the Cambridge PM Process was observed over a period of 6 months, during which the managers attended the workshops, identified a set of strategic objectives and developed a draft set of top-level performance measures. However, at this point,
Company I withdrew from the process without having validated or implemented the new PM system. Although the process was not completed, enough data was collected to enable the case study analysis to be undertaken effectively. The results of the processual analysis are presented in Table 6.1.

The patterns identified for the behavioural analysis revealed four distinct phases throughout the process: the initial interviews which were held with each of the seven managers involved; observational data from each workshop session; observational data from the performance measure development sessions and the final interviews which were held with the four available managers. Table 6.2 illustrates these phases, along with some of the observational and verbal evidence expressed by the managers throughout each phase. This clearly illustrates the progressive loss of enthusiasm for the Process from the company participants, which was apparent at each phase.

<table>
<thead>
<tr>
<th>Phase</th>
<th>Behaviour</th>
<th>Comments and Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial Interviews</td>
<td>Enthusiastic</td>
<td>“Cambridge Process is simple and straightforward”</td>
</tr>
<tr>
<td></td>
<td>Pre-process Assumptions</td>
<td>“Performance measures will help gain control of operations”</td>
</tr>
<tr>
<td></td>
<td></td>
<td>“Will deliver predictive capability to company”</td>
</tr>
<tr>
<td></td>
<td></td>
<td>“Practical, usable process”</td>
</tr>
<tr>
<td>Workshops (To identify strategic objectives)</td>
<td>Initial Enthusiasm</td>
<td>High level of co-operation for organising workshops</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lively discussions about current PM shortcomings</td>
</tr>
<tr>
<td></td>
<td></td>
<td>High expectations about the value of new performance measures</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Good participation from most managers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Serious debates to resolve conflicting opinions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Willingness to take responsibility for tasks</td>
</tr>
<tr>
<td>PM Development Sessions</td>
<td>Waning Enthusiasm</td>
<td>Less co-operation to arrange sessions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lack of communication between managers to arrange sessions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>High enthusiasm from some individual managers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Difficulty gaining access to some managers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>All sessions delayed at least once</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Low level of enthusiasm for the task</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Unwillingness to do preparation work outside sessions</td>
</tr>
<tr>
<td>Final Interviews</td>
<td>Collapse of Process</td>
<td>Some managers unsure why the process had stopped</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Too resource intensive – particularly individual tasks</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Company unable to cope with implications of new measures</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Too strategically oriented – need practical performance measures now</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Company fire-fighting was always the top priority</td>
</tr>
</tbody>
</table>

Table 6.2: Tracking Behaviour throughout the Intervention
6.2.4.1 Observations on the Processual Aspects of the Intervention

The results of the case study analysis show that, although the Process was not completed, the draft measures that were produced were strategically aligned. However, only three of the four dimensions of performance identified by the conceptual model were covered. This was because, at the strategic objective setting stage, supplier issues were not considered as there were no immediate changes required in this area. A further reason was that the process used the Balanced Scorecard (Kaplan and Norton, 1992) to ensure a balanced set of measures was developed. As the Balanced Scorecard does not explicitly identify supplier effectiveness as a dimension of performance, it is easy to see how it might be missed. However, this is an important dimension, particularly for SMEs. Supply chains are becoming substantially more competitive (Oakes and Lee, 1999) and it is therefore increasingly necessary to ensure the smooth supply of materials into companies in order for them to maintain a smooth supply of goods to their customers.

6.2.4.2 Observations on the Behavioural Aspects of the Intervention

The Process used for developing the PM system led to some interesting observations about the way that it worked in a SME environment. The behavioural data illustrates how the reactions of the management team appeared to change over the course of the intervention. Although Company I was initially full of enthusiasm about what the Cambridge PM Process could help them achieve, interest levels dropped dramatically when it came to actually developing the measures.
The use of workshops for group consensus building and debate was new for Company I, but was regarded as an invaluable exercise because it got the entire management team together to think about their strategy for the future. This was clearly seen as a useful experience for the company, with one manager commenting:

The meetings were great – but as soon as people get out, the fire-fighting begins again and everything is forgotten until next time.

In the early stages of the Process it was the managers’ enthusiasm for the workshops that contributed to their success, with the key outcome being the identification of a set of strategic objectives that provided a foundation for the development of top-level performance measures. However, when individual managers were allocated responsibility for developing a preliminary set of performance measures difficulties were encountered. This was partially due to problems associated with establishing specific, defined targets for objectives that were often broad in scope. This situation was exacerbated by the fact that no detailed operational measures were developed, which might have helped to break the objectives down into more manageable, specific measures. However, the main issue seemed to be that the managers were allocated the task of developing the performance measures individually, outside the workshops. It was at this point that the downturn in enthusiasm became apparent. The explanation for this was that the managers felt that they did not have enough time to complete any of the tasks outside the workshops, due to their already hectic, day-to-day schedules. Severe resource constraints, combined with a reactive management style, left little room for additional developmental activities. One manager commented:

We have a group of very experienced managers who get involved in everything due to our fire-fighting approach – which works well, but doesn’t allow us to get involved in anything else. We don’t spend enough time looking to the future.
The difficulties in getting people to develop the performance measures slowed the Process down and led to waning enthusiasm amongst the managers. This became particularly apparent among the senior managers. The underlying reason for this became apparent during the final interviews. It seemed that after the managers had developed the strategic objectives and were trying to develop performance measures to support them, they realised that the Process was unsuitable to address the company’s immediate needs. The Operations Manager, who had initially championed the Process, commented in his interview that it:

needs customising to include day-to-day operations, rather than just the strategic stuff. We need to focus our attention on basics – how we can improve customer perceptions is the main one at the moment – we aren’t quite at the stage for top-level performance measures yet.

The Process had been attempting to develop strategically aligned performance measures in a company where there was no explicit strategy. This eventually led to a discrepancy between the strategic outputs of the workshops and the reactive fire-fighting that marked the everyday reality in the Company, helping to explain why the process faltered directly after the identification of the top-level objectives. It was only at this stage that the Company came to regard the process as unsuitable to address its immediate priority, which was to complete the restructuring programme that had been running concurrently with the PM workshops. This programme resulted in job losses and the re-allocation of management to new roles, which not only provided an unstable environment for the development of the PM system, but was also given a higher priority than the PM development process by all the managers concerned.
6.2.5 Summary

The main benefit of using the Cambridge PM Process in Company I was that it highlighted an imbalance in the Company’s current PM system, which was based, almost entirely, on financial measures. However, because the Process was not completed, the Company did not achieve the implementation of a more balanced system. The analysis of the Company’s strategic position and the identification of strategic objectives were acknowledged by the participants to have fostered consensus and focused their improvement efforts. However, the main drawbacks of the Process from a SME perspective were that it was both resource-intensive and time-consuming, requiring resources which were not readily available. Furthermore, the emphasis on strategic measures and the exclusion of the development of operational measures led to a perception that the approach was a future planning activity rather than one which facilitated improvements in current performance.

6.3 Recommendations

Several of the characteristics of SMEs, identified in Chapter 4, helped contribute to the failure of Company I to introduce integrated PM using the Cambridge PM Process. The key inhibiting characteristics were as follows:

- a reactive mentality;
- severe resource limitations;
- informal, reactive strategies.

The effects of these characteristics were exacerbated by a lack of management expertise, as this increased the time required to complete each activity. In addition, the strategic objectives and measures advocated by the Cambridge PM Process were incompatible with
the reactive mentality and lack of formal strategy found in Company I. According to the literature review in Chapter 4, these characteristics are common in SMEs. Therefore, it is likely that a combination of these characteristics contributed to the low implementation rate identified in the Bourne and Neely (1998) study. It is also likely that they would affect future attempts to introduce integrated PM into SMEs using any approach which relies on the availability of a formal strategy from which to develop the measures. Therefore, the requirements of integrated PM development approaches, as identified in the conceptual model, need to be supplemented as follows to make them effective for use in SMEs:

1. The development approach needs to be very resource efficient to ensure viability;
2. The approach should produce notable short term, as well as long term benefits, to help maintain the momentum and enthusiasm of the development team over time;
3. The development approach should facilitate the surfacing of informal strategies;
4. The development approach should be dynamic and flexible enough to accommodate strategic changes and to ensure continued strategic relevance over time.

6.4 Conclusion

In this Chapter, the structured development of integrated PM systems in SMEs has been investigated through a review of existing studies in this area and an empirical study undertaken to develop an integrated PM system in a SME. This builds on the previous chapters and illustrates the difficulties associated with integrated PM development in a SME context. The following Chapter will use the requirements identified, along with information from the previous chapters, to specify a new approach for developing integrated PM, which will be designed in conjunction with, and on behalf of, SMEs.
Chapter 7: Designing a SME PM Development Approach

7.0 Introduction

Chapters 3 and 4 highlighted the key characteristics of PM and SMEs and an examination of current PM practice in SMEs was undertaken in Chapter 5. Chapter 6 then illustrated how SME characteristics make integrated PM development difficult using existing approaches. This Chapter will describe the design and development of a new approach for introducing integrated PM more effectively in SMEs. An evaluation of a number of design processes is carried out and an appropriate process is adopted. The requirements identified in the previous Chapters (3-6) are then used to form the basis of a new SME integrated PM development approach.

7.1 Design Theory

Before embarking on designing a new SME integrated PM development approach, it was first necessary to understand the fundamentals of design theory. This entailed identifying a design strategy and an appropriate design process, to ensure the overall coherence of the design. Unfortunately, the creative process of design is not described in the process design literature, which is aimed more at the management of design / redesign (e.g. Davenport, 1993). Therefore, a wider review of the design literature has been undertaken, covering a broad range of disciplines, from engineering and IT, to architecture and the arts. This will be used to identify an appropriate design strategy and process from which to formulate the new SME integrated PM development approach.
7.1.1 Design Strategies

A number of explicit strategies for design have been proposed by Jones (1992). These fall into two categories: pre-planned strategies and search pattern strategies. These are not completely separate categories. Rather they represent two ends of a continuum on which each of the strategies fit (see figure 7a).

![Design Strategy Continuum](figure7a.png)

The strategy with the highest level of pre-planning is called a *Linear Strategy*. This is the most straightforward strategy, designed for use in familiar situations where novelty is unnecessary and a definite end point can be reached, via a number of steps, without the need for feedback. This is closely followed by the *Cyclic Strategy*, which is basically linear, but has feedback loops at some or all of the stages. In addition, *Branching Strategies* are effectively either linear or cyclic strategies in which several strands of a design can be followed at the same time, independently of each other.

At the other end of the continuum are *Incremental Strategies*, which seek only to modify existing designs, but do so without a high degree of pre-planning, allowing creative ideas to be incorporated, albeit on a limited scale. *Adaptive Strategies* are similar, but less constrained in scope. The idea here is that a definite starting point is decided, but no other steps are pre-planned. Instead, this strategy relies on the results of the creative process to determine the pattern of the strategy. Finally, Random Strategies are completely unplanned and can be used when a high degree of novelty is required. Their main use is in
situations where all suggestions are potentially valuable and do not necessarily need to be linked in any apparently coherent way.

7.1.2 The Process of Design

Until the 1950’s, design was considered almost mystical process, incapable of being described in a rational way. However, since then, many attempts have been made to explain the creative process in practical terms (Jones, 1992). One of the difficulties with this is that design takes place within the context of such disparate disciplines as engineering, architecture, IT and the arts. This has resulted in the creation and use of a number of similar approaches, each reflecting the nature and purpose of the discipline it was developed in.

One of the basic processes for product design in engineering has been put forward by French (1999). This is essentially linear and comprises the following phases, with feedback loops at each stage:

- **Analysis of Problem**: Identifying the need to be satisfied as precisely as is possible or desirable.
- **Conceptual Design**: It takes the statement of the problem and generates broad solutions in the form of schemes.
- **Embodiment of Schemes**: The schemes are worked up in greater detail and, if there is more than one, a final choice between them is made.
- **Detail Design**: This is the last phase, in which a number of small, but essential points remain to be decided.

This is closely mirrored by Pahl and Beitz (1984), whose process comprises very similar basic phases; Clarification of Task; Conceptual Design; Embodiment Design; and Detail Design. However, this is rather more prescriptive, with very specific details included in each phase.
A more generalised design process, again from the engineering design literature, is proposed by Cross (1994). He conceptualises the creative process as Exploration – Generation – Evaluation – Communication. Again, the notion of feedback is included, this time between the Generation and Evaluation phases. The essential difference with this process is that it not only identifies the process of designing, but also includes a formal end point for the design in terms of communication. This is also a feature of Archer’s (1984) process, which includes an Executive Phase to fulfil this function.

However, it is not only in engineering design that a formal end point is considered a practical necessity. RIBA (Royal Institute of British Architects) also include this feature in their design process, which is as follows:

Assimilation:
The accumulation and ordering of general information and information specifically related to the problem in hand.

General Study:
The investigation of the nature of the problem. The investigation of possible solutions or means of solution.

Development:
The development and refinement of one or more of the tentative solutions isolated during phase 2.

Communication:
The communication of one or more solutions to people inside or outside the design team. (RIBA, 1965)

Again, the process has feedback loops included at each stage. However, this process differs from the engineering design approaches by placing more emphasis on overall design and communication rather than on producing increasingly detailed designs, which is a notable feature of most design activities in engineering.

A more generalised version of architectural design is presented by Rowe (1987). This process looks at design essentially as a series of
problems which need to be solved: the Problem Representation Problem; the Solution Generation Problem; and the Solution Evaluation Problem. This model has strong links to the generic design process postulated by Jones (1992), amongst others, which is defined as; Analysis, Synthesis and Evaluation. Both these processes are essentially sequential in format, with iterative feedback loops incorporated where necessary. However, Lawson, (1997) criticises linearity because, he suggests, although designers might go through each phase identified, in reality the process is much more confused than linear models can illustrate. Therefore, he adapts the Jones (1992) process into a triangle (Figure 7b), which is more representative of the actual process of designing.

Although each conceptualisation of the design process examined is subtly different, there are striking similarities between them. This was recognised by Gregory (1966) when the understanding of design was still in its infancy, when he claimed that all design is carried out using essentially the same process. Assuming this is correct, then the minor differences identified in each representation of the process are simply customisations, which make them more appropriate for the specific design contexts for which they were developed. Therefore, the model developed by Jones (1992) and modified by Lawson (1997) appears to be an appropriate representation of the design process as a generic entity.

7.2 SME PM Approach Design Qualities

According to Rowe (1987), there are three distinct types of design problem: well-defined problems, ill-defined problems and wicked problems. Well-defined problems are so called because they have straightforward solutions. Similarly, ill-defined problems have convoluted or awkward solutions.
However, wicked problems are so named because they are problems which do not have perfect solutions. Therefore, any solution put forward can only ever be partial and will always have room for improvements. The problem of designing a SME integrated PM development approach is one that falls into this category. Since every SME is different, there will never be a perfect approach which will work in all situations. Instead, the design will attempt to create a ‘best fit’ solution for the target SMEs, which fulfils the problem as it has been described in the preceding chapters. The aim of designing a new SME integrated PM development approach is, therefore, to enhance the current state of knowledge in the area of integrated PM development in SMEs, rather than attempt to create some kind of panacea.

As the problem of integrated PM development in SMEs is naturally complex and ill-defined, the most appropriate design strategy was the *Adaptive Strategy*, with an initial analysis of the problem acting as the starting point for the design. Using Lawson’s (1997) model, the design process progressed through the stages of *Analysis, Synthesis* and *Evaluation*, with the freedom to move between each stage as appropriate. Once the initial design was developed, an incremental strategy was adopted in order to improve the design through empirical testing in a SME. The emphasis throughout the design process was to establish the three qualities described by Laseau (1989) of *Firmness*, in terms of valid construction, *Commodity*, by satisfying its functional needs and *Delight*, through aesthetic appeal.

### 7.3 Designing the SME PM Approach

The initial analysis of the problem focused on establishing the requirements for the SME focused integrated PM development approach. These were derived from the conceptual model of integrated PM development and the specific requirements to make integrated PM
more accessible to SMEs, which were identified in Chapter 6. A summary of these requirements is illustrated in table 7.1.

<table>
<thead>
<tr>
<th>A SME PM Development Approach Should:</th>
<th>Develop measures in the four key dimensions of performance:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provide a need evaluation</td>
<td>Customer satisfaction</td>
</tr>
<tr>
<td>Enable strategic objective identification</td>
<td>Stakeholder satisfaction</td>
</tr>
<tr>
<td>Facilitate performance measure development</td>
<td>Supplier effectiveness</td>
</tr>
<tr>
<td>Include a periodic maintenance structure</td>
<td>Operational effectiveness</td>
</tr>
<tr>
<td>Involve key users</td>
<td></td>
</tr>
<tr>
<td>Have top management support</td>
<td></td>
</tr>
<tr>
<td>Have full employee support</td>
<td></td>
</tr>
<tr>
<td>Have clear and explicit objectives</td>
<td></td>
</tr>
<tr>
<td>Have set timescales</td>
<td></td>
</tr>
<tr>
<td><strong>Be very resource efficient</strong></td>
<td>Derived from strategy</td>
</tr>
<tr>
<td><strong>Provide short term as well as long term benefits</strong></td>
<td>Clearly defined with an explicit purpose</td>
</tr>
<tr>
<td><strong>Be able to surface informal strategies</strong></td>
<td>Relevant and easy to maintain</td>
</tr>
<tr>
<td><strong>Be dynamic and flexible</strong></td>
<td>Simple to understand and use</td>
</tr>
<tr>
<td></td>
<td>Able to provide fast, accurate feedback</td>
</tr>
<tr>
<td></td>
<td>Able to link operations to strategic goals</td>
</tr>
<tr>
<td></td>
<td>Able to stimulate continuous improvement</td>
</tr>
</tbody>
</table>

Table 7.1: Requirements for a SME PM Approach

### 7.3.1 Designing the Structure of the New Approach

An analysis of the specific SME requirements, derived from the Company I case study, was carried out in an attempt to discover the design features of the Cambridge PM Process which contributed to its failure. This indicated that the root cause of the failure was due to the way the Process was structured. Its structure demanded that a complete set of top-level performance measures, each aligned to a strategic objective, be developed. Only once these measures were implemented could operational measures, which would drive performance towards the strategic objectives, be identified.

The broad scope and scale of each stage of the development process is indicative of a ‘one-off’ approach to integrated PM development, supplemented by a maintenance plan to ensure continued strategic relevance. However, such an approach demanded more resources than were available in Company I. In addition, there was a requirement for a definite and relatively stable strategy from which to develop the strategic level measures,
which was incompatible with the Company’s informal and flexible approach to strategy. Therefore, alternative designs to the ‘one-off’ development process were investigated and assessed for appropriateness for the SME integrated PM development approach.

In the literature there are two commonly espoused approaches to change: the one-off, radical change advocated in the BPR (Business Process Re-engineering) literature (e.g. Hammer and Champy, 1993) and the incremental approach found in the Kaizen, or continuous improvement (Imai, 1986), literature. According to Imai (1986) there are 12 key differences between the two different approaches (Table 7.2), which illustrate their fundamentally distinct natures. Each approach has pros and cons that vary with the circumstances in which they are to be used.

<table>
<thead>
<tr>
<th>Incremental Change (Kaizen)</th>
<th>Radical Change (e.g. BPR)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Effect</strong></td>
<td>Long-term and undramatic</td>
</tr>
<tr>
<td><strong>Pace</strong></td>
<td>Small steps</td>
</tr>
<tr>
<td><strong>Timeframe</strong></td>
<td>Continuous and incremental</td>
</tr>
<tr>
<td><strong>Change</strong></td>
<td>Gradual and constant</td>
</tr>
<tr>
<td><strong>Involvement</strong></td>
<td>Everybody</td>
</tr>
<tr>
<td><strong>Approach</strong></td>
<td>Group effort / systems approach</td>
</tr>
<tr>
<td><strong>Mode</strong></td>
<td>Maintenance and Improvement</td>
</tr>
<tr>
<td><strong>Spark</strong></td>
<td>Conventional know-how and state of the art</td>
</tr>
<tr>
<td><strong>Practical Requirements</strong></td>
<td>Little investment / high effort</td>
</tr>
<tr>
<td><strong>Effort Orientation</strong></td>
<td>People</td>
</tr>
<tr>
<td><strong>Evaluation Criteria</strong></td>
<td>Process / effort for better results</td>
</tr>
<tr>
<td><strong>Advantage</strong></td>
<td>Good in slow growth economies</td>
</tr>
</tbody>
</table>

Table 7.2: Differences between Incremental & Radical Change (adapted from Imai, 1986)

In terms of integrated PM development, the radical BPR approach is better suited to companies that have the skills and resources to be able to go back to the drawing board as far as PM is concerned and develop an entirely new system. This is the approach adopted in the Cambridge PM Process (Neely et al, 1996), which was developed in, and for, large companies that had these capabilities. However, SMEs would appear to be far better suited
to an incremental mode of change, as this requires less investment of time and resources and less organisational upheaval.

To give an integrated PM development approach an incremental structure would involve breaking it down into small and manageable stages. This could be achieved by only developing a performance measure for one strategic objective at a time, rather than for a complete set. A benefit of this would be that the measure could immediately be cascaded down to operational level, to help drive performance towards achieving the objective. This would help to reduce the time gap between strategic measure implementation and tangible benefits being gained. The trade-off in this approach is that an incremental method of introducing integrated PM would require more effort over a far greater period of time than the radical change model. Despite this, the potential benefits of an incremental approach make it better suited to integrated PM development in SMEs than the radical alternative, because:

- each increment would be fast and efficient by focusing on just one objective at a time;
- short term and long term benefits would be gained through the immediate linking of operational improvement efforts to achieving the identified strategic objective;
- performance measures would be revisited with each increment, ensuring that they were constantly updated and modified to reflect changes in strategic priorities.

A potential problem which arises from using an incremental structure is that there is always the possibility that SMEs will stop after the first increment, thereby losing the strategic balance that is sought in integrated PM. This is an important trade-off because, whilst risking imbalance in SMEs that do not continue past the first increment, this structure still appears to be the method of introducing integrated PM into SMEs most likely to succeed. Therefore, although it is a valid concern, it is important to note that the
structure is specifically designed to be continuous. If used appropriately, a comprehensive and balanced set of measures will be developed over time.

7.3.2 Populating the New Approach

Having proposed an incremental structure as an alternative design for the SME integrated PM development approach, it was necessary to populate it through the identification of appropriate stages. The requirements for the SME PM development approach state that it requires an explicit stage for identifying strategic objectives, developing appropriate performance measures and maintaining the measures. The benefit of identifying strategic objectives with each new iteration is that it will help to identify strategic changes, thereby ensuring that all the measures remain relevant and useful. However, there is also a need for prioritising the objectives because the nature of the approach is such that only one objective will be addressed at a time. In addition, although not explicitly stated in the requirements, the measures have to be implemented before they can be classified as being useful. Therefore, a key stage in the approach should be the implementation of the measures developed.

![Figure 7c: The Preliminary SME PM Cycle](image-url)
Taking these requirements into account, a preliminary model of the SME PM Cycle was produced. Figure 7c illustrates the four basic iterative stages of the Cycle. An additional requirement was to ensure that companies understand why integrated PM development is necessary, through identifying how it can be of benefit to individual companies. This is a prerequisite, so it should not be part of the Cycle but a one off stage carried out before the Cycle is used.

Other requirements for the development approach were focused around who should be involved and how it should be managed. These aspects were incorporated into the approach as the detail was added to each stage. However, two of the requirements were difficult to incorporate. Top management support is not something that could be built into the Cycle, but explicit advice was given to highlight its importance. Similarly, guidance is given for timescales to encourage companies to set target dates for the key tasks within the process.

Specific requirements regarding what should be measured and what the measures should look like demanded the careful development of appropriate sets of tools. The first stage of the Cycle, which incorporates strategic objective identification, needed tools to ensure that a balanced set of measures is developed across the four primary dimensions of performance. In addition, the Performance Measure Record Sheet (Neely et al, 1997) was used to ensure that all performance measures developed conformed to the performance measure characteristics identified in the conceptual model. A brief explanation of all the tools used in the workbook is given in Table 7.3.

The SME PM Cycle was written up in workbook format, as a draft, to enable all the information and advice to be clear and easily accessible. In addition, it ensured that each of the tools which had been chosen or developed for each stage could be illustrated and...
described in detail, for ease of use (the final version of this workbook is included in Appendix 2).

<table>
<thead>
<tr>
<th>Cycle Stage</th>
<th>Tool Used</th>
<th>Purpose</th>
<th>Selection Rationale / Development</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage 1: Name</td>
<td>Customer/ Stakeholder analysis chart</td>
<td>Identify current strategic needs</td>
<td>Used successfully in the Cambridge PM Process for the same purpose</td>
</tr>
<tr>
<td>Stage 1: Name</td>
<td>The Balanced Scorecard</td>
<td>To ensure balance across strategic objectives identified</td>
<td>Popular and simple framework for ensuring balance</td>
</tr>
<tr>
<td>Stage 1: Name</td>
<td>The Performance/ Importance matrix</td>
<td>To prioritise critical strategic objectives for immediate action</td>
<td>Tried and tested approach for establishing business priorities</td>
</tr>
<tr>
<td>Stage 2: Act</td>
<td>Staff Survey</td>
<td>To collect suggestions from staff to help achieve named objective</td>
<td>Developed to fulfil specific need by brainstorming with colleagues</td>
</tr>
<tr>
<td>Stage 2: Act</td>
<td>Activity Prioritisation chart</td>
<td>To help evaluate data from the staff surveys</td>
<td>Modified slightly from Cambridge PM Process evaluation method</td>
</tr>
<tr>
<td>Stage 2: Act</td>
<td>Benefits / Drawbacks chart</td>
<td>To evaluate practicality of implementing proposed changes</td>
<td>Developed to fulfil specific need by brainstorming with colleagues</td>
</tr>
<tr>
<td>Stage 2: Act</td>
<td>Performance Measure Record Sheet</td>
<td>To ensure development of well-designed measures</td>
<td>Tried and tested approach for developing useful measures</td>
</tr>
<tr>
<td>Stage 3: Use</td>
<td>PM Information point</td>
<td>To communicate measurement data across the company</td>
<td>Developed to fulfil specific need by brainstorming with colleagues</td>
</tr>
<tr>
<td>Stage 4: Learn</td>
<td>Review Sheet</td>
<td>To record summary PM data and actions arising from PM reviews</td>
<td>Developed to fulfil specific need by brainstorming with colleagues</td>
</tr>
</tbody>
</table>

Table 7.3: Rationale for Selection / Development of Tools Used at each Stage

The diagram in Figure 7d illustrates the draft SME PM Cycle. The planning stage involves identifying and naming the current top priority business objective, in order to focus improvement efforts and eliminate communication problems (Name). This is followed by the development of a small number of performance measures to drive progress towards the named objective (Act). Using the performance measures helps to evaluate the success of any improvement efforts and to monitor progress towards the named objective (Use). Reviewing the performance data regularly gives an early warning of potential problems
and ensures that the measures remain relevant. This may result in updating existing measures and removing inappropriate, or obsolete, measures (Learn).

One of the primary concerns when designing the Cycle was that it should conform to the design precepts of firmness, commodity and delight postulated by Laseau (1989). Firmness of design was achieved by identifying design alternatives from theory and developing the new approach directly from the requirements established in the investigative phase of the research. Delight, in terms of aesthetic appeal, was achieved through the use of a simple, four stage cycle to illustrate the Cycle. This was expanded into a workbook, which provided clearly explained sections which mapped to the different stages of the cycle. Commodity, however, can only be achieved through applying the SME PM Cycle in a practical environment. This will ensure that it satisfies functional needs and verify the validity of its construction.
7.4 Conclusion

This Chapter has described the design of a new approach for introducing integrated PM into SMEs. The requirements for the SME PM Cycle were discussed and an incremental structure was adopted and populated with appropriate stages for effective integrated PM development. An explanation of the way that the Cycle fulfilled the theoretical requirements was also given. The following Chapter will describe how the Cycle was tested in a SME, to identify areas for enhancement and to establish its usefulness and usability in a practical SME environment.
Chapter 8: SME PM Cycle Practical Development

8.0 Introduction

The previous Chapter described the development of a new approach for introducing integrated PM into SMEs. The underlying rationale of this approach was for it to be practical and usable in a SME environment. Therefore, the paper-based and, so far, entirely theoretical SME PM Cycle needs to be applied in the environment for which it was designed in order to check that it is relevant and usable in this context. This will complete the design process by enabling practical refinements to be made to the Cycle and a final version to be developed.

8.1 Developmental Case Study

The draft of the SME PM Cycle contained a number of tools and techniques at each stage. These had been carefully selected, or newly developed, to facilitate the completion of each stage (as illustrated in Table 7.3). This completed the pure design phase, which utilised an adaptive design strategy. The next phase involves the adoption of an incremental design strategy to further develop and improve the Cycle. This will be achieved through a test application carried out in a practical SME environment. The purpose of the test is to ensure that the tools are appropriate and that the outputs of one tool flow logically into the next. For this reason, the test case has not been designed to be a validation of the Cycle, although this should be implied in the result, but rather a further development of it in a practical SME environment.
8.1.1 Selecting the Case Company

This case study required a different type of purposive sample from that used in the Investigation phase of the research. This is because it aims to develop and refine the SME PM Cycle for use in any of the target population, namely South West based manufacturing SMEs which conform to the characteristics defined in Chapter 4. Therefore, rather than identifying a purposive sample of critical cases, this case company was deliberately selected because it was perceived to be a ‘typical case’ (Patton, 1990). As Maxwell (1996) notes:

*A small sample that has been systematically selected for typicality and relative homogeneity provides far more confidence that the conclusions adequately represent the average members of the population than does a sample of the same size that incorporates substantial random or accidental variation.*

An additional criterion of selection was also deemed necessary for the case. This was because the selected company would be required to use the new approach to implement integrated PM. Therefore, it was essential that the senior managers involved were willing to make this commitment.

Using these selection criteria, Company J was identified as an appropriate case company for the development of the SME PM Cycle. Company J is a SME based in the South West of the UK. It designs and manufactures electromechanical winches and gearboxes, primarily for use in the automotive recovery industry. The Company has been established for 25 years and currently employs 96 people.

In 1999 Company J went through a major period of change, initiated by its sister company in the United States. Pressure was exerted on the Company to reduce costs and to improve overall profitability. To help achieve this they employed a new Operations Director. One
of the major problems he found was that there was very little control over the manufacturing operation and staff were powerless to make even obvious improvements. Therefore, he felt that the SME PM Cycle could be used to help prioritise and focus improvement efforts across the Company.

8.1.2 Data Collection

An action research approach was adopted for the data collection (Lewin, 1946). This was appropriate because it allowed the researcher the freedom to get actively involved in applying the Cycle, in order to gain an in-depth understanding of the way it worked within the company. As Eden and Huxham (1996) note:

...interventions in organisations provide ideal opportunities for experimentation in the sense that they provide opportunities to try out complex theoretical frameworks that cannot be pulled apart for controlled evaluation of individual theories. This is important in management research where it is often the systemic nature of a uniquely interlocking set of theories from many management disciplines that makes the body of theory powerful and useful. Action research is, therefore, concerned with such systemic relationships, rather than with single theories – the aim is to understand conceptual and theoretical frameworks where each theory must be understood in the context of other related theories.

Acting as the facilitator also enabled the researcher to ensure that the Cycle was applied appropriately in the case company. An added benefit was that it would provide a thorough understanding of any differences and similarities encountered in other companies, in the validation stage of the research.

The Cycle was applied through three workshops and two meetings involving managers, supervisors and shop floor employees. This enabled data to be collected about both the approach itself and the way it was received by the Company. The meetings were supplemented where appropriate with informal, unstructured, interviews with the various staff who were involved with the intervention. The function of these interviews was
invariably to gain a better understanding of, or a particular perspective on, how the activities that were being carried out as a part of the SME PM Cycle were affecting the company. All the workshop participants were also provided with feedback sheets, which asked them to evaluate each stage of the Cycle in terms of usability and usefulness. In addition to triangulating the data through multiple methods and multiple data sources, a further measure was also taken, to help reduce personal bias. This was achieved through the presence of an additional researcher at each meeting or workshop connected with the intervention.

8.2 Developing the SME PM Cycle in Company J

The Cycle was developed to be usable and useful in a SME context. As Company J was specifically selected for its conformance to the characteristics of SMEs identified in Chapter 4, the results from the case study provide a useful indication of how the new approach might work in a SME context.

The results of the case study may be divided into two distinct areas. Firstly, the extent to which the Cycle was a useful and practical approach for introducing integrated PM into SMEs. Second, the overall effect of the Cycle on Company J. The former may be established by assessing whether the Cycle adequately conformed to the requirements for a SME focused integrated PM development approach identified in Chapter 7. The latter may be established by evaluating the benefits and drawbacks the Cycle had on Company J.

8.2.1 Conformance to Requirements

In order to assess the usefulness and practicality of the SME PM Cycle, the case study data will be evaluated to establish whether or not each of the requirements identified in Table
7.1 were fulfilled in Company J. (Appendix 2 provides a detailed account and supplementary evidence of the case at Company J).

8.2.1.1 Requirement: Rationale for using the Cycle / Top management Support

These two requirements have been grouped together because they are both considered to be prerequisites for using the SME PM Cycle. In setting up the case study, two meetings were held with the management of Company J. The purpose of these meetings was to ensure that the company had a need for improved PM capabilities and to explain precisely what was involved in the SME PM Cycle. It was through these meetings, that top management support was gained and the need for the Cycle was recognised within the company. As the Manufacturing Director pointed out:

*I’ve started thinking about so many improvements here – but what we really need first is some measures to understand what is happening here and help us focus and prioritise what we are doing.*

8.2.1.2 Requirement: Strategic Objective Identification / Develops Measures in the Four Key Dimensions of Performance

Company J worked through a number of tools which were provided for identifying and prioritising their strategic objectives in Stage 1 of the Cycle. These tools were modified during the workshops to make them more relevant to the business and reduce the scope for confusion, thereby making them more user-friendly. The set of strategic objectives identified were as follows:

- Reduce manufacturing and raw material costs;
- Introduce a global warranty service;
- Introduce modular design and standardise products;
- Increase manufacturing capacity;
- Deliver products on time;
- Improve flexibility;
- Improve reject rates and accuracy of reject data;
- Simplify / improve engineering design;
- Improve manufacturing processes and systems.

Two of these objectives were identified as being critically important to the Company at this time: increasing manufacturing capacity and on-time delivery. The Company decided to focus its efforts on the latter, as it was recognised that, until the production process had been made efficient enough to cope with current demands, there would be little point in increasing capacity.

The Manufacturing Director commented that the results of the strategic analysis were broadly in line with where he had felt the Company’s priorities lay and was happy with the result. This was useful, as it gave the workshop participants more confidence in the Cycle when they realised that the tools they were using were able to give an accurate assessment of their strategic objectives. This made them more open to the selection of on-time delivery as their focus for improvements in the first iteration of the Cycle.

Although the prioritisation meant that only one strategic measure would be developed, it is important to recognise that the Cycle is designed to be iterative. Therefore, providing the Cycle is used continuously a set of strategic measures, balanced across the four key dimensions of performance, would be developed over time.

### 8.2.1.3 Requirement: Involves Key Users / Has Full Employee Support

At the end of Stage 1, supervisors and team leaders from across the company were selected to make up a project team. Five people were chosen because they were seen to be
pro-active and enthusiastic, whilst also enjoying the respect of the shop floor workers. The
team was to be responsible for identifying appropriate improvements and performance
measures to support the named objective. They were offered two possible methods of
gaining input from the other members of staff: a survey or brainstorming sessions. Due to
a lack of time and resources to devote to brainstorming sessions, it was decided that a
survey of all staff was the best option. The survey was sent out to every employee with
their payslips, and they were given just 3 days to respond. The response rate was 22%,
which was considered acceptable given the limited time-scale.

Feedback from the survey was varied – the content of the responses showed the
underlying enthusiasm for the job, but the tone was typically angry or despairing that
anything would actually improve, for example:

_I’m sad that this has to be asked by the management of [Company J]. We
are always hearing that we are on stop with this or that company. Until we
pay the bills life at [Company J] will remain hard. 9 months ago, we the
workforce, were told by management “your[sic] the guys that know, we’ll
talk to you” – we never see management to be asked “any problems, how’s
it going” – we’ve had consultants, experts, others. And now you ask us. This
leads to bad moral [sic]._

_I understand that finances aren’t always available...we are here to make the
winches to sell to pay our wages for all of us. If we have not got the parts
we can’t make them. You can’t sell, we don’t make any money. You and I
and the rest of us don’t get paid. That’s it._

The issues identified from the surveys were prioritised to highlight the key issues and
activities which were needed to achieve the named objective. A summary of the key issues
and activities identified is given below:

- Kanban system needs to be completely revised and used properly;
- Stock information to be reviewed and updated;
- Better communication required – particularly between purchasing and manufacturing;
- Improved teamwork and training systems needed across the company;
• Reliable equipment needed;
• Better credit and debt control required;
• More production planning and control;
• Quality equipment to be made more accessible;
• IT system needs to be used fully and effectively;
• Implement feedback loop on corrective actions throughout company;
• Manage labour resources effectively.

The project team found the survey responses both useful and enlightening and they were keen to use surveys again to help them develop a more pro-active workforce and help improve employee morale.

8.2.1.4 Requirement: PM Development Guidelines / Develop Measures which Conform to Identified Characteristics

When it came to the development of performance measures, a gap in the Cycle was identified. This was highlighted when, after identifying the key improvements which would help drive performance towards achieving the on-time delivery target, a message from the Company was received, stating:

*Could we please postpone the next visit for a couple of weeks? We have a couple of internal issues we are trying to resolve, which will mean that the team members involved will not be available until then.*

When the next meeting was finally held, it became apparent that these ‘internal issues’ had involved the implementation of a number of the immediately achievable improvements identified in the previous workshop. These improvements included setting up a group to co-ordinate IT usage across the Company and dedicating two members of staff to maintaining the kanban system and improving stock control. Although it was encouraging to see that the project team was keen to move forward on the improvements, the way they
chose to do this precluded any measures being developed to ensure that the improvements were having the desired effect.

Despite this setback, appropriate performance measures were eventually developed, using the Neely et al (1997) PM Record Sheet to ensure that they conformed to all the characteristics identified in the conceptual model. Due to a lack of understanding of where the specific production problems lay which affected delivery performance, the team decided to start measuring delays in the production process. This was achieved by developing a checklist to record the reasons for machine downtime in both production and assembly (Figure 8a). This was implemented immediately and is used by supervisors in both the machine shop and the assembly room to record reasons for machine downtime in each area.

<table>
<thead>
<tr>
<th>Machine Downtime Record (G50) Monday</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>M/C No</strong></td>
</tr>
<tr>
<td>-----------</td>
</tr>
<tr>
<td>S04</td>
</tr>
<tr>
<td>S05</td>
</tr>
</tbody>
</table>

Figure 8a: Downtime Checklist
Along with a measure to monitor delivery performance, this was seen as being a key way of identifying and monitoring improvements in Company J, facilitating a move towards continuous improvement.

![Delivery Performance Graph](image)

**Figure 8b: Measuring Delivery Performance**

In addition, Company J’s sister company in America, which had more human resources available, developed the measures further, producing graphs to monitor both delivery performance and the reasons for missed deliveries (Figures 8b and 8c). These measures have now also been implemented in the UK Company.

![Missed Deliveries Graph](image)

**Figure 8c: Monitoring the Reasons for Missed Deliveries**
The measures have helped identify the main reasons for missing due date delivery. Each month, the reasons are collated and the primary problem becomes the focus for improvement actions. This has led to a number of improvements being made in the machine shop, where a major problem was that the assembly operation were not receiving parts on time. It has also highlighted a number of supplier – Company communication issues, which are now being investigated.

8.2.1.5 Requirement: Periodic Maintenance Structure / Clear and Explicit Objectives / Set Timescales
The iterative nature of the approach meant that maintenance was built in, since each iteration involves a re-evaluation of business priorities and the development of measures and improvements to support them. Similarly, it has ‘designed in’ objectives which Company J found straightforward and simple to understand. However, the Cycle was originally scheduled to be completed in one month, with meetings and workshops being held once a week. The lack of an explicit stage for implementing improvements meant that the company cancelled these workshops until they had made a number of improvements and the Cycle therefore took nearly three months to complete. Having modified it to accommodate this gap, the expected timescale has now been adjusted so that, depending on the scale of the improvements to be implemented, the Cycle should now take between three and six months per iteration.

8.2.1.6 Requirement: Very Resource Efficient / Dynamic and Flexible Development Approach
Throughout the intervention, Company J had a number of demands on management time and resources. Several visits were made by representatives from its sister company in America and a considerable amount of time was taken up by local staff in meetings with
their US colleagues. This undoubtedly slowed progress, particularly as it was at this time that the Company was trying to implement the improvements. However, despite these difficulties, the Cycle was completed in a timely fashion, with improvements having been made and useful measures having been implemented. Comments from the project team in the feedback session at the end of the first iteration of the Cycle included:

*Its a useful process for any company – I would recommend it.*

*We might implement a training program to teach other people how to use the cycle, to take the pressure off the managers.*

One key factor which ensured that the first iteration of the Cycle was completed was the enthusiasm of the project team. Without this, it is unlikely that the commitment to working through the Cycle could have been sustained when other, equally pressing, demands were being made on resources.

### 8.2.1.7 Requirement: Short Term as well as Long Term Benefits

The fact that the first iteration of the SME PM Cycle highlighted a number of immediately actionable improvements helped ensure that enthusiasm levels among staff remained high. This was because tangible benefits were identified early on, which were directly linked to the achievement of the long-term strategic objective of improving delivery performance. This feature of the Cycle was the key to ensuring that the Company completed the first iteration and, more importantly, went on to use the Cycle again.

### 8.2.1.8 Requirement: Able to Surface Informal Strategies

The Cycle was specifically designed to ensure that it could be used to help surface informal strategies within SMEs. The first stage of the Cycle (Name) explores current strategic needs in detail and then names the most important objective as the focus for that iteration. Company J freely admitted that they had so many seemingly important problems that needed attention that they did not know where to start. Therefore, they found the
identification and prioritisation of their strategic business objectives extremely useful and identified on-time delivery as being their priority strategic objective. If the strategic evaluation in Stage 1 is completed each time the Cycle is used, it provides a mechanism for constantly surfacing and re-evaluating strategic priorities. In Company J, a variety of objectives have been undertaken using the Cycle since the first iteration, illustrating the turbulent environment in which it operates and highlighting the importance of this constant evaluation and re-evaluation of strategic priorities.

8.2.2 Company Benefits

The feedback from the workshops, along with documentation and observational data collected, showed that the Cycle had a positive effect on Company J both in terms of physical outputs and helping to encourage a culture change. The tools used helped to gain consensus among staff about the improvements required to achieve the chosen objective. The survey identified a number of poorly performing operational factors which inhibited on-time delivery. The company was keen to use surveys again to help in the development of a more pro-active workforce and to improve employee morale. Management was also keen that they should be seen to act on the suggestions, as this would send out a positive message to the workforce, encouraging them to suggest further improvements in the future.

Two measures were identified: ‘on-time delivery’ and ‘reasons for delivery failures’. These measures have proved to be essential for identifying the primary factors which contribute to poor delivery performance. These factors are being systematically eliminated through a programme of continuous operational improvement, monitoring and learning. As these improvements take place, delivery performance is improving.
The main drawback of the Cycle in Company J was that, although it was straightforward to use it to identify improvements, it was much more difficult to persuade the Company to measure the effect of those improvements on delivery performance. However, with some encouragement from the researcher, measures were developed and implemented. It was only after the managers had seen the potential use of the data that they realised the value of measurement as a key method of identifying and monitoring improvements. This has been instrumental in facilitating a move towards a culture of continuous improvement within the company.

8.2.3 Further Iterations of the SME PM Cycle in Company J

Since the delivery performance measures were implemented in Company J, the management team has revisited the Cycle several times. This has enabled the Company to start to build up a balanced portfolio of strategically aligned measures. Two of the subsequent iterations were triggered by the first. Since the Cycle appeared to have captured the imagination of the staff, leading to improved morale and a more pro-active work environment, the managers felt it was important to retain the initiative. Therefore, the second iteration focused upon the staff training and performance appraisal system. In the past, appraisals in particular had caused much bad feeling throughout the Company for being inaccurate and too subjective – and appraisal time was imminent. The results of this iteration of the cycle were immediate, with the number of complaints about training and appraisals dropping from over 40 in 1999 to just 3 in the year 2000.

The third iteration of the Cycle focused attention on customer satisfaction. As part of the original iteration, the Company had identified that when customers asked for winches to be supplied at very short notice, it was generally unable to supply them on-time. Company J had therefore started keeping small levels of safety stocks (5-6 of each standard winch)
which they could offer customers if a customised order would be impossible to make in the time requested.

The customer service iteration SME PM Cycle revealed that many customers, a significant proportion of whom are sole traders, were unhappy with the poor after-sales service provided by Company J. Firms in the automotive recovery industry cannot afford to lose a week’s business waiting for a broken winch to be repaired. The Company have therefore established a 24/48 hr turnaround (depending on whether the winch is under warranty or not) for replacing failed winches with a loaned one for the duration of the repair. This has helped improve customer satisfaction, as none of the Company’s competitors currently offers this service.

Company J is currently completing a fourth iteration of the Cycle, this time focusing on cost reduction across the Company. This has triggered a massive improvement initiative, as the specific target is to manage a 30% cost reduction year-on-year. To keep the scale of the improvements manageable, the Company has broken down the task into product groups. These are prioritised on a competitive basis, using benchmarking against competitors to establish which product group is in most need of improvement.

8.3 Discussion

When the SME PM Cycle was applied in Company J, it was regularly referred to by the project team as an improvement process, noting the similarity between it and the PDCA (plan-do-check-act) cycle (Deming, 1986). However, despite its similarity in structure and appearance, the PDCA cycle and the SME PM Cycle are fundamentally different. This is because whereas the PDCA cycle provides a basic structure for continuous improvement, there is no explicit requirement for strategy formulation, nor is there a method for
performance measure development, incorporated within it. The SME PM Cycle, on the other hand, is specifically concerned with presenting a method for the regular surfacing and updating of current strategy and the development of performance measures which can help stimulate strategically aligned continuous improvements. In addition, the PDCA cycle is generic, but the SME PM Cycle has been specifically designed to accommodate the specific needs and requirements of SMEs.

Despite these fundamental differences, the philosophy behind both cycles is similar. The SME PM Cycle aims to involve all employees in a process of continuous, strategically aligned, improvement through the use of effective performance measures. Similarly, the continuous improvement / TQM (Total Quality Management) philosophy behind the PDCA cycle has been described as

...the way of life of an organisation committed to customer satisfaction through continuous improvement (Kanji, 1990)

This is because, as Oakland (1993) notes, “quality is meeting the customer requirements”.

This similarity was recognised when the SME PM Cycle was updated to incorporate the changes identified through the case study (see Table 8.1).

<table>
<thead>
<tr>
<th>Stage</th>
<th>Tool Used</th>
<th>Modification /Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Customer / Stakeholder Analysis</td>
<td>Modified to ‘business needs analysis’ due to confusion caused by business perspectives already including customers &amp; stakeholders</td>
</tr>
<tr>
<td>Name</td>
<td>The Balanced Scorecard</td>
<td>Discarded because it duplicated the information from the business needs analysis chart</td>
</tr>
<tr>
<td>Name</td>
<td>The Performance/ Importance matrix</td>
<td>Modified to become internal / external importance, to improve continuity from the bus. needs analysis chart</td>
</tr>
<tr>
<td>Act</td>
<td>Staff Survey</td>
<td>Modified to be more specific and therefore improve responses</td>
</tr>
<tr>
<td>Act</td>
<td>Activity Prioritisation chart</td>
<td>Modified to become a wall chart, as post-it notes were the easiest way to deal with all the suggestions from staff</td>
</tr>
<tr>
<td>Act</td>
<td>Benefits / Drawbacks chart</td>
<td>Discarded as it duplicated the previous activity</td>
</tr>
<tr>
<td>Act</td>
<td>Improvement Action Sheet</td>
<td>Incorporated to make the implementation of focused improvements an explicit part of the cycle</td>
</tr>
<tr>
<td>Act</td>
<td>PM Record Sheet</td>
<td>No changes, used successfully</td>
</tr>
<tr>
<td>Use</td>
<td>PM Info. point</td>
<td>No changes required</td>
</tr>
<tr>
<td>Learn</td>
<td>Review Sheet</td>
<td>No changes required</td>
</tr>
</tbody>
</table>

Table 8.1: Modifications to the Tools in the Workbook Resulting from Case J
The changes included the modification of several of the tools in Stage 1, to make them more user friendly and the addition, in Stage 3, of an explicit section for the implementation of improvements. The purpose of this change was to encourage the development of performance measures before the implementation of improvements, rather than retrospectively. A full explanation of each change can be found in the Company J Case Study, which can be found in Appendix 2. The changes resulted in the workbook being rewritten and published under the name of *Continuous Strategic Improvement through Effective Performance Measurement: A Guide for SMEs* (see Appendix 2). This name was selected because it highlights the Cycle’s ability to link ongoing strategy formulation to continuous improvement, through effective performance measures.

**8.4 Conclusion**

This Chapter has described how the new, theoretically derived, approach for introducing integrated PM into SMEs was applied and developed in a SME to provide practical insights about the way it worked in this environment. The resulting Cycle is iterative and has the potential to link PM to continuous improvement activities within companies. The following Chapter will present two further case studies, which will validate the new approach. These cases will focus on the strengths and weaknesses of the Cycle in this environment, with the aim of enhancing current knowledge about PM in SMEs. The results will be used to validate an enhanced version of the conceptual model of integrated PM development, specifically aimed at SMEs.
Chapter 9: Validation

9.0 Introduction

The design requirements identified in Chapter 7 form the basis for an enhanced version of the conceptual model of integrated PM development, specifically aimed at SMEs. The aim of this Chapter is to validate this SME focused version of the conceptual model. As the SME PM Cycle was designed to conform to this conceptual model, validation is achieved through the application of the Cycle in two further SMEs. The results of these case studies, along with those of the developmental case study carried out in Company J, are examined to identify the similarities and differences between the companies and how these may have affected the outcome of the applications. This data is then used to formulate some conclusions about the strengths and weaknesses of the SME PM Cycle, along with the validity of the SME focused conceptual model of integrated PM development.

9.1 The Purpose of Validation

In Chapter 2, the question of generalisability and relevance was explored and Thomas and Tymon’s (1982) framework was selected to ensure that the outputs of the research are useful to practitioners. Validation is critical for fulfilling two aspects of this framework; Goal Relevance and Operational Validity. These aspects are specifically concerned with ensuring that the outputs of the research address the concerns of, and are usable by, practitioners. The purpose of undertaking the validation cases is to establish that the SME PM Cycle is useful and usable in the target SMEs. This will enable the validation of the conceptual model of integrated PM development for SMEs.
9.1.1 Validation Criteria

To ascertain the usefulness and usability of the SME PM Cycle, the validation cases are assessed against a number of criteria. These criteria have been derived from the design requirements established in Chapter 7 (see Table 9.1 - the ticks show which design requirements are covered by each validation criterion). From these requirements, three key criteria for establishing goal relevance have been identified. The criteria cover all the design requirements which are focused around the content and outputs of the Cycle, as these determine the overall usefulness of the Cycle. Therefore, the goal relevance criteria state that the SME PM Cycle should facilitate:

1. The development of a balanced set of strategically aligned performance measures;
2. The production of well-designed performance measures;
3. Continuous, strategically aligned, improvement.

<table>
<thead>
<tr>
<th>Design Requirements</th>
<th>Goal Relevance Criteria</th>
<th>Operational Validity Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provide a need evaluation</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Enable strategic objective identification</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Facilitate performance measure development</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Include a periodic maintenance structure</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Involve key users</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Have top management support</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Have full employee support</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Have clear and explicit objectives</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Have set timescales</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Be very resource efficient</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Provide short term as well as long term benefits</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Be able to surface informal strategies</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Be dynamic and flexible</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Develop measures in:                          |                         |                               |
| Customer satisfaction                         | ✓                       |                               |
| Operational effectiveness                     | ✓                       |                               |
| Stakeholder satisfaction                      | ✓                       |                               |
| Supplier effectiveness                        | ✓                       |                               |

| Develop measures with the following characteristics: | | |
| Derived from strategy                          | ✓                       |                               |
| Clearly defined with an explicit purpose        | ✓                       |                               |
| Relevant and easy to maintain                  | ✓                       |                               |
| Simple to understand and use                   | ✓                       |                               |
| Able to provide fast, accurate feedback        | ✓                       |                               |
| Able to link operations to strategic goals     | ✓                       |                               |
| Able to stimulate continuous improvement       | ✓                       |                               |

Table 9.1: Determining Validation Criteria from the Design Requirements
A further two criteria were identified to validate the structure of the Cycle, as this determines its usability, or operational validity. These criteria state that the Cycle must be:

1. Easy to use;
2. Able to work within SME constraints.

The SME PM Cycle will be deemed to have operational validity and goal relevance if it meets these criteria.

9.2 Research Method

According to Yin (1989) validation may be conducted in two ways, by literal replication and theoretical replication. Literal replication claims validation by predicting similar results from similar cases, whereas theoretical replication validates by predicting different results, for predictable reasons, in cases which differ from the original. For this study, literal replication was appropriate for validation, as the SME PM Cycle had been specifically designed to work in SMEs which exhibit certain characteristics. Theoretical replication was considered to be beyond the scope of this study. This is because, whilst the Cycle was designed specifically to work within set constraints (i.e. the specified characteristics of SMEs), this would not necessarily preclude it from working in other environments.

9.2.1 The Case Companies

The selection of the case companies for validation purposes used the same sampling strategy as the developmental case study (see chapter 8 for details). Therefore, companies were identified which appeared to exhibit the characteristics of SMEs, as identified in Chapter 4, and were willing to undertake the commitment to use the process to develop integrated PM in their company. These criteria resulted in the selection of two companies,
Company K and Company L, in which to undertake the validation cases. Both companies are manufacturers, based in the South West of the UK.

Company K manufactures boat propellers for the luxury powerboat industry, supplying to the top powerboat manufacturers in the UK. It has been established for 26 years and currently employs 170 people at its Devon location, with a further 40 at sites in Fareham (UK), Holland, Dubai and the US. The Company was keen to learn about PM, in particular, how it could help to improve efficiency and productivity in the main factory. In addition, the Production Director, who was to be the process ‘champion’, perceived the study to be good value, as he felt that the Company would benefit from free advice and consultancy throughout the project.

Company L manufactures a range of lubrication systems for plant vehicles and trucks. These are generally retrofitted to the vehicles, via a loosely structured distribution network. The Company now employs around 100 people, having gone through a management buy-out from its German parent firm in August 2000. The Managing Director of the Company, along with the other directors, had produced a business plan and were keen to use the SME PM Cycle to help operationalise it throughout the Company and to monitor its success.

9.2.2 Data Collection

The first test of the new Cycle, in the developmental case study, used action research as the vehicle for data collection. As Gummesson (1991) points out;

*In action science, the researcher / consultant is expected to produce “usable research”, defined as research that could be applied in real life situations and be helpful to the practitioner...Quality is assessed in relation to the way research results are perceived to facilitate the solution of an actual problem.*
Effective validation of the SME PM Cycle should also, therefore, be carried out in a ‘real life situation,’ because it must be able to work within the identified constraints affecting SMEs. This requires an in-depth examination of the practical application of the Cycle in SMEs. Action research provides the most appropriate method of data collection, as it enables the simultaneous evaluation of the Cycle itself and the context in which it is being applied. This helps to provide a rich picture of the strengths and weaknesses of each application.

The SME PM Cycle was applied in both companies through a combination of meetings and workshops. These were supplemented, where appropriate, by informal discussions with people involved in the intervention in order to gain a deeper understanding of various issues. The structure for the intervention was dictated primarily by the participants from each company. It was felt that, as long as each stage was accomplished, it would be more beneficial in terms of ownership and buy-in to the Cycle to allow the companies to dictate the pace and style of the application.

Data collection consisted primarily of first-hand experience, gained from being actively involved in each application of the Cycle, as well as observation, informal interviews and various forms of documentation from each company. These were used to build a rich picture of each application, from which to analyse the usefulness and usability of the Cycle. The different sources and methods of data collection enabled effective triangulation, which helped ensure the validity of the findings.

9.2.3 Data Analysis

Analysis of the case study data was carried out on two levels; within-case analysis and cross-case analysis (Eisenhardt, 1989). Within-case analysis occurred in parallel with data
collection, as the write-up of each case was done as soon as practically possible after each intervention in order to ensure the accuracy of the data (see Appendix 3 for copies of each case). Each stage of the write-up entailed the synthesis and reduction of all the accumulated data from each meeting into a structured and comprehensible format. Once each case was complete, it was coded and categorised into predetermined themes, to establish how closely the validation criteria were adhered to in each case.

When both studies were complete, cross-case analysis was carried out on the two validation cases and the developmental case study previously documented (see Chapter 8). The purpose of this phase of the analysis was investigate the similarities and differences between each case in order to gain a deeper understanding of the contextual issues surrounding the effective application of the SME PM Cycle.

9.3 Case Studies

This section will present the results of the within-case analysis of the studies carried out at Company K and Company L. This will provide the case-based assessment of the SME PM Cycle, against the specified validation criteria (Appendix 3 provides detailed accounts and supplementary evidence of the cases at companies K and L).

9.3.1 Case Company K

To determine whether the case study at Company K fulfilled the validation criteria, each will be assessed in turn. Initially the analysis will assess the usefulness of the SME PM Cycle at Company K, after which the overall usability of the Cycle will be evaluated.
9.3.1.1 Facilitate Development of a Balanced Set of Strategically Aligned Measures

The key to developing a balanced set of strategically aligned measures is the surfacing of appropriate strategic objectives, balanced across the dimensions of performance. In Company K, this was achieved during the first workshop. Two members of the Company were present; the Production Director and the Production Manager. Initially, a discussion took place to ensure that the Company participants knew what the Cycle was and understood how it could be used in Company K. Despite this, during the strategic objective identification phase, both participants were very focused towards improving production. Although this was unsurprising, due to their roles, it was important that a balanced set of objectives were identified. However, the tools provided in Stage 1 of the Cycle facilitated the assessment of their business needs across the primary dimensions of performance. This led to a reasonably well-balanced set of strategic objectives being identified, as follows:

- Improve resource utilisation;
- Improve delivery reliability;
- Rationalise products and customers;
- Implement a new performance appraisal system;
- Reduce overtime.

Having identified a balanced set of strategic objectives, it was necessary to prioritise one of them for immediate action. Using the tools provided, delivery performance was identified as the critical objective, although both Company participants insisted that resource utilisation was equally important. This meant that both objectives were initially selected for immediate action. However, when the Company started losing orders from one of their biggest customers through poor delivery performance, this quickly took over as the sole priority objective.
The tools provided in Stage 1 of the SME PM Cycle helped Company K to surface their immediate strategic priorities. This is critical for the development of balanced, strategically aligned, performance measures. However, only one strategic objective is prioritised in each iteration of the Cycle. Therefore, there is a reliance on the continued use of the Cycle to ensure the development of a balanced portfolio of measures. In Company K, although the participants were keen to use particular tools again, there was a unanimous reply that they would not work through the Cycle as a whole again. This means that, although they have one set of measures in place to monitor one strategic objective, Company K is unlikely to develop a complete, balanced set of measures.

9.3.1.2 Facilitate the Production of Well-Designed Performance Measures

One of the key features of well-designed performance measures is that they should help link operations to strategic goals. Stage 2 of the SME PM Cycle facilitates this by identifying and measuring operational improvements which drive performance towards operational goals. The initial focus for improvements was aimed at the propeller shop, as this is where the bulk of the work in the Company K is carried out. A survey was sent out in this area, asking for improvement suggestions. However, out of 40 staff, only 9 responses were received. As a recent brainstorming workshop had proved successful with workers in the foundry area, this was seen as a good way of supplementing the surveys in the propeller shop.

Before the brainstorming workshop could take place, the Production Director was headhunted by another company and left without warning. The workshop still went ahead, but it was now headed by two TCS Associates (working on two year graduate placement projects), one of whom was looking at improving the quality systems within the Company and the other of whom was implementing a new IT system across the Company.
Although the workers from the propeller shop seemed rather indifferent to improvement efforts, some useful outputs which would help to improve delivery performance were identified, as follows:

- improve production planning;
- reduce rework levels;
- improve communication between the foundry and the propeller shop;
- improve staff training so people get it ‘right first time’;
- improve fettling standards in foundry;
- remove customer returned goods for re-work from the standard production line.

After the brainstorming workshop, a meeting was held with the two TCS Associates (TCS-As) to identify appropriate measures of performance. One measure had already been identified by the participants: monitoring the amount of re-work on each propeller. Previously, scrap had been monitored, but the full-scale scrapping of a propeller is rarely required. Instead, it is usually re-worked by hand which is a highly skilled and labour-intensive process. The new measure required the re-design of the scrap reporting sheet, so that it encouraged the reporting of all rework, rather than simply scrap. The purpose of this was to enable an appraisal of how much rework was occurring in the propeller shop and to highlight the production and training problems which were causing it.

A further measure developed was concerned with ensuring the accuracy of data for the new IT system. The measure developed was aimed at levelling the production plan by updating the accuracy of the data on the IT system. This was achieved by monitoring the actual date that a propeller reached and left each machine, rather than relying on potentially inaccurate theoretical data. Jobs received late would indicate a problem further up the production process, whereas jobs leaving a machine late would indicate a problem
with that machine. The data could then be used to be investigate and eliminate these problems and also refine the IT system shop floor model, thereby enabling greater accuracy in production planning, which would ensure that orders are processed as quickly as possible.

A Consultant, brought into the Company through its investors, had now taken over most of the vacant role of Production Director. He redeveloped the delivery performance measure, to try to focus the Company’s efforts on achieving on-time delivery for their biggest 4 customers. He also started displaying the results of these measures around the Company (See figure 9a).

![On Time Delivery Performance](image)

In each case it was the person who had developed the measure who was responsible for collecting and analysing the data it produced. From an overall delivery perspective, this was achieved by splitting the delivery performance into groups, depending on the customer and the product (e.g. see Figure 9a – group 2 consists of propellers delivered to the ‘Big 4’ customers, which are individually monitored). The key delivery target was to
deliver 100% on-time to the ‘Big 4’ customers, which was achieved through a number of operational level improvements.

The IT measure is used on an ‘as and when necessary’ basis, to ensure that the IT system has the correct loading data for each machine. The measure is not used permanently because of the time required to regularly maintain it. The eventual outcome of this measure will be to prevent the IT system from overloading the shop floor, thereby making delivery promises more accurate and reliable.

Finally, the rework measure was implemented, but unfortunately, the data indicates a lack of enthusiasm for completing the forms. This is highlighted because virtually all the responses received came from one person and it is highly unlikely that he is the only person who had any problems over the first measurement period. It appears that the supervisors and shop floor managers are equally uninterested in the accurate reporting of rework, as despite several attempts, they have not persuaded their staff of the benefits of this procedure. As the data is incomplete, it is difficult to interpret trends and therefore unlikely that any significant improvements will result from it.

The measures developed in Company K conformed to all the criteria for well-designed performance measures. However, only two out of the three developed were used successfully. Although staff were assured that the measure was to establish the key reasons for rework, they were either afraid of the repercussions of such an exercise, or were simply indifferent to the problem.
9.3.1.3 Facilitate Continuous Strategically Aligned Improvement

Although the Company ran successfully through the Cycle once, when questioned, the unanimous reply was that they would be unlikely to go through it again. However, more brainstorming improvement workshops have been, or are planned to be, carried out in every section of the company. The fact that the Company continued with the workshops, but not with the Cycle as a whole, somewhat negates the comment made by one of the TCS-As, that they would not continue with the it because it was too “time consuming”. However, this shows that, although there was no real understanding of the importance of running through the Cycle again, the idea of continuous improvement has made an impact. However, it is unlikely that, under these circumstances, the improvements will be strictly focused around strategic priorities.

9.3.1.4 SME PM Cycle Must be Easy to Use

To fulfil this criterion, it was essential that the objectives and timescales of the iteration of the Cycle were made explicit. This would ensure that the participants understood exactly what the Cycle aimed to achieve in the Company. Although the objectives were made clear and some general timescales were identified at the first meeting, the loss of the Production Director as the ‘change champion’, caused problems. After he had left, there was some confusion between the quality initiative, which had sparked the original interest in brainstorming workshops, and the SME PM Cycle. This was due to the fact that one of the TCS-As who had taken over the running of the Cycle was also heavily involved with the quality initiative. Therefore, the iteration of the Cycle in Company K was not as easy to manage as it should have been.
9.3.1.5 SME PM Cycle Must be Able to Work Within SMEs Constraints

One of the key aims of the Cycle was that it be fast and resource efficient to apply. Company K began the Cycle just before Christmas 2000 and the last measures were implemented by May 2001. This means that it took 5 months to complete the first iteration of the Cycle in the Company. During this time, four members of staff were actively involved in the Cycle; the Production Director, the Production Manager and, after the Production Director had left the Company, the two TCS-As. These people took part in three meetings in total, one to work through Stage One of the Cycle, one to assess the surveys and arrange the brainstorming workshop and one to develop the measures. In addition, the brainstorming session involved a number of staff from the propeller shop for most of the afternoon, which was an expensive exercise, but one for which the managers thought the outcomes would be worth the cost. There was also some work that was undertaken outside of the meetings, particularly when it came to implementing and then monitoring the results of the measures. Overall, the Cycle was as quick and resource efficient as was possible under the circumstances. However, the fact that the quality initiative was already underway before the Cycle began and the Company were implementing a new IT system, meant that it was always battling for time with the staff involved.

The requirement for flexibility was made in recognition of the fact that many SMEs live in a turbulent environment, in which environmental, strategic and structural changes may occur with dramatic effects. In Company K, the need for flexibility was essential, as the priorities actually changed during the course of the Cycle, from a focus on improving resource utilisation, to a full-scale assault on on-time delivery. This was coupled with the premature departure of the Production Director, who was the ‘change champion’, so that new people had to be brought onto the project team. In addition, the surveys produced inadequate results, which meant that a further consultation exercise had to be undertaken.
in the form of a brainstorming session. The very fact that, amidst so many changes, the Cycle was seen through to completion is evidence of its ability to work within SME constraints.

9.3.2 Case Company L

The within-case analysis will now assess the case study carried out in Company L against the validation criteria. This will be achieved using the same methods as the case in Company K.

9.3.2.1 Facilitate Development of a Balanced Set of Strategically Aligned Measures

In the first meeting, Stage 1 of the Cycle was completed, which aims to surface and prioritise a balanced set of strategic objectives. The Company participants comprised the Manufacturing Director, the Manufacturing Controller and the Logistics Controller. Using the tools provided, a lively discussion took place to surface the Company’s current strategic objectives. These were eventually established, as follows:

- Improve overall efficiency;
- Sort out lead times;
- Increase capacity;
- Improve on-time delivery;
- Increase volume flexibility.

Prioritisation was straightforward, as all participants agreed that improving on-time delivery was the key objective, as this would necessarily involve the need for adequate capacity, efficiency, flexibility and lead times, whilst also having a knock-on effect on both customer satisfaction and employee morale.
The identification of strategic priorities was a useful starting point for the development of a balanced set of strategically aligned performance measures. However, this is only achievable if the Company iterates around the Cycle regularly, building new measures as strategic priorities change. Company L has done this, revisiting the Cycle to identify a reduction in inventory as the next strategic priority. If the Company continue to use the Cycle, a balanced set of measures will be developed, in line with strategy, over time.

9.3.2.2 Facilitate the Production of Well-Designed Performance Measures

Although the Company already measured the value of manufacturing arrears, there was no specific measure of actual delivery performance – there was simply a ‘gut feel’ that it was poor. Therefore, the first measure developed was simply a straightforward delivery performance measure. The need to establish a delivery performance benchmark led to a mini-iteration of the Cycle being completed, whereby the delivery performance measure was implemented and the data analysed before any further measures or improvements were identified.

Having started to gather data on delivery performance, the Company participants used this information to help to identify some of the key improvements necessary to raise the delivery performance figures. This was achieved by analysing the data to identify trends, then brainstorming ideas between the project team and various other members of staff who were called in to meetings on an ‘as and when needed’ basis. Resource issues meant that it was difficult to get a group together for meetings. Therefore, the project team identified areas which appeared problematic and simply brought the relevant staff into the meetings to discuss potential improvements. The drawback of this approach was that it spread the identification of measures and improvements over a number of meetings. However, the
Company was always keen to implement the ideas from one meeting before the next was held, thereby helping to maintain the momentum of the project.

Overall, the improvements and measures that were established at these meetings were as follows:

- Run full batch sizes to reduce set-up time and increase machine efficiency;
- Monitor machine efficiency;
- Enable sales team to identify non-forecasted items so they can check availability before quoting a lead time;
- Increase forecasted items from 300 to 500 to reduce stock-outs on popular items;
- Improve sales-manufacturing communication to reduce number of impossible lead times due to front-loaded orders;
- Establish a make-to-stock agreement for key customers to reduce front-loaded orders.

The data from the overall delivery performance measure was used to identify a number of areas for potential improvements. Figure 9a illustrates one analysis, which was carried out to establish the quantity of forecasted and non-forecasted items which were late and on-time. The purpose of this was that the Company participants thought that forecasted item products should always be on time.

![Figure 9b: Analysing the Delivery Data in Company L](image-url)
The fact that so many of the forecasted items were being delivered late led to the suggestion that the forecast quantities might be set too low. The Financial Director was called in and the situation was discussed, after which he agreed to raise the number of forecasted items to help eliminate any standard items being delivered late. This type of process was used for each of the improvements and measures and the Company expect that, collectively, they will have a significant impact on delivery performance.

Company L successfully implemented the overall delivery performance measure and developed time cards for the machine shop, to measure machine efficiency. Improvements were also implemented, including running full batch sizes, increasing the number of forecasted items from 300 to 500 and revamping the sales data screens so that all products requiring non-forecasted items were highlighted and lead times could be individually identified. The measures developed conformed to the characteristics of well-designed performance measures and were used to identify operational improvements which would help drive performance towards achieving on-time delivery.

9.3.2.3 Facilitate Continuous Strategically Aligned Improvement

In the penultimate meeting, the participants were asked for feedback on the SME PM Cycle, including whether they would use it again. This provoked a positive response as the participants felt that the Cycle had been useful in helping to identify solutions to a number of problems which adversely affected delivery performance within the Company, as one manager commented

“it’s a good problem solving approach – we will use it again”.

They were, therefore, keen to continue using the Cycle as a method of troubleshooting other strategic priorities. In a follow-up meeting, the Company participants revealed that
they had already started another iteration of the Cycle. This time, the key strategic priority was inventory reduction, as inventory had begun to rise to unacceptable limits and was beginning to cause cash-flow problems within the company. A focus on inventory measurement has already seen stock holdings level out and The Company expects to hit their target over the coming months. This demonstrates that Company L is using the Cycle to facilitate continuous, strategically aligned, improvements.

9.3.2.4 The SME PM Cycle Must be Easy to Use
Clear objectives were a key aspect of making the SME PM Cycle easy to use. To facilitate this, initial meetings were held with the Managing Director and then the Manufacturing Director in order to explain the SME PM Cycle to them in detail. They were also given a copy of the workbook to read, which provides a step-by-step guide to what the Cycle is and how it works. The first project meeting began with more explanation of the Cycle for the benefit of the other company participants. It was clear at this point that the Manufacturing Director had both read and understood the workbook, as he was able to explain what it could do to the others and even gave some initial thoughts about how it might best be applied in Company L. All the Company participants were confident about what was happening at each stage and why. This demonstrates that the Cycle is easy to understand and use.

9.3.2.5 The SME PM Cycle Must be Able to Work Within SME Constraints
The first iteration of the Cycle was run over approximately 4 months. During this time, the Company held periodic meetings to identify improvements and monitor their effects on delivery performance. Sending out a survey to consult staff about potential improvements was not seen as appropriate but, due to time restrictions, full-scale brainstorming was not a viable alternative. Therefore, initial ideas for potential improvements were identified
directly from the available delivery performance data and specific staff were asked to attend meetings to discuss the viability and utility of these improvements. This approach worked well and ensured that critical staff were not away from their work for longer than absolutely necessary. Therefore, the Cycle was seen as being both time and resource efficient in Company L.

The flexibility of the Cycle in Company L was demonstrated when, despite severe resource constraints, a method of consultation which was both appropriate and useful was developed to enable the identification of measures and improvements. Although the chosen method was unconventional in that it had not been described in the workbook, it used the same principles of consulting the staff who would be directly affected by any of the changes proposed, in order to gain consensus and feedback on the suggestions. These findings show that the Cycle was flexible enough to be able to work within SMEs constraints.

9.4 Cross-Case Analysis

It is interesting to note that the two validation companies (K and L) and the developmental company (J) were very different, despite conforming to the identified SME characteristics. Hence, this section will focus on cross-case analysis of all three applications of the SME PM Cycle, to evaluate how it was received in these very different environments.

The focus for the cross-case analysis is the identification of similarities and differences between the cases, along with any interesting anomalies. The emphasis will be on using evidence, along with the contextual understanding gained from individual cases to explain how and why these occurred. The aim of this analysis is to draw some conclusions about
overall validity and generalisability of the SME PM Cycle and the conceptual model which underpins it (Table 9.2).

<table>
<thead>
<tr>
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<th>Development process requirements</th>
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<tbody>
<tr>
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<tr>
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<td>Performance measure development</td>
</tr>
<tr>
<td>Provide fast, accurate feedback</td>
<td>Periodic maintenance structure</td>
</tr>
<tr>
<td>Link operations to strategic goals</td>
<td>Top management support</td>
</tr>
<tr>
<td>Stimulate continuous improvement</td>
<td>Full employee support</td>
</tr>
<tr>
<td></td>
<td>Clear and explicit objectives</td>
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<tr>
<th>Dimensions of performance</th>
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<tbody>
<tr>
<td>Customer Satisfaction</td>
<td>Set time-scales</td>
</tr>
<tr>
<td>Operational Effectiveness</td>
<td>Be very resource efficient</td>
</tr>
<tr>
<td>Stakeholder Satisfaction</td>
<td>Provide short term as well as long term benefits</td>
</tr>
<tr>
<td>Supplier Effectiveness</td>
<td>Be able to surface informal strategies</td>
</tr>
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<td></td>
<td>Be dynamic and flexible</td>
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Table 9.2: Enhanced Conceptual Model of Integrated PM Development for SMEs

9.4.1 Similarities and Differences

The key similarity between the three cases was that every company experienced some benefits from using the SME PM Cycle. In each company, significant progress towards the fulfilment of the named objective was made through focusing improvement efforts using the Cycle. In addition, all companies reported improved interdepartmental communication and morale amongst the workforce. It is also interesting to note that all the companies selected the same objective to focus on; improving delivery performance. However, the methods used and the improvements identified to help achieve this objective were very different in each company.

Further similarities were also noted between Cases J and L. The participants from both these companies were clearly committed to the idea of making strategically aligned improvements, even when they were unclear initially about what their strategic objectives actually were. Company K differed in this respect because, although the participants did identify strategically aligned objectives, they were always reluctant to drop their focus on
internal efficiency and productivity to concentrate solely on the strategic objective. This illustrates the subjectiveness associated with the requirement that a need evaluation is carried out to ensure buy-in to the Cycle by each company. Although participants in Company K had convinced themselves that the Cycle would be useful, they appeared not to have the same openness to the changes it provoked as the other companies.

In addition, both Company J and Company L realised the value of measurement data and started using it to monitor and highlight further areas for improvements. In this respect, Company J were initially slow, as participating staff were rather more keen to implement improvements than to monitor them, but they quickly realised that to ensure performance continued to improve, measurements were necessary. This was not repeated in Company K, however. Here the participants had difficulties implementing the measures that they had developed and the measurements were purely output-oriented, providing little data on areas for improvement.

A third difference that was noticed between Company K and the other cases, was the style of managers who were participants in the Cycle. In Companies J and L, the managers were often frustrated and sometimes angry with various staff, but they were generally sympathetic to their needs and views. In addition, the project teams were made up of managers from different levels, with some being directly involved with the supervision and running of various parts of the manufacturing operation. This helped to ensure that decisions were reasonable and would be accepted by the staff. However, the attitudes of the initial project team in Company K were startlingly different. Both managers openly admitted that they felt that the workforce was generally lazy and ignorant and only responded to coercion to make them more efficient. As one manager noted:

“Basically people would rather turn up and do nothing for 3 hours and get paid for it than work harder during normal hours and take home a bonus.”
Even when the project team changed, one of the original managers remained involved. This ensured that the staff who attended the brainstorming session felt uncomfortable, as the manager’s opinion of them was openly low. As he said when brainstorming was first suggested:

“Well, forget that for a start – you won’t find enough brains around here for that”.

This might have accounted for the disinterest shown from many staff at the brainstorming workshop and the lack of response to the survey. The workbook provides methods to ensure that staff get involved and provides guidance to help make sure that measures are developed by the people who will be using them. However, this alone is unable to ensure that the requirements for the involvement of key users and full employee support are fulfilled by individual companies. It does, however, help to validate that these requirements are important elements of an integrated PM development approach for SMEs.

A further difference between Company K and the other cases was that the participants claimed that they would not use the Cycle again, despite their commitment to introducing the brainstorming workshops across the Company. Company J participants, on the other hand, had provided evidence of continued use of the Cycle in their Company, with the Manufacturing Director commenting that:

“the process was the catalyst which galvanised the workforce into action...measuring is helping to make the Company transparent, so that every member of staff can see the effect of their improvement efforts and can see the Company beginning to achieve its primary objectives.”

Company L claimed it too was using the Cycle again and had identified the critical objective for this second cycle. It is interesting to note here, that Company J was the only company with a strong order book – both companies K and L had falling orders. The
difference between them is that Company L is using the Cycle to systematically achieve their internal strategic objectives, whilst external strategies to increase sales take effect. However, Company K is currently finding it difficult to look to the future and is relying on purely internally focused brainstorming workshops to try to instil an atmosphere of improvement within the organisation.

9.4.2 Summary
The validation cases, along with the initial developmental case, were all deemed successful in that each company completed one cycle of the SME PM Cycle, leading to actual performance improvements to the strategic objective identified. Case L fulfilled all the validation criteria, but Case K only partially fulfilled them. However, the reasons for this have been discussed and shown to be beyond the scope of a development approach. That Case K was less successful than the other cases lends support to the need for integrated PM development to conform to all the criteria in the enhanced conceptual model of integrated PM development, for SMEs.

Overall, when applied in SMEs, the SME PM Cycle seems to be an effective method of identifying appropriate improvements and measurements to drive performance towards the achievement of critical strategic objectives, whilst also helping to improve communication and morale across the company. However, Companies J and L, which derived the most benefit from the Cycle and were keen to use it again, differed from Company K in several key areas. It appears that, for the Cycle to flourish, Company staff must:

- Be open and willing to change;
- Have an understanding of the importance of measurement both to drive performance towards achieving the strategic objective and highlight areas for further improvements.
9.5 Conclusion

This chapter has detailed the cases undertaken to validate the SME PM Cycle and the SME focused conceptual model of integrated PM development. It has demonstrated how each case fulfilled the validation criteria and then compared them, along with the developmental case study (Company J), to establish the limits of generalisability for the Cycle. Of the three cases, two appeared to be more effective and have a more profound effect on the companies than the other one. Having investigated this phenomenon in detail, two key issues were identified which were missing in this case, but were present in the others. These issues have now been formulated into recommendations for companies, for the effective use of the SME PM Cycle.
Chapter 10: Conclusions

10.0 Introduction

This thesis has documented the research undertaken to extend current knowledge and understanding of integrated PM development into a SME context. From the literature review and initial empirical research, it was clear that current approaches for the development of integrated PM, aimed at larger organisations, were inappropriate for use in SMEs. Hence, despite the well-documented benefits of using integrated PM, SMEs have largely been unable to take advantage of them.

The research has identified the context-specific factors that affect the introduction of integrated PM into SMEs from both theory and practice. These factors supplemented the theoretically derived requirements for the effective introduction of integrated PM, to make them more applicable to SMEs. The requirements were used to design a new approach for introducing integrated PM into SMEs. This approach was developed and tested in three SMEs. The results of these studies were used to validate the requirements which underpinned the new approach.

This chapter identifies and describes the key conclusions of this research and details its contribution to knowledge. A brief discussion of the difficulties experienced conducting the research follows. The chapter concludes by identifying potential directions for future research in this area.

10.1 Key Conclusions

The research sought to investigate two key research questions:
1. Are current integrated PM development approaches appropriate for use in SMEs?
2. How can integrated PM be introduced effectively into SMEs?

The work undertaken to investigate these questions has identified two key conclusions:
1. Established approaches for integrated PM development are inappropriate for SMEs;
2. The SME PM Cycle facilitates the effective introduction of integrated PM into SMEs.

A summary of the research results from which these conclusions were drawn will now be provided.

10.1.1 Conclusion 1: Established Approaches for Integrated PM Development are Inappropriate for SMEs

The deficiency of current approaches for developing integrated PM in SMEs was the key conclusion from the Investigation Phase of the research. The conclusion was derived from four elements of the research, which were described in Chapters 3-6.

In Chapter 3, a conceptual model for the development of integrated PM was formulated from the literature. This focused on three sets of requirements: what should be measured, what measures should look like and the features of an effective development approach. The model represented a synthesis of current academic opinion about what integrated PM is and how it can be developed effectively. A number of established approaches for developing integrated PM were evaluated against this model. This resulted in the identification of an approach which conformed to all the elements of the conceptual model.

Chapter 4 established a set of SME characteristics from the literature. The conceptual model of integrated PM was then reviewed from the perspective of a SME exhibiting these characteristics. This review concluded that each element of the conceptual model was applicable to SMEs and that integrated PM should be useful in this environment.
However, it was also concluded that the development and implementation process is likely to be more challenging in this environment, due to the constraints emerging from their characterisation.

Two empirical studies were carried out. The first study aimed to evaluate whether SMEs already used integrated PM (Chapter 5). This was achieved by carrying out a number of interviews with SME managers. The results of this study show that SME PM systems have little in common with the conceptual model. This demonstrated that the research was relevant, as SMEs were not currently using integrated PM.

The second empirical study (Chapter 6) examined the development of an integrated PM system in a SME using the process which conformed to the conceptual model. A case study was carried out using participant observation techniques. The results identified that the SME characteristics exhibited by the case company had made the introduction of integrated PM problematic. Further analysis identified that the reliance of the development process on the availability of a formal strategy was a key reason for this failure. This also indicated that future attempts to introduce integrated PM into SMEs would be problematic if they used existing approaches. This is because existing approaches are reliant on the provision of a formal strategy from which to develop the measures. This led to the conclusion that existing approaches for integrated PM development are inappropriate for use in SMEs.

10.1.2 Conclusion 2: The SME PM Cycle Facilitates the Effective Introduction of Integrated PM into SMEs

The conclusion that that established approaches for introducing integrated PM are inappropriate for use in a SME environment stimulated the identification of additional requirements for a more effective development approach. Four specific requirements,
identified from the empirical study, were synthesised with the original conceptual model. The enhanced conceptual model formed the basis for addressing research question 2, through the design and development of a SME focused, integrated PM development approach. This comprised the Innovation Phase of the research and is reported in Chapters 7 and 8.

Chapter 7 described how an appropriate design process was adopted and how the requirements for a SME PM development approach were identified. To fulfil these requirements effectively, an alternative structure for the approach was investigated and an incremental structure was identified as being the most appropriate. The Cycle was populated with four stages for integrated PM development comprising: Strategic Objective Identification and Prioritisation, Performance Measure Development, Implementation and Review. A number of tools were then identified or developed to facilitate the completion of each stage and to ensure that the Cycle adhered to all the design requirements.

In Chapter 8, the SME PM Cycle was applied in a SME. This provided valuable insights into the implementation of the approach and resulted in some refinements. The addition of phases for identifying and implementing improvements as part of the Cycle, were then introduced. However, the study demonstrated that the Cycle complied with the identified requirements and provided a number of benefits to the Company involved. This suggested that the design requirements were appropriate and indicated the need for a validation study.

Chapter 9 described the Application Phase of the research. This began with the identification of five validation criteria, derived from the design requirements, from which to assess the usefulness and usability of the SME PM Cycle. These criteria were used to evaluate two further case study applications of the Cycle in SMEs. The cases were carried
out using action research techniques as the primary vehicle for data collection. This enabled the simultaneous evaluation of the Cycle itself and the SME context in which it was applied.

One case study fulfilled all of the validation criteria and one partially fulfilled them. A comparison between both the validation cases and the developmental case revealed that the companies that strictly adhered to the Cycle attained the best results. This indicates that the enhanced conceptual model, on which the Cycle was based, provides a more appropriate framework for the development of SME PM approaches. However, to overcome the difficulties experienced with companies that fail to comply with all the requirements, two recommendations for effective use were also identified. This led to the conclusion that the SME PM Cycle is appropriate for use in SMEs.

10.2 Contribution of the Research

The research reported in this thesis makes a contribution to both knowledge and practice. The major contribution to knowledge lies in the identification of the context-specific factors that affect the development of integrated PM in SMEs, along with an improved knowledge of how SMEs understand and use PM. The contribution to practice comes from the design, development and validation of a continuous improvement approach to the introduction of integrated PM systems, specifically aimed at SMEs.

The identification of the context-specific factors that affect the introduction of integrated PM in SMEs, along with existing criteria for effective integrated PM development identified from the literature, has enabled the formulation of a conceptual model of integrated PM development in SMEs. This model, illustrated in Table 10.1, identifies what should be measured and the characteristics of performance measures, along with criteria
for an effective development approach which incorporates these new, context-specific requirements for SMEs. This represents a significant step forward in overcoming the barriers that inhibit the introduction of integrated PM systems in this context.

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**Figure 10a: The SME PM Cycle**
The new conceptual model was used to design and develop the SME PM Cycle (Figure 10a), which conforms to all the criteria it identifies. This Cycle is novel because it currently stands as the only continuous improvement based approach for integrated PM system development in SMEs.

To summarise, the contribution to knowledge and practice through this research has been achieved by:

• establishing a set of context-specific requirements for the introduction of integrated PM into SMEs;
• adding these requirements to existing criteria identified in academic literature, to form a conceptual model of integrated PM development, specifically aimed at SMEs;
• designing, testing and validating a novel, continuous improvement approach for the development integrated PM systems in SMEs, which conforms to the criteria identified in the conceptual model;
• improving existing knowledge of how SMEs understand and use PM.

10.3 Critical Review of the Research

The research set out to fulfil a specific aim, which was to extend current knowledge and understanding of integrated PM development into the context of SMEs. To ensure that this aim was fulfilled adequately, a deliberate decision was made to limit the areas for research and the research methods used. As a result of this decision there are areas where, although one route for investigation was selected, another may have been equally valid or, with hindsight, perhaps more appropriate. In addition, some potential areas for investigation, which might have strengthened the overall findings, were excluded to help preserve a strict focus. Therefore, in the interests of future research which may build on the work reported in this thesis, a brief discussion of these limitations will now be given.
The research methods selected were deemed to be the most appropriate ways of gaining access to the information required at each stage of the research. However, as with all research methods, there are a number of associated limitations. The most obvious limitation of this study, which was conducted entirely from a case study and action research perspective, is that of generalisability.

To facilitate the generalisability of the research findings, precautions were taken to ensure that a representative sample of SMEs was selected. However, as SMEs are a very large and heterogeneous group, this was problematic. Therefore, the sample was limited through size, sector and location stratification. In addition, participating companies had to conform to the list of general SME characteristics derived from the literature, shown in Table 4.1. This was to facilitate the selection of a relatively homogenous group of SMEs, to increase the generalisability of the results. However, in practice, the characteristics were very difficult to check as there was no way of formally assessing conformance before working with the companies. In addition, as none of the companies in the sample appeared to contravene any of the characteristics, it raises the question of whether the use of such a set was really appropriate in the first place. If not, the level of confidence about the type of companies the findings of the research apply to would be more restricted.

A further limitation concerned with generalising the research findings may be found in the design of the developmental and validation studies. The SME PM Cycle was applied in three different companies, in order to test it in three different environments and increase the level of generalisability. However, this design precluded an in-depth, longitudinal, study of the use of the Cycle over time. This is important in view of the fact that the Cycle is claimed to facilitate the development of an integrated set of performance measures over a number of iterations. However, to overcome this weakness in the research design, where
possible the companies were followed up after the intervention to collect some longitudinal data on the continued use of the Cycle. This provided some additional confidence that the companies were not simply reacting to the influence of the researcher during the intervention, thereby reducing the Hawthorne effect.

In addition to the limitations of the research, there were some deliberate omissions in the research design, to ensure that the work remained concentrated on the research objective. An example of this is the literature review of integrated PM. This was strictly concerned with synthesising a conceptual model of integrated PM development from the literature and assessing existing approaches against it, thus leaving little room for critical reflection. Although the criteria in the conceptual model, together with the additional, context-specific, requirements for SMEs, were validated through the case studies, with hindsight a detailed critical evaluation of each criterion may have helped to strengthen overall validity.

Furthermore, an evaluation of the appropriateness of the conceptual model against the characteristics of SMEs was given in Chapter 4. This evaluation could, potentially, have been considerably strengthened through the use of a design matrix to evaluate each individual criterion in the model. However, this approach was rejected since its complexity would have caused the research to move away from learning about the development of integrated PM in SMEs and instead, would have triggered a detailed theoretical evaluation of the appropriateness of integrated PM for SMEs. Therefore, although this was not the purpose of this research project, it represents an interesting area for future development.
10.4 Concluding Observations

To test the new SME PM Cycle a total of 8 SMEs were approached, all of which appeared to conform to the sampling characteristics identified. Of these potential case companies, two expressed an interest in using the Cycle but did not wish to take part in the project due to the timescales involved. A further two companies wanted to use particular elements of the Cycle, rather than applying it in its entirety. Another SME wanted to work through the Cycle, but in its own time and without input from the researcher. Although this company initially agreed to give feedback from their experiences, the case was eventually abandoned as it appeared that no useful feedback would be forthcoming within the timescales of the research. This meant that only three cases (Companies J, K and L) used the Cycle and were monitored through to completion.

The issue of gaining access to companies is a challenge facing all researchers who study SMEs. For this research project, it was vital that all participating companies should be volunteers, in order to ensure that the Cycle was not seen as being imposed on any company. However, it has been noted that voluntary participation in improvement initiatives tends to encourage only those companies:

...with the least to change and therefore arguably the least to gain (Down and Smith, 1998).

That Company K did not get as much out of using the Cycle as the other case companies, despite being a willing volunteer initially, demonstrates how initial enthusiasm is really only the first step towards effective use of the Cycle. It is clear that, before SMEs are willing and able to develop integrated PM in their organisations, they must have both an effective development approach and a clear understanding of its potential benefits. This research represents the first step in this process. The SME PM Cycle might make integrated PM more accessible to SMEs, but persuading companies to use it and providing
the impetus for change to do so effectively, represent some serious future challenges for the research community.

10.5 Future Research

This research has established a set of criteria, in the form of a conceptual model, for developing integrated PM in SMEs. An approach which conforms to those criteria has also been developed and validated for use in SMEs. However, to limit the scope of the research, the SMEs used in the study were all manufacturers based in the South West of the UK. Further research should now be carried out to establish the applicability of the Cycle in SMEs from other areas and industry types. As well as strengthening the overall validity of the criteria in the conceptual model, such a study would enable the effects of sectoral and regional differences in the introduction of integrated PM into SMEs to be explored.

Further validation of the continuous improvement style approach to the development of integrated PM in SMEs would also be useful. This could be achieved by undertaking a number of longitudinal studies on the use of an approach such as the SME PM Cycle, which would provide a detailed understanding of the ongoing use of such an approach in SMEs. In addition, a comparative study between integrated PM system development in large companies and SMEs would be an interesting way of assessing how perceptions of integrated PM change in these different environments.

Although outside the scope of this research project, the findings suggested that the regular surfacing of strategy is important for SMEs. Therefore, a future study might focus on adapting the SME PM Cycle to create a potential approach for emergent strategy development and implementation in SMEs.
Other areas for potential research include studying the quantifiable benefits of implementing integrated PM systems in SMEs. This would provide an incentive to encourage more SME managers to develop integrated PM in their companies. In addition, in-depth studies in SMEs need to be undertaken to identify the primary attributes that inhibit or improve the effectiveness of improvement initiatives such as integrated PM development. This would enhance academic knowledge of SMEs and enable the further refinement of SME-focused development approaches, not only for integrated PM but also, potentially, for many other improvement initiatives.
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