DEVELOPMENT OF A STRUCTURED FRAMEWORK FOR CORE COMPETENCE EVALUATION IN THE MANUFACTURING AND SERVICE INDUSTRIES

by

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ABSTRACT

During the last decade, the theory of competence-based competition has drawn a considerable amount of attention from the academic and practitioners alike. The theory asserts that corporate and business strategies should be built upon the strengths of the core competencies of a firm. The aim of this research is to construct a structured and practical framework for core competence evaluation. The thesis begins with the introduction of the basic concept of core competencies through presenting three core competence-based approaches. Research methodology is described in detail. Two data collection methods are used for this study: case study and questionnaire survey. By reviewing the literature, six competence identification models are identified and analysed. The strengths and limitations of these models are discussed.

Having provided working definitions for firm tangible and intangible assets, a relationship between resource and capability is developed and examined. Using financial and non-financial performance measures, Analytic Hierarchy Process (AHP) technique is employed to determine the key capabilities of firms. Subsequently using "collectiveness" and "uniqueness" attributes, a comprehensive method for evaluating competencies is provided. The attribute 'collectiveness' is introduced for determining the 'universal usefulness' of these candidates in the scope of a business. The attribute 'uniqueness' is employed for assessing the distinctiveness of the potential competence candidates in competition. Competencies are evaluated by subjectively assigning relevant scores to these characteristics. The effectiveness of this method is demonstrated through two case studies.

The author believes that being unique in competition is not sufficient for core competencies to keep their strategic values in dynamic competitive environment. A true core competence should be able to continuously create new business options for the firm. Therefore, this thesis emphases that to be core competence, the candidates must be strategically flexible. By employing "strategic flexibility" as the main criterion, this study has presented a distinctive mechanism to differentiate core competencies from the competencies. The dynamic nature of the core competencies is evaluated using characteristics such as resource re-deployment and routine re-organisation. The generic nature of this framework is tested through conducting two case studies and a questionnaire survey.

This thesis makes three main contributions to the existing body of knowledge. Firstly the thesis provides a systematic and practical core competence architecture which can be used for firms to accurately understand the concept of core competence. Secondly the thesis gives a detailed and structured core competence evaluation framework which can be used for firms to identify their business strengths and weaknesses systematically. Thirdly by conducting a questionnaire survey, the thesis presents a snapshot of the UK manufacturing and service industry core competencies, and bridges the gap between theory and practice. The framework may be viewed as a practical, robust and generic tool to benchmark a service, manufacturing or public sector organisation. The outcome of this study would help companies in strategic decision-making with regards to diversification, focusing and investment in competence building activities.

PREFACE

This thesis is submitted to the School of Engineering of Sheffield Hallam University for the degree of Doctor of Philosophy. The thesis contains eight chapters which consist of the conceptual models developed for core competence evaluation and the validation and application results of the models through implementation in practice. The detailed structure of the thesis is as follows.

For understanding the basic concepts of core competencies, Chapter 1 first introduces three different approaches within the theory of core competence-based competition and discusses the characteristics of the approaches. The significance of core competence evaluation to the strategic management of organisations is explained. Then, it outlines the main objectives of the research and proposes three hypotheses which are used as the foundation of conceptual model building. A research methodology is then developed for this study. Established based on an experimental method, the methodology is divided into three main stages: literature review, development of conceptual models, and implementation of the proposed framework. Two data collection methods are used, i.e., case study and questionnaire survey, and their objectives are described.

Chapter 2 identifies six competence identification models developed by previous researchers through reviewing the literature. The main characteristics of the models are described. The implications of these models to this study are analysed. Based on the theory of core competence-based competition, the limitations of the models with regard to core competence evaluation are discussed.

Chapter 3 provides a set of clear working definitions of the terms such as firm resources and capabilities. The characteristics of these concepts are described. In particular, firm resources are decomposed into three categories of assets, namely, physical, intellectual, and cultural. All these terminologies and classifications are supplemented by giving relevant examples. A functional approach is introduced for systematically mapping firm capabilities. The relationship between resource and capability is discussed and validated using a case study.

Chapter 4 describes a structured procedure for determining the key capabilities of firms. Both financial and non-financial performance measures are described and subsequently used as the criteria for building the model of key capability determination. Analytic Hierarchy Process (AHP) procedure is introduced for quantitatively analysing the value of firm capabilities. The effectiveness of the model is tested through five case studies. A sensitivity analysis is conducted to examine the robustness of the model.

Chapter 5 describes a comprehensive method for identifying firm competencies using "collectiveness" and "uniqueness " attributes. The working definitions of these attributes are provided. The detailed procedures for assessing these attributes are described. The method used for determining competencies is designed. The successful implementation of this method is demonstrated using two case studies.
Chapter 6 proposes a technique for identifying core competencies of firm. The attributes used to differentiate between competence and core competence are defined. A process is

developed based on the attributes for assessing the candidates of core competence, and a two-dimension matrix model is designed for core competence determination. The process of core competence identification is illustrated and validated using two case studies.

Chapter 7 first introduces the architecture of core competence and then provides an integrated framework for core competence evaluation. The framework is formed by the integration of various models proposed in Chapters 3, 4, 5 and 6. A questionnaire survey is used to implement the framework in both manufacturing and non-manufacturing industries. Through analysing the collected data, some important research findings are summarized and presented. The results from the survey are also used to validate the effectiveness of the framework.

Chapter 8 provides discussions and conclusions to this thesis. First of all, it highlights a number of the gaps between core competence theory and practice that has been filled in by the research. Secondly, the implications of validation studies are discussed. Thirdly, the main findings revealed by questionnaire survey from UK manufacturing and non-manufacturing companies are presented. Fourthly, the main deliverables of the thesis are summarised. Finally, the further work is recommended from two aspects: the present work improvement/development and new research areas for applying the work.

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TERM DEFINITION

Term	Definition	Example	Source
Resource	Any tangible or intangible asset owned or controlled by a firm	Belief Plant Copyright Truck fleet Brand name Perception of quality	The present author
Capability	The capacity for a team of resources (assets) to perform some task or activity	Design Purchasing Manufacturing Strategic planning Sales and marketing Finance management	Grant (1991)
Key capability	A capability that play critical role in realizing the business objectives of a firm	IKEA's cost control	Various authors
Competence	A key capability which is highly 'collective' within the firm and 'unique' in competition	IKEA's on-site promotion	The present author
Core competence	A competence which is highly flexible in terms of creating new strategic options for future business in dynamic environment	IKEA's design	The present author

CHAPTER 1

INTRODUCTION

Whilst the concept of core competence has been accepted and perceived as very important to both business and corporate strategic management, the techniques that can be used for realizing its benefits haven't been fully developed, and particularly, very few practitioners and researchers have claimed that they have developed and employed an effective approach of core competence identification (Doz, 1997; Klein *et al.*, 1998). This thesis is concerned with the development of a generic and structured framework to help firms evaluate their true core competencies. This chapter first discusses the significance of core competence identification to strategic management through a brief introduction of the theory of core competence-based competition and then presents the research objectives and methodology of this study.

1.1 Background to the Research

Corporate and business strategies are about overall scope of an organisation and how to compete in marketplace. The present environment is increasingly turbulent and complex and hence demanding companies to have the ability of fast and effective strategic responses. In order to find optimum solutions for the strategic problems and direction of the company, managers need to be able to "take decisions about change and implement change with great deal more assurance and skill than hitherto"(Johnson and Scholes, 1993). The assurance and skill are the direct contributors to the achievement of competitive advantage. They are unlikely gained without the supports of appropriate strategic theories and tools.

In the field of strategic management, many theoretical constructs (e.g., growth-share matrices, transaction cost theory) have been established for guiding practitioners to create or gain competitive advantage. For example, Porter's competitive forces theory (1980) has been used for linking strategy with industry structure. The theory demands the management of a firm first to understand the external business opportunities and competitive threats of the firm, and then to develop business strategy based on industry attractiveness. Subsequently the requisite capabilities and resources for implementing the strategy are determined and acquired. Sometimes this perspective is also characterised as an "outside-in" due to the order of its external-internal analysis (Krogh and Roos, 1995; Javidan, 1998).

With the changing environment characterised by advanced technologies and business globalisation, however, the industry structure approach is being challenged for its completeness and appropriatability. Many authors have argued that the approach has over-emphasised the importance of industry structure and relied solely on barriers to entry as the determinant of profitability (Lippman and Rumelt, 1982; Barney, 1986; Hansen and Wernerfelt, 1989). Also, the approach is biased towards the product-market while completely ignoring the strategic relevance of firm resources and capabilities (McWilliams and Smart, 1993).

More recently empirical studies have found that the superior business performing firms possess some special resources and processes which are hard to imitate (Rumelt, 1991; Bharadwaj *et al.*, 1993). Researchers agreed that simply focusing on market barrier, for example, monopoly or tangible assets like production capacity, is not sufficient. Intangible resources like knowledge and skills are becoming increasingly important in adding value to products and services. Results from successful business stories have

revealed the fact that sustainable competitive advantage stems mainly from the internal factors. For example, by exploiting its capability in miniaturisation, Sony has been able to constantly introduce those innovative, high quality personal electronics products that meet or cause customers demands (Prahalad and Hamel, 1990; Grant, 1991).

Such practical findings inspired academics and practitioners alike to search for an alternative approach to the industry structure. For example, Hayes (1985) expressed strongly his opinion in favour of an "inside-out" (starts with internal analysis and then examine the external environment) approach by saying "do not develop plans and then seek capabilities; instead, build capabilities and then encourage the development of plans for exploiting them". Hamel (1994) claimed that "competition is as much a race for competence mastery as for market position and power". Within a decade, three new theories have emerged as " a counterpoint to market structure analyses of competitive strategy" (Rumelt, 1994). These include resource-based view of the firm, dynamic capabilities approach and core competence perspective. In the literature, together they are called the theory of competence-based competition.

1.2 Theory of Competence-based Competition

1.2.1 Resource-based View of the Firm

In this approach a firm is viewed as a bundle of resources comprising assets and capabilities. Firms are heterogeneous to each other by possessing some unique assets and capabilities. These unique resources, accumulated and acquired by a firm in marketplace, determine the competitive advantage of the firm. The approach suggests that management efforts should be concentrated towards protecting and exploiting these

resources (Wernerfelt, 1984; Barney, 1991; 1997; Ulrich and Lake, 1991; Mahoney and Pandian, 1992; Peteraf, 1993).

The resource-based view underlines the importance of possessing unique resources to attain competitive advantage. However, accumulation and development of these resources is not addressed. In addition, the approach employs a relatively broad definition of firm resources in which capabilities are defined as part of resources. This implies that either assets (e.g., plant) or capabilities (e.g., design) may become a direct source of competitive advantage.

1.2.2 Dynamic Capabilities Approach

This approach claims that competitive advantage is attained by leveraging the managerial and organisational processes, and is shaped by the strategic positioning of firm assets and available paths. Competitive advantage may be sustained through firm's existing competence endowment and "dynamic" capabilities. The term "dynamic" is defined as " the capacity to renew competencies so as to achieve congruence with the changing business environment" (Teece *et al.*, 1990; 1997).

In the dynamic capabilities approach, firm assets are not considered as the direct source of competitive advantage. While explicitly recognising the role of firm assets as supporting, the approach focuses on the dynamic capabilities to maintain the competitive advantage of a firm.

1.2.3 Core Competence Perspective

The core competence perspective advocates that only those capabilities representing the 'collective learning' of organisation, and not discrete assets, are the source of sustainable competitive advantage (Prahalad and Hamel, 1990; Hamel, 1994). In particular, this approach suggests to identify those capabilities which span over multiple products or markets for leverage and building (Bogner and Thomas, 1994). Originally Prahalad and Hamel (1990) have defined the core competencies from the viewpoint of technical activities and systems. However, Stalk *et al.* (1992) have suggested that other distinctive capabilities such as managerial ones may be included in a wider context of the definition.

To this approach, products and services are nothings but the superficial expression of a firm's core competencies. It asserts that core competence management should become one of the top priorities in strategic management.

1.2.4 Discussion

The essence of the firm's strategy is about choices. It is about how much to invest on different possible areas for creating competitive advantage (Dierickx and Cool, 1989). The objective of a new theory would be to create and support self-managing organisational processes that enable better interpretation of, and faster response to, complex, dynamic environments and their attendant uncertainties. In the field of strategic management, industry structure approach and competence-based competition theory are complementary. Table 1.1 summarises the salient characteristics of the two approaches.

	Industry structure approach "outside-in"	Competence-based competition "inside-out"
Assumption	• Industry-specific resources are homogeneously distributed and perfectly mobile • Business environment is relatively stable	• Competing firms' resources are heterogeneous and imperfectly mobile • Business environment is dynamic and unstable
Level of analysis	Industry structure	Individual firm
Unit of analysis	• Competitors/new entrants • Suppliers/buyers • Threats from substitutes	• Resources • Capabilities
Source of competitive advantage	• Entry barrier • Mobility barrier	• Core competencies • Dynamic capabilities
Representative authors	• Porter (1980; 1985)	• Prahalad and Hamel (1990) • Teece et al. (1997)

Table 1.1 A comparison of the "outside-in" and "inside-out" approaches

The theory of competence-based competition provides a new insight to understand organisational and competitive dynamics. According to the theory, the success of long-term business by and large depends upon the performance that how efficiently and effectively core competencies of the firm are managed (Hamel, 1994 ; Sanchez and Heene, 1997). The theory itself comprises three contemporary approaches: resource-based view of the firm, dynamic capabilities approach and core competence perspective. The three concepts have many overlapping features in terms of definition and characteristics. Table 1.2 summarises the salient characteristics of the three contemporary approaches.

1.3 Significance of Competence Identification

Core competence management comprises three elements: competence identification, competence leverage and competence building. Whilst competence leverage and competence building are the critical processes by which competitive advantage is actually created and sustained, competence identification is the key to both of them. Many authors have even claimed that the competence identification is one of the most important contributions senior management can make (Winterscheid, 1994; Eisenhardt and Schoonhoven, 1996; Compbell *et al.*, 1997; Stein, 1997; Snyder and Ebeling, 1997).

1.3.1 Competence Leverage

Competence leverage refers to the firm's ability to share and exploit its competencies in the pursuit of new opportunities (Chakravarthy, 1997). As pointed out by Prahalad and Hamel (1990), successful firms deploy their core competencies across multiple

	Resource-based view (1980s)	Competence-based perspective (1990s)	Dynamic capabilities approach (1990s)
Concept of a firm	A bundle of resources and capabilities comprising: • Tangible assets • Intangible assets • Capabilities • Activities	An open system of asset stocks and flows comprising: • Tangible assets • Intangible assets • Capabilities • Managerial process	A system formed by processes, routines, and resources comprising: • Tangible assets • Intangible assets • Capabilities • Organisational/ Managerial processes
Competitive strategy	Controlling and exploiting strategic resources manifested in assets or capabilities	Deploying, protecting and developing competencies resulted from the integration of assets and capabilities	Deploying and exploiting capabilities embedded in organisational/ managerial processes, and continual reshaping the portfolio of assets
Attributes of resources/ competencies	• Valuable • Rare • Inimitable • Non-substitutable	• Valuable • Rare • Inimitable • Non-substitutable • Robust (for new market)	• Valuable • Rare • Inimitable • Non-substitutable • Dynamic
Development method	Development of intangible assets	Development and integration of intangible assets and capabilities	Development and integration of intangible assets and capabilities
Development environment	Internal	Internal and external	Internal and external
Representative authors	Wernerfelt (1984) Barney (1991)	Prahalad and Hamel (1990) Sanchez and Heene (1997)	Teece, Pisano, and Shuen (1990; 1997)

Table 1.2 A comparison of the contemporary strategic management approaches

businesses and products. They use core competencies as a platform to enter into new markets (e.g., Honda's engine design capability) by configuring and co-ordinating firm assets and capabilities in "any number of ways that facilitate a positive firm response to evolving market opportunities or necessities" (Sanchez *et al.*, 1996). However, in reality many times long-term competitiveness is jeopardised in pursuit of short-term benefits (e.g., cost savings) due to the lack of knowledge about core competencies (Rothery and Robertson, 1995; Alexander and Young, 1996).

1.3.2 Competence Building

Competing on core competence is a moving target. A core competence couldn't sustain its strategic value to the firm forever without some kind of changes (Hamel, 1994). IBM's failure to switch its core competence from mainframes to microcomputers and DEC's reluctance to renew its workstation capabilities, both indicate the important nature of competence building (Turner and Crawford, 1994). Collis (1994) has listed the following reasons why a competence could lose its value:

(i) erosion of the competence as the firm adapts to external or competitive changes;
(ii) replacement by a different capability; and
(iii) being surpassed by a better capability.

Sanchez *et al.* (1996) defined competence building as

"any process by which the firm qualitatively changes its assets and capabilities and thereby improves the ability of the firm to co-ordinate and deploy assets in ways that help the firm achieve its goals".

Competence building is viewed as a process of gap closing (Sanchez and Thomas, 1996). The perceived gap between the intended competencies of future and the existing ones motivates the firm to take actions such as investing on resources and capabilities to close it. This implies that existing gap is a catalyst for resource accumulation, and determine the rate at which the firm is able to build new competencies (Bogner and Thomas, 1994; Verdin and Williamson, 1994). In fact, Jensen (1996) has found out that the complementary competencies of SMEs had been used as the basis of forming interfirm co-operative arrangements. Therefore, some authors have suggested that learning techniques (e.g., strategic alliances or partnership) should be determined based on the strengths of core competencies. For example, by building strategic alliances NEC developed its capabilities complementary to its core computing capability (Lei *et al.*, 1996).

1.3.3 Discussion

Competence identification is fundamental to core competence management. By successfully identifying core competencies, firm would clearly understand its business boundaries and potential. It would diversify and/or focus its assets and capabilities for maximum benefits.

However, competence identification is a complex process. As Klein *et al.* (1998) have pointed out that unless there is a practically useful framework aided, the identification of core competence could easily turn into a "political process". When a firm fails to identify correctly its core competencies, it may well miss attractive opportunities and chase poor ones.

1.4 Research Objectives

The overall aim of this research is to provide a structured and practical framework for core competence evaluation. More specifically, the objectives of the research are:

1. To provide clear working definitions for the building blocks of a firm, such as resource, capability, and competence for understanding core competence concept.
2. To identify a set of static as well as dynamic characteristics to differentiate core competencies from firm capabilities.
3. To provide quantitative tools to help the subjective assessment procedures.
4. To construct a balanced procedure for assessing the candidates of core competence by incorporating financial as well as non-financial performance measures.
5. To develop, implement, and validate a generic framework for evaluating core competencies of manufacturing as well as non-manufacturing companies.

Drawing from the three approaches of core competence-based competition theory and later literature review, this research first of all sets to determine and define the basic units of analysis for building a core competence evaluation framework. In general the thesis attempts to provide appropriate answers to at least three hypothesises. The first one is that firm resources are input factors to firm capabilities and the firm capabilities are the direct source of core competencies. The second one is that true core competencies of firms can be evaluated through a combination of attributes using some qualitative and quantitative assessment techniques. The third one is that the core competencies of both manufacturing firms and non-manufacturing firms can be identified using the same framework.

1.5 Research Methodology

Methodology is defined as "a collection of problem solving methods governed by a set of principles and a common philosophy for solving targeted problems" (Checkland, 1981). For a complex task such as this study, it will be better to employ a structured process (i.e., methodology) for achieving the objectives effectively and efficiently. This means that an appropriate methodology should be adopted. This section is used to explain the reasons for adopting the selected methodology and its ways of working in this research.

1.5.1 The Selection of Methodology

During the last decade, contributions have been made to establish the theoretical foundations of core competence-based competition, and some major characteristics of core competencies of firms have been identified by various researchers. These concepts can provide a blueprint that enables the researcher to structure the research problem. Therefore, a deductive-experimental method is adopted for the research methodology. According to Gill and Johnson (1997), the process of deduction might be divided into the following four major steps:

1. Theory/hypothesis formulation;
2. Operationalisation – translation of abstract concepts into indicators or measures that enable observations to be made;
3. Testing the theory through observation of the empirical world; and
4. Corroboration

Some other factors are also considered into the determination of the methodology, such as, the nature of the objects of study. The objects of study are those manufacturing and non-manufacturing companies public or private owned, and widely different to each other in terms of business contents and operations. These companies are very likely a voluntary participator. Therefore, the selected methodology should facilitate the development of framework that can be adapted in a generic fashion.

1.5.2 The Ways of Working

The methodology of this study adopts three main stages: literature review, development and validation of conceptual models, and application of framework through a questionnaire survey. Figure 1.1 illustrates the inter-relationships among these stages.

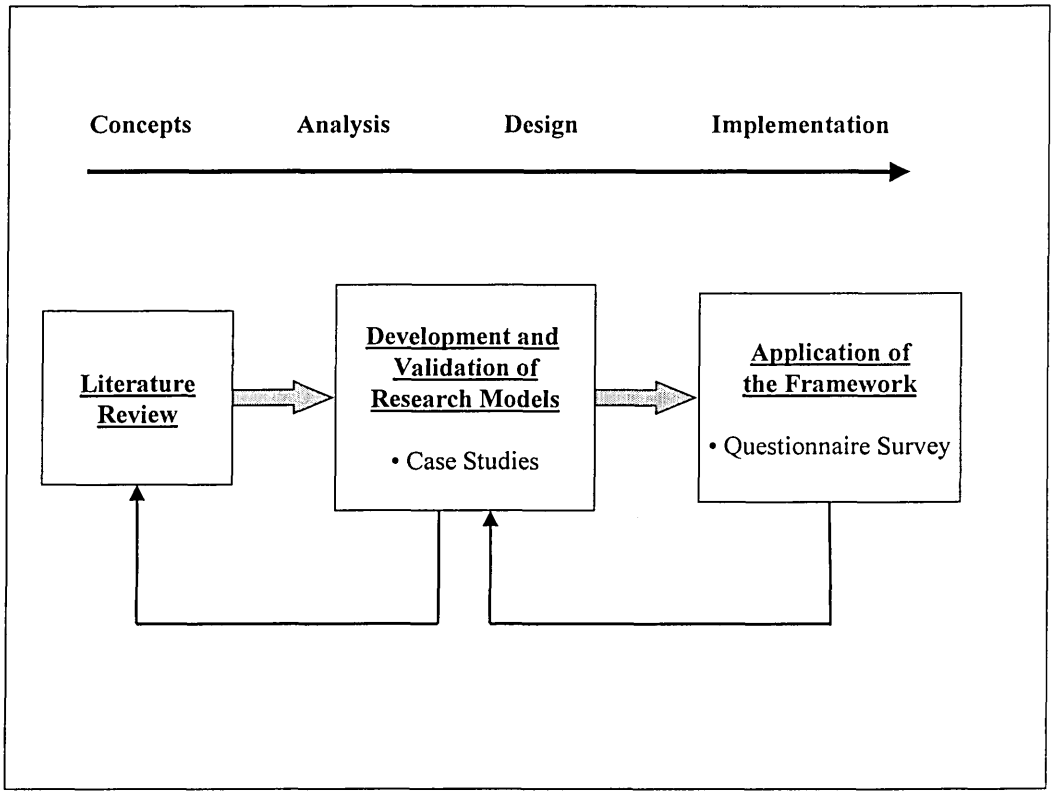


Figure 1.1 Research methodology

1.5.2.1 Stage I – Literature Review

The literature review stage is used for achieving two objectives. The first objective is to understand the basic concept of core competencies advocated by the three approaches of core competence-based competition theory, i.e., resource-based view of firm, dynamic capabilities approach, and competence-based perspective. The attention is focused on defining those components of core competence and identifying the key attributes of core competence. The second objective is to study of those competence identification models proposed by previous researchers. The interest here is to deduce some guidelines for developing a framework by comparing and contrasting the conceptual and practical limitations of the previous work. The knowledge gained will also be used for providing the working definitions of relevant units of analysis and constructing subsequent conceptual models. Journals, library books, conference proceedings, company reports, and media are used as the major vehicles of information retrievals at the Stage I.

1.5.2.2 Stage II – Development and Validation of Research Models

Gill and Johnson (1997) have classified survey research into two types: analytical and descriptive. Analytical surveys attempt to test a theory and descriptive surveys are concerned primarily with addressing the particular characteristics of a specific population of subjects. Therefore, for this research the case study method is used to conduct an analytical study of a specific manufacturing or non-manufacturing companies to test the hypotheses, and a postal questionnaire is employed to conduct a sample survey of manufacturing and non-manufacturing companies to investigate the practical understandings of core competence concept, and also to examine the validity of the proposed framework using the collected data.

Stage II concerns the development of the conceptual models. Using the proposed working definitions for the units of analysis and the identified attributes of core competence, four models are built and devoted for describing resource and capability relationship, determining key capabilities, evaluating competencies, and identifying core competencies, respectively. The data collection method of case study is employed throughout the research for the validation of the models. A case study is an empirical enquiry that can be used for investigating contemporary phenomena within its real life context. This method can benefit from the prior development of theoretical propositions to guide data collection and analysis (Yin, 1989).

Case studies

For this research, the main considerations for the selection of suitable case study companies included:

- The companies should be willing to co-operate actively and easy to contact (i.e., local)
- The senior managers of the companies are available for the interviews
- Both manufacturing and non-manufacturing industry sectors are represented in the sample

The tactics used for conducting the case studies are that a shortlist of the prospective companies is generated first and then the senior managers of the companies are contacted either by writing or telephone calls. The purpose of the study is explained and the scope of the survey is roughly described. Five UK-based companies and one UK subsidiary of an international-based company (IKEA) are finalised as the participants.

Although the UK-based companies were generally willing to participate in the study, the degree of their provisions of relevant information and data was varied. Except for the case study Company A, the other four volunteered only to provide those data related to functional areas and used for key capabilities identification. Out of these four companies, two are non-manufacturing representing consultancy and bank services. IKEA is selected as its operation is widely understood and information can be found readily in the literature. However, the published information isn't complete enough for validating the model of key capability identification. Therefore, the IKEA case was used to test the competence and core competence models as described in Chapters 5 and 6 respectively.

The data are collected by paying visits to and conducting face-to-face interviews /or structured survey for the UK-based companies, and by surveying published books, journals, and company reports for IKEA. The collected information and data enabled to paint a better picture of the core competence-related issues.

1.5.2.3 Stage III - Application of the Framework

Nanda (1996) has pointed out that so far most of the competence-based competition models are validated using case studies, and since such validations are deductive, the results tend to be non-robust, non-generalised and subject to sampling and observer biases. Therefore, questionnaire survey method is also adopted to complement or in many places supplement the case studies. A questionnaire is a method of obtaining information about a defined problem through a large-scale investigation. After the data collected are analysed and interpreted, the results will provide a better understanding of the problem (Easterby-Smith *et al.*, 1991; Hague, 1993).

The questionnaire is used in the final stage of the research, i.e., the application of the proposed framework of core competence evaluation. The main concerns with the design of the questionnaire included:

- The questionnaire is to be sent to both UK-based manufacturing and non-manufacturing companies in equal proportion
- The questionnaire will be sent, if possible, to the named persons of the respondent companies
- A covering letter will be used for explaining the purpose of the study and the benefits of the research outcomes, and for declaring guaranteed confidentiality of the data to remove any fear of information loss to a third-party
- A revised covering letter and a second copy of the questionnaire will be sent to those non-respondents to remind them for completion.
- Feedback would be sent to the interested participating companies.

In the questionnaire survey, the perceptions of the participants are sought to subjectively identify the core competencies of their companies. This perception is used as a measure of comparison against the developed framework. This comparison presents a primary source of validation, as well as gives a snapshot of the kind of core competencies and the management understanding. The data collected from the questionnaire survey are processed separately for manufacturing and non-manufacturing companies. The main purpose is to summarize the relevant characteristics and present the findings for each industry.

1.6 Summary

By introducing the theory of core competence-based competition, the basic concept of core competencies is discussed and summarized. The distinctive characteristics of core competencies are presented. The significance of core competence identification to strategic management is described.

After defining the research objectives and hypotheses of this study, a detailed research methodology is provided. The methodology is developed based on an experimental method within which conceptual models are first designed and then practical data are collected. Two data collection methods are employed for the methodology: case study and questionnaire survey. It is hoped that by using the combination of case studies and questionnaire survey methods, this study is able to obtain sufficient information and data from both manufacturing and non-manufacturing industries for validating and implementing the conceptual models.

CHAPTER 2

LITERATURE REVIEW

The theory of competence-based competition only provides a general framework to define core competence. As Grant (1991) has pointed out, "Prahalad and Hamel's notion of 'core competencies' is less an identification of a company's current capabilities than a commitment to a path of future development". This chapter first reviews the literature to identify those models developed by the previous researchers for competence identification. The limitations of these models in terms of conceptual and practical weaknesses are analysed and discussed.

2.1 Previous Research on Competence Identification

Over the last decade, the importance of competence identification work has attracted research interests of the academics and practitioners alike. Many authors have provided disparate conceptual guidelines for helping companies to identify their business strengths (e.g., Prahalad and Hamel, 1990; Grant, 1991; Myer and Utterback, 1993; Hamel, 1994; Sanchez *et al.*, 1996; Javidan, 1998). However, the majority of these guidelines do not provide a structured process or detailed procedures to be used by the practitioners for direct application. Only a small number of authors have demonstrated somewhat detailed processes of competence identification, showing limited success in specific situations. The author of this thesis has identified six such models which can be classified into two groups: business strategy models and competence models. These models are presented in the next two sections.

2.2 Business Strategy Models

2.2.1 Production Competence Model

Cleveland *et al.* (1989) have developed a conceptual model for identifying competence by linking production process (e.g., job shop, batch) with business strategy (e.g., cost, differentiation). With this model, production competence is defined as the skill or capability that enables manufacturers to carry out a specific business strategy. Business strategies here refer to cost, differentiation, and focus. The model involves identifying nine key areas of production performance (e.g., quality, delivery, throughput, lead time, etc.). The strengths of these performance areas are then assessed against the degree of production process sophistication. Concurrently, the importance of these process capabilities against alternative business strategies is evaluated. The production competencies are determined based on the results of the two assessments as shown in Figure 2.1. Through applying the model on six companies the authors made several observations and conclusions including that firm competence "could be defined and quantified by consistently using a well-planned procedure within a fixed framework of measurable variables".

2.2.2 Manufacturing Competence Model

Using competitive priorities and business strategies as measures, Kim and Arnold (1992) have constructed a framework to illustrate the concept of manufacturing competencies (see Figures 2.2). In their view manufacturing competence is represented by the degree of consistency between the importance given to a capability and the firm's strength with regard to that particular capability. The capabilities used by these authors

are those competitive priorities such as cost, quality, flexibility, and delivery.

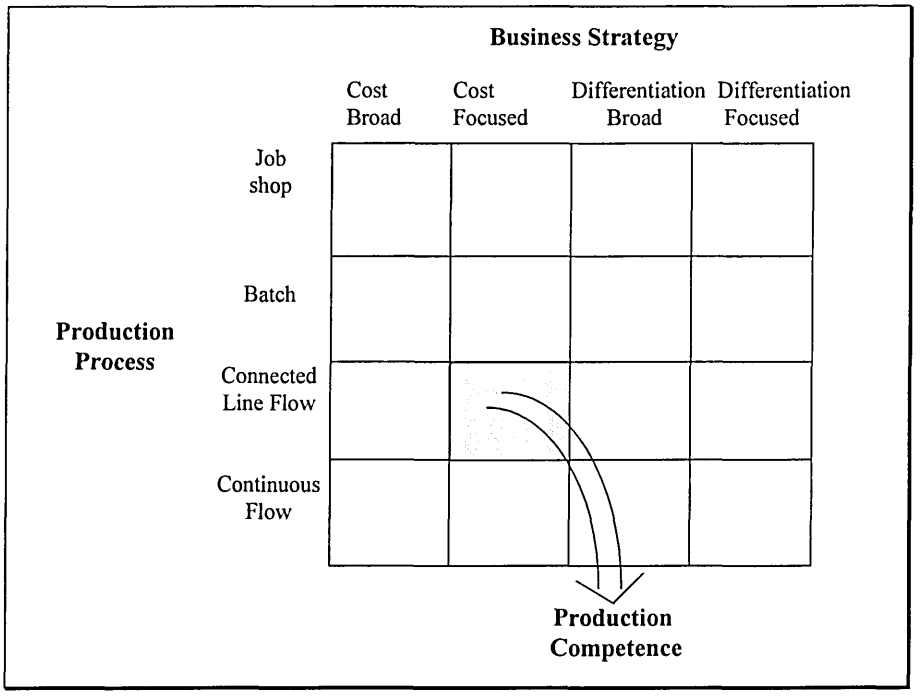


Figure 2.1 Production competence model (Cleveland *et al.*, 1989)

In order to determine manufacturing competencies of firm, two assessments are required: the strength in capabilities and the importance of capabilities. Both assessments are based upon the perceptions of management and employ a seven-point scale where 1 = not important and 7 = very important. The comparison among various capabilities is made referring to a normalized score which is calculated by finding the differences between a score of each capability and the average of all capabilities. Then according to the comparison results the capabilities are plotted into an analytical model shown in Figure 2.3. The manufacturing competencies are determined from those capabilities which are highly important to the firm and strongly competitive in competition. Using the data collected from 1990 Manufacturing Futures Survey, the model is tested. Like Cleveland *et al.* (1989), Kim and Arnold have also found a

statistically significant relationship between manufacturing competence and business performance.

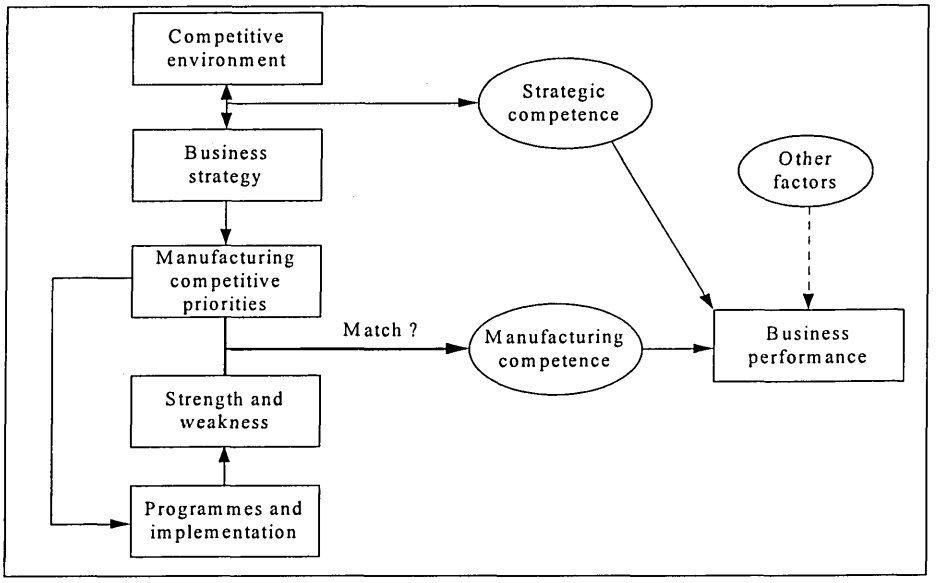


Figure 2.2 The framework of manufacturing competence concept

(Kim and Arnold, 1992)

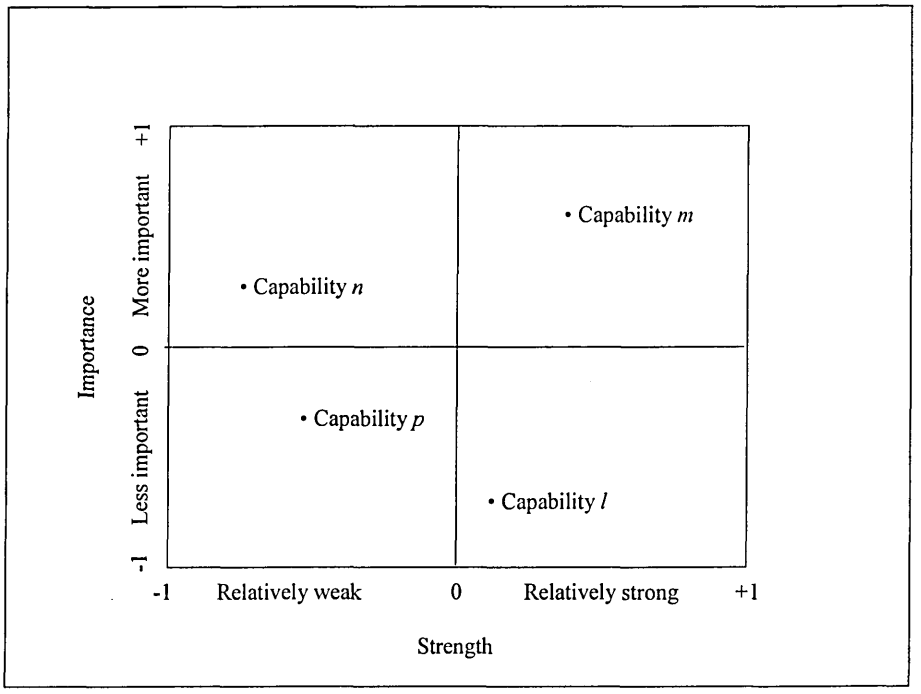


Figure 2.3 The model for determining manufacturing competence

(Kim and Arnold, 1992)

2.2.3 Make or Buy Model

Probert *et al.* (1993) propose a four-stage model to differentiate the strategic values of various manufacturing technologies for make or buy decision-making (see Figure 2.4). The core of the process is formed by two separate assessments for technology candidates. The first assessment is used to determine the importance of a technology to the business of a firm. The second assessment is employed for determining the competitiveness of the technology in marketplace. The criteria used for the first assessment are the performance measures such as cost, quality, delivery, leadership, and vulnerability. The criteria used for the second assessment are those indicators which can be used for external comparisons (i.e., comparing with competitors).

The two assessments involve assigning weights for each technology against each of the criteria based upon the judgement of the decision-makers. The results from the both assessments are then used for plotting the technologies into a three by three matrix proposed originally by Abetti (1989) as shown in Figure 2.5. Depending upon the respective position of each technology in the matrix, appropriate make or buy decisions are suggested. In addition to the assessments, the authors also suggest that the future evolution of existing and new technologies should be also considered into the choice of the make or buy decisions. The framework has been tested by the authors within a particular factory site of Lucas Aerospace for evaluating investment options. The results show that the proposed stepwise procedures for differentiating various manufacturing technologies are logical, workable, and practical.

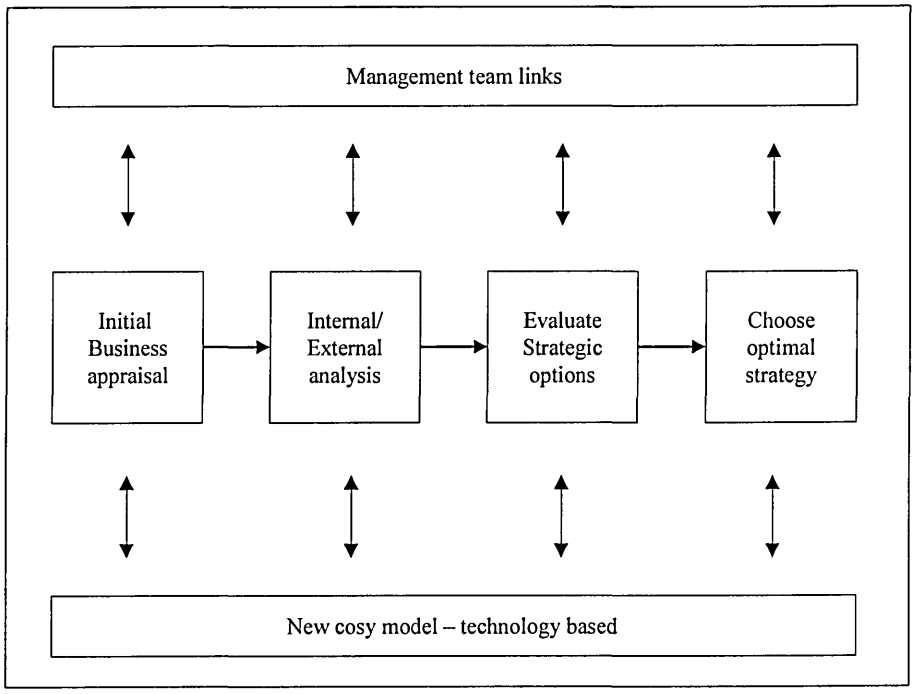


Figure 2.4 Manufacturing technology differentiation process (Probert *et al.*, 1993)

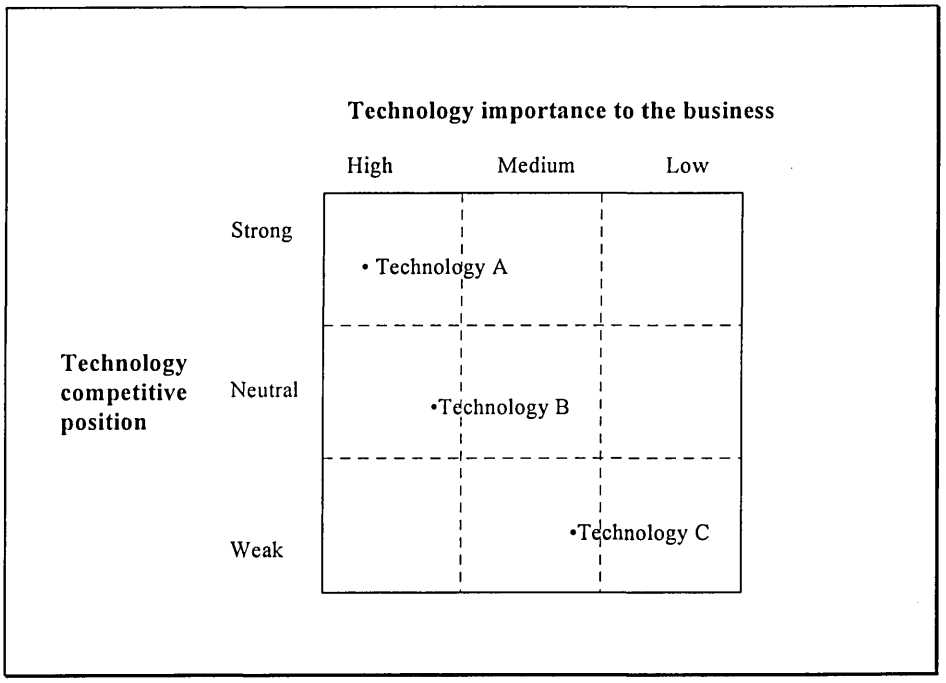


Figure 2.5 Make or buy model (Probert *et al.*, 1993)

2.3 Competence Models

2.3.1 Technical Subsystem Model

Tampoe (1994) proposes a framework for identifying and exploiting core competencies. He assumes that core competencies are residing within the firm's technical and management subsystems. The identification process starts by mapping the firm's revenue stream against its major products and services. The aim is to determine main products or service which generates relatively more revenues for the firm. The main products or services are then analysed for identifying those technologies, employee know-how and other assets that play major role in creating these products or service. The core competencies are then determined by evaluating the strategic importance of the key assets. The framework is illustrated in Figure 2.6.

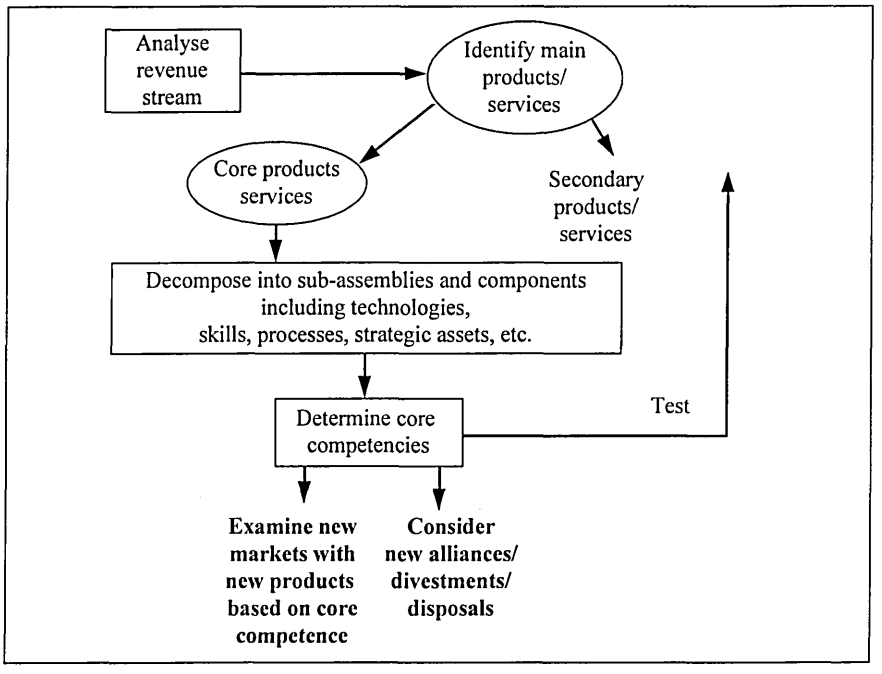


Figure 2.6 Technical subsystem model (Tampoe, 1994)

Tempoe also points out that to maximise profit-generating ability, core competencies should be exploited within the strategic intent of the firm. The model is explained using several worldwide organizations (e.g., Hewlett-Packard, Ciba-Geigy) as the examples.

2.3.2 Competitive Advantage Model

By presenting a conceptual model of sustainable competitive advantage for service industries (see Figure 2.7), Bharadwaj *et al.* (1993) provide a process for identifying the valuable and unique resources and capabilities of a firm. In this model, firm resources and capabilities are used as the basic units of analysis. Barriers to imitation (uniqueness) are emphasized as a central feature to the model. Financial performance (e.g., return on investment, shareholder wealth creation) and non-financial performance (e.g., market share, customer satisfaction) are the outcomes of competence application.

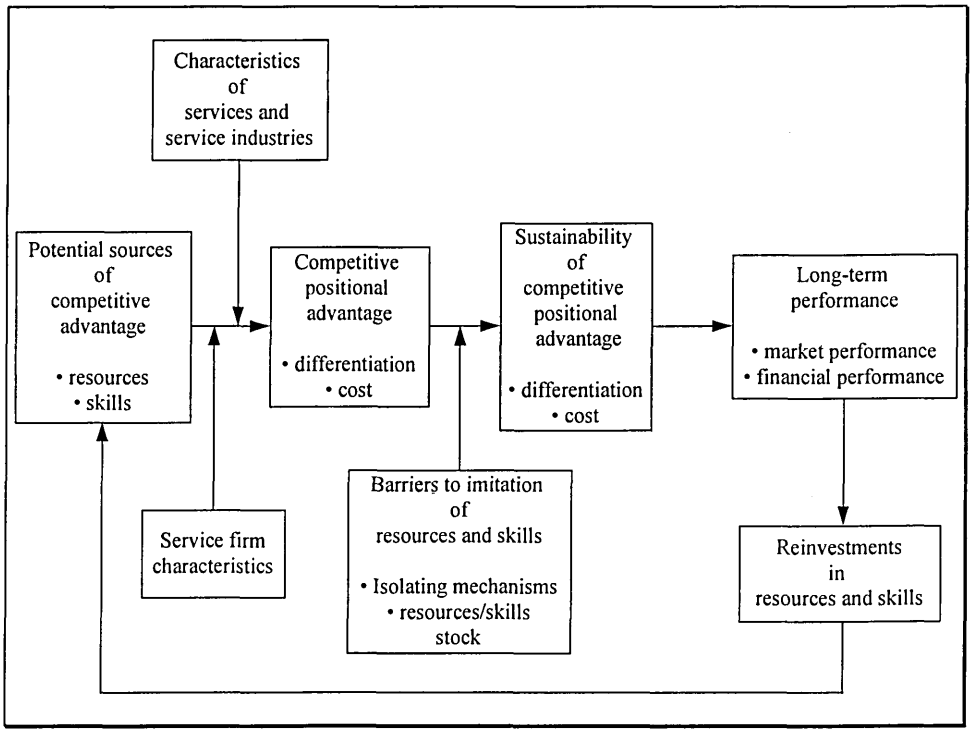


Figure 2.7 Competitive advantage model (Bharadwaj *et al.*, 1993)

Based upon the model, the authors have analysed the resources and capabilities underlying a service business's competitiveness. The effect of organizational culture on the competitive advantage and business performance has been discussed in detail. They have also provided a number of propositions delineating the moderating effects of the characteristics of services, service industries, and firms within industries on these sources.

2.3.3 Competence Analysis Process

Lewis and Gregory (1996) have proposed a four-stage process for identifying the competencies of a firm (See Figures 2.8). The process starts with the analysis of firm's activities and constituent resources. The first stage is designed for helping firms understand their activities and the resources associated at the various levels. The goal here is to develop a common model of the firm. The authors suggest that the top-level activities can be decomposed into more detail. A hierarchical structure is used to represent the mapped activities. The second stage is used to review the business planning process, company goals, and strategy for achieving those goals. This is to set the directions for competence identification. The third stage involves an analysis of the uniqueness for competence candidates. Drawing from the literature, seven metrics are determined and employed for the uniqueness analysis, namely, scarcity, imitability, durability, retention, codification, embodiment, and importance. The values of the mapped activities are determined assessing against the importance to firm and the performance of firm. The fourth stage of the process aims to review the results, implications, conducts etc., and to understand the dynamics of the firm through monitoring the data related to the results change over time.

Lewis and Gregory have applied the approach in a UK-based manufacturing company, Advanced Audio Ltd. They argue that a process approach to strategic problem solving is more beneficial than traditional "expert" analysis of a business as most organisations can be more effective if they learn to diagnose their own strengths and weaknesses. In addition, an understanding the profile of firm resources can help towards strategy formulation and implementation.

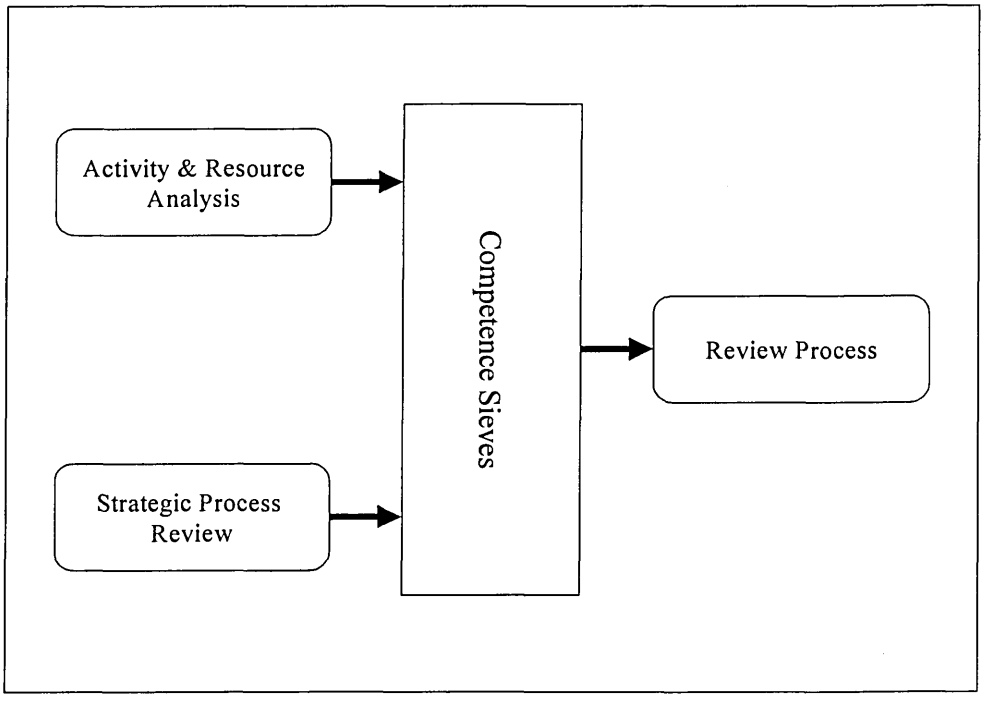


Figure 2.8 The model of firm activities and resources (Lewis and Gregory, 1996)

2.4 Discussion

One of the main objectives of the previous research work has been to provide tools for understanding competencies and to determine objectively optimum business strategies. It is understood that the proposed models all have strengths and weaknesses. Some important guidelines can be drawn for the previous work.

2.4.1 Implications of the Models

By analysing the methods and application results of the six models, the present author has drawn the following conclusions which are perceived to be valuable for designing a new framework for core competence evaluation:

1. Five out of the six models use resources and/or capabilities as the objects of analysis. Only the model described by Tampoe (1994) uses different objects (end products or services) as inputs of his competence identification model.
2. All the three models within the context of business strategy as well as Lewis and Gregory (1996) model show that core competence can be determined based upon some kinds of quantitative analyses. The other two models have described the procedures to conduct a qualitative evaluation of units of analysis.
3. A set of criteria is required for evaluating the characteristics of competence candidates. The criteria are first determined and then used as vehicles for obtaining objective or subjective data from practitioners.
4. A process-based, systematic model is more logical and practically useful. The models designed by Probert *et al.* (1993) and Lewis and Gregory (1996) have demonstrated such characteristic and proved its benefits in practical applications.

2.4.2 Limitations of the Models

Appraising under the theory of competence-based competition, however, the models have limitations. A closer analysis reveals that none of these models as such could be utilised to identify core competence. The main shortcomings are listed in the following.

2.4.2.1 Vague Definitions of Terms

None of these models provide a clear definition of the terms used. For example, definitions of the fundamental terms such as resource, asset, capability and competence are not explained clearly. The interrelationships between these terms are either defined poorly or not defined at all. These fuzzy and poorly understood definitions would cause serious problems if firms seek to implement these models.

2.4.2.2 Incomplete and Unbalanced Evaluation Criteria

It is understood that the success of core competence identification by and large would depend upon the criteria used. One of the salient characteristics of core competence is that it must be strategically flexible and hence able to create new business options for the firm. However, all these models use only static criteria for assessment. In addition, the static criteria used by most of the models are also not complete. For example, the technical subsystem model (Tampoe, 1994) only uses financial measures for differentiating among the technologies embedded in products and services. Non-financial measures such as, customer satisfaction, new product development, are completely ignored. Such analysis could only present a biased view of the organisation in recognising the core competencies.

2.4.2.3 Lack of a Detailed Procedure

Core competence identification is a complicated process. In order to help practitioners to fully understand and easily implement the procedure, a structured approach is needed. With the exception of make vs. buy model (Probert *et al.*, 1993), none of the other

models described present a detailed implementation procedure. Although Lewis and Gregory (1996) have described their approach for core competence identification extensively, the detailed implementation methods are limited. For example, while they have used a structured approach for firm activity mapping, the technique employed for determining the top-level activities is not provided.

2.4.2.4 Lack of Generic Nature

As mentioned in Chapter 1, the survey results obtained through employing case studies only tend to be non-robust, non-generalised and subject to sampling and observer biases. However, all these competence models are tested through case studies. Such narrowly defined context may limit the range of applications. Hence, in the absence of a more balanced research method, none of the models can be viewed "generic" enough with a potential to be used in both manufacturing and non-manufacturing sectors.

2.5 Summary

The literature review shows that whilst the previous models have made some valuable contributions to solve their designated problems, some inherent limitations have been identified. These limitations restrict these models to be a truly valuable and used in both manufacturing as well as services industries. Two important conclusions are drawn from the literature review. First is that determining the units of analysis is the first step towards building a conceptual model. Second is that the appropriateness of the assessment criteria is the key to the success of a proposed model. Table 2.1 gives a summary of the identified implications and limitations associated with the proposed models.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Basic units of analysis	Capability	Capability	Technology	Products	Resource and skill	Capability and resource
Analysis technique	Quantitative and qualitative	Quantitative and qualitative	Quantitative and qualitative	Qualitative	Qualitative	Quantitative and qualitative
Criteria used	Importance Strength	Importance Strength	Importance Strength	Performance (Financial only)	Performance Uniqueness	Importance/performance Uniqueness
Clear definitions	No	No	No	No	No	Yes
Systematic procedure	No	No	Yes	No	No	Yes
Generic application	Low Manufacturing only	Low Manufacturing only	Low Technology only	Low Technical sub-system	Low Services only	Low Manufacturing only

Table 2.1 The implications and limitations of the previous models

Key: Model 1 = Production competence model (Cleveland *et al.*, 1989);

Model 2 = Manufacturing competence model (Kim and Arnold, 1992);

Model 3 = Make or buy model (Probert *et al.*, 1993); Model 4 = Technical subsystem model (Tampoe, 1994);

Model 5 = Competitive advantage model (Bharadwaj *et al.*, 1993); and

Model 6 = Competence Analysis Process (Lewis and Gregory, 1996)

CHAPTER 3

RESOURCE and CAPABILITY RELATIONSHIP

The literature review presented in Chapters 1 and 2 has shown that firm resources and capabilities are the basis on which a core competence evaluation framework should be built. However, it was realized that it is very difficult to distinguish between resources, capabilities and competencies. Phrases like firm resources, knowledge, capabilities, strategic assets and core competencies are used interchangeably, arbitrarily, and loosely (Bogaert and Van Cauwenbergh, 1994; Nanda, 1996). This chapter serves to provide the working definitions of firm resources and capabilities and propose a resource-capability relationship model. The model is verified using a case study example. This relationship secures the basis of competence evaluation exercise described in the subsequent chapters.

3.1 Firm Resources

While the literature generally describes firm resources as the basic unit of analysis to explain the concept of core competence, it was very hard for one to find a unified or convergent definition of firm resources (Wernerfelt, 1984; Dierickx and Cool, 1989; Barney, 1991; Sanchez and Heene, 1997). In the present author's view, this is counter productive in understanding the concept of core competence, especially for those organisations willing to embark on the route of core competence identification. This section at first reviews various resource definitions, compares their characteristics, and then provides a working definition for the purpose of model building. The strategic value and characteristics of firm resources are also discussed.

3.1.1 Working Definition

Table 3.1 gives examples of resource definitions as found in the literature.

Authors	Resource
Grant (1991)	Inputs into production processes
Aaker (1989)	Something a firm possesses
Barney (1991)	Anything controlled by a firm
Sanchez et al. (1996)	Useful assets
Nanda (1996)	Fixed, firm-specific input factors of production

Table 3.1 Firm resource as defined in the literature

These definitions range from a broad interpretation to a very specific description. On the one hand, firm resources are defined as "anything which could be thought of as a strength or weakness of a given firm" (Wernerfelt, 1984). This "anything" includes physical resource (e.g., plant and equipment, financial endowments, raw materials), human resource (e.g., training, experience, skills) as well as organisational resource (e.g., firm image, processes, routines, internal systems for research) (Barney, 1991; Marino, 1996). With this regard, a relatively complete and clear definition is due to Sanchez *et al.* (1996), who provide definitions of assets (tangible and intangible), capabilities, as well as resources. Note that in their terminology capabilities are considered as part of resources.

On the other hand, many authors do not include capabilities within the definition of firm resources because of their dynamic "doing" nature. The basis of this approach is that

capabilities are the results of resource deployment and organisational processes and should be treated independently. For example, Nanda (1996) suggests that resources and capabilities should be defined differently:

" if resources are defined in terms of what they do rather than what they are, it becomes impossible to distinguish among them the strategic and the non-strategic resources".

A relatively clear description of resources and capabilities is due to Grant (1991):

"Resources are inputs into the production process-they are the basic unit of analysis ..... A capability is the capacity for a team of resources to perform some task or activity".

For the present author, Nanda's comments explain the reason why resources and capabilities should be defined differently, and Grant's definition is more logical and practical. Hence, drawing from these definitions, the present author defines resource as "any tangible or intangible asset owned or controlled by a firm, and firm resources comprise not only those assets that are endowed inside a firm but also those that link the firm with external constituencies (relationship-specific assets)". The examples of the latter factors include consumer loyalty, public trust, relationships with government, etc.

3.1.2 Strategic Value of Firm Resources

The value of firm resources usually rests on two fundamental premises: firstly they provide the basic direction for a firm's strategy and secondly they are primary source of

profit for the firm (Grant, 1991; Black and Boal, 1994). Whilst business environment is much more dynamic, firm resources are relatively stable. Therefore, in fast changing environment, strategic decision-makings of firm are increasingly influenced by firm resources rather than by market needs. If a resource is unique in competition, it will sustain its value in strategic decision-making by resisting erosion that initiated by competitors. Together with capabilities, they represent the identity of a firm (Barney, 1991).

With respects to the profitability, firm resources such as scale-efficient plant and product reputation are the ultimate source of any business strategies adopted by a firm (e.g., cost advantage or differentiation). Without sufficient and necessary resources, a firm could not implement its strategies effectively. This is recognised by the fact that firms are advised to treat resource development as one of the top priorities of management (Harvey and Lusch, 1997).

3.1.3 Characteristics of Firm Resources

Firm resources are usually passive and fragmented. They produce value only if organised into activities and processes that ensure products or services produced and valued by customers/users (Grant, 1991). In many circumstances, a firm achieves rent not because it has better resources, rather its ability to make better use of the resources (Hofer and Schendel, 1978; Ford *et al.*, 1986). For example, Prahalad and Bettis (1986) have empirically proved that firm diversity is a characteristic stemming from the management logic for processing and understanding firm resources. The ability is termed capability in the literature.

3.2 Categories of Firm Resources

Drawing from the literature (e.g., Barney, 1991; Grant, 1991), the present author classifies firm resources into three categories of assets, namely, physical, intellectual and cultural assets. The three categories can be used to represent all the tangible and intangible assets.

3.2.1 Physical Assets

A salient attribute of a physical asset is its visible or tangible existence. Resources such as plant and equipment, office buildings, warehouses, inventories, geographic location and access to raw materials are the examples of physical asset. Due to the tangible nature of these assets, they are readily valued in the accounting system and balance sheets of the firm.

3.2.2 Intellectual Assets

Intellectual assets are invisible, soft things including knowledge, rights of patents, trademarks, copyright, employee know-how, brand image, and customer loyalty. Intellectual assets (as well as cultural assets) differ from physical assets in two ways (Nanda, 1996):

1. They have no physical existence;
2. They are a by-product of the firm-production process.

Intellectual assets, particularly employee know-how and organisational knowledge, are

very often viewed as the most important elements of core competence (Itami, 1987; Hall, 1989). Intellectual assets are usually capable of simultaneous multiple uses, durable and difficult to imitate (Lado and Wilson, 1994).

3.2.3 Cultural Assets

Cultural assets are intrinsically rounded up with a firm's unique history and heritage (Lippman and Rumelt, 1982; Barney, 1986). Schein (1985) defined culture as:

"A pattern of basic assumptions invented, discovered, or developed by a group as it learns to cope with its problems of external adaptation and internal integration - that has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think, and feel in relation to those problems".

There are evidences that cultural assets have become important factors that differentiate the business performance of competing firms (Bharadwaj *et al.*, 1993). The firms those have relatively strong traits, values and shared belief patterns are likely to outperform their competitors (Dennison, 1984). Distinctive cultural assets can help to attain a shared vision and goal congruence among employees to meet organisational goals (Wilkins and Ouchi, 1983) or empower employees to be flexible and achieve organisation goals (Pascale, 1985). For example, Hewlett Parkard (HP) cultural assets include commitments to teamwork and cross-division co-operation. HP has exploited such assets within its innovation capability to enhance the compatibility of its numerous products including printers, plotters, personal computers and electronic instruments. As a result HP has been able to almost double its market value without introducing any radical new products or technologies (Tampoe, 1994).

3.2.4 Examples of Assets

Traditionally, physical assets are valued much higher than the other counterparts due to their visible contributions to business. However, in the recent time, some authors have argued that a firm's economic value is not merely the sum of the values of its tangible assets, whether measurable at historic cost, replacement cost, or current market value prices, but also that of intangible assets (Johnson and Kaplan, 1987). In fact practitioners have realised that intangible assets that are not valued in the balance sheets had relatively more contribution in the business success (Hall, 1994). Table 3.2 gives a summary of definitions of the assets along with relevant examples.

3.3 Firm Capabilities

As no convergent definition of firm capabilities existing, this section is used first to provide a working definition for firm capabilities and then discuss its strategic value and characteristics. A capability mapping technique is also described.

3.3.1 Working Definition

Capabilities result from a complex pattern of actions and a positive synergy among various resources (Grant, 1991; Nanda, 1996). They are invisible and manifested within organisational activities and processes and enable firms to provide products or services to customers (Hammer and Champy, 1993; Childe *et al.,* 1994; Day, 1994). Penrose (1959) points out that capabilities are the actual and active inputs of production function. Capabilities of a firm can be developed indigenously or collaboratively with

Term	Definition	Examples
Physical asset	A tangible or 'touchable' thing	• Wal-Mart's dedicated truck fleet (Stalk *et al.*, 1992) • McDonald restaurant's outlets (Grant, 1991)
Intellectual asset	An intangible or 'invisible' thing	• Marks & Spencer's reputation of quality (Tampoe, 1994) • Coca Cola's brand name (Kay, 1993) • Kellogg's customer loyalty (Hitt *et al.*, 1995)
Cultural asset	A pattern of basic assumptions	• Motorola's ethics for close co-ordination with suppliers (Hitt *et al.*, 1995) • Hewlett-Packard's belief in empowerment (Tampoe, 1994) • Xerox's commitment to customer service (Hitt *et al.*, 1995) • 3M's belief in individuals' initiative for stimulating innovation (Goold *et al.*, 1997)

Table 3.2 Categories of firm resources

the help of the firm's stakeholders. In this study, I would adopt the capability definition proposed by Grant (1991):

"A capability is the capacity for a team of resources (assets) to perform some task or activity".

3.3.2 Strategic Value of Capabilities

Similar to firm resources, capabilities are also a primary source of profit and provide the basic direction for strategic decision-making. As capabilities represent the integration and synergy of firm resources, they generate more strategic options for business than firm resources. In fact it is capabilities that play an active role in production, not resources. That is why many authors refer to capabilities in order to study core competence (Nelson and Winter, 1982; Dierickx and Cool, 1989).

3.3.3 Characteristics of Firm Capabilities

Unlike firm resources which exist individually and independently, capabilities cannot deliver their value without using resources. Firm capabilities involve complex patterns of co-ordination between resources (Grant, 1991; Teece and Pisano, 1994). A capability tends to change along with the quality or quantity change of its embedded activity structure or resource base. In turn, capabilities can create new resources or improve existing ones. Also, it is possible for firm capabilities to be perfected over time through experience.

3.3.4 Categories of Firm Capabilities

Embedded in business activities and processes, firm capabilities can be differentiated according to their business functions (Learned *et al.*, 1969; Grant, 1991). For example, Snow and Hrebiniak (1980) use a functional classification of the firm's activities to study business capabilities. Their functional classification comprises ten function titles, namely, general management, financial management, marketing and selling, market research, product R & D, engineering, production, distribution, legal affairs, and personnel. For each business function, capabilities may be formed by the integration of multiple activities (processes) or developed just from a single (discrete) activity (Grant, 1996). Generally, if more activities are involved, the capability is likely to be more complex.

3.3.4.1 Discrete Capabilities

The examples of discrete capabilities may include those dealing with individual activities or specialised tasks such as surface mounting of components or wave soldering. These capabilities are relatively simple, however, large in number. Whilst such capabilities may be indispensable to business operation, on their own they have limited value to the firm. Hamel (1994) has pointed out that such capability is unlikely to qualify as core competence.

3.3.4.2 Integrated Capabilities

Integrated capabilities are viewed as the synergy among various discrete capabilities. Comparing with discrete capabilities, they are few in number. Since the integration is

realised through extensive communications and interactions among discrete capabilities, integrated capabilities are also known as 'collective learning' (Prahalad and Hamel, 1990).

Because of its richer contexts, an integrated capability can provide more flexible business options to the firm. Since integrated capabilities are relatively more complex, it is much harder for outsiders to understand and comprehend the capabilities. For example, Canon's R & D capability represents the integration of its optical, microelectronic, and precision-mechanical research activities. Although some of its competitors also have the ability to master these individual activities, only Canon has delivered high quality, wide-range products to customers (Grant, 1991).

3.4 Capability Mapping

In order to determine the candidates of core competence, firm capabilities need to be identified and mapped. The success of the identification is crucial to the quality of core competence evaluation. However, as mentioned in Chapter 2, in their model, Lewis and Gregory (1996) didn't provide a detailed method for mapping firm capabilities. While a hierarchical structure was constructed for the quality activities, how to identify and determine the top-level capability in terms of its scale and scope wasn't given. This shortcoming would cause difficulty for firms to implement the model.

The present author suggests an effective capability mapping process involving top-down decomposition of business functions. This approach requires one to fully understand the contents and structure of a business function. The functional capability can be decomposed into several levels as illustrated in a tree structure (see Figure 3.1). Level 2

represents operations-related capabilities. The operational capabilities are, in turn, formed by several less-integrated capabilities (say, process-based). Further decomposition may be carried out until single-task or activity-based capabilities are identified within each of the process-based capabilities. This process is used in Section 3.6 for mapping capabilities for Company A and subsequently used in Chapter 4 for determining the candidates of key capability identification.

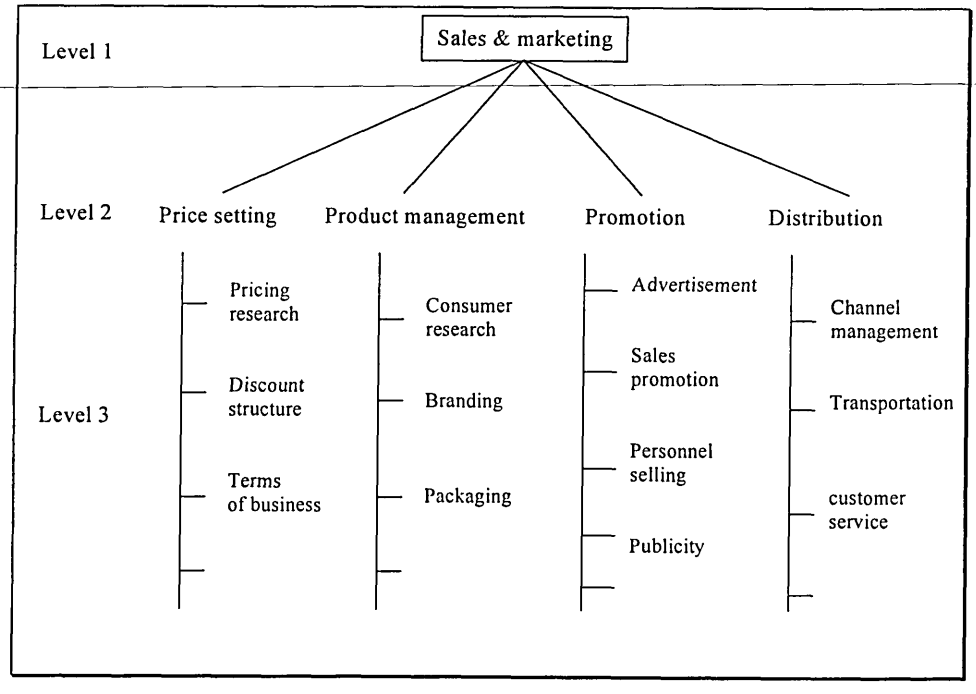


Figure 3.1 The decomposition tree of functional capabilities

3.5 Relationship between Resource and Capability

As mentioned earlier, firm resources are productive only if organised into activities that ensure the products or services are produced and valued by the customers. Resource organisation and activity operations are managed in form of capabilities. Figure 3.2 shows a conceptual model of resource and capability relationship as perceived by the present author. The resource base of each capability is formed using all the three

categories of assets: physical, intellectual and cultural. Some capabilities use more intellectual assets (e.g., product design) whilst others use a greater degree of physical assets (e.g., transportation). Note that firm capabilities can be used to develop/enhance existing assets of the firm (as shown by the dotted line).

As explained earlier, this model implies that core competencies should be identified from firm capabilities rather than resources. Whilst this conclusion is being accepted and cited by many researchers, few evidences have been provided to show that the relationship between resources and capabilities is a cause-effect one. For the purpose of verifying the proposed relationship, a case study is conducted to examine how practitioners perceive this relationship. Note that this verification is a prerequisite to the subsequent work reported in Chapters 4 to 7.

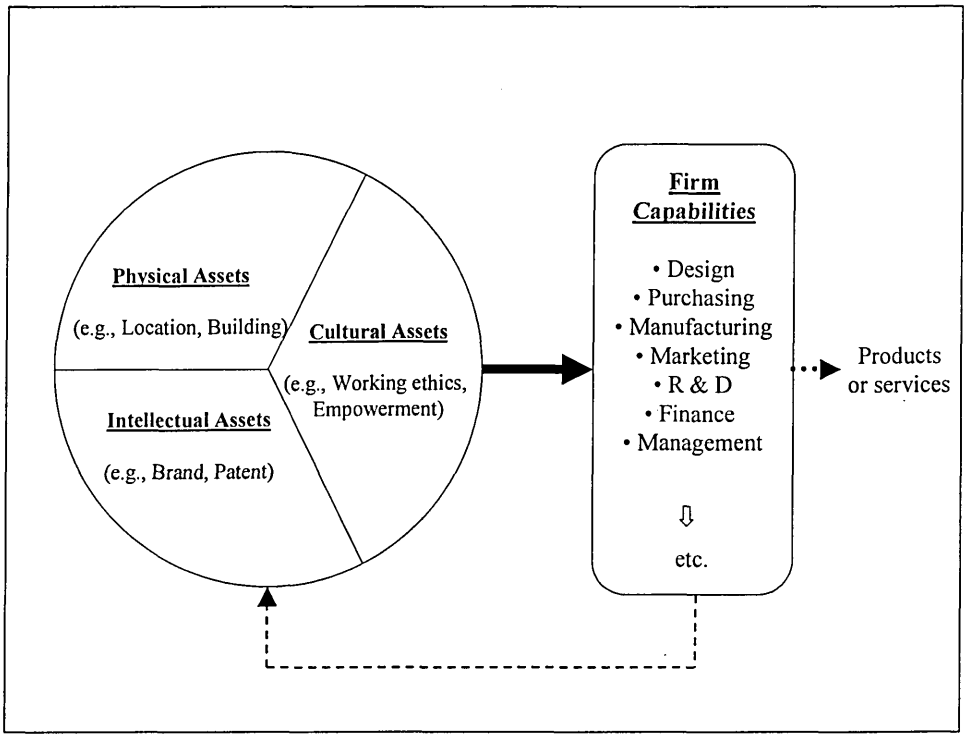


Figure 3.2 Resources as inputs to capabilities

3.6 Case Study of Company A

Two main reasons were behind the decision to choose Company A. The first reason was that the present author had a direct involvement in a manufacturing project three years ago with Company A. The author has observed various functions personally including manufacturing plants and distribution departments, and had useful discussions with senior managers. The second reason was that a convenient contact inside the company was interested in this study and proved to be a helpful resource.

The company was formally contacted in the late 1998 by writing a letter to its managing director. In less than one week time a positive response was received. The first impression was that the company was very keen to this research work. It has discovered at the later stage the company had been seeking efficient and effective ways to improve its competitiveness.

3.6.1 Company A Profile

Company A is a UK-based manufacturing company with more than 500 employees and over 100 million pounds turnover. The company operated in a highly competitive steel product market supplying to construction, automotive, food, aerospace, and defence industries. Its business mission was to be the number one choice of the customer in Europe and business strategy was pursuing an effective ways of providing high quality but low costs products.

The business of Company A was compartmentalised into five main functions, namely, purchasing, sales and marketing, R & D, manufacturing and performance management.

Although the management of the company had perceived their business strengths residing within these functional areas, the opinion was widely divided on how to specify those resources and capabilities most important to current and future business.

3.6.2 Data Access

After explaining the definitions of resources and capabilities, the managing director was first asked "What would you consider as the direct source of core competencies (business strengths), assets or capabilities?" The purpose was to gauge the practitioner's view against the theory and proposed relationships in terms of source of core competencies. Taking some internal activities (e.g., distribution) as example, the interviewee clearly pointed out that "doing" is a distinctive nature of the company's business strengths and the assets (e.g., plant) have little value without being incorporated into, and used by business activities or processes.

Within each of the functional areas, the managing director was then asked to identify those operational capabilities that are perceived as the strengths of the company and crucial to the business objectives. The functional approach that suggested earlier was used for the mapping process. While ignoring the individual capability level which is less important to core competence, the mapping process was restricted to analyse the activities at the operational level. Figure 3.3 presents the results of the mapping process. A set of twenty capabilities was identified as the major operational capabilities of the company.

It is deemed inappropriate to use a numerical scale (say 1 to 5) to describe the usage of intellectual and cultural assets for a specific capability, a percentage scale was

employed. The managing director was asked to assign relative percentage scores for each of the operational capabilities for each category of assets. Two rules were explained to the interviewee before the start of the score assignment exercise. If the manager perceived a specific category of assets (say cultural assets) not an input factor to a specific capability, the assigned score should be zero. Also the sum of the scores assigned for the three categories of assets should be 100%. Table 3.3 shows the breakdown of the subjective scores assigned by the managing director of Company A.

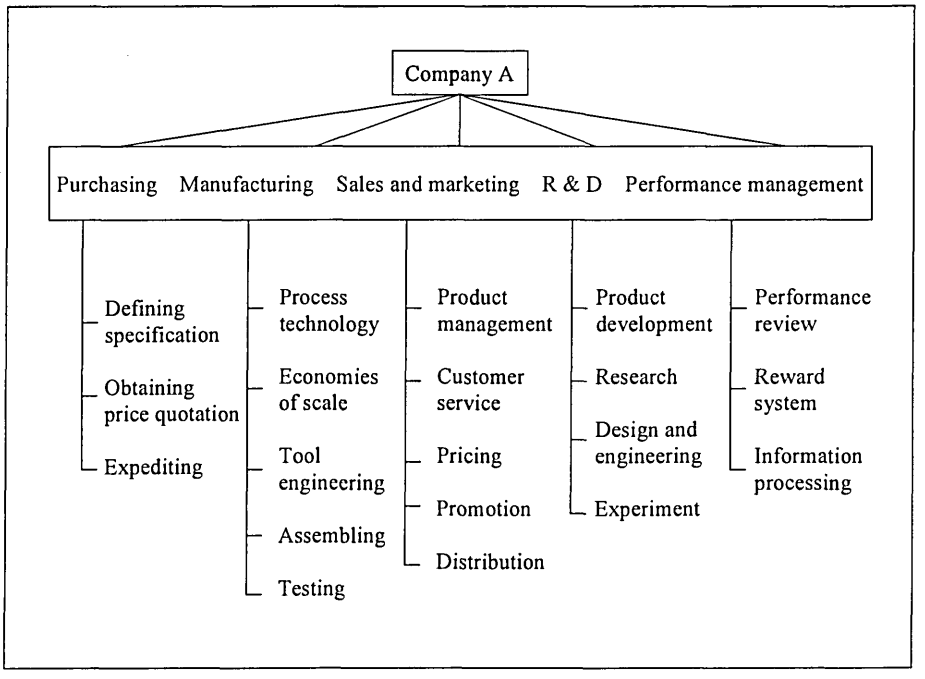


Figure 3.3 The operational capabilities of Company A

3.6.3 Results Analysis

The main purpose of this analysis is to help a company to understand the composition of resource profiles in making up various capabilities, and is the building block for subsequent analysis. The data analysis reveals some interesting results. The managing director strongly believed that because of their "doing" nature capabilities are the direct

sources of business strengths (core competencies) rather than firm resources. He believed that a capability is formed using assets and accepted the asset categories proposed by the author. This can be seen from the percentage scores assigned to the operational capabilities of the company.

Capability	% Physical asset	% Intellectual asset	% Cultural asset	Total
Defining specification	20%	50%	30%	100%
Obtaining price quotation	10%	60%	30%	100%
Expediting	10%	60%	30%	100%
Process technology	50%	30%	20%	100%
Economies of scale	60%	30%	10%	100%
Tool engineering	40%	40%	20%	100%
Assembling	50%	30%	20%	100%
Testing	30%	40%	30%	100%
Product management	40%	40%	20%	100%
Customer service	30%	40%	30%	100%
Pricing	20%	40%	40%	100%
Promotion	10%	40%	50%	100%
Distribution	30%	40%	30%	100%
Product development	30%	50%	20%	100%
Research	20%	40%	40%	100%
Design and engineering	30%	50%	20%	100%
Experiment	30%	50%	20%	100%
Performance review	10%	50%	40%	100%
Reward system	40%	40%	20%	100%
Information processing	30%	50%	20%	100%

Table 3.3 The resource and capability relationships of Company A

As expected, physical assets made up the largest contribution to form the operational capabilities within the manufacturing function (average percentage of over 45%). In contrast, the capabilities associated with purchasing employed the least proportion of physical assets (average percentage of less than 14%). Intellectual assets gained a high score for purchasing, R & D and performance management functions. The expediting capability scored top rating (with a 60% score) within the intellectual assets category.

With respect to cultural assets, sales and marketing-related operational capabilities were perceived as the largest users. On average, about 34% of the resource base were formed by cultural assets. Also the capabilities within purchasing functional areas were also rated as larger users of cultural assets with an average ratio of almost 30%. Note that these capabilities are strongly linked with external business environment (e.g., suppliers, customers). This indicates that the interviewee of Company A believed that the cultural assets play more important role in the 'outward' capabilities than those 'inward' capabilities (e.g., manufacturing, R & D). Using the average scores from Table 3.3, Figures 3.4 to 3.8 presents the resource - capability relationships for Company A.

3.7 Summary

This chapter has introduced the concepts of resources and capabilities. The definitions suggested by various previous researchers are presented and discussed. Although some researchers (e.g., Lewis and Gregory, 1996; Sanchez *et al.*, 1996) have provided a set of relatively complete definitions for the concepts, the present author identifies some shortcomings associated with the definitions. For example, Sanchez *et al.* (1996) define firm capabilities (of doing nature) as a special class of assets (of having nature). According to Nanda (1996), using this definition it will be very difficult to distinguish

among them the strategic and the non-strategic assets. While Lewis and Gregory (1996) have introduced a method for mapping firm activities, the detailed procedures are not provided. As no structured technique is given, the usefulness of the mapping method is in doubt.

Drawing from the literature, the present author provides working definitions for firm resource and capability. A functional approach is introduced for systematically mapping firm capabilities. Resources are classified into three categories of assets, namely, physical, intellectual, and cultural assets. The relationship between resource and capability is discussed and validated using a case study.

The case study has shown that the practitioner perceived firm capabilities as the direct source of core competencies and firm resources are input factors of the capabilities. It is proved that the asset categories, namely, physical, intellectual, and cultural, are practical. In fact, based upon the proposed classification, some interesting results were identified from the data analysis. For example, the operational capabilities within manufacturing area were the major users of physical assets. The capabilities within purchasing were formed by mainly using intellectual assets and the sales and marketing was perceived as "culture intensive" functional area.

The experiment results show that there is sufficient evidence to prove the hypothesis that firm assets are the input factors of capabilities and the latter is the direct source of core competencies. Using this basic model the next chapter would be focused on firm capabilities to develop a conceptual model for core competence identification.

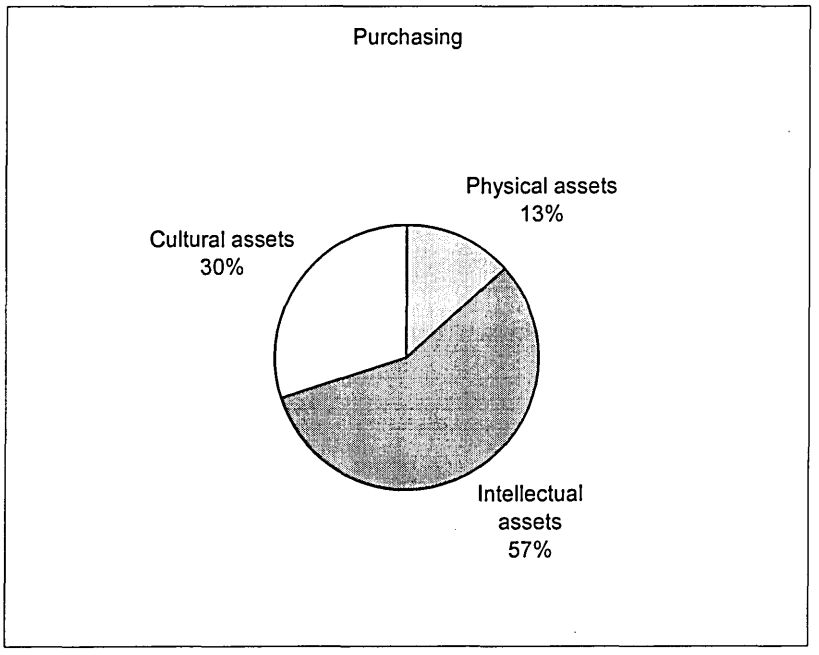


Figure 3.4 Resource - capability relationships for the purchasing function

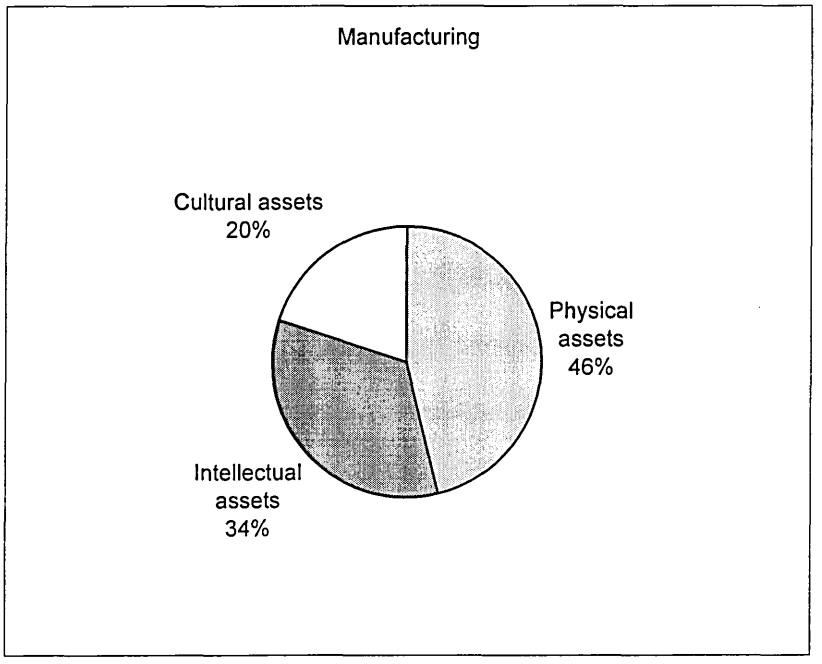


Figure 3.5 Resource - capability relationships for the manufacturing function

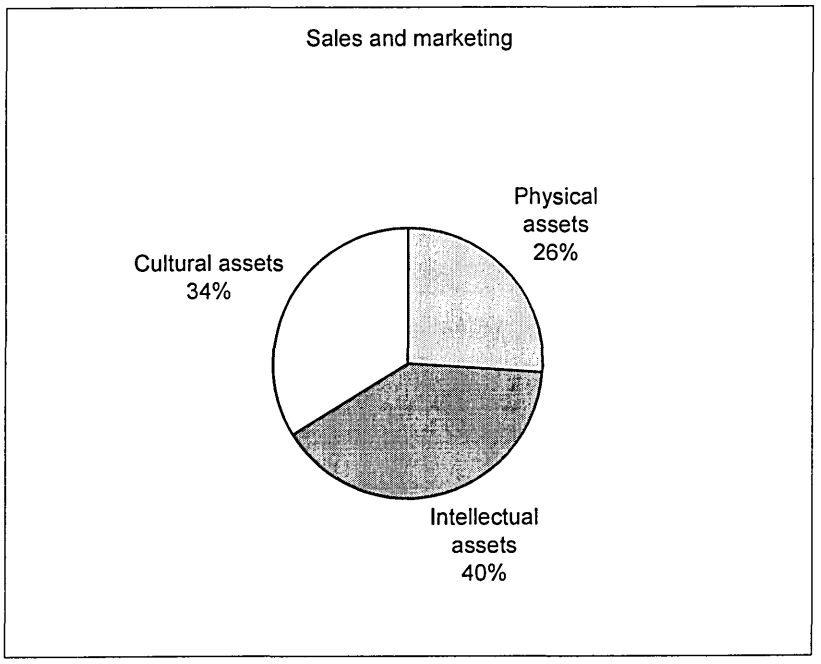


Figure 3.6 Resource - capability relationships for the sales and marketing function

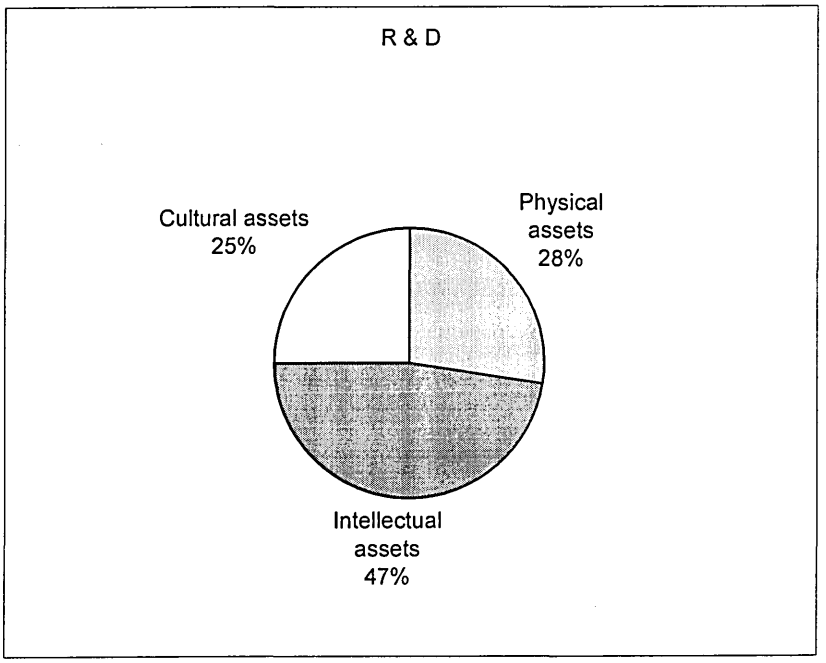


Figure 3.7 Resource - capability relationships for the R & D function

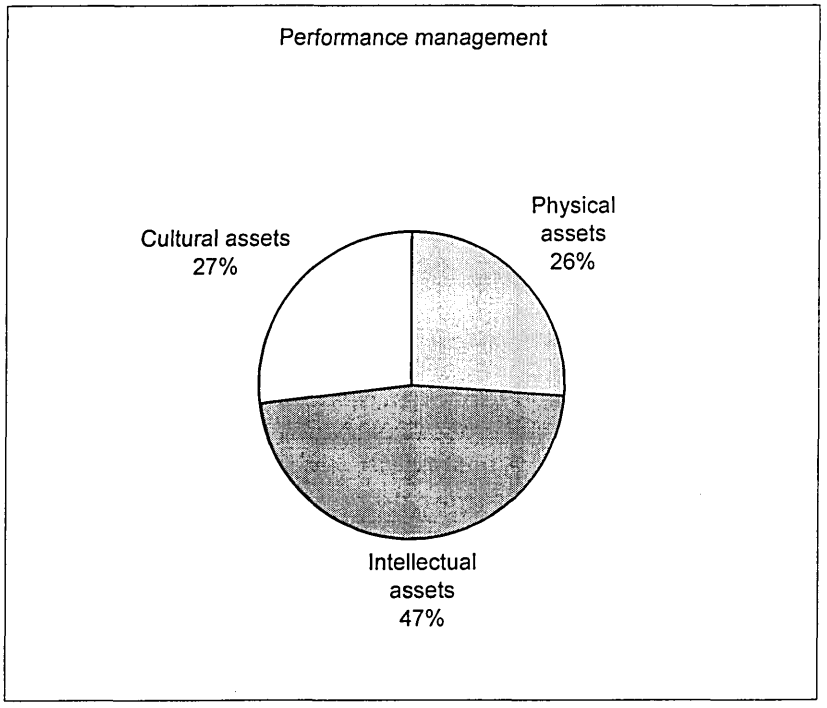


Figure 3.8 Resource - capability relationships for the performance management function

CHAPTER 4

KEY CAPABILITY DETERMINATION

As proved in Chapter 3, firm capabilities are the direct source of core competencies. This chapter develops a model for identifying the strategically valuable capabilities or key capabilities of a firm. The model employs Analytic Hierarchy Process (AHP) approach as the analysis tool, and is validated using five case studies.

4.1 Definition of Key Capability

Firm capabilities may be differentiated according to their strategic values to business performance (Chester, 1994; Day, 1994; Markids and Williamson, 1994). Performance has been defined as " the way the organisation carries out its objectives into effect" (Flapper *et al.*, 1996). Many authors believe that only those capabilities that play critical roles in the attainment of business objective should be considered fundamentally important to the firm. In this thesis, such capabilities are termed as key capabilities. The author also agrees with the view that key capability is "a capability that plays critical role in realising the business objectives of a firm" (Hitt and Ireland, 1985; Aaker, 1989; Myer and Utterback, 1993). Determining these key capabilities has been suggested as the first step towards core competence identification (Turner and Crawford 1994; Collis, 1996; Russo and Fouts, 1997).

4.2 Attributes of Key Capability

The strategic value of key capabilities to business performance can be categorised into

two dimensions, namely, efficiency and effectiveness. Effectiveness refers to the extent by which customer requirements are met, while efficiency is a measure of how economically the firm's resources are utilised when providing a given level of customer satisfaction (Neely *et al.*, 1995). In the literature, the two dimensions are very often supported by financial and non-financial performance measures.

4.2.1 Financial Performance

Financial performance is regularly used by firms as an approach to assess the fulfilment of their economic objectives (Venkatraman and Ramanujam, 1986). Some outcome-based measures, for example, return on capital employed (ROCE), profit, productivity, and sales growth, are frequently employed for the purpose of assessment (Ghalayini and Noble, 1996). The assessment results are then interpreted to indicate the efficiency of the firms' capabilities in resource deployment. For example, the productivity assessment has long been regarded as a primary mean to measure the efficiency of manufacturing capability in the use of labour, materials, and machine tools.

4.2.2 Non-financial Performance

Traditionally, accounting-based financial measures have been used to measure performance in Western companies (Doyle, 1994). Recently, however, many authors have pointed out that focusing exclusively on the financial measures is not without implications (Venkatraman and Ramanujam, 1986; Blenkinsop and Burns, 1992). The critics argue that we have come a long way away from a demand-led markets. Therefore, superiority in some operational areas such as customer service or new product development is becoming more and more important in the long-term survival of

a business. While the financial indicators very often suggest the short-term wealth of a firm, non-financial indicators are usually responsible for the healthy development as they actually reflect the actionable steps needed for survival (Kaplan and Norton, 1993; Lee *et al.*, 1995). In addition, a possible consequence brought by this financial only approach is that the important, but difficult to assess, strategic implications tend to be ignored (Probert *et al.*, 1993). For example, profits can be quickly raised by sacrificing investment on some important areas such as product development. As a consequence the "improved" financial situation may well be outweighed by the suffering of the long-term competitiveness (Sanchez *et al.*, 1997).

Non-financial measures consist of those reflecting customer and innovation perspectives. The customer perspective encompasses the measures of customer satisfaction, brand awareness, and customer retention. The main measure with respects to innovation perspective is the new product introduction rate (Slater *et al.*, 1997; Thompson, 1998). Those measures relative to competitors, such as market share, may be included as non-financial ones as well. Table 4.1 explains some of the commonly cited financial and non-financial performance measures in the literature.

4.3 Determining Key Capabilities

As mentioned earlier key capabilities are determined through value evaluation. This involves analysing the contribution of firm capabilities against the financial and non-financial performances. Figure 4.1 presents a method for determining key capabilities. Essentially, the method involves three steps:

Measure	Description	Source
Market share	A factor used to measure market power of a firm	Johnson and Scholes (1993)
Customer satisfaction	A measure to reflect the degree to which customers are satisfied with the products and services of the firm	Various authors
New product introduction	A measure of product and technology innovation	Various authors
Operating profit	{turnover-(cost of sales + overheads)} The profit arising from the manufacturing and trading operations of a business	Pass *et al.* (1991)
Return on capital employed (ROCE)	A measure expressing the firm's profits for an accounting period as a percentage of its period-end capital employed	Pass *et al.*, (1991)

Table 4.1 Commonly used financial and non-financial performance measures

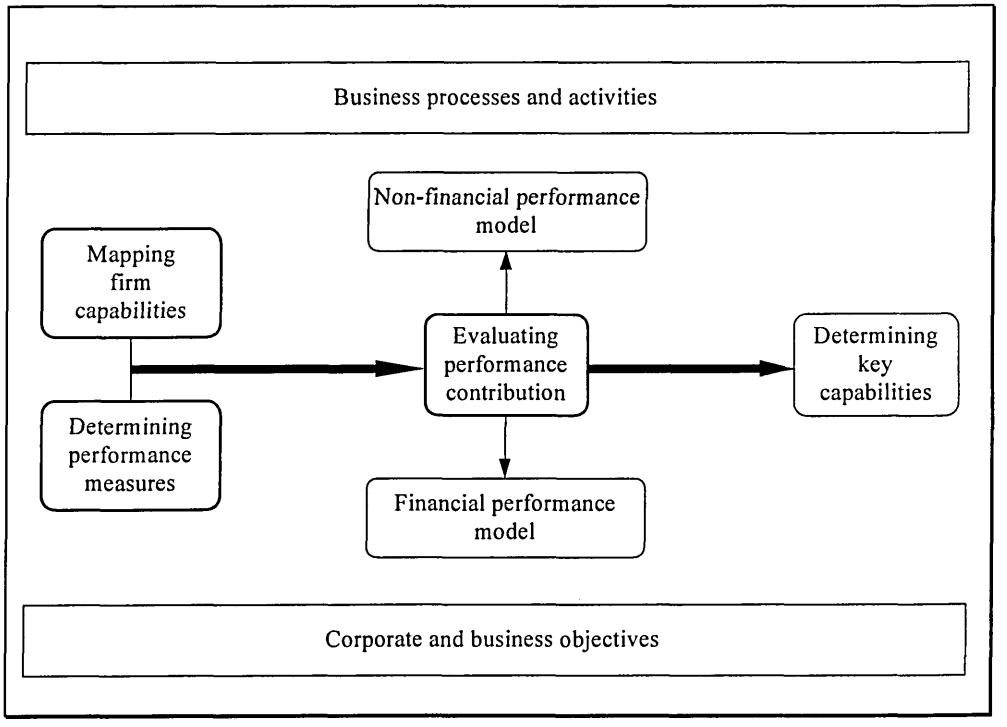


Figure 4.1 A model for determining key capability

Step 1: Determining performance measures and mapping firm capabilities,

Step 2: Evaluating performance contributions using Analytic Hierarchy Process (AHP), and

Step 3: Determining key capabilities.

4.3.1 Determining Measures and Mapping Capabilities

Business performance measures are determined by taking into account corporate objectives and strategies. For example, when a firm employs a specific business strategy (e.g., cost leadership), there is some recommended performance measures associated to it (e.g., market share). As described earlier, both financial and non-financial measures, as indicated in Table 4.1, should be included in the analysis.

Capability mapping exercise requires the management to fully understand its business processes and activities. As mentioned in Section 3.4, firm capabilities can be mapped through the analysis of functional areas such as, purchasing, manufacturing, marketing and R & D. Since each function may comprise a large number of embedded activities, it is quite possible to generate an exhaustive list. Therefore, it is recommended that the mapping exercise should not go down to the individual activity level of a function as too specific and disaggregated processes or capabilities are usually uninformative.

The capability mapping process starts by auditing various functions within the firm. For example, management of the company can be asked to identify and describe the working practices within each function. A facilitator then helps to pull together these key skills and capabilities in a structured list form. Appendix A gives some examples of the capabilities mapped using the functional approach.

4.3.2 Evaluating Performance Contribution Using AHP

The objective of this process is to identify those major contributors to business performance as accurate as possible. The involvement of multiple firm capabilities and the employment of financial and non-financial measures together indicate that the key capability determination is a complex, multi-criteria decision-making process. Since this process is crucial to the success of core competence identification, thus, an efficient and effective decision-making method is required.

In the literature, many management decision-making methods can be found, for example, net present value (NPV), internal rate of return (IRR), cost-benefit analysis, knowledge-based decision support systems (KB-DSS), multi-attribute utility theory (MAUT), Analytic Hierarchy Process (AHP), and heuristics (Naik and Chakravarty, 1992; Vincke, 1992; Saaty, 1994; Klein and Methlie, 1995). While the former three techniques are only suited to conduct quantitative analysis, the latter four can incorporate both qualitative considerations and quantitative factors in the process.

KB-DSS is a relatively new technique which is based upon expert system. While it seems promising to solve some complicated problems such as those related to bank and financial institutions, in my opinion whether it is suitable for the key capability evaluation remains questionable. Unlike those banking and financial issues which have relatively complete and sound procedure to follow and hence experts' knowledge to count, the knowledge base regarded to key capability evaluation is not fully established. For example, there is still no universally approved set of 'standard' evaluation criteria identified. In addition, knowledge-based systems very often use heuristic search method

which is developed based upon 'rule of thumb', and the heuristics sometimes lead to systematic and severe errors (Klein and Methlie, 1995).

MAUT and AHP techniques have been designed and used for making multiple-attribute decisions. While they both can be used in the combination of qualitative and quantitative factors, the processes and complexity of their applications are quite different. Designed using hierarchical structure and pairwise comparison, AHP has been perceived having several advantages, for example, simple to use and consistency measurement which allows to filter out inconsistent and somewhat biased data (Saaty, 1980; Rangone, 1996). In fact, Moutinho (1993) has successfully employed the AHP approach for solving a complex multicriteria problem: corporate goal setting and goal assessment. The AHP model is designed to link corporate effectiveness to the corporate control tools such as management meetings and market analysis through corporate goals. The corporate goals are those financial and non-financial measures such as profits and market share.

Analytic Hierarchy Process (AHP)

The AHP is a theory of measurement that has been extensively applied in modeling the human judgment process (Lee *et al.*, 1995). The approach was developed during the 1970s by Thomas L. Saaty. It may simplify the problem of a multiple criteria evaluation by decomposing the complex decision operation into a multi-level hierarchical structure. The structure allows quantitative and qualitative criteria to be considered and trade-offs among them to be addressed (Rangone, 1996).

The AHP application is established on three basic steps: the hierarchy construction, the

prioritization procedure, and results calculations (Partovi, 1994). The first step involves to disintegrate the unstructured evaluation problem into components and then arrange them into a hierarchical order. A typical hierarchical structure is very often made up by three levels of elements. The top level reflects the overall objective of the evaluation. The second level represents the elements affecting the decision. The elements are called criteria. The third level comprises the decision alternatives. The criteria and the alternatives may have their own sub-criteria and sub-alternatives.

Once the hierarchy has been constructed, the decision-makers may provide pairwise comparisons to determine the relative importance of the elements in each level (Partovi *et al.*, 1990; Partovi, 1994). Elements in each level are compared pairwise with respect to their importance to an element in the next higher level. The process starts at the top of the hierarchy and works down. During the comparisons, a number of square matrices called preference matrices are created. Each matrix will generate a list of weights for the elements with respect to the element in the next higher level. The procedure is repeated by moving downward along the hierarchy until all the levels have their weights determined. The overall weights of the decision alternatives are then determined by aggregating the weights cross the hierarchy. The whole evaluation process may be conducted using a computer software package.

With the AHP, absolute values of 1 to 9 is used for making the pairwise comparison judgments (see Table 4.2). The outcome of the evaluation is the prioritised alternatives. Usually, the most prioritised alternatives are likely the choice of the decision-making. The AHP provides a measure called the consistency ratio (CR) to check the consistency of judgment. Inconsistency likely to occur when decision-makers make careless errors or exaggerated judgment during the process of pairwise comparisons. A consistency

ratio of 0.1 is considered as the acceptable upper limit. If the consistency ratio is greater than 0.1 then the decision-makers have to constantly re-evaluate their judgments in pairwise matrix until a CR of less than 0.1 is achieved.

Absolute value	Definition
1	Equal importance
3	Moderate importance of one over another
5	Strong or essential importance of one over another
7	Very strong or demonstrated importance of one over another
9	Extreme importance of one over another
2, 4, 6, 8	Intermediate values
Reciprocals	Reciprocals for inverse comparison

Table 4.2 Comparison scale

The financial evaluation model

The overall objective of this evaluation is to examine the contributions made by capability alternatives to the financial business performance. Under this objective, the model may consist of evaluation criteria and capability alternatives. The criteria used here are those traditional accounting ratios, for example, return on capital employed, sales growth and operating profits. The alternatives are the capabilities identified from business processes and activities. Each capability alternative may have a hierarchy of capability components themselves. Figure 4.2 presents an example of a financial evaluation model with single-level capability alternatives. This model is used as a generic one aiming at providing practitioners a starting point for the financial evaluation

problem. For a specific company, the criteria and alternatives need to be decided to adapt the practical situation.

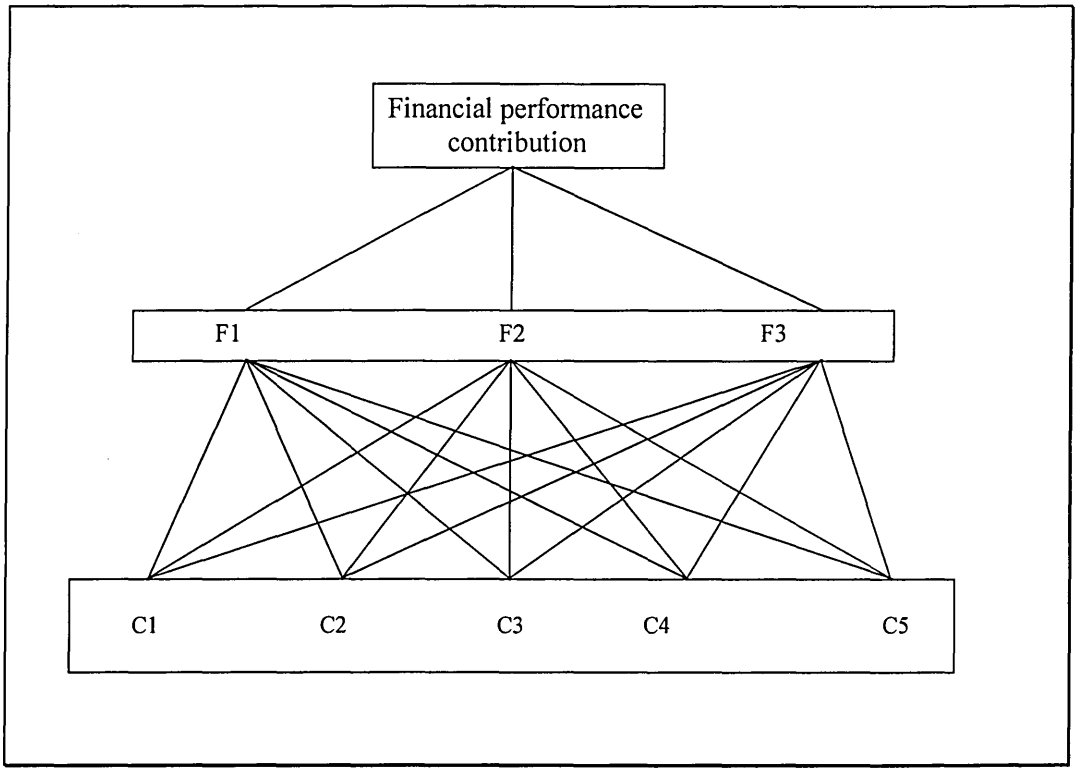


Figure 4.2 Financial performance evaluation model

Key: F = financial performance measure; C = capability alternative

As indicated earlier, a typical three-level model may involve three basic steps in using AHP. The first step is to determine the importance of the criteria, i.e., financial performance measures to the overall objective by pairwise comparison. It would require an objective or subjective assignment of preference weights to each pair of the measures. The comparisons may be made by asking the following questions:

1. Which measure is more important with regards to the objective, F1 or F2, and by what scale (1 to 9)?

2. Which measure is more important with regards to the objective, F2 or F3, and by what scale (1 to 9)?
3. Which measure is more important with regards to the objective, F3 or F1, and by what scale (1 to 9)?

The second step involves evaluating the impact of each capability alternative on the financial business performance. The alternatives are compared among themselves with respect to each financial measure, thereby a weight vector for each of the alternatives is assigned. The third step is to synthesise the assignment results. The weight vectors are multiplied together to generate a final list of weighting vectors for each capability alternative. The pairwise comparisons may be conducted using AHP software package. The software is able to execute each phase of the evaluation and then synthesise these judgments. It is also able to check the consistency ratio for the pairwise comparisons of each level automatically.

The Non-financial evaluation model

A similar procedure to that of financial performance evaluation is used to construct a generic non-financial model (see Figure 4.3). Again, the final result of the AHP evaluation is a list of prioritised capabilities indicating their relative importance to non-financial business performance. As mentioned earlier, most of the non-financial measures are qualitative. This means that the pairwise comparisons of the non-financial measures mainly rely upon the subjective judgment of the decision-makers. If there are more than one decision-maker involved, the pairwise scores assigned to the criteria and capability alternatives should be based on the geometric mean of the individual scores.

4.3.3 Determining Key Capabilities

In order to determine key capabilities, the evaluation results from the two AHP models are plotted in a two-dimension matrix as shown in Figure 4.4. The top right hand cell of the matrix represents the capability alternatives extremely important to both the financial and non-financial performance of the firm. Clearly the capabilities occupying this cell are key to the business success. However, in practice, capabilities which are simultaneously key to both the financial and non-financial business performance are limited in number, and many capabilities such as R & D are relatively more important to the non-financial performance (e.g., new product introduction) comparing with the financial targets (e.g., operating profit) of the firm. Therefore, in order to identify the key capabilities fully, it is suggested that capabilities those are in the vicinity of the key capability cell should also be considered as potential key capabilities.

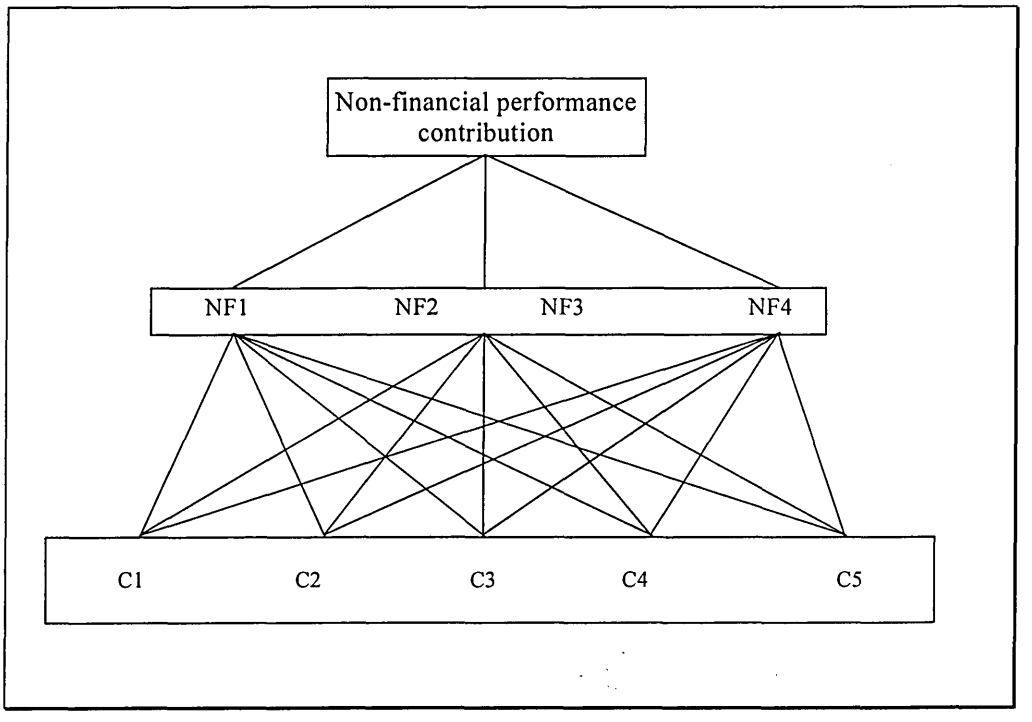


Figure 4.3 Non-financial performance evaluation model

Key: NF = non-financial performance measure; C = capability alternative

When determining if a capability alternative qualifying as key capability in the financial and non-financial performance matrix, the mean value of all the priority weights can be used as a standard. The mean is calculated by adding up the individual values of the alternatives for each dimension and then dividing by the number of the alternatives. If a capability whose financial and non-financial priority weights are higher than the respective mean values, the capability is identified as a key capability. However, as mentioned earlier, it is quite possible that a capability secures a very high priority in one performance dimension, say financial, and a low number in the non-financial dimension. In this situation, in order to determine if the capability belongs to the vicinity of the key capability cell, the following method is suggested:

1. The two mean values are multiplied together (since they are representing heterogeneous concepts, addition is not considered suitable) to generate a standard value representing an area on the matrix. This value represents the total contribution of a specific capability to the business performance;
2. All those alternatives fall within the top right boundary of the mean curve should be considered as a candidate key capability. For example, if the mean values for the financial and non-financial dimensions are calculated as 0.6 and 0.58, respectively, the curve would vertices at the 0.348 (0.6×0.58) on the matrix as shown in Figure 4.4.

Using this method, the C4 and C2 as shown in Figure 4.4 are considered as potential key capabilities along with the clear winner, C3.

4.4 Implementation

The proposed method was implemented to evaluate the key capabilities of Company A (section 3.6). The operational capabilities mapped for Company A were used as the input for this evaluation (see Table 3.3). A second interview was conducted with the managing director to collect the pair-wise scores for various alternatives as explained in Section 4.4.1.

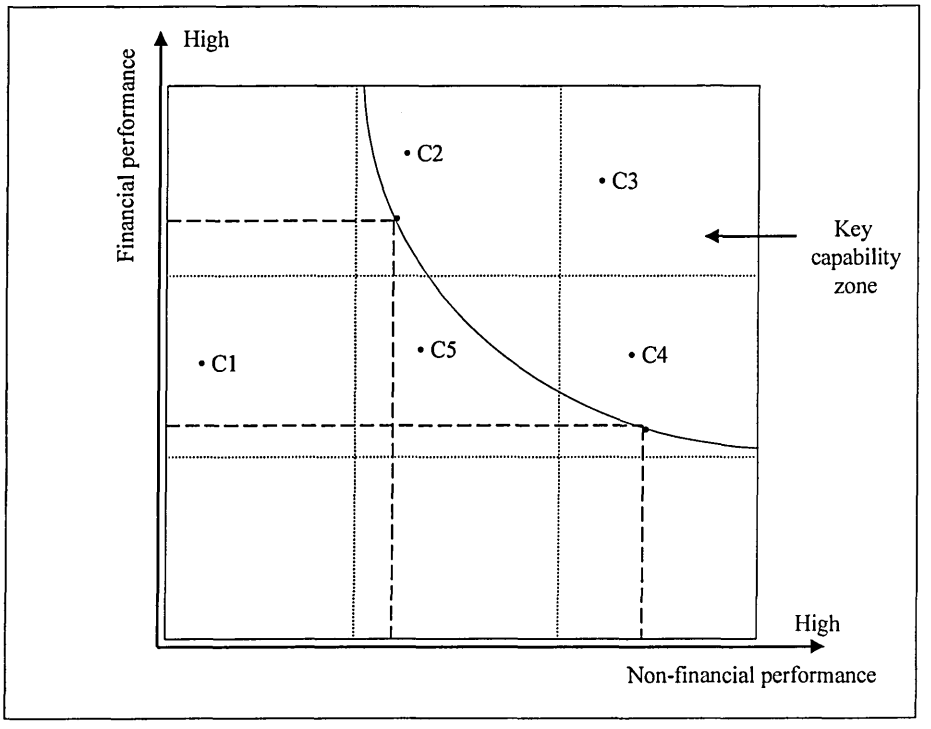


Figure 4.4 Determination of key capabilities

4.4.1 Case Study of Company A

The interview was conducted in a combination of structured and unstructured style. That is, based upon the interviewee's initial response to some open-ended questions, a structured questionnaire was used for obtaining relevant data. The major information

flows during the interviewing process included:

- The explanation of the key capability concept
- The confirmation of business performance measures
- The securing of the data related to the both AHP financial and non-financial evaluations

Before collecting the data, the definition of key capability and the model designed for key capability determination were first introduced and explained to the managing director. The intention here was to gather the interviewee's views on the conceptual framework based on his perception and practical knowledge. The comments on the attributes of the key capabilities and the structure of the model were particularly sought.

The interviewee accepted the proposed model as practically feasible and confirmed that business performance measures can be used for the evaluation. Keeping in mind the business objectives and strategies, the managing director selected six measures as the evaluation criteria. The financial measures included return on capital employed, sales growth and operation profits. The non-financial measures included market share, new product introduction and customer satisfaction.

This information was subsequently used to develop the financial and non-financial AHP models by translating the measures and capabilities in a four-level hierarchical structure (see Figures 4.5 and 4.6). The first and the second level of each model were formed using respectively, the overall objective and the performance measures. The third and fourth levels were formed using respectively, the business functions and the identified twenty capabilities of Company A.

The evaluation process started at the second level. The performance measures were compared pairwise to assign the subjective priorities. The scales assigned by the interview were then processed using an AHP software package. Using the consistency ratio (CR) mechanism provided by the AHP, the subjective priorities assigned for the pairwise comparisons were examined for consistency. When an inconsistent judgment was found, i.e., the CR was greater than 0.1, the interviewee was asked to re-examine the subjective priorities assigned to each of the comparisons. One or more new scales were then assigned to replace the priorities mis-judged earlier until the CR was less than 0.1. Tables 4.3 and 4.4, respectively, show the priority weights of financial and non-financial measures. The priority weight results show that Company A was mainly concerned about two performance measures: return on capital employed (ROCE) (0.655) and customer satisfaction (0.699).

For level 3, the business functions are compared pairwise against each of the criteria employing the same procedure as described earlier. In order to collect data at level 4 of the hierarchy, the interviewee was asked to compare each of the capability alternatives in pairs. The specific question put up to the interviewee worded: "which capability is more important within the function and by what scale?" Tables 4.5 to 4.19 show the details of the complete evaluation results.

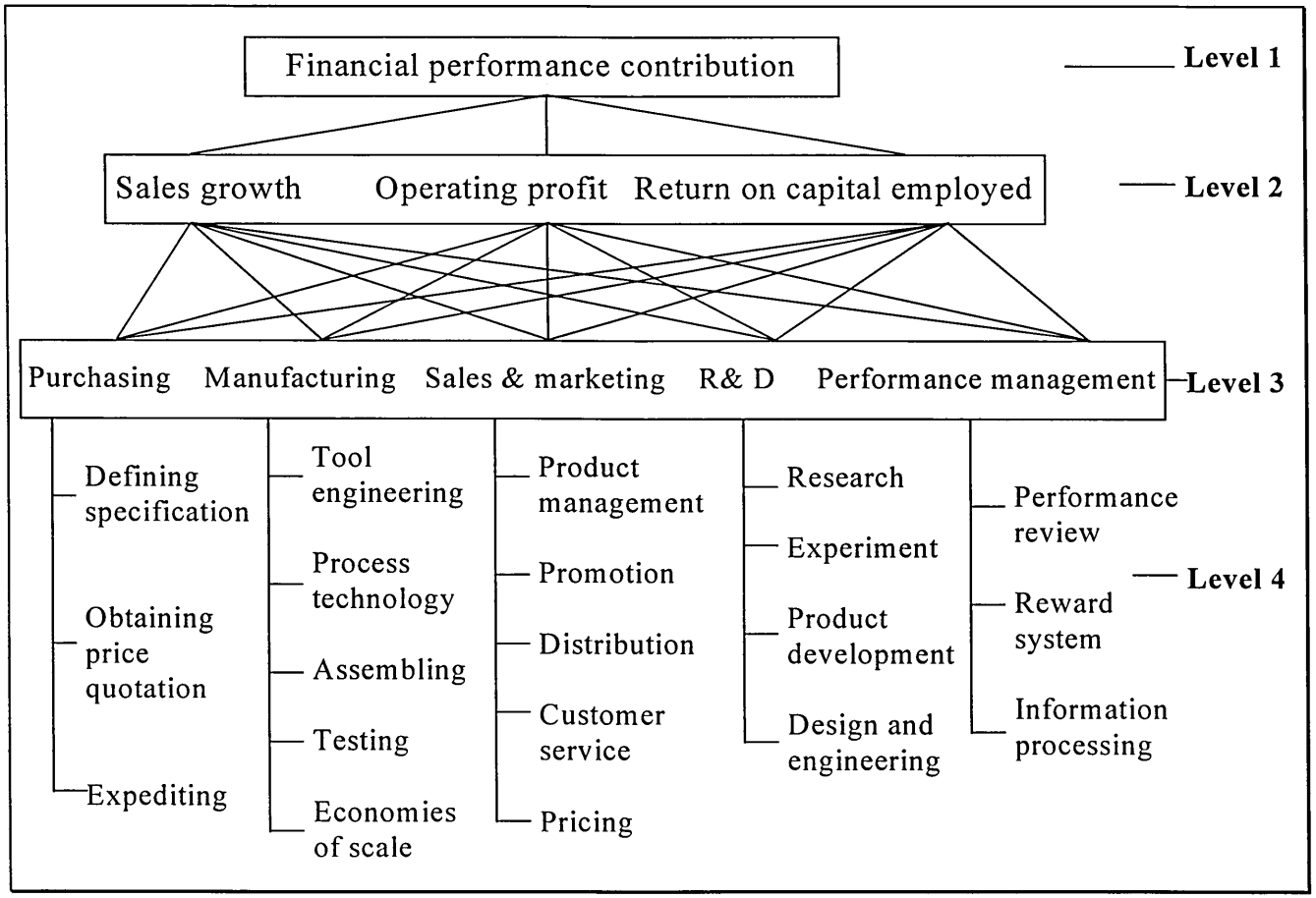


Figure 4.5 The financial AHP model of Company A

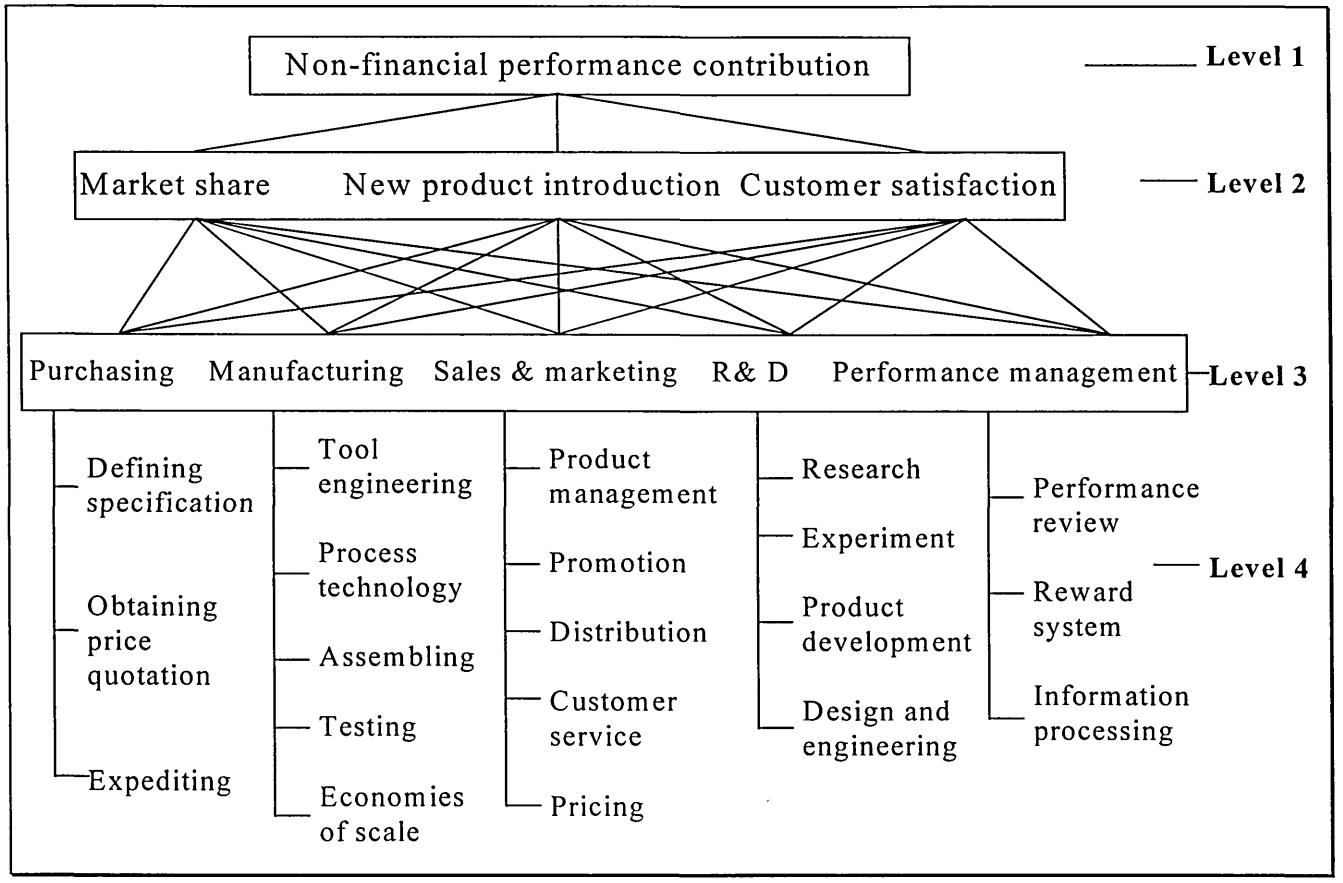


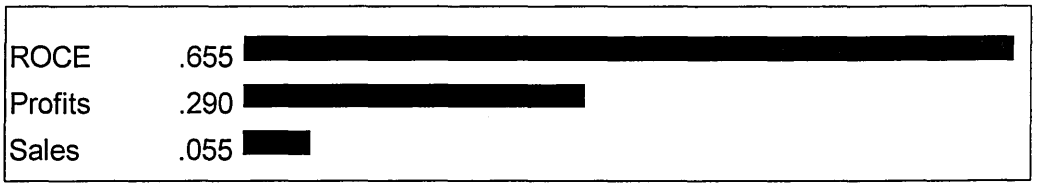
Figure 4.6 The non-financial AHP model of Company A

Compare the relative IMPORTANCE with respect to: GOAL

	Profits	Sales
ROCE	3.0	9.0
Profits		7.0

Row element is __ times more than column element unless enclosed in ()

Abbreviation	Definition
Goal	Financial performance
ROCE	Return on capital employed
Profits	Operating profits
Sales	Sales growth



Inconsistency Ratio =0.08

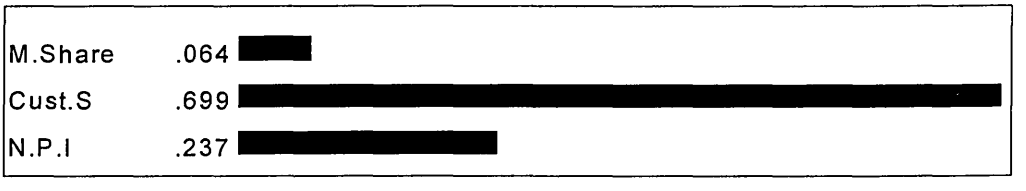
Table 4.3 The priority weights for financial measures

Compare the relative IMPORTANCE with respect to: GOAL

	Cust.S	N.P.I
M.Share	(8.0)	(5.0)
Cust.S		4.0

Row element is __ times more than column element unless enclosed in ()

Abbreviation	Definition
Goal	Non-financial performance
M.Share	Market share
Cust.S	Customer satisfaction
N.P.I	New product introduction



Inconsistency Ratio =0.09

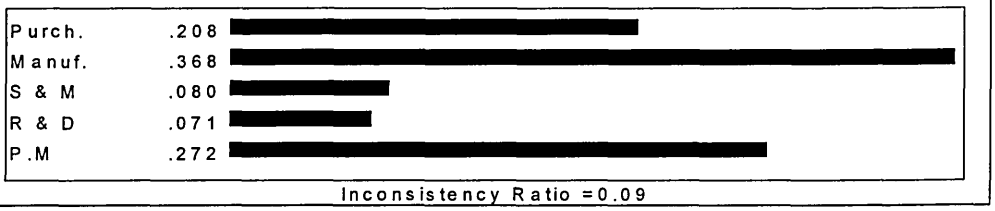
Table 4.4 The priority weights for non-financial measures

Node: 10000

Compare the relative PREFERENCE with respect to: ROCE < GOAL

	Manuf.	S & M	R & D	P.M
Purch.	1.0	3.0	3.0	(3.0)
Manuf.		3.0	5.0	3.0
S & M			1.0	(3.0)
R & D				(3.0)

Abbreviation	Definition
Goal	Financial performance
ROCE	Return on capital employed
Purch.	Purchasing
Manuf.	Manufacturing
S & M	Sales and marketing
R & D	Research and development
P.M	Performance management



Inconsistency Ratio =0.09

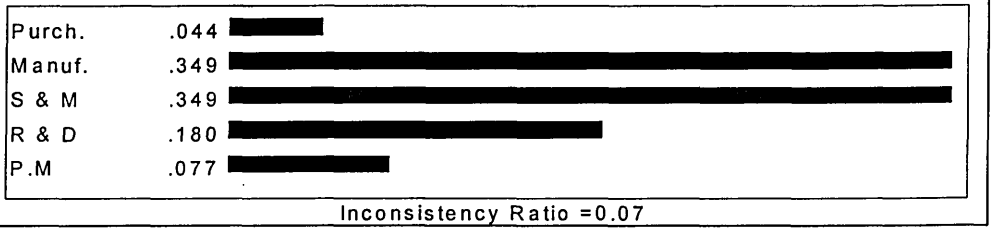
Table 4.5 Pairwise comparisons of the functional capabilities on ROCE

Node: 20000

Compare the relative PREFERENCE with respect to: Profits < GOAL

	Manuf.	S & M	R & D	P.M
Purch.	(5.0)	(5.0)	(7.0)	(3.0)
Manuf.		1.0	3.0	5.0
S & M			3.0	5.0
R & D				3.0

Abbreviation	Definition
Goal	Financial performance
Profits	Operating profits
Purch.	Purchasing
Manuf.	Manufacturing
S & M	Sales and marketing
R & D	Research and development
P.M	Performance management



Inconsistency Ratio =0.07

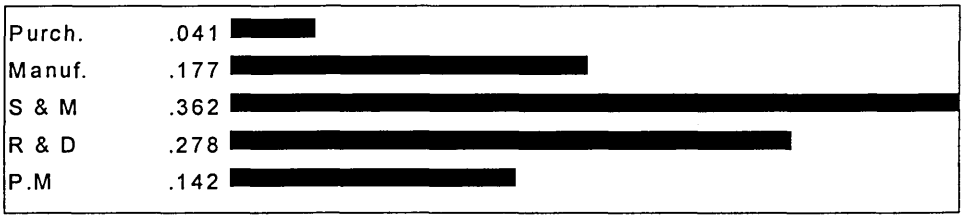
Table 4.6 Pairwise comparisons of the functional capabilities on operating profits

Node: 30000

Compare the relative PREFERENCE with respect to: Sales < GOAL

	Manuf.	S & M	R & D	P.M
Purch.	(5.0)	(7.0)	(5.0)	(5.0)
Manuf.		(3.0)	1.0	1.0
S & M			1.0	3.0
R & D				3.0

Abbreviation	Definition
Goal	Financial performance
Sales	Sales growth
Purch.	Purchasing
Manuf.	Manufacturing
S & M	Sales and marketing
R & D	Research and development
P.M	Performance management



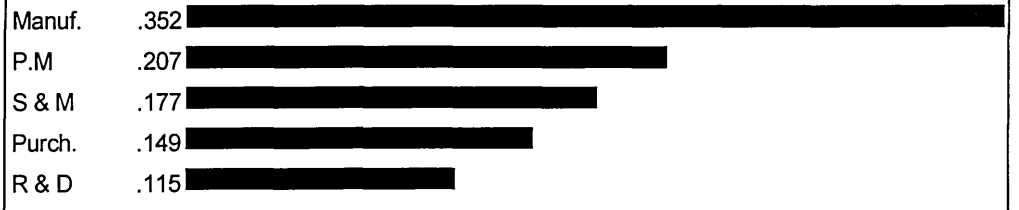
Inconsistency Ratio =0.04

Table 4.7 Pairwise comparisons of the functional capabilities on sales growth

Synthesis of Leaf Nodes with respect to GOAL

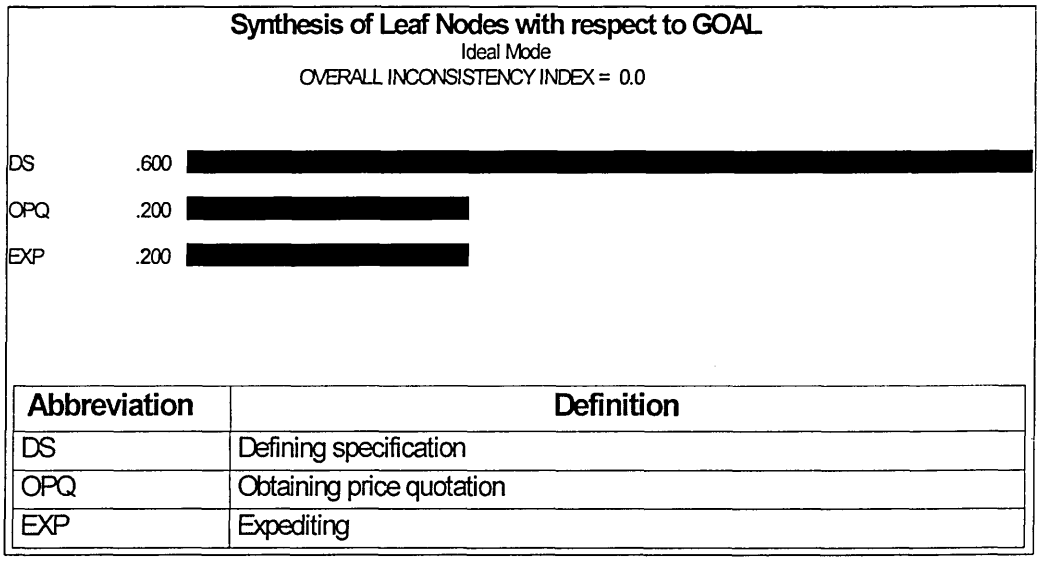
Ideal Mode

OVERALL INCONSISTENCY INDEX = 0.08



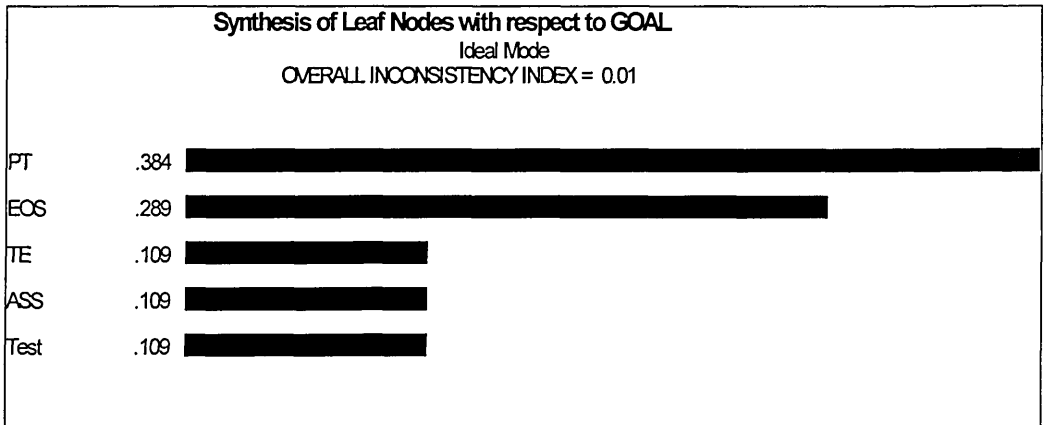
Abbreviation	Definition
Manuf.	Manufacturing
P.M	Performance management
S & M	Sales and marketing
Purch.	Purchasing
R & D	Research and development

Table 4.8 Synthesis of the financial evaluation



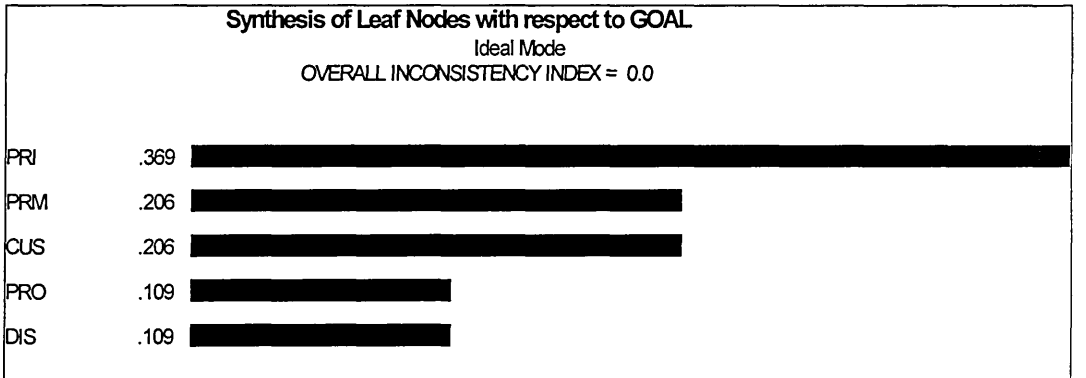
Abbreviation	Definition
DS	Defining specification
OPQ	Obtaining price quotation
EXP	Expediting

Table 4.9 Pairwise comparisons of the operational capabilities of purchasing function



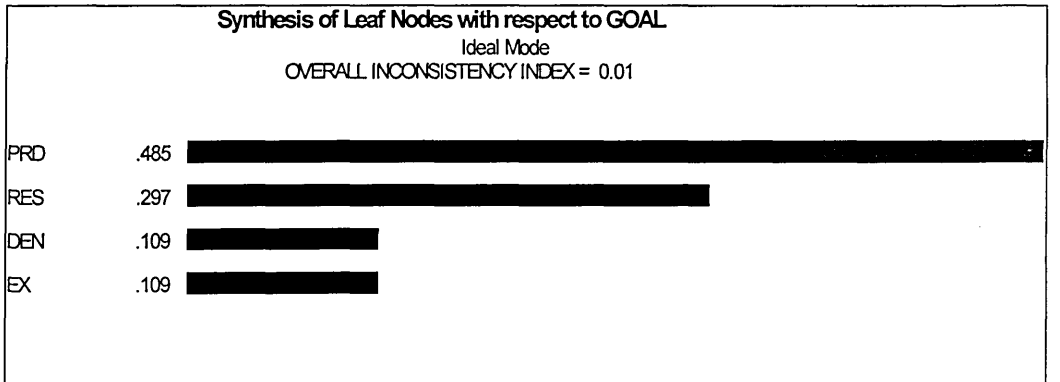
Abbreviation	Definition
PT	Process technology
EOS	Economies of scale
TE	Tool engineering
ASS	Assembling
Test	Testing

Table 4.10 Pairwise comparisons of the operational capabilities of manufacturing function



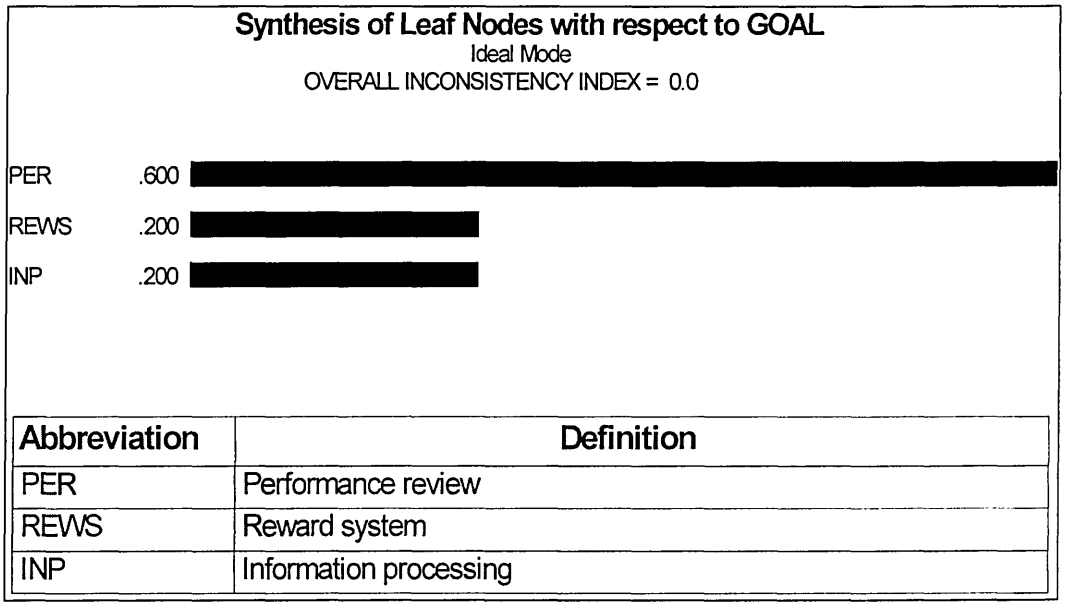
Abbreviation	Definition
PRI	Pricing
PRM	Product management
CUS	Customer service
PRO	Promotion
DIS	Distribution

Table 4.11 Pairwise comparisons of the operational capabilities of sales and marketing function



Abbreviation	Definition
PRD	Product development
RES	Research
DEN	Design and engineering
EX	Experiment

Table 4.12 Pairwise comparisons of the operational capabilities of R & D function



Abbreviation	Definition
PER	Performance review
REWS	Reward system
INP	Information processing

Table 4.13 Pairwise comparisons of the operational capabilities of performance management function

Functional/operational capabilities		Weights
Purchasing (0.149)	Defining specification (0.6)	0.089
	Obtaining price quotation (0.2)	0.030
	Expediting (0.2)	0.030
Manufacturing (0.352)	Process technology (0.4)	0.141
	Economies of scale (0.3)	0.110
	Tool engineering (0.1)	0.035
	Assembling (0.1)	0.035
	Testing (0.1)	0.035
Sales and marketing (0.177)	Product management (0.2)	0.035
	Customer service (0.2)	0.035
	Pricing (0.4)	0.071
	Promotion (0.1)	0.018
	Distribution (0.1)	0.018
R & D (0.115)	Product development (0.5)	0.058
	Research (0.3)	0.035
	Design and engineering (0.1)	0.012
	Experiment (0.1)	0.012
Performance development (0.207)	Performance review (0.6)	0.124
	Reward system (0.2)	0.041
	Information processing (0.2)	0.041

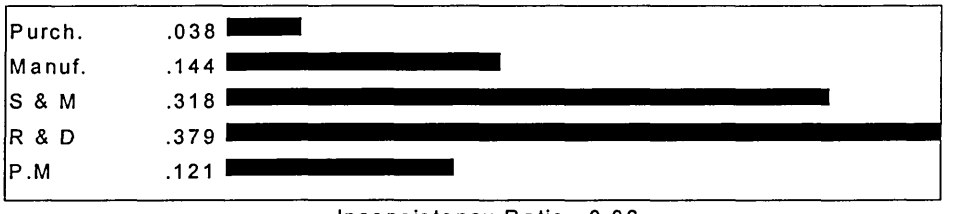
Table 4.14 The priority weights for the financial evaluation

Node: 10000

Compare the relative PREFERENCE with respect to: M.Share < GOAL

	Manuf.	S & M	R & D	P.M
Purch.	(7.0)	(5.0)	(7.0)	(5.0)
Manuf.		(3.0)	(3.0)	1.0
S & M			1.0	3.0
R & D				5.0

Abbreviation	Definition
Goal	Operational performance
M.Share	Market share
Purch.	Purchasing
Manuf.	Manufacturing
S & M	Sales & marketing
R & D	Research and development
P.M	Performance management



Inconsistency Ratio =0.06

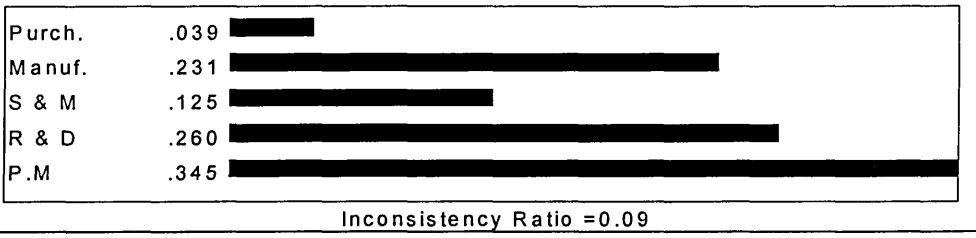
Table 4.15 Pairwise comparisons of the functional capabilities on market share

Node: 20000

Compare the relative PREFERENCE with respect to: Cust.S < GOAL

	Manuf.	S & M	R & D	P.M
Purch.	(7.0)	(7.0)	(5.0)	(5.0)
Manuf.		3.0	1.0	(3.0)
S & M			(3.0)	(3.0)
R & D				1.0

Abbreviation	Definition
Goal	Operational performance
Cust.S	Customer satisfaction
Purch.	Purchasing
Manuf.	Manufacturing
S & M	Sales & marketing
R & D	Research and development
P.M	Performance management



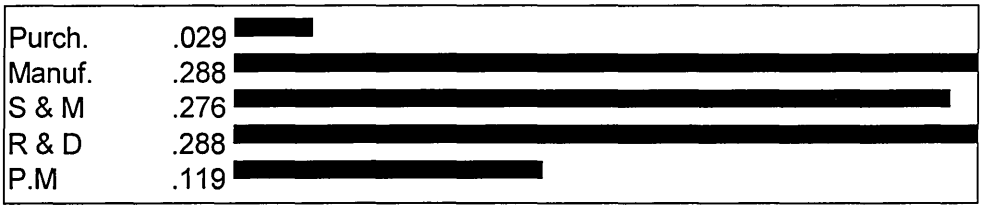
Inconsistency Ratio =0.09

Tables 4.16 Pairwise comparisons of the functional capabilities on customer satisfaction

Compare the relative PREFERENCE with respect to: N.P.I < GOAL

	Manuf.	S & M	R & D	P.M
Purch.	(9.0)	(7.0)	(9.0)	(7.0)
Manuf.		1.0	1.0	3.0
S & M			1.0	3.0
R & D				3.0

Abbreviation	Definition
Goal	Operational performance
N.P.I	New product introduction
Purch.	Purchasing
Manuf.	Manufacturing
S & M	Sales & marketing
R & D	Research and development
P.M	Performance management



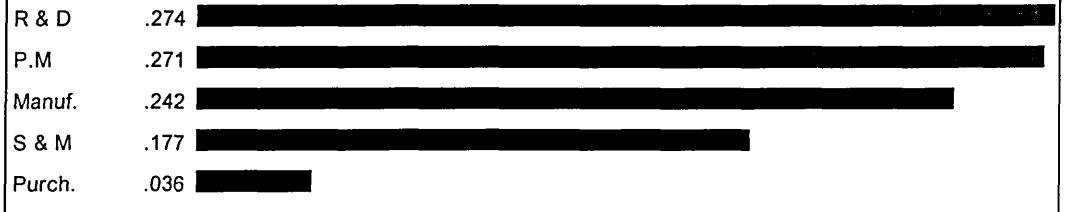
Inconsistency Ratio =0.03

Table 4.17 Pairwise comparisons of the functional capabilities on N.P.I

Synthesis of Leaf Nodes with respect to GOAL

Ideal Mode

OVERALL INCONSISTENCY INDEX = 0.08



Abbreviation	Definition
R & D	Research and development
P.M	Performance management
Manuf.	Manufacturing
S & M	Sales & marketing
Purch.	Purchasing

Table 4.18 Synthesis of the non-financial evaluation

Functional/operational capabilities		Weights
Purchasing (0.036)	Defining specification (0.6)	0.022
	Obtaining price quotation (0.2)	0.007
	Expediting (0.2)	0.007
Manufacturing (0.242)	Process technology (0.4)	0.097
	Economies of scale (0.3)	0.073
	Tool engineering (0.1)	0.024
	Assembling (0.1)	0.024
	Testing (0.1)	0.024
Sales and marketing (0.177)	Product management (0.2)	0.035
	Customer service (0.2)	0.035
	Pricing (0.4)	0.071
	Promotion (0.1)	0.017
	Distribution (0.1)	0.017
R & D (0.274)	Product development (0.5)	0.137
	Research (0.3)	0.082
	Design and engineering (0.1)	0.027
	Experiment (0.1)	0.027
Performance development (0.271)	Performance review (0.6)	0.163
	Reward system (0.2)	0.054
	Information processing (0.2)	0.054

Table 4.19 The priority weights for the non-financial evaluation

4.4.2 Key Capabilities of Company A

The final priority weights of each of the capability alternatives to the objective (i.e., from level 4 up to level 1) were calculated through cross-multiplying the priority weights of each level. Table 4.20 presents the overall priority weights for the financial and non-financial performance evaluations. Note that most individual capabilities have not secured high scores simultaneously with respect to the both dimensions. For example, product development was rated high (0.137) with regards to the non-financial performance but low (0.058) against the financial performance. On the other hand defining specification secured high with respect to the financial performance, but low against the non-financial performance.

Operational capability	Financial weight	Non-financial weight
Defining specification	0.089	0.022
Obtaining price quotation	0.030	0.007
Expediting	0.030	0.007
Process technology	0.141	0.097
Economies of scale	0.110	0.073
Tool engineering	0.035	0.024
Assembling	0.035	0.024
Testing	0.035	0.024
Product management	0.035	0.035
Customer service	0.035	0.035
Pricing	0.071	0.071
Promotion	0.018	0.017
Distribution	0.018	0.017
Product development	0.058	0.137
Research	0.035	0.082
Design and engineering	0.012	0.027
Experiment	0.012	0.027
Performance review	0.124	0.163
Reward system	0.041	0.054
Information processing	0.041	0.054

Table 4.20 The overall priority weights for the capability alternatives

The key capabilities of Company A was determined by plotting the priority weights in the two-dimension matrix form as shown in Figure 4.7. The capability alternatives mapped into the top right hand cell, namely, process technology and performance review, are clearly the key capabilities of Company A. For determining those less obvious key capabilities, the method proposed in Section 4.3.3 was used. First, the mean values of the two performance evaluations were calculated (0.05 and 0.05, respectively). Then using the area value of $0.05 \times 0.05 = 0.0025$ as the standard limit, the multiplication value of financial priority and non-financial priority was examined for each of the capability alternatives and used to determine if the alternatives can be identified as the key capabilities.

This method proved effective during the case study. For example, the capability "research" secured the financial and non-financial priorities of 0.035 and 0.082, respectively. The priority results show that the value of 0.035 is below the mean of 0.05. If judging the capability using only the financial mean value, the research should not be considered as a key capability. However, by applying the suggested method, the multiplication value 0.00287 (0.035×0.082) was higher than 0.0025. Therefore, the capability is considered in the vicinity area of the key capability cell and identified as a key capability as well.

Table 4.21 gives a relationship of the identified key capabilities of Company A to their respective functional areas. The identified key capabilities include not only process technology and performance review but also product development, economies of scale, pricing, and research. These results were verified by the managing director of Company A.

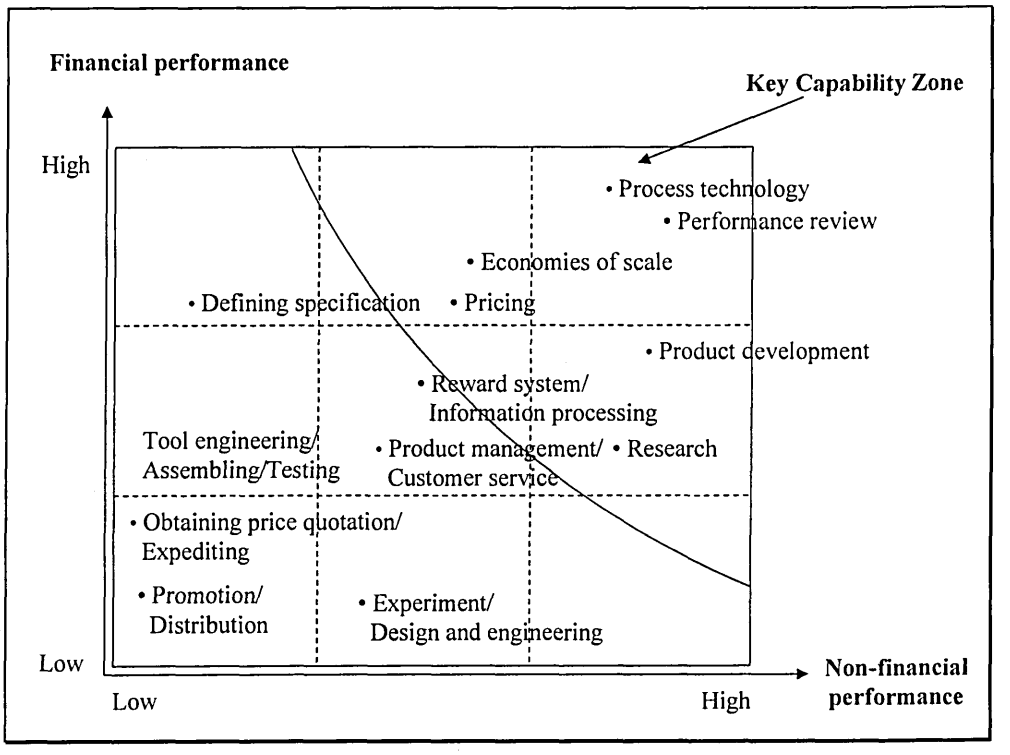


Figure 4.7 The financial and non-financial performance matrix

Functional areas	Key capabilities
Manufacturing	Process technology Economies of scale
Sales and marketing	Pricing
R & D	Product development Research
Performance management	Performance review

Table 4.21 Portfolio of key capabilities for Company A

4.4.3 Sensitivity Analysis

In order to check the response of the key capability results to variation of preference

priorities in the pariwise comparison, sensitivity tests were performed. During the test, the priority weights of the financial and non-financial performance measures were adjusted by ±10% and ± 50% of its actual value, respectively. An AHP software package was used to conduct the analysis. In the following sub-sections, the results for the both financial and non-financial evaluations are presented.

4.4.3.1 Sensitivity Analysis of Financial Performance Measure

As mentioned earlier, the Company A used three financial measures to evaluate the financial contributions of the capability alternatives. These are ROCE, operating profits, and sales growth and their priorities were determined as 0.655, 0.290, and 0.055 respectively.

- Sensitivity of the ROCE Measure

Figures 4.8 presents the sensitivity graphs for a ± 50% variation to ROCE. The vertical solid line shows the actual priority of the ROCE (0.655). The intersection of this solid line with the alternative lines determines the priorities of the capability alternatives, showing manufacturing and performance management, are identified as the preferred choices as key capabilities. For a + 50% change in the priority of the ROCE (to 0.983) or even higher, there is no relative impact of top two alternatives choice. When the priority of the ROCE is changed to 0.33 (i.e., - 50% change), as shown by the dotted line, the manufacturing is still the most preferred, however sales and marketing, originally in the third place, takes over the second spot in the preference list, relegating the performance management to the fourth place. However, a further analysis reveals that the results are very resilient to a ± 10% change.

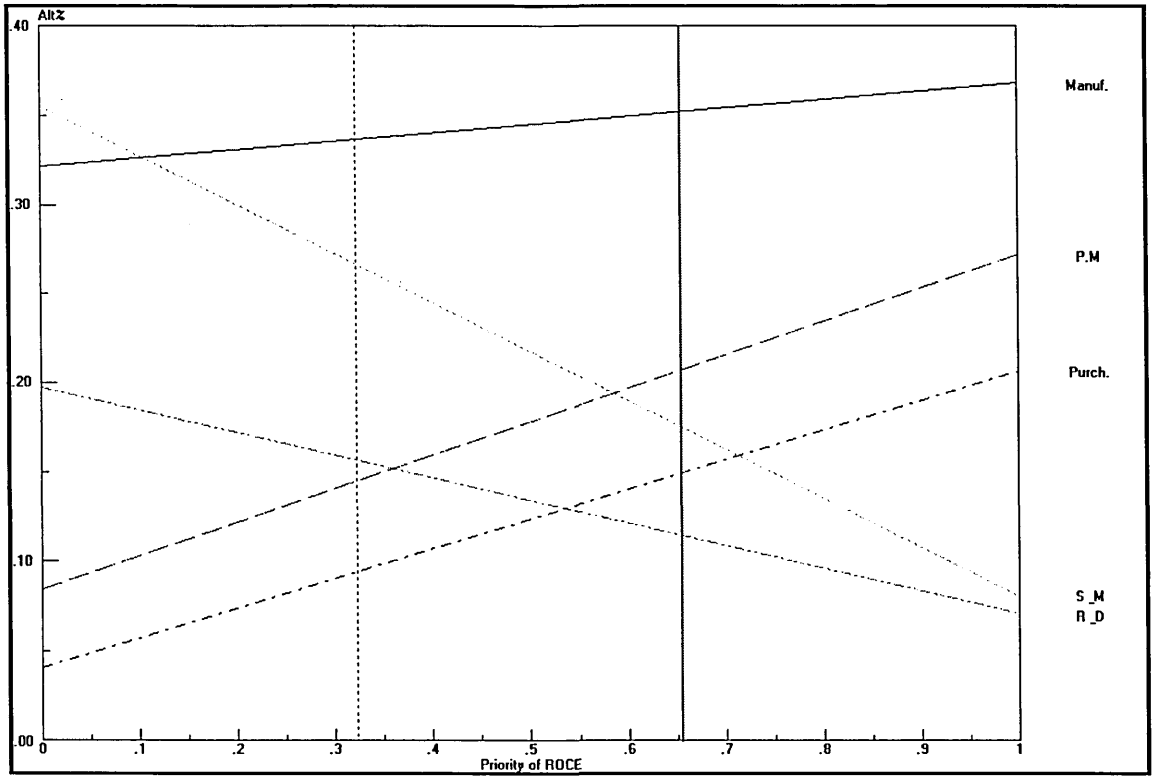


Figure 4.8 The sensitivity with regard to the change of ROCE priority

Key: Manuf = Manufacturing; P.M. = Performance management;

Purch. = Purchasing; S-M. = Sales and marketing; R-D = R & D

- Sensitivity Analysis of the Operating Profit Measure

Contrary to that of the ROCE, it is easy to see that when the priority of the operating profits (0.290) is changed to 0.145 (i.e., - 50% change), the relative preference of the top two alternatives, i.e., manufacturing and performance management, will not change (see Figure 4.9 (a)). When the priority of the operating profits is changed to 0.435 (i.e., + 50% change) as shown by the vertical dotted line, sales and marketing will become the second most preferred alternative while manufacturing will still keep its top preference position. However, the preference position of the performance management will drop from the original second to the third. Figure 4.9 (b) shows the sensitivity graph with regard to the increased priority of operating profit. The analysis also reveals that when the priority weight of the measure is adjusted by ± 10% of its actual value (0.319 and 0.261, respectively), the relative preference of the present top two alternatives, i.e., manufacturing and performance management, will not change at all.

- Sensitivity Analysis of the Sales Growth Measure

Similar to that of the operating profits, the capability alternatives are not sensitive to the change of the sales growth priority. Figure 4.10 shows that when the criterion is raised by 50% higher to original value (as shown by the dotted line), the relative preference of each of the alternatives is same to that of original one. Even for a - 50% variation, it can be seen that the preference order of the alternatives are not changed. In summary, no matter that the priority value of sales growth is change by ± 10% or ± 50%, manufacturing and performance management are identified as the top two preferred capability alternatives.

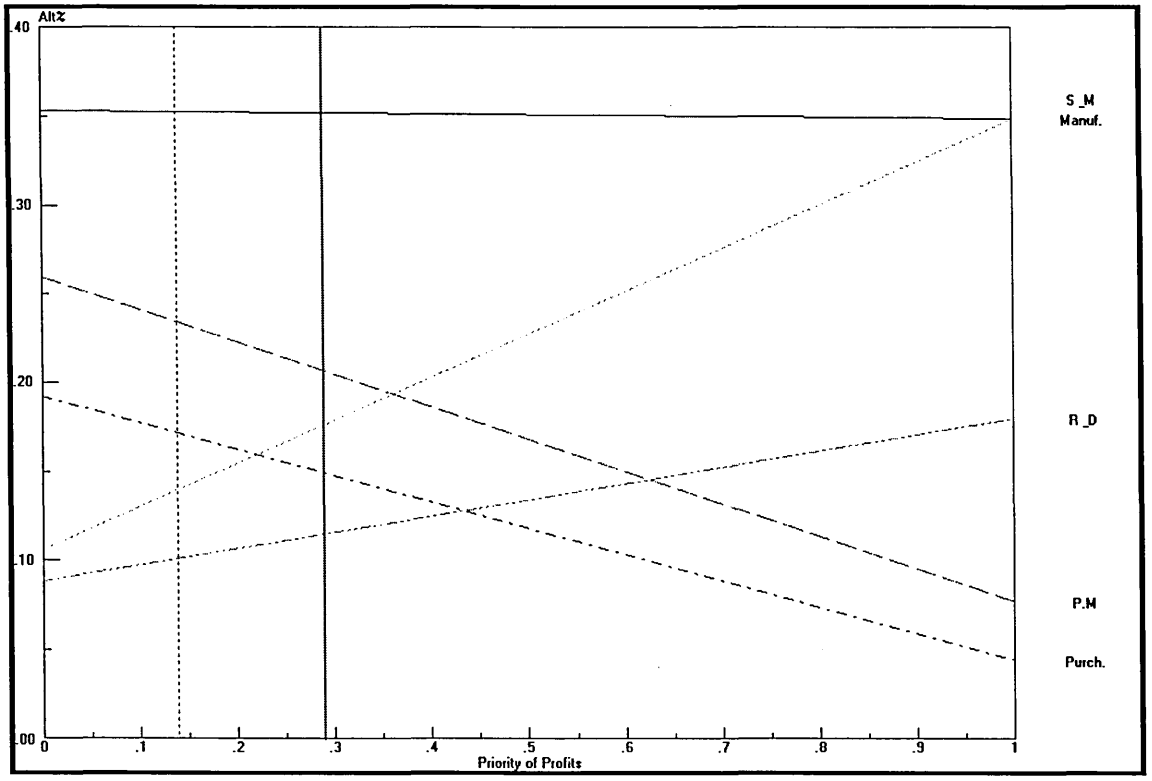


Figure 4.9 (a) The sensitivity with regard to the change of operating profit priority (50% value decrease)

Key: Manuf = Manufacturing; P.M. = Performance management;

Purch. = Purchasing; S-M. = Sales and marketing; R-D = R & D

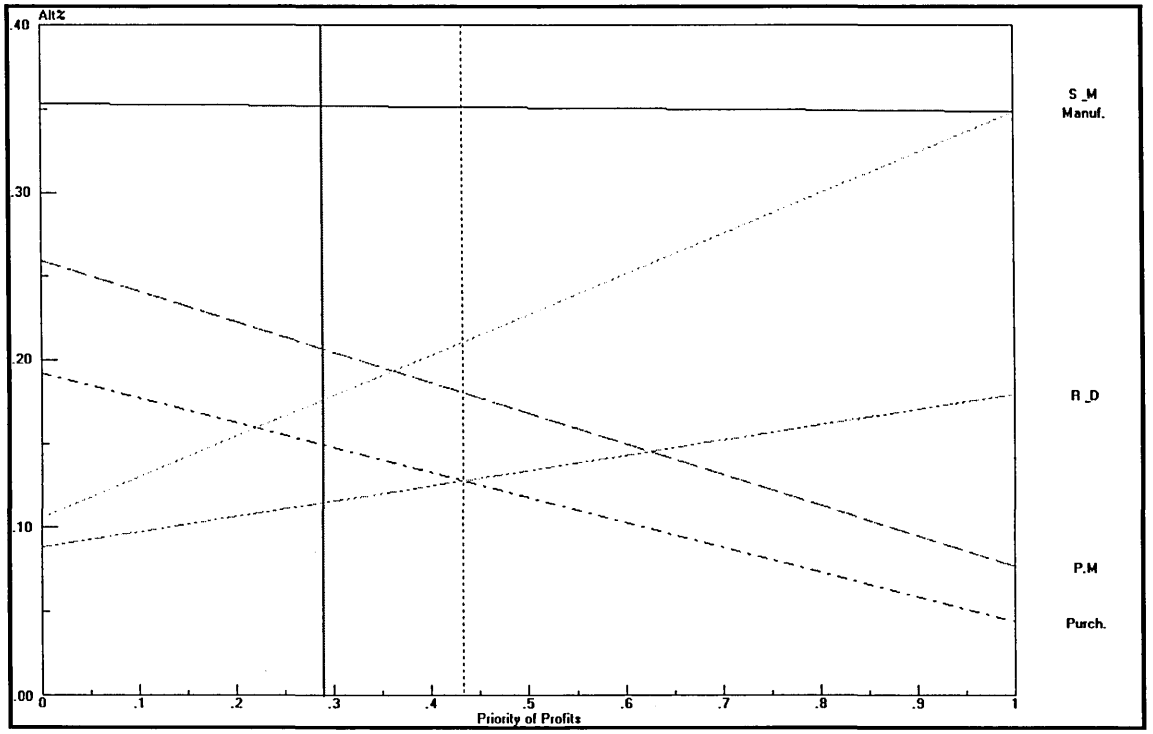


Figure 4.9 (b) The sensitivity with regard to the change of operating profit priority (50% value increase)

Key: Manuf = Manufacturing; P.M. = Performance management;

Purch. = Purchasing; S-M. = Sales and marketing; R-D = R & D

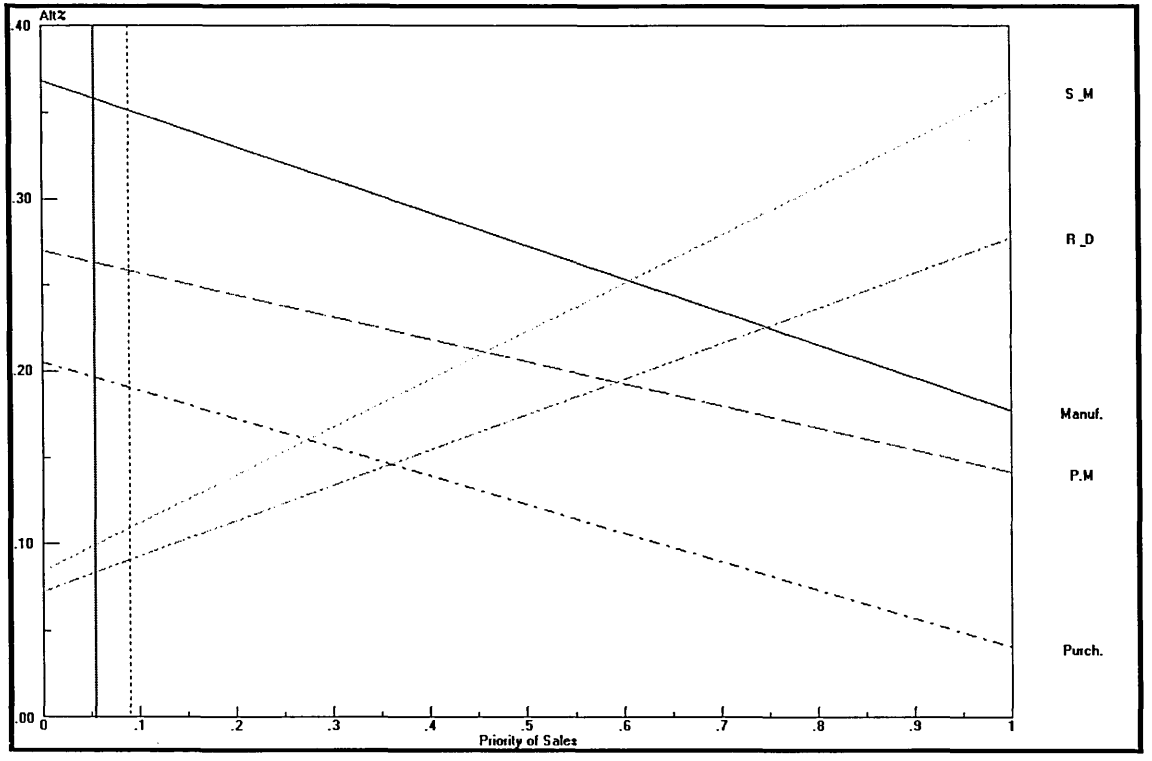


Figure 4.10 The sensitivity with regard to the change of sales growth priority

Key: Manuf = Manufacturing; P.M. = Performance management;

Purch. = Purchasing; S-M. = Sales and marketing; R-D = R & D

4.4.3.2 Sensitivity Analysis of Non-financial Performance Measure

The three non-financial measures used for the evaluation included market share, new product introduction, and customer satisfaction. The priority weights of the measures were respectively identified as 0.064, 0.237, and 0.699. The following sensitivity tests were also performed for the capability alternatives, i.e., purchasing, manufacturing, sales and marketing, R & D, and performance management, with regard to changes of ± 50% in the weights of the measures.

- Sensitivity Analysis of the Market Share Measure

Figure 4.11 shows the sensitivity of the capability alternatives with regard to changes in the weights of market share. According to the graph, it is obvious that if the current priority of the solid line is increased by 50%, the preference order of any of the capability alternatives is not changed. The R & D and performance management are the most and second most preferred capability alternatives. However, for a 50% decrease in the market share as represented by the vertical dotted line, the positions of the top two preferred capabilities is swamped. A further analysis for ± 10% change reveals that the results are more resilient.

- Sensitivity Analysis of the Customer Satisfaction Measure

With regard to the current priority of customer satisfaction (0.699, represented by the solid line), the R & D, performance management, and manufacturing were identified as the most preferred three capabilities. A variation of + 50% (which would exceed the maximum possible value of 1.0), only R & D and performance management order is

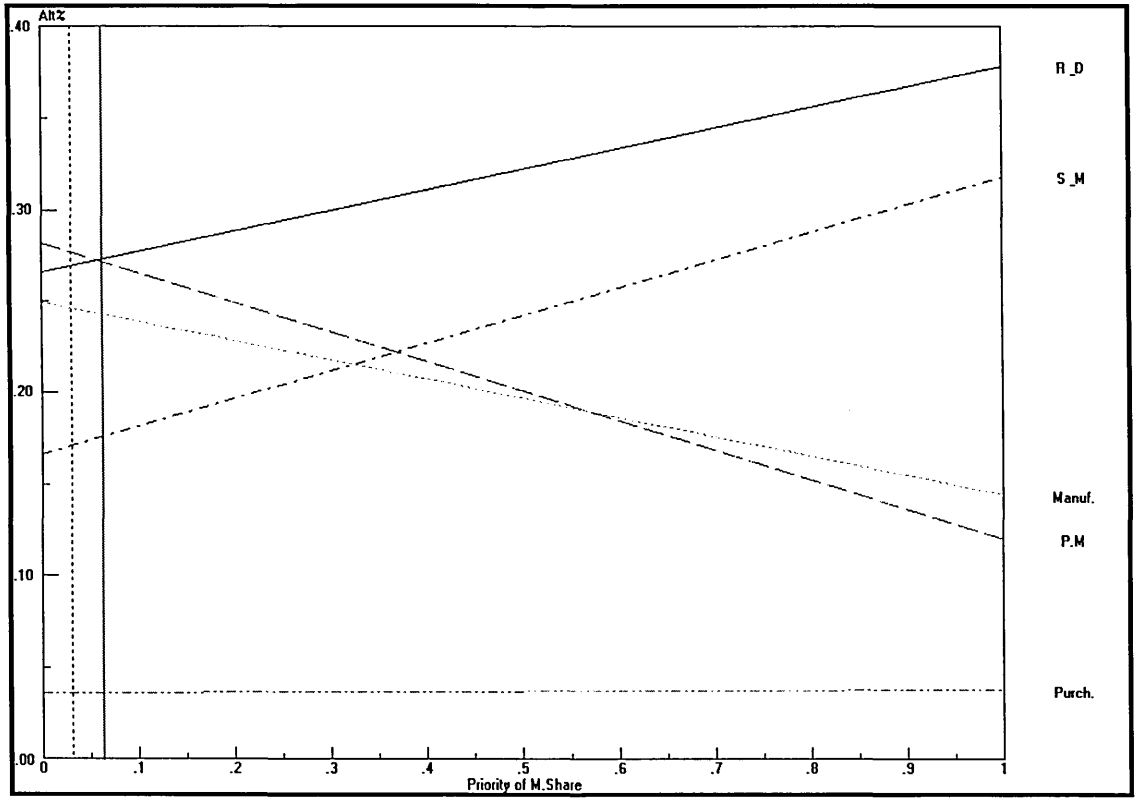


Figure 4.11 The sensitivity with regard to the change of market share priority

Key: Manuf = Manufacturing; P.M. = Performance management;

Purch. = Purchasing; S-M. = Sales and marketing; R-D = R & D

exchanged (see Figure 4.12 (a)). If the priority is dropped by 50% as shown in Figure 4.12 (b), the current most preferred capability, i.e., R & D, still keep its leading position. However, the position of the manufacturing is changed from the third to the second place, and the original second most preferred capability, performance management, is moved to the forth place. The analysis also reveals that for a + 10% change there is a similar result to that of + 50% change and for a – 10% change there is no preference order change for any of the capability alternatives.

- Sensitivity Analysis of the New Product Introduction Measure

For a + 50% increase to new product introduction measure, the sensitivity of each of the capability alternatives is represented in Figure 4.13 (a). In this case, the only change happened to the original preference list (identified by the solid line) is that R & D and the performance management weights nearly overlap each other. For a - 50% variation, the only change is that the two most preferred capabilities, i.e., manufacturing and performance management, will exchange their position in the list (see Figure 4.13 (b)). The further analysis for a ± 10% change reveals that there is no change to the original preference list in both situations.

4.4.3.3 The Robustness of the Evaluation Process

The sensitivity analyses performed above have shown that the proposed AHP evaluation process is robust to the changes in the criteria. Analysing the sensitivity of the capability alternatives for a variation up to ± 50% for both financial and non-financial performance evaluations, the preference orders of the capabilities have been examined. Generally speaking no significant preference shifts have been found. Particularly, the

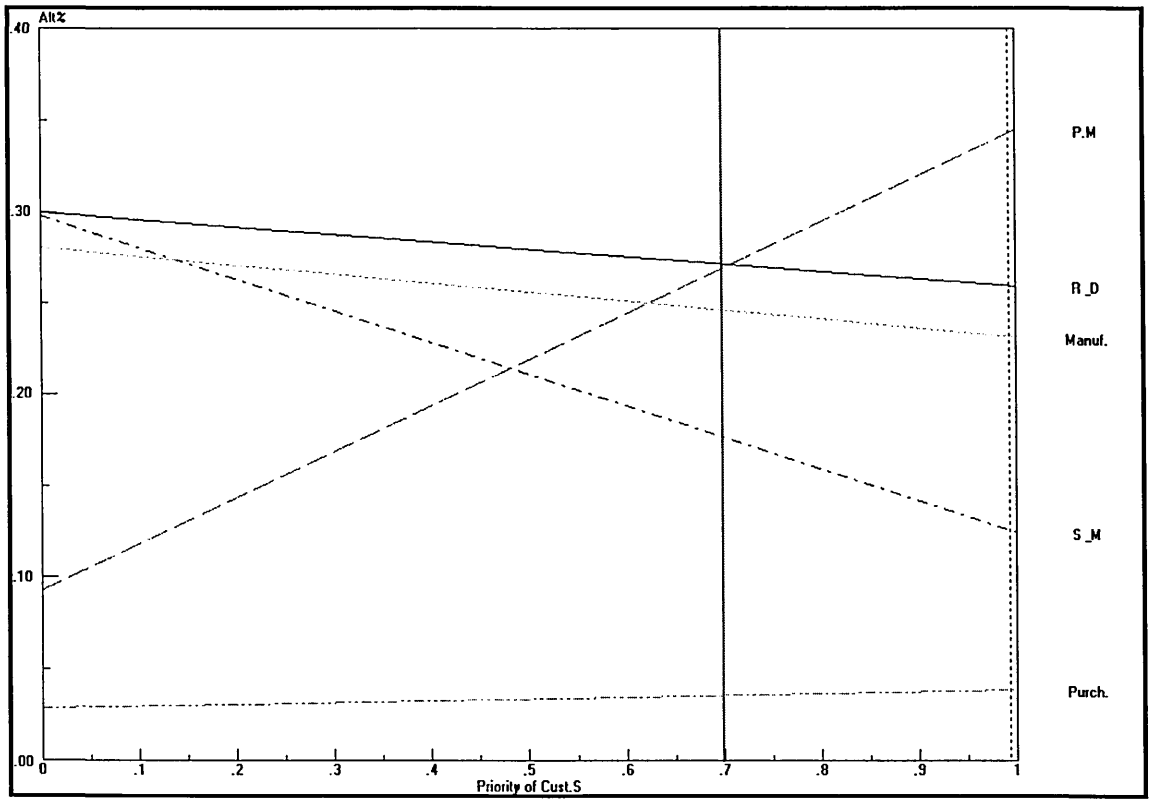


Figure 4.12 (a) The sensitivity with regard to the change of customer satisfaction priority (50% value increase)

Key: Manuf = Manufacturing; P.M. = Performance management;

Purch. = Purchasing; S-M. = Sales and marketing; R-D = R & D

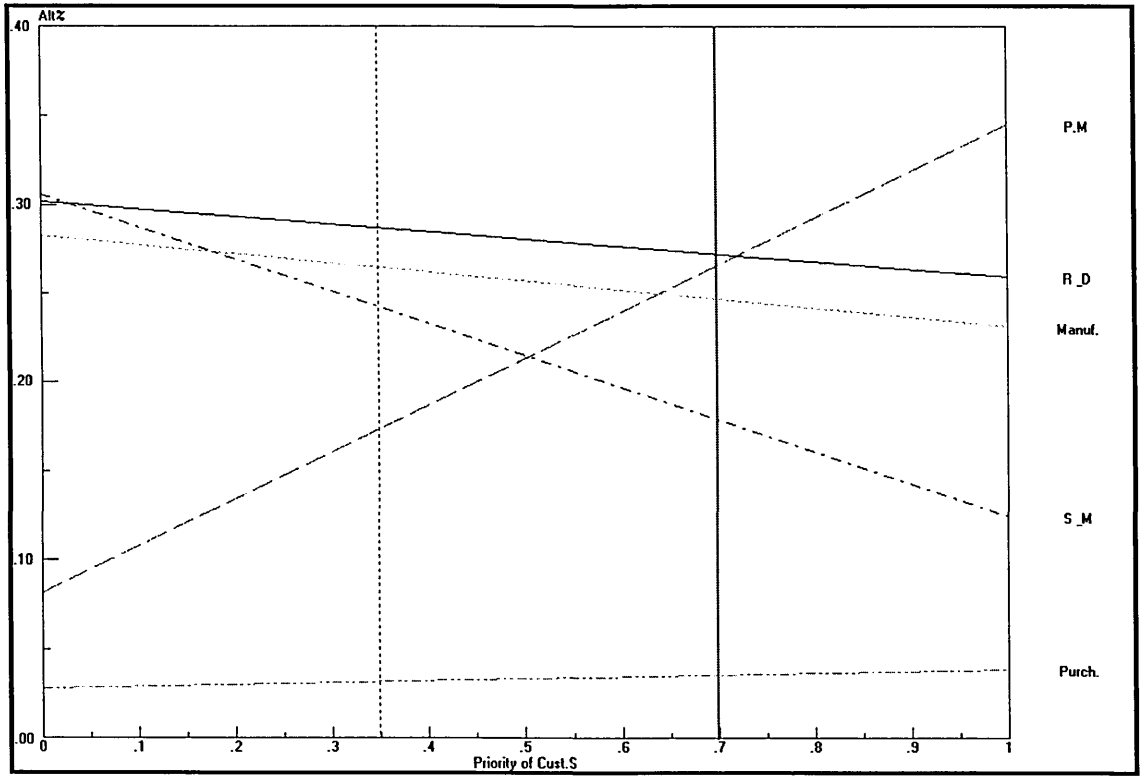


Figure 4.12 (b) The sensitivity with regard to the change of customer satisfaction priority (50% value decrease)

Key: Manuf = Manufacturing; P.M. = Performance management;

Purch. = Purchasing; S-M. = Sales and marketing; R-D = R & D

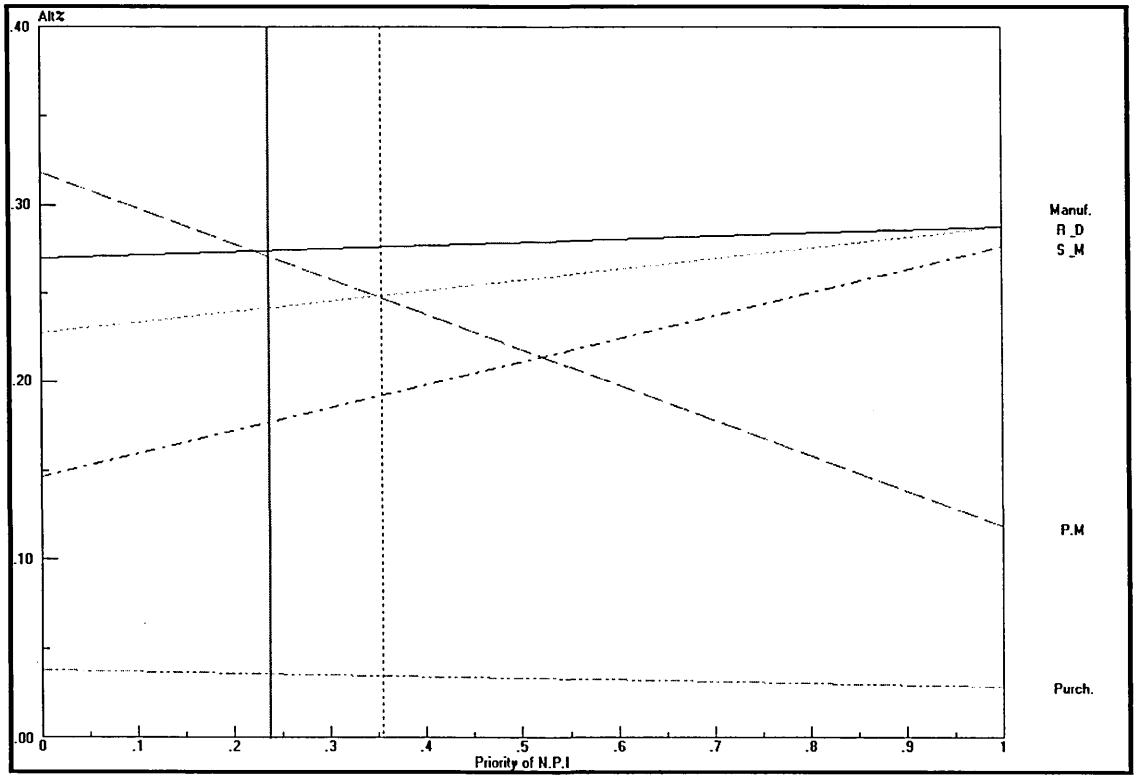


Figure 4.13 (a) The sensitivity with regard to the change of new product introduction priority (50% value increase)

Key: Manuf = Manufacturing; P.M. = Performance management;

Purch. = Purchasing; S-M. = Sales and marketing; R-D = R & D

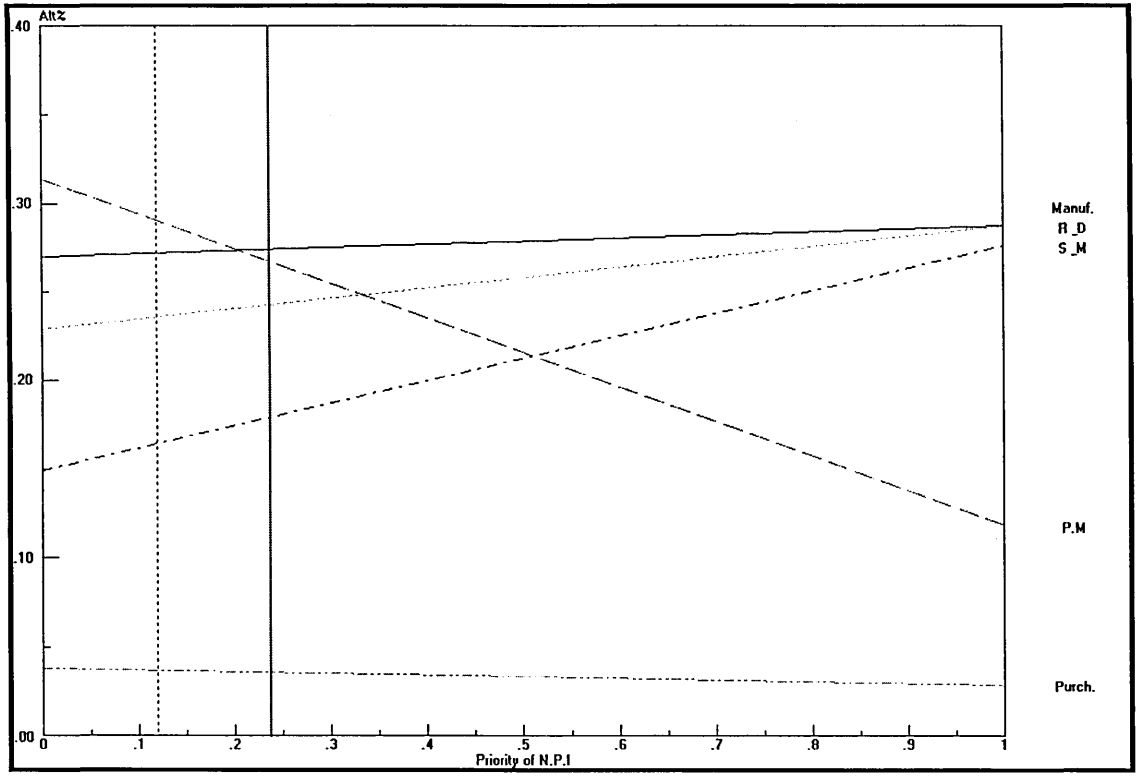


Figure 4.13 (b) The sensitivity with regard to the change of new product introduction priority (50% value decrease)

Key: Manuf = Manufacturing; P.M. = Performance management;

Purch. = Purchasing; S-M. = Sales and marketing; R-D = R & D

analyses have shown that the top three most preferred capability alternatives keep their preference position in the ladder.

4.4.4 Validation through Structured Questionnaire

In order to further test the model, more studies were conducted. Ten local companies were selected from the local business list of the CBI UK Kompass (1998), where five were from manufacturing sector and the other five represented services industries. The senior managers of these companies were contacted through writing for seeking for their participations.

4.4.4.1 The Companies

Only four companies responded positively, with two services and two manufacturing organisations. A brief background of the companies is given in Table 4.22.

Background	Company B	Company C	Company D	Company E
Industry sector	Manufacturing	Manufacturing	Service	Service
No. of employees	Under 100	100-199	Under 100	Over 1,000
Annual Sales	Under £5m	£5-50m	£5-50m	Over £500m
Location	England	England	England	England
Main products	Metal work	Die forging	Recruitment	Bank

Table 4.22 The company profiles

4.4.4.2 Data Collection and Analysis

Although generally interested in the research, none of them were willing to provide the data and information as detailed as Company A did. Also, the allowed interview time was generally restricted (usually no more than a half hour). Considering the reality and the aim of the case studies, it was decided to employ a structured interview method. A structured questionnaire was designed for this purpose (see Appendix B). Financial and non-financial measures as well as the five functional capabilities those identified through the case study of Company A were used as the criteria to construct the AHP models. However, when conducting the interviews for those two services companies, functions such as manufacturing/processing were re-interpreted according to the specific business nature. For example, for Company E whose business is banking, the manufacturing/processing was interpreted as process including crediting, loan, investment, and insurance.

Totally five senior managers were involved in the interviews (two of them were together representing the banking company). Based on the questionnaire, the interviewees were asked to compare pairwise the measures and the capability alternatives respectively. Using AHP software package, the data were processed and recorded. However, the exception was Company D, where the interviewee only confirmed and used four performance measures (See Appendix C for the evaluation details).

4.4.4.3 Key Capabilities of Companies B to E

The procedures used for determining the key capabilities for Companies B to E is same

to that used for Company A. Based on the results given in Appendix C, the identified key capabilities of Companies B to E are summarized and presented Table 4.23. The results were generally accepted by the participants (During the interviews they were also asked to identify subjectively at least two functional capabilities which they regarded most likely the key capabilities of their companies).

Note that the consistence ratios (CR) of financial and non-financial evaluations are within the 0.1 limit (see Table 4.24). The CR of below 0.05 for company E shows that the input data is least corrupted with subjective biases. However, an exact match is obtained between the identified key capabilities using the model and the perceived key capabilities as understood by the management of the respective companies. This clearly shows that the model is valid and practical tool to evaluate key capabilities of a firm.

Functional capability	**Company B**	**Company C**	**Company D**	**Company E**
Purchasing				
Manufacturing/processing	√	√		√
Sales and marketing	√	√	√	√
R & D				
Performance management			√	√

Table 4.23 The identified key capabilities for the four companies

Key: √ = Indicator of key capability

Company	Identified key capabilities	CR (F)	CR (N-F)	Perceived key capabilities
Company B	Manufacturing/processing Sales and marketing	0.07	0.06	Manufacturing/processing Sales and marketing
Company C	Sales and marketing Manufacturing/processing	0.10	0.09	Sales and marketing Manufacturing/processing
Company D	Sales and marketing Performance management	0.07	0.09	Sales and marketing Performance management
Company E	Manufacturing/processing Sales and marketing Performance management	0.02	0.05	Manufacturing/processing Sales and marketing

Table 4.24 The impact of CR on the evaluation results

Key: F = Financial evaluation; N-F = Non-financial evaluation

4.4.4.4 The Sensitivity Analysis

Using the procedure conducted for the case study of Company A (Section 4.4.3), the sensitivity analysis of the capability alternatives was performed for each company. Again ± 10% and ± 50% sensitivity ranges were employed on the priorities of each financial and non-financial measure. The results are recorded and shown in the Appendix D. Table 4.25 summaries the sensitivity of each of the companies with regard to the changes of each performance measure. It can be seen that the top two most preferred capabilities identified under each of the measures are not sensitive to priority change of ± 50%. For a ± 10% change the analysis reveals that the sensitivity results are more resilient. Table 4.26 presents the analysis results for each of the companies.

(A) Financial Performance Evaluation

	Change in the ROCE priority			Sensitivity	Change in the operating profits priority			Sensitivity	Change in the sales growth priority			Sensitivity
	Original preference order	After + 50% change	After - 50% change		Original preference order	After +50% change	After - 50% change		Original preference order	After + 50% change	After - 50% change	
Company B	1. S & M 2. MAN	1. S & M 2. MAN	1. MAN 2. S & M	Low	1. MAN 2. S & M	1. MAN 2. S & M	1. MAN 2. S & M	Very low	1. S & M 2. MAN	1. MAN 2. S & M	1. S &M 2. MAN	Low
Company C	1. S & M 2. PUR	1. S & M 2. PUR	1. S & M 2. PUR	Very low	1. S & M 2. PUR	1. S & M 2. PUR	1. S & M 2. MAN	Medium	1. S & M 2. PUR	1. S & M 2. PUR	1. S & M 2. PUR	Very low
Company D	N/A	N/A	N/A	N/A	1. S & M 2. PM	1. S & M 2. PM	1. S & M 2. PM	Very low	1. S & M 2. PM	1. S & M 2. PM	1. S & M 2. PM	Very low
Company E	1. MAN 2. S & M	1. MAN 2. S & M	1. MAN 2. S & M	Very low	1. S & M 2. MAN	1. S & M 2. MAN	1. S & M 2. MAN	Very low	1. MAN 2. S & M	1. MAN 2. S & M	1. MAN 2. S & M	Very low

(B) Non-financial Performance Evaluation

	Change in the market share priority			Sensitivity	Change in the customer satisfaction priority			Sensitivity	Change in the new product introduction priority			Sensitivity
	Original preference order	After + 50% change	After - 50% change		Original preference order	After + 50% change	After - 50% change		Original preference order	After + 50% change	After - 50% change	
Company B	1. S & M 2. MAN	1. S & M 2. MAN	1. MAN 2. S & M	Low	1. S & M 2. MAN	1. MAN 2. S & M	1. S & M 2. MAN	Low	1. MAN 2. S & M	1. MAN 2. S & M	1. MAN 2. S & M	Very low
Company C	1. PM 2. MAN	1. PM 2. MAN	1. PM 2. MAN	Very low	1. PM 2. MAN	1. PM 2. MAN	1. MAN 2. PM	Low	1. PM 2. MAN	1. MAN 2. PM	1. PM 2. MAN	Low
Company D	1. S & M 2. PM	1. S & M 2. PM	1. S & M 2. PM	Very low	1. PM 2. S & M	1. PM 2. S & M	1. PM 2. S & M	Very low	N/A	N/A	N/A	N/A
Company E	1. MAN 2. R & D	1. MAN 2. S & M	1. MAN 2. R & D	Low	1. MAN 2. R & D	1. MAN 2. R & D	1. S & M 2. R & D	Medium	1. S & M 2. R & D	1. S & M 2. R & D	1. S & M 2. R & D	Very low

Table 4.25 Sensitivity of the top two originally most preferred capabilities (± 50% change)
Key: S & M = Sales and marketing; R & D = Research and development; PM = Performance management; MAN = Manufacturing; PUR = Purchasing
Very low = no change to original preference order; Low = the original preference order swamped;
Medium = one of the preferred alternatives is replaced by a new one; High = the both preferred alternatives are replaced by new ones

(A) Financial Performance Evaluation

	Change in the ROCE priority			Sensitivity	Change in the operating profits priority			Sensitivity	Change in the sales growth priority			Sensitivity
	Original preference order	After + 10% change	After - 10% change		Original preference order	After + 10% change	After - 10% change		Original preference order	After + 10% change	After - 10% change	
Company B	1. S & M 2. MAN	1. S & M 2. MAN	1. S & M 2. MAN	Very low	1. MAN 2 .S & M	1. MAN 2. S & M	1. MAN 2. S & M	Very low	1. S & M 2. MAN	1. S & M 2. MAN	1. S &M 2. MAN	Very low
Company C	1. S & M 2. PUR	1. S & M 2. PUR	1. S & M 2. PUR	Very low	1. S & M 2. PUR	1. S & M 2. PUR	1. S & M 2. PUR	Very low	1. S & M 2. PUR	1. S & M 2. PUR	1. S & M 2. PUR	Very low
Company D	N/A	N/A	N/A	N/A	1. S & M 2. PM	1. S & M 2. PM	1. S & M 2. PM	Very low	1. S & M 2. PM	1. S & M 2. PM	1. S & M 2. PM	Very low
Company E	1. MAN 2. S & M	1. MAN 2. S & M	1. MAN 2. S & M	Very low	1. S & M 2. MAN	1. S & M 2. MAN	1. S & M 2. MAN	Very low	1. MAN 2. S & M	1. MAN 2. S & M	1. MAN 2. S & M	Very low

(B) Non-financial Performance Evaluation

	Change in the market share priority			Sensitivity	Change in the customer satisfaction priority			Sensitivity	Change in the new product introduction priority			Sensitivity
	Original preference order	After + 10% change	After - 10% change		Original preference order	After + 10% change	After - 10% change		Original preference order	After + 10% change	After - 10% change	
Company B	1. S & M 2. MAN	1. S & M 2. MAN	1. MAN 2. S & M	Low	1. S & M 2. MAN	1. MAN 2. S & M	1. S & M 2. MAN	Low	1. MAN 2. S & M	1. MAN 2. S & M	1. MAN 2. S & M	Very low
Company C	1. PM 2. MAN	1. PM 2. MAN	1. PM 2. MAN	Very low	1. PM 2. MAN	1. PM 2. MAN	1. PM 2. MAN	Very low	1. PM 2. MAN	1. PM 2. MAN	1. PM 2. MAN	Very low
Company D	1. S & M 2. PM	1. S & M 2. PM	1. S & M 2. PM	Very low	1. PM 2. S & M	1. PM 2. S & M	1. PM 2. S & M	Very low	N/A	N/A	N/A	N/A
Company E	1. MAN 2. R & D	1. MAN 2. R & D	1. MAN 2. R & D	Very low	1. MAN 2. R & D	1. MAN 2. R & D	1. MAN 2. R & D	Very low	1. S & M 2. R & D	1. S & M 2. R & D	1. S & M 2. R & D	Very low

Table 4.26 Sensitivity of the top two originally most preferred capabilities (± 10% change)
Key: S & M = Sales and marketing; R & D = Research and development; PM = Performance management; MAN = Manufacturing; PUR = Purchasing
Very low = no change to original preference order; Low = the original preference order swamped;
Medium = one of the preferred alternatives is replaced by a new one; High = the both preferred alternatives are replaced by new ones

4.5 Summary

This chapter firstly provides the working definition of key capabilities and then discusses the criteria required for their evaluation. It is emphasized that both financial and non-financial performance measures should be used as the criteria for evaluating the importance of capability alternatives to the business. Based on the AHP approach, a model of key capability evaluation is proposed. The present research is different to the model proposed by Moutinho (1993) as the evaluation process uses two different AHP models for assessing the financial and non-financial performance of capabilities. This is considered more appropriate to conduct the pairwise comparison between two homogeneous measures, for example, profits and sales growth, rather in between two heterogeneous measures, for example, profits and customer satisfaction. Also Moutinho used corporate control tools (e.g., management meetings, marketing analysis, customer input data) as the decision-making alternatives. The control tools actually comprise both firm assets and capabilities.

The model has been validated using five case studies. Through the case studies, it has been confirmed that both financial and non-financial measures are needed for the practitioners regardless of the business nature (manufacturing or non-manufacturing). The validation results show that it is appropriate to employ the AHP approach for assessing the capability alternatives based upon both qualitative and quantitative judgments. The sensitivity analyses performed for the identified key capabilities have shown that the AHP-based method is robust and reliable. The proposed method is also simple to use, structured, and computer-aided.

CHAPTER 5

COMPETENCE EVALUATION

The model, proposed in Chapter 4, provides firms a tool to focus their attentions on a small number of promising candidates of competencies (i.e., key capabilities). Using the key capabilities as inputs, this chapter presents a model for the identification of competence.

5.1 Defining Competence

It is understood that the business successes of most companies in the marketplace owe to some unique capabilities in competition (Barney, 1986; 1991). However, there is a lack of a common definition to explain such capabilities. Phrases like competencies, strategic capabilities, intangible resources, metaskills, and distinctive resources have been randomly used.

As indicated in Chapter 4, firm competencies must be very valuable in business operations and production. In another words, they must be the key capabilities of the firm. However, since they create and sustain the competitive advantage, competencies must be some special key capabilities with some extra characteristics (Grant, 1991; Hamel, 1994).

First, a competence is usually an integrated rather than discrete capability (Klein *et al.*, 1998). In another words, it is the result of collective learning of organisation. For example, 3M's competence in R & D resulted from the co-ordination of several

capabilities such as research, product development, and experimentation (Goold *et al.*, 1997). Canon's competence in product development is the integration of its expertise in fine optics, precision mechanics and micro-electronics (Grant, 1991). Many authors have pointed out that it is the "collectiveness" nature that makes competencies be very valuable in strategic decision makings (Snow and Hrebiniak, 1980; Stalk *et al.*, 1992; Amit and Schoemaker, 1993).

Secondly, competencies are themselves an "isolating mechanism" (Lippman and Rumelt, 1982). They have some barriers preventing the firm's competitors to imitate. Since these competencies cannot be quickly and evenly distributed across all competing firms, the competitive advantage thus is expected to sustain for long time (Barney, 1991). For example, Motorola's difficult-to-be imitated mastery of continuous quality improvement is one of the foundations of its long-term business success (Bartmess and Cerny, 1993). For the purpose of this study, the present author would define competencies as "those key capabilities which are highly 'collective' within the firm and 'unique' in competition". The explanation of these terms is given in the following subsection.

5.2 Characteristics of Competence

Whilst the terms 'collectiveness' and 'uniqueness' are well acknowledged, a literature review suggests that the contents of competence characteristics are not clearly explained. By reviewing some highly influential works in the literature, for example, Prahalad and Hamel (1990), Barney (1991), Grant (1991), Durand (1997), Grandstrand *et al.* (1997), Teece *et al.* (1997) and Swink and Hegarty (1998), remaining part of this section identifies and systematically presents some most commonly cited attributes of

competence.

5.2.1 Collectiveness

Competencies represent 'synergy' among some business activities of a firm. Many authors have pointed out that it is the 'collectiveness' that makes a firm competence "universally" useful in the scope of a business (e.g., Prahalad and Hamel, 1990; Grant, 1991). In many circumstances it enables the firm to enter a new market segment or to develop new products. In the author's view three attributes may be used to represent the 'collectiveness' characteristic of competencies, namely, across-product, across-function and across-business.

5.2.1.1 Across-product

Competencies should not be some "isolated", special purposed capabilities but the platform of multiple lines of products (Bakker *et al.*, 1994). They should have the ability to deliver various product families and services and hence add value to the firm by integrating diverse assets and skills. For example, as the integration of optical and micro-electronic skills and knowledge, Canon's research and development capability forms the basis of the company's success in product families ranging from laser copiers to X-ray equipment (Goold *et al.,* 1997). The other examples include manufacturing process technology and product design capability.

5.2.1.2 Across-function

Competencies should be formed through integrated efforts from multiple teams or

groups within a whole business function. A competence can be described as the artillery of capability networks of a function (Grant, 1991). Its existence is critical to the excellence of functional operation. For example, Black and Decker's design capability of small motors is formed through joint efforts of its technical researchers and product developing engineers and its existence makes the company's R & D function distinctive among its competing firms.

5.2.1.3 Across-business

Very often, a competence is an indispensable element of the business process that cuts horizontally across the functional areas of the firm. It can be seen as part of the identity of the firm. In fact, Prahalad and Hamel's "core competence concept" has particularly emphasised the importance of across-business competencies to a multi-business corporation. Many authors believe that such capabilities are extremely useful for the firm to seek better integration options among Strategic Business Units (SBUs) (Kogut and Zander, 1992; Bartmess and Cerny, 1993; Henderson and Cockburn, 1994; Klein and Hiscocks, 1994; Rumelt, 1994; Sanchez, 1995; Chiesa and Manzini, 1997; Doz, 1997; Goddard, 1997; Teece *et al.*, 1997; Moingeon *et al.*, 1998). Table 5.1 summaries the attributes of collectiveness by giving some examples. The definitions are provided by the author based on the literature review.

5.2.2 Uniqueness

As indicated in Chapter 1 (Table 1.2) that the contemporary management approaches all agree that being "unique" is a salient characteristic of competence. A unique capability could become an "isolating mechanism" which is able to prevent competitors to erode

Collectiveness	Description	Examples
Across-function	The extent to which a capability is an indispensable element of one or more cross-functional processes	• Nissan's cost control for its efficient logistics and production processes (Christopher, 1998)
Across-product	The extent to which a capability is shared by various products	• Canon's optical technology used in image systems, copiers, and cameras (Hamel, 1993)
Across-business	The extent to which a capability is an indispensable element of various business units	• McDonald's operations management for its world-wide outlets (Grant, 1991)

Table 5.1 Examples of the attributes of collectiveness

the competitive edge created by the capability (Reed and DeFillippi, 1990). To render "unique", a capability should show at least one of the three attributes namely, rare in marketplace, less imitable by competitors, and difficult-to-be substituted (Barney, 1991; Hamel, 1994; Wright, 1996; Ghingold and Johnson, 1998).

5.2.2.1 Rare in marketplace

If one or more key capabilities are rare in competition, a firm could enjoy competitive advantage by implementing a value-creating strategy based upon the capabilities. For example, Sony's capability in miniaturisation is rare in the world-wide electronics markets and, therefore, has helped the company to preserve its competitive advantage in the market for a long time (Hamel, 1994). Being "rare" doesn't necessarily mean that a specific capability is held only by a single competing firm. Generally speaking, rareness is very often attributed to the following two factors (Reed and DeFillippi, 1990; Grant, 1991):

1. Path dependency (i.e., the firm-specific experience). For example, Mark & Spencer's high quality retailing results from the operating experience of its long history (Thompson and Richardson, 1996).
2. Asset mass deterrence (i.e., the ability to accumulate necessary assets in time). For example, BT's selling capability is largely depending upon its dominant dealer networks in UK.

5.2.2.2 Inimitability

Inimitability is the degree to which a firm's resources or capabilities cannot be duplicated by its competitors (Barney, 1991). If a resource or capability is difficult to be

imitated, then it is likely to have some extra value in competition. The more inimitable a resource or capability is, the more likely it would maintain its superiority.

Inimitability usually stems from 'imperfect' information. If competitors have incomplete or confused information about a specific capability, then it is likely that the capability can sustain its exclusivity for a period time. For example, Wal-Mart's logistic capability is embedded in a complex process that harmonises an array of tools (e.g., satellite communication, electronic order system, etc.). Its main competitor, K-Mart, has the ability to acquire these tools. However, since the capability is developed by cross-functional activities and invisible to outsiders, K-Mart is still unable to imitate the logistics capability of Wal-Mart (Stalk *et al.*, 1992).

5.2.2.3 Non-substitutability

Substitution is also a serious threat to the value of a capability. As Dierickx and Cool (1989) pointed out that the existence of substitutes means that the capability no longer be able to create distinctive value to the customers. For example, when Canon challenged Xerox's dominant position in the low to medium volume copier market, Xerox's extensive service network was a formidable barrier to overcome. However, by developing a superior product design capability, Canon was able to provide high quality products and reduce the rate of service. This led Xerox's service network partly obsolete and thereby loss of value to customers (Hamel, 1993). Substitution may happen in various ways, such as, technological development, material change, process revolution, and methodology improvement. Table 5.2 summaries the attributes of uniqueness giving some examples. Same to that of collectiveness, the definitions are provided by the author based on the literature review.

5.3 Competence Evaluation Model

Based on the working definition and the attributes of firm competencies, a structured model of competence evaluation is designed. The basic assumption here is that competence evaluation can be realized through the analysis of the attributes of the candidates, i.e., key capabilities, and the both collectiveness and uniqueness assessments are necessary. As would be explained later, one of salient features of the model is that it can be used for identifying unique resources of the firm as well. Essentially the model consists of four stages as illustrated in Figure 5.1:

Stage 1: assessing the collectiveness of key capabilities;

Stage 2: assessing the uniqueness;

Stage 3: determining firm competencies; and

Stage 4: identifying the unique resources.

5.3.1 Collectiveness Assessment

This assessment seeks to identify those key capabilities which have the common characteristics for across-function, across-business or across-product attributes. Generally speaking, analyzing collectiveness tends to be subjective as detailed and clear-cut related information and data is hard to obtain. However, if the assessment results can be shown in a quantitative style, it would help in determining the collectiveness of a capability. This was the major intention of Probert *et al.* (1993) using the weights and scores (matrix) technique for identifying major manufacturing technologies (see Section 2.2.3 of Chapter 2). The author finds this technique suitable, therefore, adopts it for the collectiveness assessment.

Attribute	Description	Examples
Rareness	The degree to which a particular capability is distinctive in competition	• Sony's miniaturisation capability (Grant, 1991)
Inimitability	The degree to which a particular capability is inimitable by competitors	• Honda' know-how in engine design (Prahalad and Hamel, 1990)
Non-substitutability	The degree to which a particular capability cannot be replaced by other resources or capabilities	• Microsoft's operating system capability (Schoemaker, 1992)

Table 5.2 Examples of the attributes of uniqueness

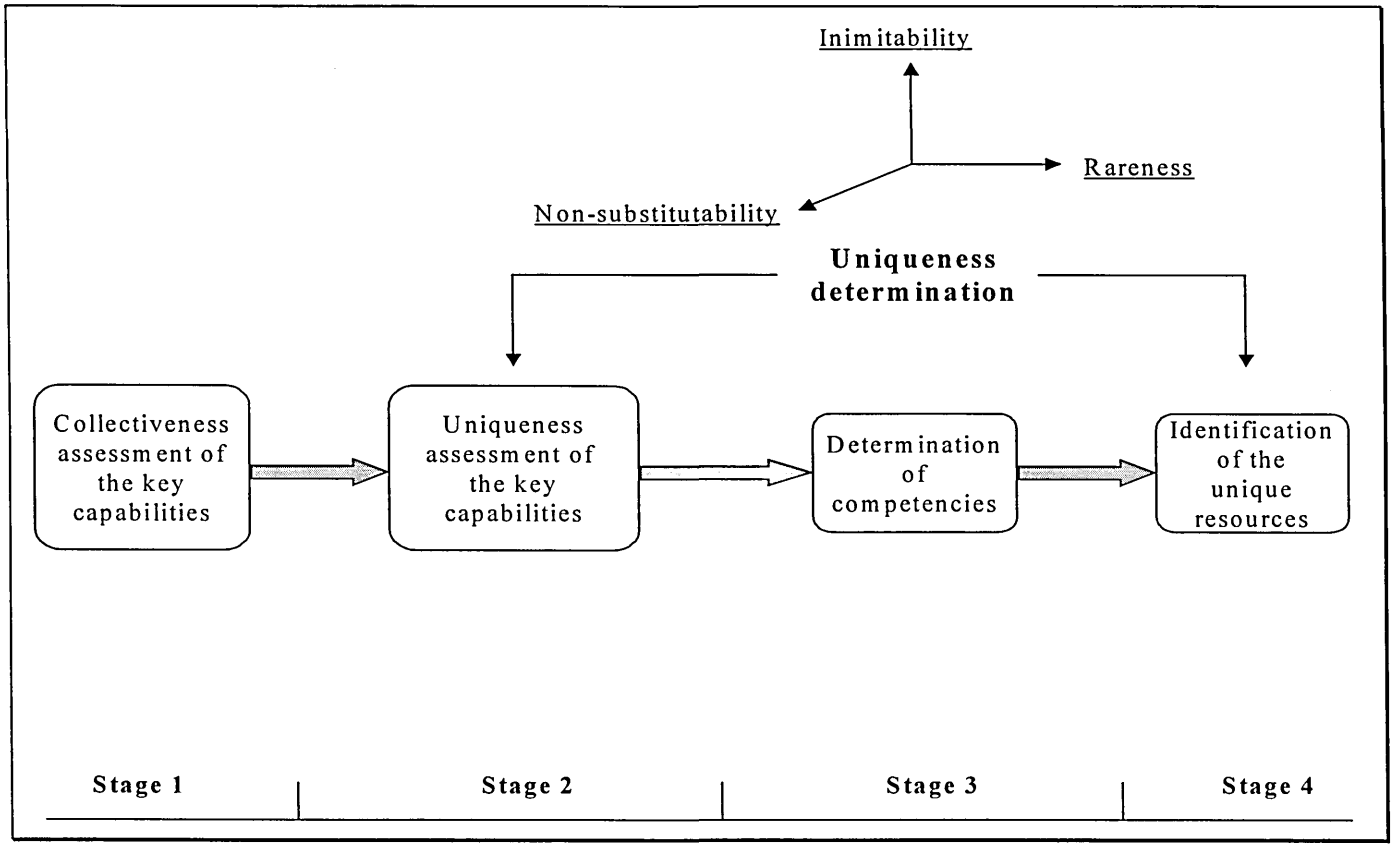


Figure 5.1 The model for competence evaluation

A weights and scores technique is very often realized using a Likert-style scale. The most often used are 5-points or 7-points scales. A 5-point scale is able to elicit sufficient information as well as simplify the process of data collection. In order to discourage the respondents to take a neutral stand, a four-point scale is selected. Therefore, the key capabilities is evaluated on a four-point scale where 1 = low collectiveness and 4 = high collectiveness (see Table 5.3). The scores assigned to each attribute should reflect the decision-makers' perception how much collective a key capability is.

The method used for determining the 'collective' key capabilities is the averaging same as suggested in Section 4.3.3 of Chapter 4. After the collectiveness scores are obtained for all candidates, the mean value of the total weights is calculated (by adding-up the weights and dividing the number of the candidates). If the individual candidate scores higher than the mean, the capability is considered highly collective. In the example shown in Table 5.3, the mean is 7.5 (i.e., 45/6). Hence, the capabilities A, C, D and F with a total score of 7.5 or more (out of 12) show that they are an integral part of various business operations.

Key capability	Across-function (Out of 4)	Across-product (Out of 4)	Across-business (Out of 4)	Total (Out of 12)
Capability A	3	3	2	8
Capability B	3	1	1	5
Capability C	2	4	2	8
Capability D	3	3	3	9
Capability E	3	1	1	5
Capability F	4	3	3	10

Table 5.3 Example of collectiveness assessments of the key capabilities

5.3.2 Uniqueness Assessment

Since the key capabilities have already been differentiated by the collectiveness assessment, the uniqueness assessment would be more efficient focusing only on the highly collective key capabilities. The assessment is similar to an external benchmarking exercise, therefore, the decision-makers should have some knowledge of the strengths and weaknesses of their major competitors.

Each 'collective' key capability is then assessed against the three attributes of uniqueness, namely, rareness, inimitability, and non-substitutability. Based upon the same considerations to that of collectiveness assessment, each attribute may be measured on a scale of 1 to 4, where 1 represents very low probability and 4 represents very high probability of having that characteristics. The total uniqueness score for a specific capability can be obtained through adding together the three attribute scores of the capability. Table 5.4 gives an example how the scores for the three attributes of uniqueness can be assigned for the collective capabilities identified from Table 5.3.

Key capability	**Rareness** (Out of 4)	**Inimitability** (Out of 4)	**Non-substitutability** (Out of 4)	**Total**
Capability A	4	4	3	11
Capability C	3	1	2	6
Capability D	3	4	3	10
Capability F	2	3	2	7

Table 5.4 Uniqueness assessment for the 'collective' key capabilities

5.3.3 Competence Determination

Based on the scores as assigned in Table 5.4, the key capabilities can be plotted on a three-dimensional diagram as shown in Figure 5.2. The three axes represent, respectively, rareness, inimitability and non-substitutability attributes. Note that the cell formed at the maximum points, i.e., (4, 4, 4) of the cube, represents that a key capability is simultaneously rare, inimitable and non-substitutable, or the competence. However, in reality, a capability may have only one or two attributes. Therefore, careful consideration should be given to those capabilities which belong to the neighborhood of the competence zone. This would help to avoid the mistake of neglecting a potential competence candidate. The averaging method used for the collectiveness assessment can also be employed here for determining the competencies. In Figure 5.2, capabilities A and D clearly qualify as the competencies of the firm.

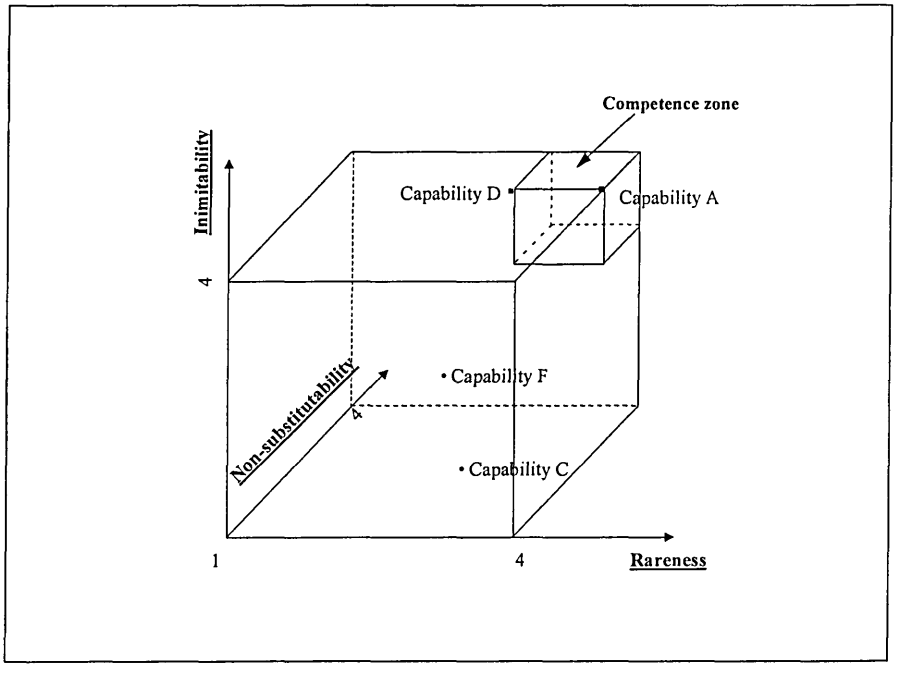


Figure 5.2 Competence determinations using three-dimensional model

5.3.4 Unique Resource Determination

In dynamic environment, intangible assets (i.e., intellectual and cultural assets) are particularly emphasised to become the differentiating factors among the competing firms. For example, Kellogg's customer trust was earned through a history of publicity and quality service in the cereals market and cannot be bought or substituted (Hitt *et al.*, 1995). Therefore, by identifying their unique resources, firms may understand which resources are precious and indispensable to the business. This would help the firm to make appropriate decisions how to protect, nurture and develop these unique resources.

5.3.4.1 Resource Mapping

Usually a firm owns a very large number of assets. Therefore, it could take a lot of efforts and time for a firm to identify its major resources if a focused mapping process is not used. The present author proposes an approach which can be used for mapping those assets closely related to firm competencies.

As mentioned earlier that competencies (or simply capabilities) are formed by integrating firm resources. These include physical, intellectual and cultural assets. For each competence, the asset stock is analysed against the physical, intellectual and cultural category. During the mapping process, more attention needs to be paid to the intellectual assets because they are difficult to identify due to their invisibility. Table 5.5 presents an example of a relationship between assets and competencies. The identified assets would then be subjected to uniqueness assessment procedure.

Resource	Competence A	Competence B	Competence C	Competence D
Physical asset	Warehouse	Plant	Buildings	Store location
Intellectual asset	Dealer loyalty	Employee skills	Database	Brand name
Cultural asset	Win-win belief	Value of quality	Empowerment	Working ethics

Table 5.5 Identification of resource-competence relationships

5.3.4.2 Resource Assessment

By employing the method described in Section 5.3.2, the identified assets may be assessed for uniqueness based on the three dimensions namely, rareness, inimitability and non-substitutability. For each dimension, a 4-point scale is used where 1 = very low ; 2 = low; 3 = high; and 4 = very high. If necessary, weighting factors are added to the three dimensions to reflect the decision-makers' perception of their importance to the uniqueness. An example of this method is illustrated in Table 5.6. Similar to the competence determination unique assets can be plotted in the three dimensional box shown in Figure 5.3 and determined using the average method. For the given example, attitude, skills, reputation, and knowledge are clearly unique assets.

Resource	Rareness (Out of 4)	Inimitability (Out of 4)	Non-substitutability (Out of 4)	Total
Plant	2	2	1	5
Equipment	2	1	1	4
Location	3	3	2	8
Knowledge	3	3	3	9
Skill	4	4	4	12
Brand name	3	3	2	8
Reputation	4	4	4	12
Belief	2	2	1	5
Perception	3	3	2	8
Attitude	3	4	4	11

Table 5.6 Uniqueness assessment for competence-related resources

5.4 Validation of the Competence Model

The proposed model is validated using two case studies. The key capability analysis results obtained for Company A were used as inputs to validate the model for a manufacturing company (see Table 4.21). Companies B, C, D, and E were contacted but they offered no more interviews. Therefore, to validate the model for a service company, IKEA home furnishing chain was chosen using the published data. This illustrates the integrity of the proposed method.

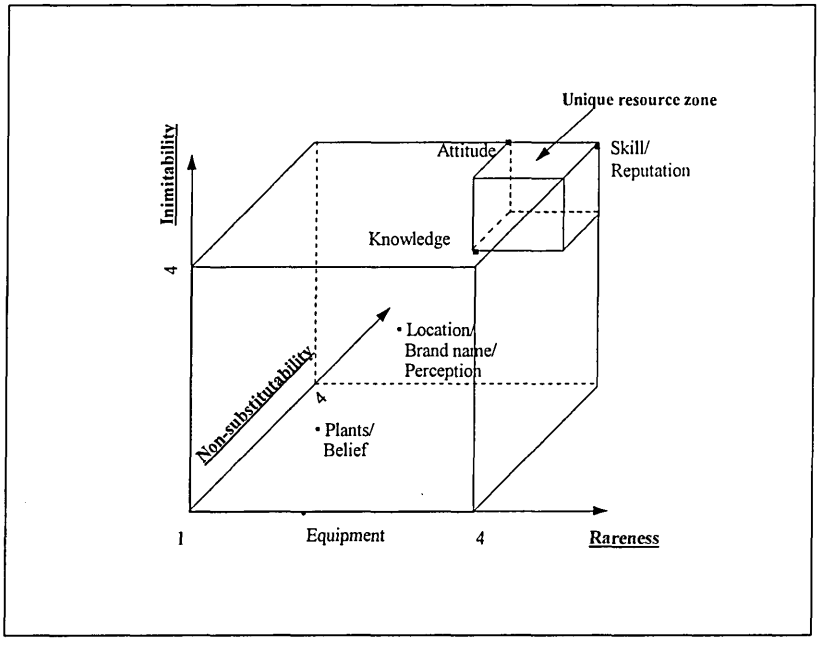


Figure 5.3 Determination of unique resources

5.4.1 Competence Determination for IKEA

5.4.1.1 A Brief Profile of IKEA

IKEA is a global retail corporation which operates 139 stores in 28 countries with revenues of approximately $6 billion. The primary selling vehicle of IKEA is its 200-page catalogue which is produced in 39 editions, in 20 languages for over 30 countries (The Economist, Nov.19, 1994; Marketing Week, March 15, 1996). IKEA's formula is that the furniture must be affordable but not at the cost of function or quality (Business Week, Oct. 6, 1997; The Financial Times, Oct.17, 1997). IKEA has succeeded in creating more value per person and securing greater total profit from its physical and human resources than most companies in any consumer industry (Normann and Ramirez, 1993). Appendix E (I) presents the financial records of IKEA.

5.4.1.2 Key Capabilities of IKEA

IKEA's main business activities are organised around four functions: product development, purchasing, retailing, and marketing (Martenson, 1987). IKEA's major capabilities within the four functional areas are identified based on their value contributions to both financial and operational business performance. A list of IKEA's key capabilities is given in Table 5.7.

Functional area	Key capability
Product development	Design Cost control
Retailing	Quality service Selling
Purchasing	Sourcing Economies of scale
Marketing	On-site promotion Advertisement

Table 5.7 IKEA's key capabilities

5.4.1.3 Data Collection

As explained in Section 1.5.2.2 of Chapter 1, IKEA is selected for testing the models of competence and core competence identifications because relatively complete information is available in the literature. As a service company, IKEA is deemed appropriate for examining the robustness and the generic nature of the model. However, due to the lack of detailed information about performance measures and operation

capabilities, it was not possible to conduct key capability evaluation exercise as described in Chapter 4.

The data for this case study was collected through an "in-house" brainstorming session. A group of five researchers (my colleagues and me) held a discussion in which the IKEA's capabilities were analysed. All of the group members had a good knowledge (e.g., company background, industry position, and business nature) about the company and four of them were a frequent visitor to IKEA stores. A summary of background information and company fact sheets showing the last ten years of performance data was also supplied to the group. The final scores for the "collectiveness" and "uniqueness" assessments were assigned by group decisions.

5.4.1.4 Assessing the Collectiveness

IKEA's success is partly rooted in its long-term internal and external networking efforts. Therefore many of its key capabilities are collective in nature (Normann and Ramirez, 1993). Table 5.8 shows the collectiveness scores for key capabilities. Note the mean of the total weights is 9.875.

The collectiveness results indicate that only the advertisement capability and economies of scale were rated low (scores of 6 and 8), therefore, they were excluded from the highly collective key capabilities list for uniqueness assessment. Other capabilities, such as quality service, cost control, and sourcing, were identified as highly collective. The scores were assigned based upon the fact that the capabilities were operated in business-wide and shared by thousands-odd products or hundreds geographically different world-wide markets. The quality of the service provided in every IKEA's retail

outlets was very much the same.

Key capability	Across-function (Out of 4)	Across-business (Out of 4)	Across-products (Out of 4)	Total (Out of 12)
Design	2	4	4	10
Cost control	3	4	4	11
Quality service	4	4	4	12
Selling	3	4	4	11
On-site promotion	2	4	4	10
Advertisement	1	2	3	6
Sourcing	3	4	4	11
Economies of scale	2	3	3	8

Table 5.8 The collectiveness scores of IKEA's key capabilities

5.4.1.5 Assessing the Uniqueness

Some of IKEA's key capabilities were firm-specific and distinctive in marketplace. For example, IKEA had a very specialised design capability of flat pack, self-assembly furniture products (Worrell and Littler, 1995). This capability was formed due to their design and retail history and was the collective learning of IKEA's design team (Beamish and Killing, 1988). The simple, high-quality, Scandinavian design created products with an almost universal appeal and attracted world-wide customers. Some unique assets, e.g., strong Swedish design philosophy, made the capability extremely difficult to be imitated by its major rivals (Normann and Ramirez, 1993). Table 5.9 gives the average subjective scores assigned for IKEA's key capabilities. Note the mean value of the uniqueness is 9.5.

Key capabilities	Rareness (Out of 4)	Non-substitutability (Out of 4)	Inimitability (Out of 4)	Total
Design	4	3	4	11
Cost control	4	2	1	7
Quality service	4	3	4	11
Selling	2	2	3	7
On-site promotion	4	3	3	10
Sourcing	4	3	4	11

Table 5.9 The uniqueness scores of IKEA's key capabilities

5.4.1.6 Determining the Competencies

Some of IKEA's key capabilities were highly invisible and hence highly inimitable. For example, IKEA's design capability in flat-packed furniture was formed by a set of design routines which were invisible to its competitors. For example, one common practice of IKEA was to link material suppliers, manufacturers and design team together to find the optimum way to design high quality but cost effective furniture. The three dimensional box was used to plot the competencies of IKEA (see Figure 5.4). The capabilities occupying the competence zone include design, quality service, sourcing and on-site promotion.

5.4.1.7 IKEA's Unique Assets

Table 5.10 shows a relationship between the IKEA competencies and resource base.

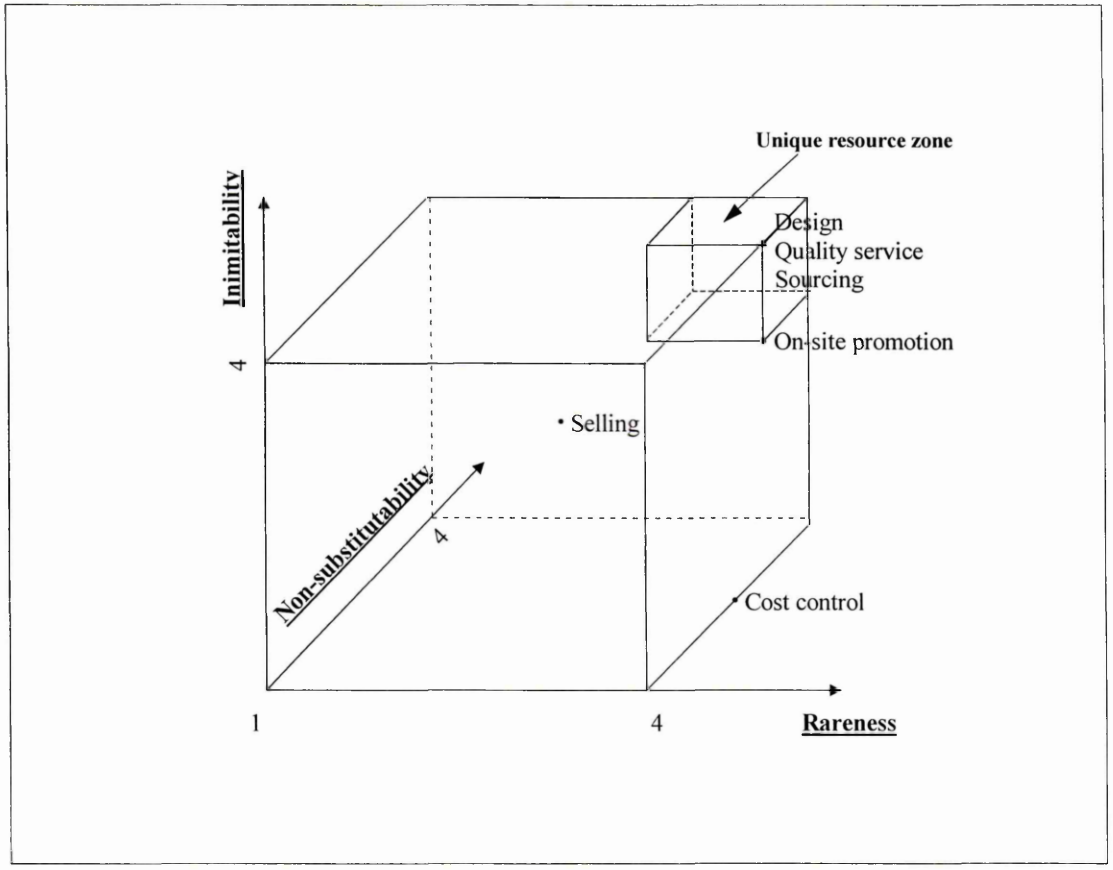


Figure 5.4 The competencies of IKEA

		Competence			
		Design	**Quality service**	**Sourcing**	**On-site promotion**
Resource	**Physical asset**		Retail outlets Restaurant Store location	Store location Warehouse Transport	Catalogue
	Intellectual asset	Design skills Market knowledge	Database	Relationship with suppliers Database	Brand Reputation Market knowledge
	Cultural asset	Design philosophy	In-store environment	Win-win belief	

Table 5.10 The competence-related resources of IKEA

While the identification of physical assets was relatively easy, the identification of intangible assets was a complex procedure. The identification process focused only on those assets which were substantially valuable to the competencies. Several assets were found to be distinctive in a benchmarking exercise. For example, IKEA's Scandinavian design philosophy was rare among competing firms. Few competitors had the ability to match its huge warehouse capacity. The design skills of its workforce in flat-packed furniture were much higher than the industry standards. IKEA's special relationships with its suppliers were established on close communication and mutual trust and were rooted in its win-win belief.

The identified assets were evaluated against the three attributes, namely, rareness, inimitability and non-substitutability as explained earlier. The assessment results are shown in Table 5.11. It shows that the retail outlet and the database are rated lower than the mean value (10.1), therefore, are not considered as unique assets. Table 5.12 summaries the competencies and unique resources of IKEA.

5.4.1.8 IKEA's Competence Leverage

In spite of expansion in its operation to over 28 countries, IKEA's products are identified with their distinguished "Swedishness" characteristics. The design philosophy is maintained through central control. The unified design conformance has ensured the quality and the identity of IKEA products worldwide.

IKEA's success results from its determination of maintaining and nurturing its competencies. Since early 1980s, IKEA has been continuously expanding through investing 15% of its total turnover in product development, sourcing and design. For

	Rareness (Out of 4)	Inimitability (Out of 4)	Non-substitutability (Out of 4)	Total (Out of 12)
Retail outlets	3	2	2	7
Warehouses	4	3	4	11
Brand name	4	4	3	11
Reputation	4	4	4	12
Market knowledge	4	3	3	10
Database	3	2	1	6
Relationship with suppliers	4	4	3	11
Design skills	4	4	3	11
Design philosophy	4	3	3	10
In-store environment	4	4	3	11
Win-win belief	4	4	4	12

Table 5.11 The assessment of resource uniqueness for IKEA

example, a network of special "buying" offices is established around the world for supplier selection purposes. Warehouses are strategically located to link with the sourcing network. Warehouses are built around retail outlets with the aim to cut down the supply cost and transportation lead time. IKEA's outlets as well as the served countries both have increased by over 60% in the last ten years. This has helped IKEA to expand its customer base by 130% within a decade (see Appendix E(II)).

Functional areas	Competencies	Unique resources
Product development	Design	Design skills Design philosophy Market knowledge
Retailing	Quality service	Market knowledge In-store environment Win-win belief
Purchasing	Sourcing	Warehouses Market knowledge Relationship with suppliers Win-win belief Brand name Reputation
Marketing	On-site promotion	Brand name Reputation In-store environment Win-win belief

Table 5.12 IKEA's competencies and unique resources

5.4.2 Competence Determination for Company A

The key capabilities of Company A were identified from the five functional areas. Again, a structured questionnaire was used for gauging the management's responses on the described characteristics of competencies.

5.4.2.1 Data Collection

In a repeat interviewing exercise, the managing director of Company A was asked to assess each of the key capabilities (Section 4.4.2) against the three attributes of collectiveness, namely, across-product, across-function and across-business.

5.4.2.2 Assessing the Collectiveness

Each attribute was measured on a scale of 1 to 4 where 1 represents low probability and 4 represents relatively high probability of having that attribute. Table 5.13 presents the scores assigned for each key capability of Company A. Note that the mean is 9.0, therefore, the two capabilities, economies of scale and pricing, were excluded from the highly collective key capabilities list.

5.4.2.3 Assessing the Uniqueness

The identified 'collective' key capabilities were then subjected to subsequent uniqueness assessment. The interviewee was asked first to assess the uniqueness of assets against the three attributes, namely, rareness, inimitability, and non-substitutability, and then to determine the contribution proportion of the assets, i.e.,

physical, intellectual and cultural, to each key capability. Table 5.14 shows the uniqueness scores obtained for the key capabilities of Company A. The mean value here is 10.75.

Key capability	**Across-function** (Out of 4)	**Across-business** (Out of 4)	**Across-products** (Out of 4)	**Total** (Out of 12)
Process technology	2	4	4	10
Economies of scale	1	4	2	7
Pricing	2	3	3	8
Product development	2	4	4	10
Research	2	4	4	10
Performance review	4	4	1	9

Table 5.13 The collectiveness scores of Company A's key capabilities

Key 'collective' capability	**Rareness** (Out of 4)	**Inimitability** (Out of 4)	**Non-substitutability** (Out of 4)	**Total** (Out of 12)
Process technology	4	2	4	10
Product development	4	3	4	11
Research	4	3	4	11
Performance review	4	3	4	11

Table 5.14 The uniqueness scores of Company A's key capabilities

5.4.2.4 Company A's Competencies

Table 5.14 shows that the only differentiating mechanism in this case was the "inimitability" characteristics. According to the results, the three key capabilities of Company A, namely, product development, research, and performance review, were identified as the competencies. This conclusion was verified by the managing director of Company A.

5.4.2.5 Company A's Unique Assets

Table 5.15 presents the uniqueness scores assigned by the interviewee for Company A's assets. The analysis revealed that inimitability was again the main attribute to assess the uniqueness of assets. The scores obtained show that intellectual and cultural assets were rated highly inimitable while physical assets were rated low. An analysis of the result is plotted in Figure 5.5. Table 5.16 summaries the competencies and unique resources of Company A.

Resource	**Rareness** (Out of 4)	**Inimitability** (Out of 4)	**Non-substitutability** (Out of 4)	**Total** (Out of 12)
Physical assets	4	2	4	10
Intellectual assets	4	3	4	11
Cultural assets	4	3	4	11

Table 5.15 The uniqueness scores of Company A's assets

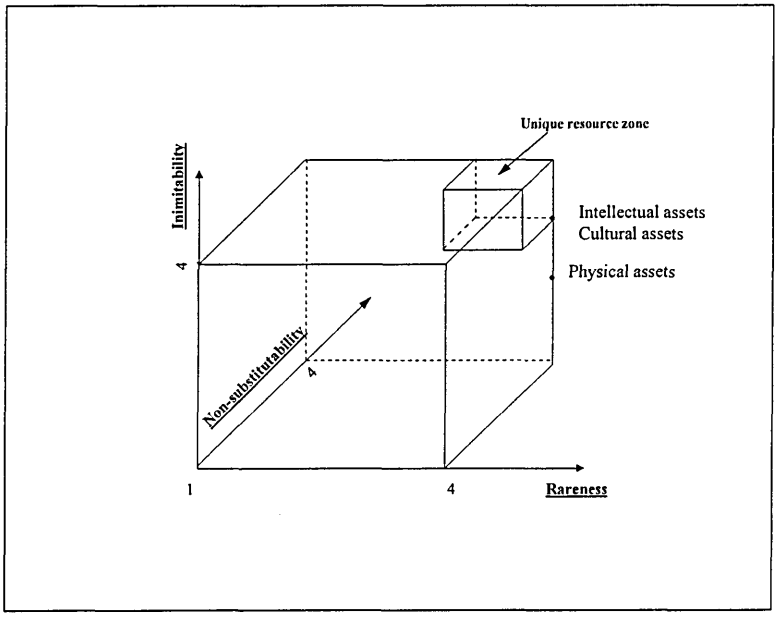


Figure 5.5 The unique resources of Company A

Functional areas	Competencies	Unique resources
R & D	Product development Research	Intellectual assets Cultural assets
Performance management	Performance review	

Table 5.16 Company A's competencies and unique resources

5.5 Summary

This chapter provides the working definition of firm competencies and discusses their characteristics. Based on the assumption that a firm competence can be identified through analyzing the collectiveness and uniqueness of key capability, a structured model is then proposed for identifying firm competencies. The model is subsequently used for identifying unique resources by employing the identified firm competencies.

Besides continuing using the manufacturing Company A the model is also validated using the data and information collected for IKEA service chain. The results from the both case studies have shown that the attributes identified for competence identification are relatively complete and representative the major characteristics of firm competencies.

As the uniqueness assessment is actually an external benchmarking exercise, it is efficient if only a selected number of key capability candidates are used. Assessing the collectiveness is used as the first filter to streamline the uniqueness assessment procedure.

CHAPTER 6

CORE COMPETENCE IDENTIFICATION

This chapter first provides the definition of core competence and then presents a two-stage model for core competence identification. The model is based on the premise that core competence should be dynamic and create new strategic options for the future business.

6.1 Definition of Core Competence

The characteristics of competence, those discussed in Chapter 5, are frequently misinterpreted as the criteria of core competence identification. Klein *et al.* (1991) have argued that such criteria incorporate only static attributes of core competence. In order to identify true core competencies, the criteria should be expanded to include some dynamic attributes as well. Many authors have pointed out that "being unique in competition" is not sufficient for core competencies to keep their strategic values in dynamic environments because an inflexible 'core competence' may quickly turn into tomorrow's "core rigidity" (Hofer and Schendel, 1978; Leonard-Barton, 1992; Collis, 1994; Bogner and Thomas, 1994). Barney (1991) very clearly points out that "unanticipated changes in the economic structure of an industry may make what was, at one time, a source of sustained competitive advantage, no longer valuable for a firm, and thus not a source of any competitive advantage". This view is supported by many examples from computer, semiconductor, aerospace and steel industries (Schoemaker, 1992; Bakker *et al.*, 1994; Helfat, 1997).

While the dynamic nature of core competencies is understood, very few authors have tried to explain such characteristics, or include the dynamism, in the definition of core competence. Also, a systematic method to differentiate core competencies from competencies by using dynamic characteristic has not been found. For the purpose of this thesis, the present author would define a core competence as "a competence which is highly flexible in terms of creating new strategic options for future business in dynamic environment".

6.2 Characteristics of Core Competence

Strategic flexibility has been defined as the capacity of a capability to create new strategic options to respond to new demands from dynamic competitive environments (Volberda, 1996). The flexibility may consist of two attributes: resource re-deployment and routine re-organisation (Sanchez, 1995). A description of these terms is given in the following subsections.

6.2.1 Resource Re-deployment

It is understood that if a competence could fully exploit its underlying resources and manage to deploy these flexibly, new strategic options may be created. For example, 3M's innovation capability is partly based upon its intangible assets such as scientific abrasive knowledge, research skills in coating and cultural norms. Since the competence is able to exploit these assets to the full and deploy them in multiple applications (e.g., dental, automotive, office work), it has consistently delivered innovative and competitive products to customers or helped the company to enter new markets (Goold *et al.*, 1997).

The effects of asset flexibility exerting on competence may be examined from the following three aspects (Sanchez, 1995):

1. Range of alternative uses. The resource re-deployment ability of a competence may be established if the underlined resources are deployed in a range of alternative uses.
2. Switching costs and difficulty. The lower the associated costs and complexity the assets can be switched for alternative applications, the more flexible the competence would be.
3. Opportunity cost of delay. The quicker one or more of the assets can respond to business opportunity, the more flexible the competence would be.

6.2.2 Routines Re-organisation

As pointed out in Chapters 3 capabilities in essence are the organisational routines which present solution to a particular problem. While a routine may be valuable to a firm for a specific period of time, it may also "create an organisational inertia which limits the organisation's ability to fully comprehend new signals from the environment and act upon them expediently "(Helleloid and Simonin, 1994). A valuable routine should be able to re-organise itself from time to time to exploit business opportunities. For example, Canon's product development competence is formed by a set of informal and less rigid routines. When necessary, the company set up short-term taskforce which brings together employees across the organisation to develop new products. Since the taskforce combine skills and knowledge within the company, and the development activities are managed and interacted flexibly, Canon is able to deliver innovative and high quality products, such as cameras, image systems and copiers, to customers (Goold *et al.*, 1997). Table 6.1 summaries the attributes of strategic flexibility by giving some

examples.

Attribute	Description	Examples
Resource re-deployment	The ease with which baseline resources of a competence may be re-deployed to develop new capabilities	• 3M's competence in coating technology has been re-deployed in automotive and office products (Goold *et al.*, 1997)
Routines re-organisation	The ease with which the manifested routines may be re-organised to support future business development	• 3M's laboratory management competence (such as technical forum, procedures, and audit process) can readily be re-organised to develop new products (Goold *et al.*, 1997).

Table 6.1 The attributes of strategic flexibility

6.3 Core Competence Identification Model

Using competence as an input and the attributes of strategic flexibility as the criteria, a core competence identification model is designed. The model consists of two stages as illustrated in Figure 6.1:

Stage 1: assessing strategic flexibility, and

Stage 2: determining core competencies.

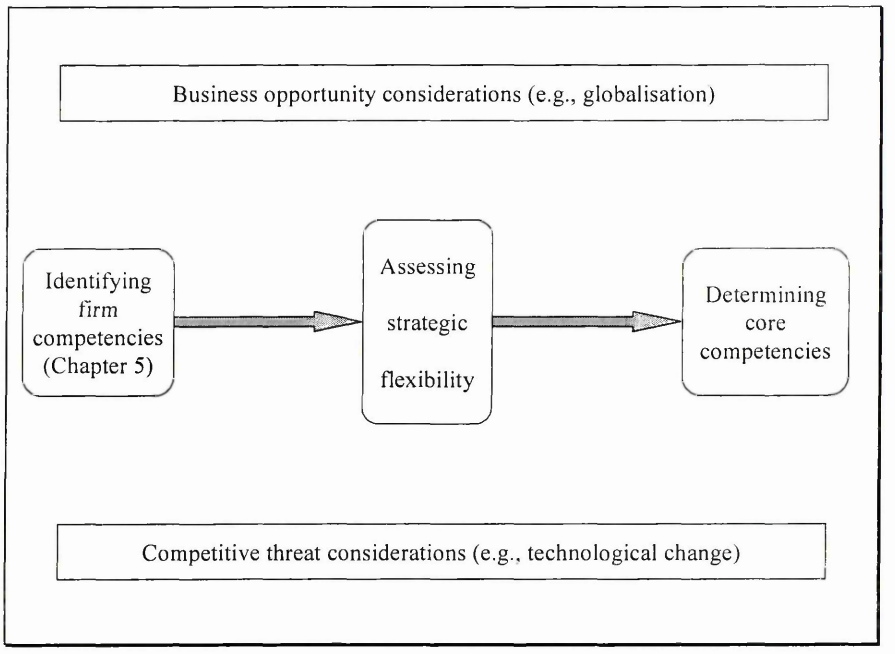


Figure 6.1 The model for core competence identification

6.3.1 Assessing Strategic Flexibility

This stage is designed to assess each competence against the two attributes of strategic flexibility namely, resource re-deployment and routines re-organisation. The assessment is actually an opportunity for the firm to examine thoroughly the flexibility of competence-related resources and routines. Flexibility assessment is a subjective exercise, and the assessment is closely related to the judgment of the future business environment and the implementation of some intended business strategies of a firm. Therefore, it is essential that the decision-makers understand the emerging and/or potential business opportunities and threats presented by the environment.

Considering the subjective nature of strategic flexibility, a similar weights and scores method employed in Chapter 5 is used. The strategic flexibility assessment can be

conducted on a 1 to 4 scales, where 1 refers to not flexible and 4 refers to highly flexible. If there are multiple decision-makers involved in the assessment, the final scores assigned to each attribute are obtained from the geometric mean values of the individual scores. Table 6.2 presents the assessment.

Competence	**Resource re-deployment** (Out of 4)	**Routine re-organisation** (Out of 4)
Competence A	3	2
Competence B	1	2
Competence C	3	3
Competence D	4	4

Table 6.2 Strategic flexibility assessment

6.3.2 Determination of Core Competencies

The core competencies are determined based upon the results of the strategic flexibility assessment. The assessed competencies are plotted on a two dimensional matrix as shown in Figure 6.2. The axes represent the two attributes namely, resource re-deployment and routine re-organisation. The apex point (4, 4) of the matrix represents that a competence is simultaneously assessed very strongly on the both attributes of strategic flexibility, therefore, should qualify as the core competence (see Competence D in Figure 6.2). Actually with this assessment the competencies plotted within the top right-hand cell (competence zone) should be considered as core competencies. However, in reality, only a few competencies would obtain high scores simultaneously on the two dimensions. Therefore, a similar method introduced in Chapter 4 is adopted

here. For each dimension of strategic flexibility, the mean value of the scores assigned to all candidate competencies is calculated. If a specific competence has scored higher for the both dimensions, it is identified as core competence. Therefore, the rule is that any competence scoring enough points to occupy a place within the competence zone is to qualify as core competence.

However, if a specific competence is rated high in one dimension but low in another, then its area value, i.e., the multiplication of the two scores, is used. The curve shown in Figure 6.2 represent those points whose area values are derived by the cross multiplication of the respective mean values. In the present example shown in Figure 6.2, the mean values for the two dimensions are 2.75 and 2.75, respectively. Competences C and D both have scored high values for the both dimensions. Hence, they are clearly identified as core competencies. Competence B is rated too low by comparing with the mean values, hence it is not considered as a core competence. Competence A has a higher score in one dimension (resource re-deployment) but low score in another (routine re-organisation). For this case, the area value, i.e., 3 by 2 = 6, is less than that of the respective mean values, i.e., 2.75 by 2.75 = 7.56. Therefore, Competence A is not identified as a core competence.

6.4 Validation of the Model

The proposed model was tested using Company A and IKEA data. The focus was to examine the validity of the proposed attributes of core competencies and the applicability of the method. The results obtained from the assessments were verified by the interviewees.

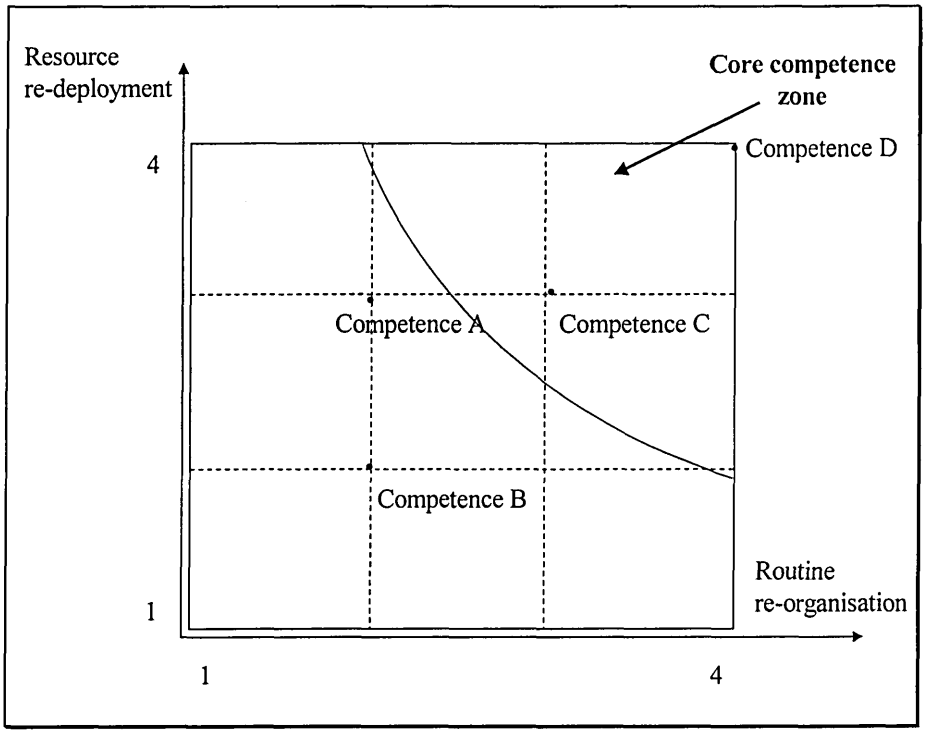


Figure 6.2 Core competence determination matrix

6.4.1 Core Competence Identification for IKEA

As mentioned in Chapter 5, the information of IKEA was obtained mainly through an "in-house" brainstorming session, and each of the discussion group members had a good knowledge about the company and four of them were a frequent visitor to IKEA stores. Therefore, the data collection and the validation of the results were conducted based upon the combination of the literature review and practical experience and knowledge.

6.4.1.1 Analyses of the Competencies

The members held a discussion and brainstormed about the assessment of strategic flexibility. The phrase "strategic flexibility" was first introduced and explained and then

the definitions of the attributes were given to the members. The viewpoints on the strategic flexibility concept were sought for feedback. Generally, the group member researchers perceived that the attributes are in line with the theory, and the proposed working definitions were clear and understandable. In particular, the members generally agreed that the attributes have incorporated the elements of core competence into the consideration and hence are realistic.

The four competencies identified for IKEA (Section 5.4.1.6), design, quality service, sourcing and on-site promotion, were assessed as the candidates of core competence. The members were asked to analyse the flexibility of those resources or sub-capabilities underlined the competencies. With regards to the resource re-deployment assessment, the competence-related resources, namely, design skills, design philosophy, market knowledge, in-store environment, win-win belief, warehouse, relationship with suppliers, brand name, and reputation (see Table 5.12), were analysed. The potential, costs and difficulty and responding time of their alternative uses in likely scenarios of future business were examined. The more useful a resource is in the future business, and/or the lower the costs and difficulty in the alternative use, more strategically flexibility the competence is. The examination revealed that the resources used by IKEA's design competence, such as design skills and market knowledge, are far more flexible than those used by its on-site promotion competence, namely, store location, categories of products and in-store instructions.

With regards to the routine re-organisation assessment, underlying activities and processes were analysed. Also, the interactions of various activities were also examined to see how dynamic they are. The purpose of the analyses was to determine the possibility of routines being re-organised to renew competencies so as to achieve

congruence with the changing business environment. The analyses revealed that the activities related to the IKEA's design competence are dynamically integrated and changeable. These activities include proactive consultation with suppliers, brainstorming sessions among designers, and research on the characteristics of local markets.

The analysis shows that IKEA's on-site promotion secured low and design competence secured relatively high scores for the both attributes. The sourcing competence secured a relatively high score for routines re-organisation only. This is due to the fact that IKEA has good working relationships with its suppliers. This competence has consistently helped IKEA to purchase high quality low-cost materials and products. IKEA has employed a unique approach to integrate its technical, financial and managerial activities together to help the suppliers to bring their productions up to world quality standards. This integration has enabled the sourcing competence to maneuver relatively free in the worldwide market (Normann and Ramirez, 1993).

6.4.1.2 The Data Collection and Processing

The data was collected using the group brainstorming or discussion as described in Section 5.4.1.3 of Chapter 5. The members were asked individually to assign scores for the competencies based on the competence analyses. Then, by reasoning and discussion, the consensus scores were reached and used for the assessments. Generally speaking, if the activities are less interactive or rigid, the competence is perceived as having less potential for the future, and accordingly, was given a low score. The scores assigned for each of the competencies were taken from the consensus of the group members. Table 6.3 illustrate the strategic flexibility assessment for IKEA. Note the mean value of the

scores assigned for the dimension of resource re-deployment is 2.75, and for the dimension of routine re-organisation is 3.25. The area value is derived as 3.25 × 2.75 = 8.9375. The assessment results are plotted, as shown in Figure 6.3.

Competence	**Resource re-deployment** (Out of 4)	**Routine re-organisation** (Out of 4)
Design	4	3
Quality service	3	4
Sourcing	2	4
On-site promotion	2	2

Table 6.3 The strategic flexibility scores of IKEA's competencies

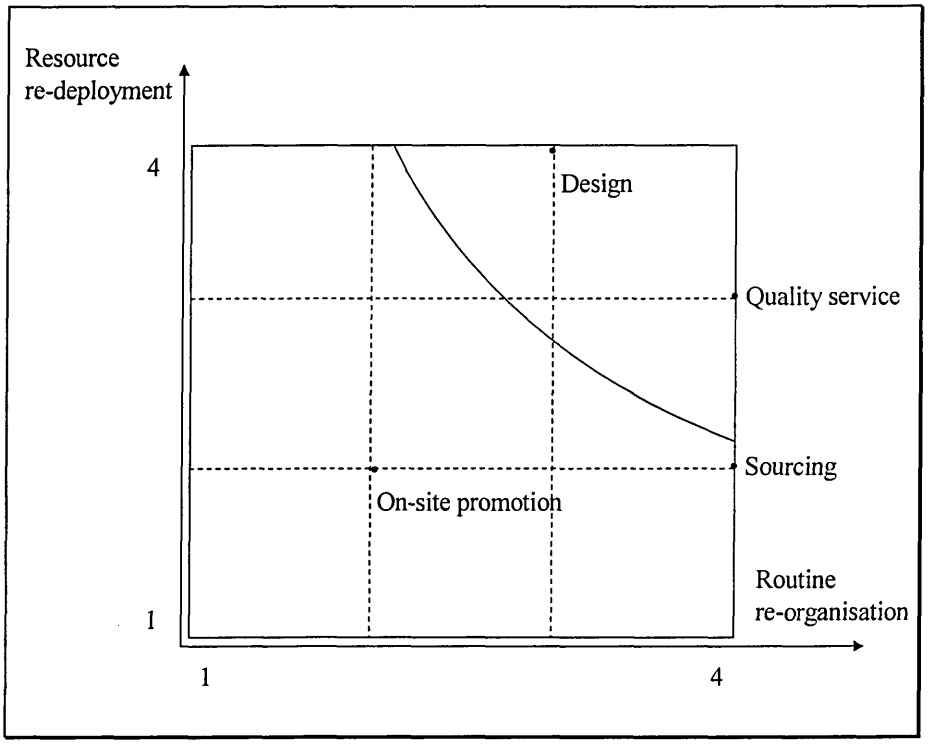


Figure 6.3 Core competence assessment for IKEA

6.4.1.3 The Core Competencies of IKEA

Clearly quality service and design are identified as core competencies. With regards to the sourcing, as its area value of 8 is less than 8.9375, therefore, it should not be considered as a core competence for securing low score on the resource re-deployment dimension. The proposed area method has helped to evaluate sourcing competence should not be identified as a core competence as its routine re-organisation score (4.0) is higher than the mean value (3.25). Without the use of this method, the determination of core competencies could easily turn into a 'political debate'. Table 6.4 summaries the identified core competencies of IKEA with the correspondent functional areas.

Functional area	Core competence
Product development	Design
Retailing	Quality service

Table 6.4 The core competencies of IKEA

6.4.2 Core Competence Identification for Company A

Again the competencies identified in Section 5.4.2.4 of Chapter 5 were used as the input. The managing director of Company A was again interviewed. Although the managing director was the main interviewee, several times he quoted the opinions of his functional managers (e.g., sales and marketing, manufacturing) as supporting points to his own judgments.

6.4.2.1 Analyses of the Competencies

The managing director of Company A was asked to assess the strategic flexibility of the competencies. At this stage, the definition of the strategic flexibility was first explained and its attributes were described. The interviewee was also asked to give his viewpoint on the method designed for differentiating core competencies from competencies. The interviewee agreed that the method is natural and logical. In his own words history of Company A has dictated that "too rigid capabilities (e.g., a specific manufacturing technology) brought only short-term benefits to the business, though they were unique among the competitors". Very often due to the changes of the external environment, the capabilities quickly became obsolete (e.g., under technology revolution) or lost their strategic value (e.g., customer demands shift).

6.4.2.2 The Data Collection and Processing

Table 6.5 illustrates the scores of strategic flexibility for each of the competencies. The results show that all the three competencies have secured high scores on the both attributes of strategic flexibility. Note that a common feature associated with these competencies is that they have a relatively large intangible asset base (see Table 3.3 of Chapter 3).

As all the three competencies were rated relatively high on the both dimensions of the strategic flexibility, the method used for determining the core competencies of IKEA is not necessary for this case. It is easy to see from Figure 6.4 that the candidates are all plotted into the most obvious core competence zone, i.e., the top right hand cell.

Competence	Resource re-deployment (Out of 4)	Routine re-organisation (Out of 4)
Product development	4	3
Research	4	4
Performance review	4	4

Table 6.5 The strategic flexibility scores of Company A's competencies

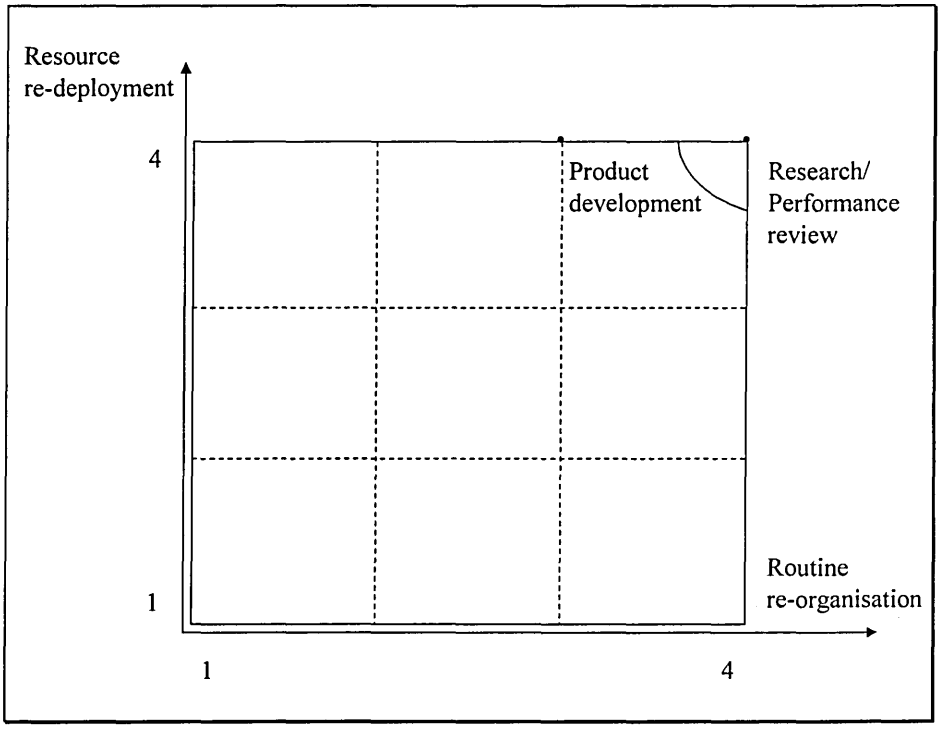


Figure 6.4 Core competence assessment for Company A

6.4.2.3 The Core Competencies of Company A

Company A case shows that when the candidates secure high score (3 or 4) for all the attributes, the core competence determination process becomes straightforward. Table 6.6 summaries the identified core competencies and their correspondent functional

areas. These results were verified by the managing director as reflecting the company's real situation.

Functional area	Core competence
R & D	Product development Research
Performance management	Performance review

Table 6.6 The core competencies of Company A

6.5 Summary

This chapter is established on the assumption that core competence differs from competencies in their strategic flexibility. A core competence is the competence which has the potential to create new strategic options for future business. Two attributes of strategic flexibility, namely, resource re-deployment and routine re-organisation, were identified. A two-stage method of core competence identification was developed by employing the underlined resources and the routines embedded within the candidate competencies. The proposed model was validated using the case studies of IKEA and Company A. The both group discussion and the interview have shown the differentiation between firm competence and core competence is necessary and reasonable, and the major criteria rest upon the strategic flexibility.

Since the criteria used for the strategic flexibility assessment were assigned equal weights for the sake of simplicity, the sensitivity of the competence candidates to the changes of the criteria weights was not performed in this chapter. Using the weights and

scores technique, the subjective assessments of strategic flexibility for competencies are turned into the quantitative results. In addition, this chapter uses the combination of an average method and a range method for determining the zone of core competencies. The main reason behind the combination is that using a range method only, say the range is formed by the upper diagonal right hand section as shown in Figure 6.5, could easily turn the determination into a "political process" because the method is designated and hence rigid and less flexible, particularly it could be true when determining the status of those capabilities which are plotted in the vicinity of the top right hand cell. Also, how to define the boundary of core competence zone itself is also a problem. If the boundary is defined too narrowly, some potential core competencies could be misidentified. On the contrary, if the boundary is defined too broadly, some of the identified "core competencies" may be not true.

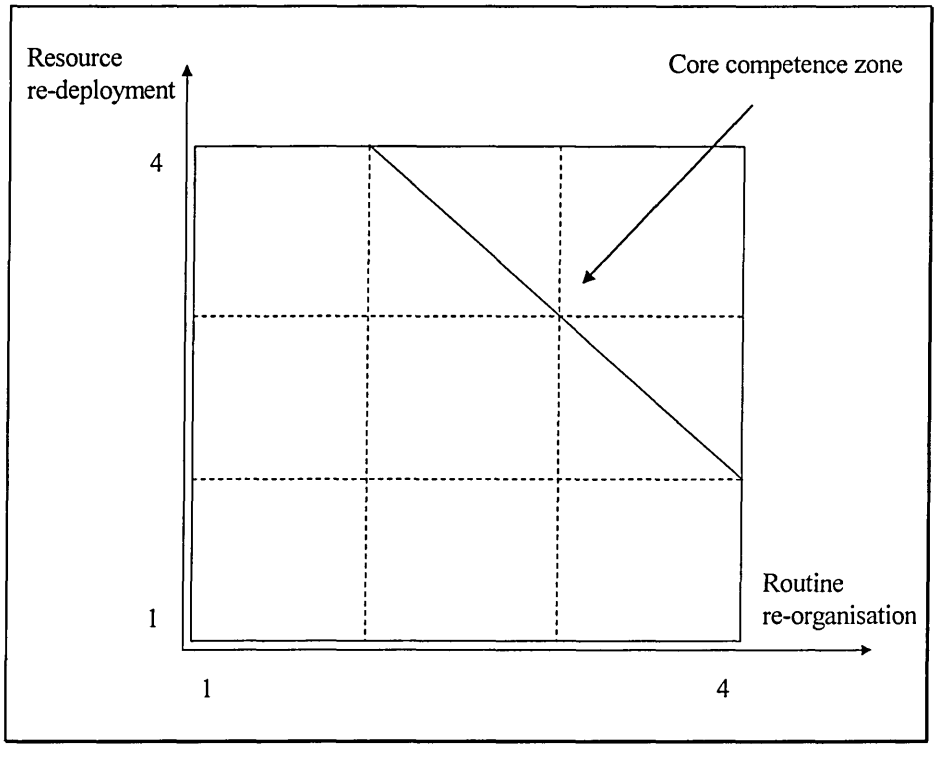


Figure 6.5 An illustration of a range method for core competence determination

Using together the range method and an average method the above problems can be avoided. The combination implies two rules. First, if a specific competence is plotted in the top right hand cell as shown in Figure 6.2, that is, it secures both high scores (3 or 4) on the attributes of strategic flexibility, then it is naturally identified as core competence. Second, for a competence which is plotted in the vicinity of the top right hand cell, that is, it only secures a high score on one of the attributes of strategic flexibility but low on the another, the mean values calculated for each attribute then can be used. The attribute scores of the competence are compared to the mean values, and if the both scores are lower, then the competence is not considered as a core competence. However, if one of the scores is higher but another is lower than the mean values, then the cross multiplication of the two mean values is used to draw the curve representing the boundary of core competence zone. The case studies have shown that the assessment method can help reduce the possibility of political argument with regard to the determination of core competencies. The analyses have revealed two general results:

1. The case study of Company A has shown that the strategic flexibility of a competence is related to the structure of its resource base. The higher proportion of intangible assets used by the competence, the more flexible the competence is.

2. The case study of IKEA has shown that the strategic flexibility of a competence is related to the routines by which the competence is formed. The more rigid the routines are, the less flexible the competence is.

CHAPTER 7

IMPLEMENTATION OF AN INTEGRATED CORE COMPETENCE EVALUATION FRAMEWORK

This chapter provides an integrated framework for core competence evaluation. The framework is formed by the integration of the models proposed in previous chapters. It consists of three stages, namely, key capability determination, competence evaluation, and core competence identification. The framework is implemented in practice by means of a questionnaire survey to serve three purposes: (i) to examine the generic nature of the framework as it is valid for the both manufacturing and non-manufacturing firms; (ii) the proposed models can be implemented as a self administered questionnaire format and pick up the right information; (iii) to examine the understandings of the UK manufacturing and non-manufacturing companies on the understanding and issues related to competence and core competence identifications.

7.1 The Architecture of Core Competence

In the previous chapters, the concepts of firm resource, capability, key capability, competence and core competence are separately introduced and validated. When these concepts are systematically linked and used, a core competence architecture is constructed. Figure 7.1 shows how firm resources, capabilities, competencies, and core competencies are inter-linked.

With this architecture, firm *resources* are the inputs to form *capabilities* of a firm. While all of the capabilities are useful to the firm's business, some capabilities play

more important role than others in realising the business objectives. These are key capabilities of the firm. *Competencies* are those key capabilities which are highly collective in business operation and relatively unique in competition. The difference between *competencies* and *core competencies* is that the latter must be strategically flexible or dynamic in nature.

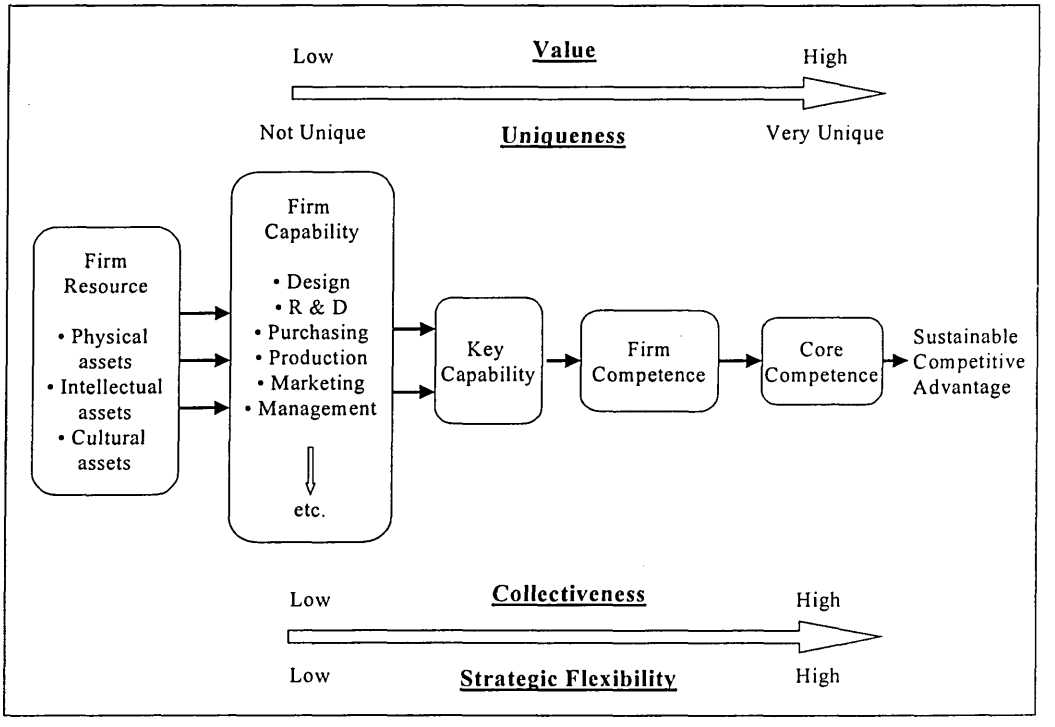


Figure 7.1 The architecture of core competencies

7.2 An Integrated Framework

Based on the architecture, an integrated core competence identification framework is developed as shown in Figure 7.2. This includes linking the individual models as explained in previous chapters. Firm capability mapping, key capability determination, competence evaluation, and core competence identification, respectively, construct four sequential stages in the identification process.

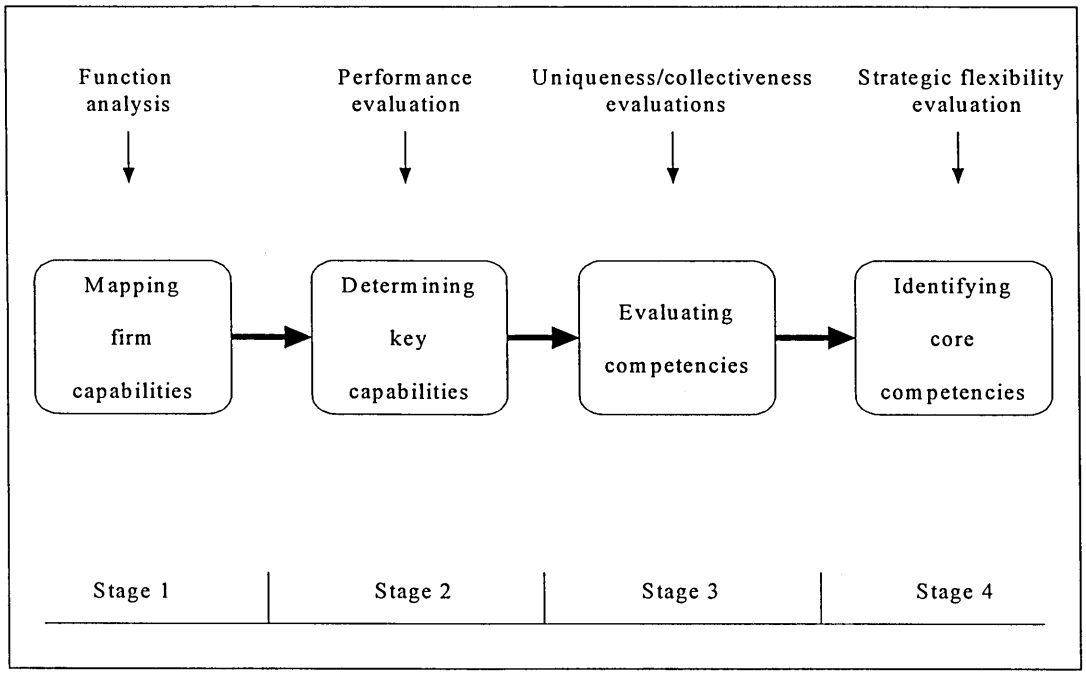


Figure 7.2 Integration of the models

In order to investigate the application of the framework in both manufacturing and non-manufacturing companies as well as to examine the integrity and validity of the framework, a postal questionnaire survey method was employed. The questionnaire survey also served the purpose to complement the results of case studies introduced in previous chapters. As mentioned in Chapter 1, using the results from case studies and questionnaire survey methodologies the validation exercise will be more rigorous.

7.3 Design of Questionnaire

The survey was conducted with the view to be informative and easy to implement. Therefore, the questionnaire was designed in a simple and compact form as far as possible aiming at obtaining high response rate. Since in Chapters 3 and 4 several case studies have been used for validating the firm capability mapping and the key capability determination models, this questionnaire survey was designed to validate the Stage 3 and Stage 4 models, namely, competence and core competence identification.

The case studies employed in Chapters 3 and 4 have shown that in general it is possible to use a set of common capabilities for obtaining relevant data from both manufacturing as well as non-manufacturing companies. Therefore, the five functional capabilities, namely, purchasing, manufacturing/processing, sales and marketing, R & D, and performance management were selected and employed for the questionnaire survey. Here, considering the questionnaire should be designed suitable for the both industries, the capability of manufacturing/processing was used instead of the manufacturing. The selection was in line with the findings of the literature and the case studies that these capabilities represent the major business processes (activities) of companies for a range of market sectors.

7.3.1 Questionnaire Design Rules

A literature review (Chapters 2 and 3) indicated that there was misconception about the terminology used to define core competence concepts. Therefore, the structure and terminology of the questionnaire were considered carefully aiming to elicit the accurate information from the practitioners. The most of the questions were in closed form with pre-defined answers so that the respondents can fill the questionnaire efficiently. Again through the experience gained from the case studies, Likert-style response mode was used for specifying and indicating options (Denscombe, 1993; Hague, 1993). Specifically, the four-point scale mechanism used in Chapters 5 and 6 was employed. As mentioned earlier, the purpose of using the four-point scale was two-folds. Firstly, the scale is simple and easy to use and therefore would elicit sufficient information from the respondents. Secondly, since no middle point is involved, the scale could help to reduce the opportunity of taking neutral stance by the respondents and hence would improve the quality of response.

7.3.2 Structure of the Questionnaire

A question was specially designed for asking the respondents to subjectively identify two most likely core competencies from the five capabilities. The perceptions were then used for verifying the core competence results identified by the framework. The questionnaire consisted of the following three sections:

Section A: Respondent and his/her company backgrounds

The following information were sought: the names of respondent and his/her company,

nature of business, position of respondent, telephone number of contact, number of employees and annual turnover of company.

Section B: Resource and capability data

This section was aimed at collecting the data related to the uniqueness of resources and capabilities. The respondents were asked to assess the rareness, inimitability and non-substitutability for each kind of assets and to assign a proportional weighting to five capabilities namely purchasing, manufacturing/processing, sales and marketing, R & D and performance management.

Section C: Collectiveness and strategic flexibility data

This section was used to obtain the data about the collectiveness and strategic flexibility of capabilities. The respondents were asked to assess the five capabilities against the attributes of collectiveness and strategic flexibility. To facilitate a better understanding of the questions, the definitions of technical terms used were provided.

7.3.3 Pilot Study

A small-scale pilot study was conducted on a group of ten industrial practitioners to reveal the strengths and weaknesses of the initial questionnaire in terms of its ability to collect the relevant information. The practitioners were selected from the CBI UK Kompass (1998) to represent large and SME UK companies. Five of the respondents were chosen from UK manufacturing industry and the others were from service sector. The main purpose taking the equal numbers for the selection was to secure responses

from the both industry sectors and hence to examine the suitability of the contents and phrases for the both industries. The following aspects of the questionnaire design were focused during the pilot study:

- its overall appearance
- the instructions to respondents
- the contents of questions
- timescale needed to complete
- their reservations on the concepts used

The questionnaires were sent to the senior managers of the selected companies by post and a covering letter was enclosed explaining the purpose. Totally four companies (three manufacturing and one non-manufacturing) responded and completed the questionnaire. The results from the pilot study were encouraging.

However, some shortcomings of the initial questionnaire were revealed. For example, the words used in some technical terms, e.g., rareness and non-substitutability, needed more clarification. Even some basic terms such as resources and capabilities were questioned. Therefore, specific examples were incorporated as an introduction to main body of the question to enhance understanding. Based on the findings, the questionnaire was modified and finalised. Appendix F presents the covering letter and the finalised questionnaire for convenience.

7.4 Sample Profile and Classification

Again using the CBI UK Kompass source, a sample of 120 companies (local as well as

UK-based multi-national) was chosen for the survey. Generally, the companies were classified into manufacturing and non-manufacturing industry sectors. Sixty of the companies represented manufacturing industry (e.g., commercial catering, engineering, computer hardware) and the others represented service industry (e.g., distribution, consultancy, NHS). The largest company had its annual sales over £500 millions and employees over 1,000 workforce. The smallest employed only about 20 people and had an annual sale of about £1 million.

The questionnaire with a covering letter was sent to the senior managers of the selected companies. The letter explained the purpose of the survey and asked either the managing director or the best suited individual to fill it in. The companies were asked to return the completed questionnaires using the provided pre-paid envelope. After the time of three weeks, a revised covering letter and a second copy of the questionnaire were sent to those non-respondents to remind them for completion.

Out of 120, 57 questionnaires were returned. However, some were only partially completed or not completed at all. Final screening left out 42 complete and valid responses, giving an overall response rate of 35%. Among the forty-two valid questionnaires, about 80 percent of them (thirty-three copies) were returned by manufacturing companies. Two possible reasons may explain this phenomenon. One is that manufacturing companies understood the importance of core competence identification since the companies are experiencing fierce and growing competition. Another is that due to very nature of manufacturing competence building is a more time and capital intensive process, therefore, the results of the participation could generate some time and cost savings for them. Figures 7.3, 7.4, 7.5 and 7.6 present the profiles of the respondent companies used in the subsequent analyses.

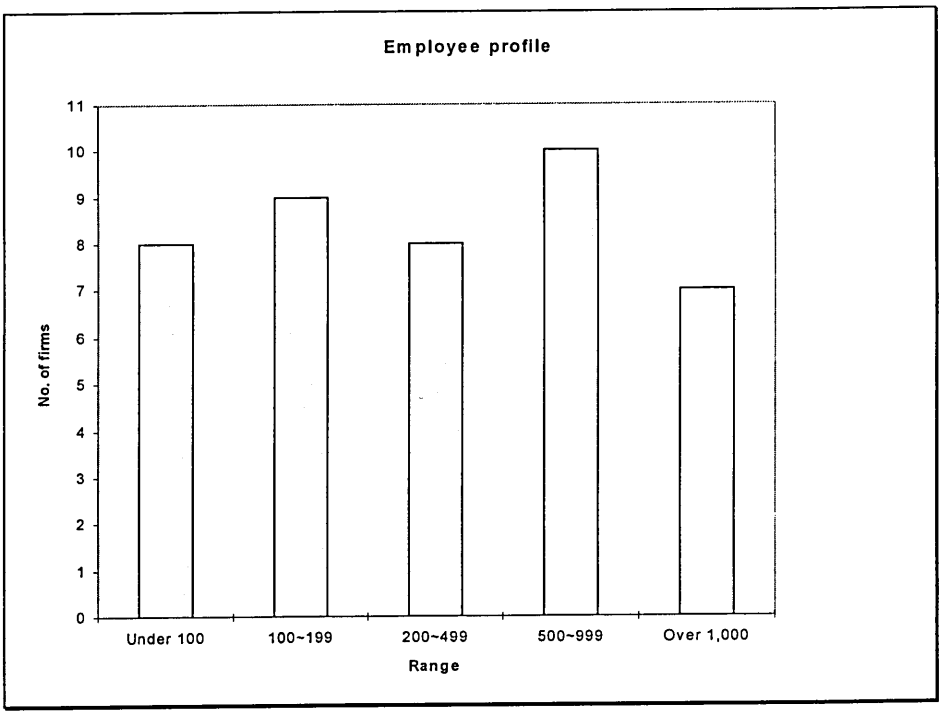


Figure 7.3 Employee profile of the respondent companies

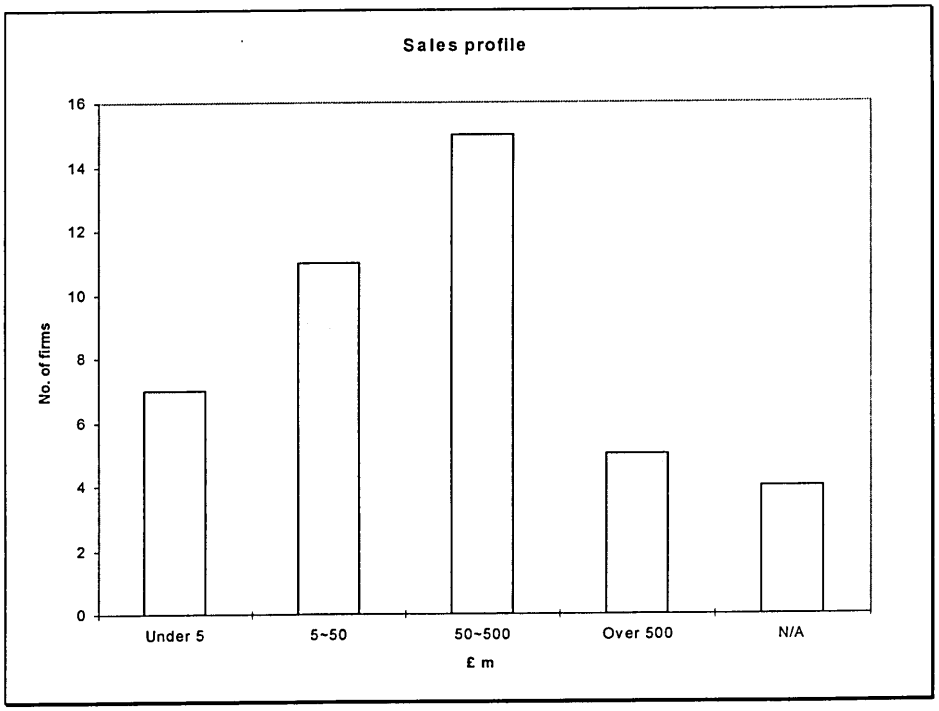


Figure 7.4 Sales profile of the respondent companies

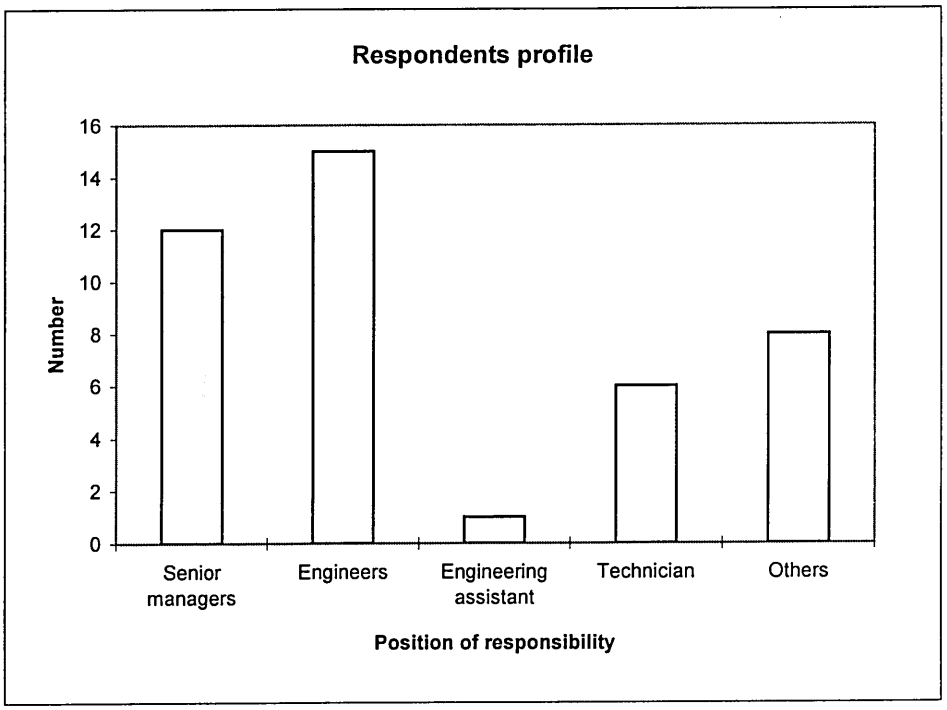


Figure 7.5 Position profile of the respondents

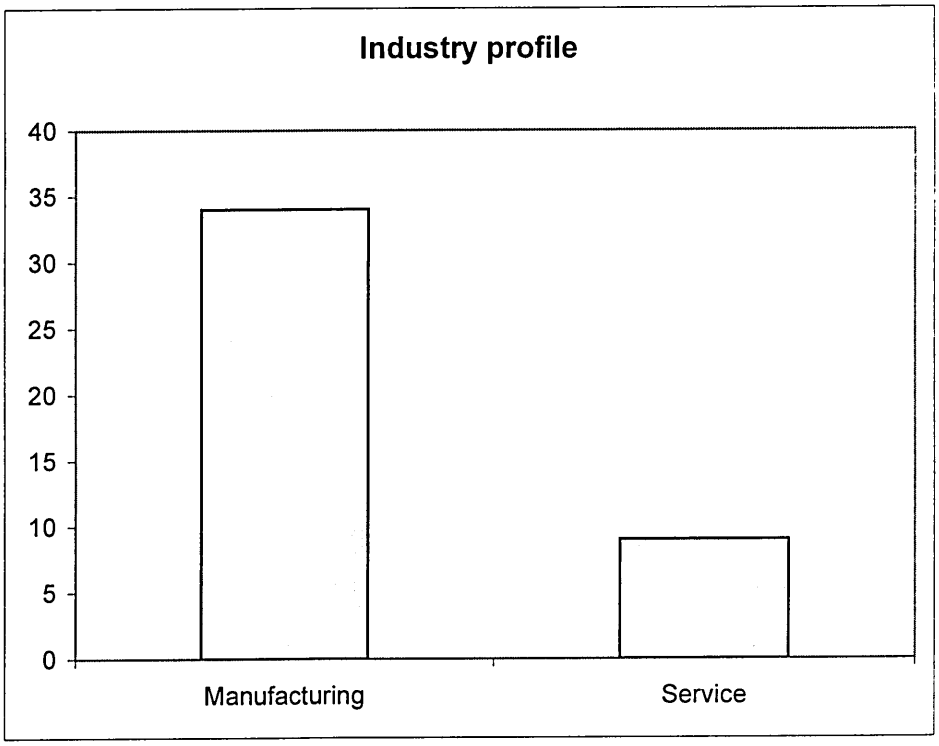


Figure 7.6 Industry sector profile of the respondent companies

7.5 Application of the Framework

Based on the data collected from the questionnaire survey, the elements underlined the core competence concept employed by the framework were examined. The findings obtained from the framework application were compared against the literature knowledge and used for explaining the framework validation results.

7.5.1 Resource and Capability Relationship

In this part of the survey, the respondents were asked to indicate the contribution of individual assets to the five key capabilities namely, purchasing, sales and marketing, manufacturing/processing, R & D and performance management, as explained in Section 3.5.

- ***Manufacturing Companies***

Table 7.1 shows the average contribution of the three kinds of assets for shaping the functional capabilities of a manufacturing company. The analysis shows that not surprisingly the manufacturing/processing capability was rated as the biggest user of physical assets (53.94%). In fact it is the only capability assessed depends more on the physical assets than the combination of the intellectual and the cultural assets together. On the other hand, the performance management was reported to exploit least of the physical assets (21.13%).

R & D with 55.34% was rated as the biggest user of intellectual assets and sales and marketing came as the second (46.94%). However, manufacturing/processing capability

with 28.48% was identified as the least user of the intellectual assets. Also, performance management was identified by the practitioners as the capability heavily influenced by the cultural assets such as quality perception, employee empowerment and working ethics (37.97%). This is plausible since the constituent capabilities of the performance management, such as performance review/appraisal systems, reward policy, and goal setting, are all highly influenced by the cultural norms and standards set by the senior management. Note that sales and marketing and purchasing those have strong links with the customers and suppliers were also gauged to be relatively culture sensitive capabilities (31.36% and 30.70%, respectively). Manufacturing/processing and R & D were assessed low on using cultural assets (17.58% and 17.63%, respectively). One possible explanation may be that in practitioners view cultural assets more closely link with the management than the technical aspect of business, and therefore, play a more important role in the "outward" capabilities (e.g., purchasing, sales and marketing) than the "inward" ones (e.g., R & D, manufacturing/processing). Figure 7.7 illustrates the resource and capability relationships for the five capabilities.

	Physical assets	**Intellectual assets**	**Cultural assets**	**Total**
Purchasing	25.85%	43.45%	30.70%	100%
Manufacturing/processing	53.94%	28.48%	17.58%	100%
Sales and marketing	21.70%	46.94%	31.36%	100%
R & D	27%	55.34%	17.63%	100%
Performance management	21.13%	40.90%	37.97%	100%

Table 7.1 The resource and capability relationships of manufacturing companies

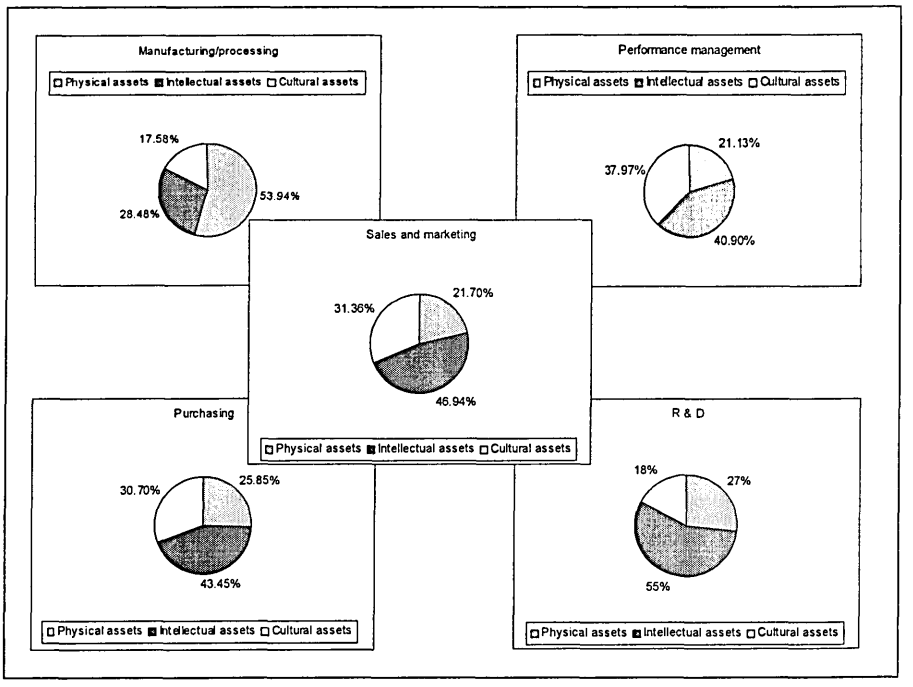


Figure 7.7 The resource and capability relationships perceived by manufacturing companies

- ***Non-manufacturing Companies***

Table 7.2 shows the average contribution of the three kinds of assets for shaping the functional capabilities of non-manufacturing companies from the survey data. The manufacturing/processing capability was rated as the main user of physical assets (37%), and note the percentage was far lower than that assigned by manufacturing companies (53.94%). In fact the non-manufacturing companies perceived the manufacturing/processing depending more on the intellectual assets than the physical assets (41.87% and 37%, respectively). In addition, whilst sales and marketing with 30.44% was reported to exploit much higher proportion of the physical assets, R & D was rated as the least user of the physical assets (16%).

	Physical assets	Intellectual assets	Cultural assets	Total
Purchasing	26%	37.78%	36.22%	100%
Manufacturing/processing	37%	41.87%	21.13%	100%
Sales and marketing	30.44%	36.33%	33.23%	100%
R & D	16%	48.29%	35.71%	100%
Performance management	26.67%	36%	37.33%	100%

Table 7.2 The resource and capability relationships of non-manufacturing companies

With regards to the intellectual assets, however, R & D was rated as the biggest user among the capabilities (48.29%). The contributions of the intellectual assets to purchasing, sales and marketing, and performance management were perceived similar averaging close to 36%. With regards to cultural assets, performance management with 37.33% was rated having the strongest link whilst manufacturing/processing with 21.13% was identified using the least of this kind of assets. Figure 7.8 illustrates the resource and capability relationships perceived by non-manufacturing companies for the five capabilities.

7.5.2 Assessing the Collectiveness

In this part of the survey, the participants were asked to assess the collectiveness of the capabilities using the attributes of across-function, across-product and across-business as explained in Section 5.3.1.

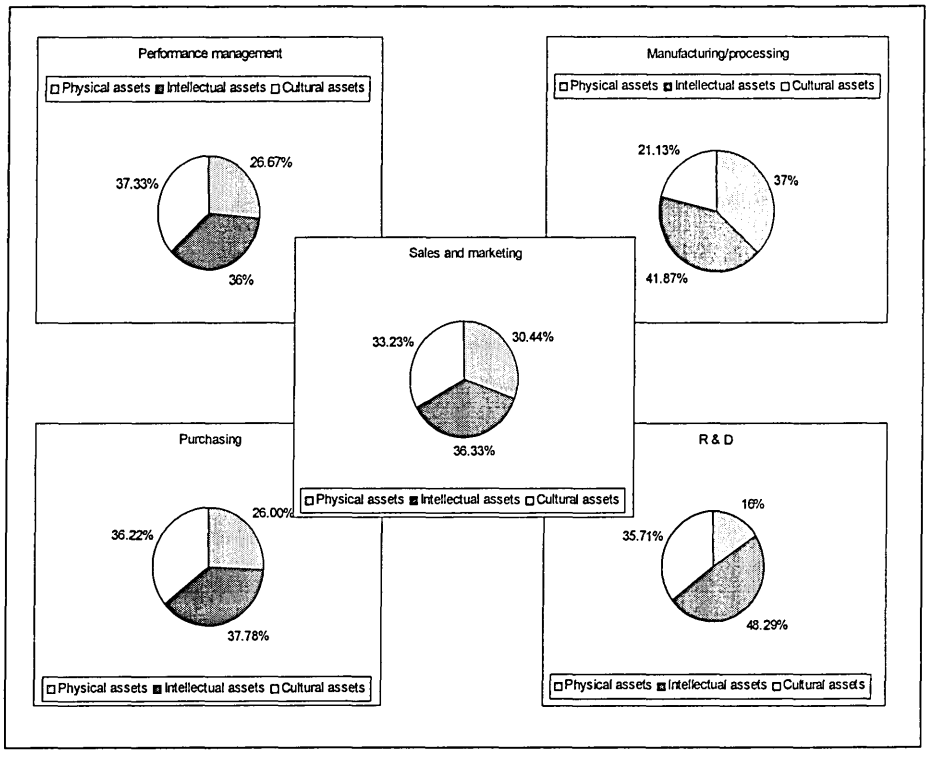


Figure 7.8 The resource and capability relationships perceived by non-manufacturing companies

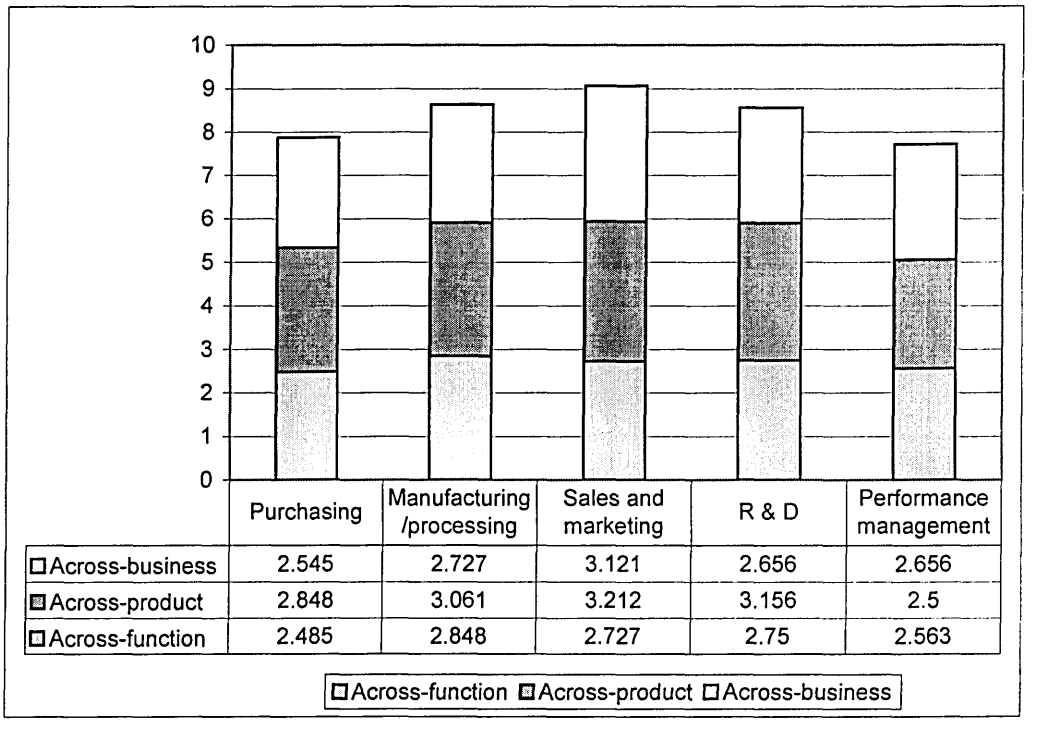
- ***Manufacturing Companies***

Figure 7.9 charts the average collectiveness scores for each of the capabilities as complied from the manufacturing sector data. Sales and marketing scored relatively the highest overall ratings with regards to all the three attributes, followed by manufacturing/processing and R & D. Whereas, purchasing and performance management secured relatively low ratings.

More details were revealed by examining the individual scores. With regards to the attribute across-function, manufacturing/processing, sales and marketing, and R & D were rated relatively higher than the other capabilities. This confirms the theoretical findings as these capabilities sit in the centre of business operations, therefore, they have a strong tendency to integrate closely with other functional capabilities (Goold *et*

al., 1997).

Sales and marketing and R & D were identified as the capabilities having relatively higher possibility to span multiple product families. This explains that in real world companies very often centrally control and manage these two capabilities. On the other hand, performance management was rated relatively low on the scale. With regards to the across-business, sales and marketing and manufacturing/processing secured higher scores with respect to the remaining capabilities.



	Purchasing	Manufacturing /processing	Sales and marketing	R & D	Performance management
Across-business	2.545	2.727	3.121	2.656	2.656
Across-product	2.848	3.061	3.212	3.156	2.5
Across-function	2.485	2.848	2.727	2.75	2.563

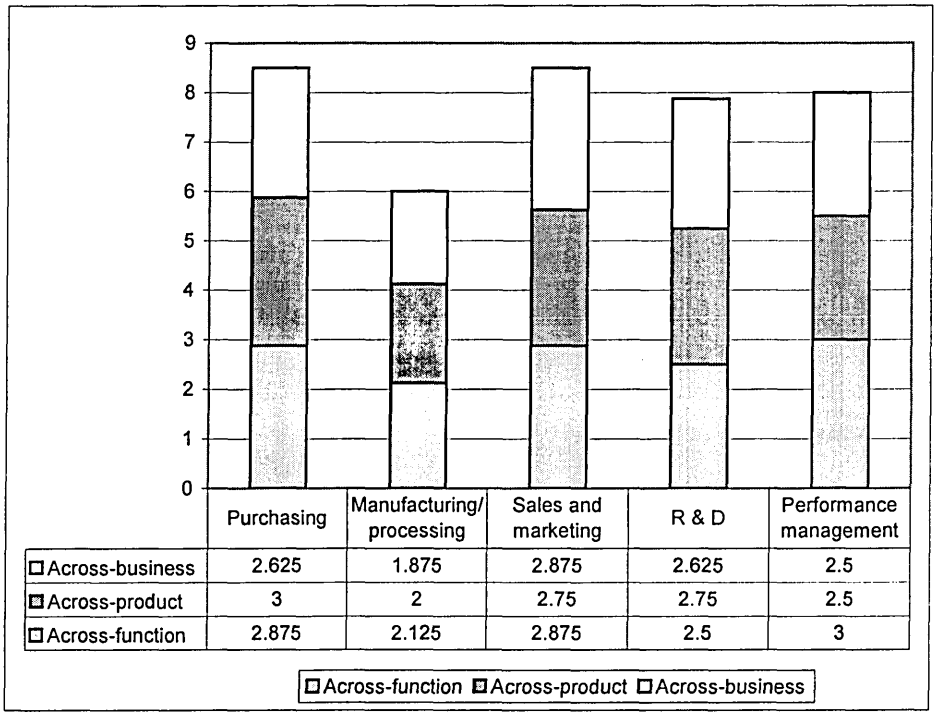
Figure 7.9 The capability collectiveness scores for manufacturing companies

- ***Non-manufacturing Companies***

Figure 7.10 presents the collectiveness scores and the corresponding bar-chart for the capabilities. For non-manufacturing organisations, performance management with 3.0 was measured as having the strongest across-function attribute than the others. On the

contrary, manufacturing/processing was rated with the lowest score (2.125). In fact, the non-manufacturing practitioners had rated manufacturing/processing relatively low against the all three attributes of collectiveness.

Purchasing secured the highest score with regards to the attribute of across-product (3.0), followed by sales and marketing and R & D (2.75 and 2.75, respectively). Sales and marketing and R & D were also identified having relatively higher possibility to span multiple businesses (2.875 and 2.625, respectively). With regards to all the three attributes, sales and marketing (8.50) and purchasing (8.50) scored relatively the highest overall ratings.



	Purchasing	Manufacturing/ processing	Sales and marketing	R & D	Performance management
Across-business	2.625	1.875	2.875	2.625	2.5
Across-product	3	2	2.75	2.75	2.5
Across-function	2.875	2.125	2.875	2.5	3

Figure 7.10 The capability collectiveness scores for non-manufacturing companies

7.5.3 Assessing the Unique Capabilities

This part of the survey was to identify that which capabilities were perceived as most

unique in competition, and also if the unique capabilities encompassed the perceived core competencies of the practitioners. The asset basis of the perceived unique capabilities was also analysed to examine if the resource and capability relationships had implications to the uniqueness of capabilities. More details of the method are described in Section 7.5.4.

- ***Manufacturing Companies***

Table 7.3 shows the uniqueness scores as analysed for the data gathered from manufacturing companies. Note that R & D capability was rated relatively higher with respect to all the three attributes of uniqueness, followed by sales and marketing. Manufacturing/processing scored the least. It may be down to the reason that manufacturing/processing being heavily dependent upon the physical assets, perceived less abstract and relatively easily copied and substituted (with regards to the uniqueness of assets, see Section 7.5.4 for more details). This is in line with the theoretical findings as described in Section 3.2.2 (Lado and Wilson, 1994). Figure 7.11 plots the average scores of uniqueness for various capabilities in three-dimensions.

	Rareness	**Inimitability**	**Non-substitutability**	**Total**
Purchasing	2.72	2.49	2.59	7.80
Manufacturing/processing	2.59	2.36	2.51	7.46
Sales and marketing	2.75	2.52	2.61	7.88
R & D	2.80	2.57	2.67	8.04
Performance management	2.72	2.49	2.58	7.79

Table 7.3 The uniqueness scores of the capabilities for manufacturing companies

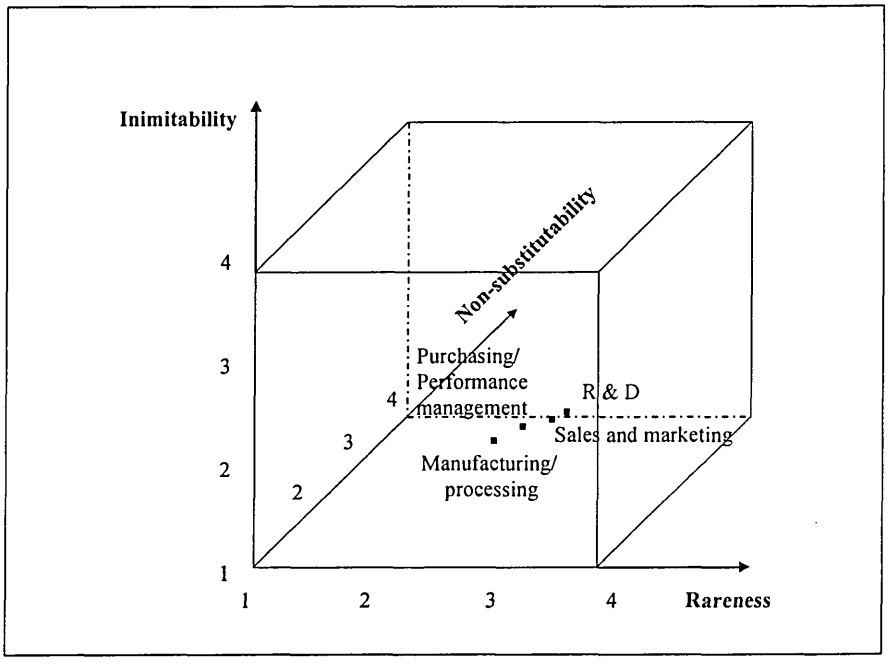


Figure 7.11 The determination of unique capabilities for manufacturing companies

- ***Non-manufacturing Companies***

Table 7.4 shows the average scores for the three attributes of uniqueness for the non-manufacturing companies. With respect to the attributes, on average the five capabilities have attained very similar scores. This reflects that for non-manufacturing practitioners the five capabilities are not differentiated against the uniqueness parameters. Specifically speaking, R & D with 2.13 was rated relatively higher with respect to inimitability, and manufacturing/processing was considered stronger in rareness and non-substitutability (2.47 and 2.23, respectively). Similar to their manufacturing counterparts, the non-manufacturing practitioners had given the attribute of "rareness" overall a relatively higher weighting, and which was followed by non-substitutability and inimitability. Figure 7.12 illustrates the locations of the capabilities plotted in the three-dimension model for non-manufacturing companies.

	Rareness	Inimitability	Non-substitutability	Total
Purchasing	2.41	2.08	2.20	6.69
Manufacturing/processing	2.47	2.02	2.23	6.72
Sales and marketing	2.41	2.05	2.21	6.67
R & D	2.43	2.13	2.16	6.72
Performance management	2.40	2.07	2.20	6.67

Table 7.4 The uniqueness scores of the capabilities for non-manufacturing companies

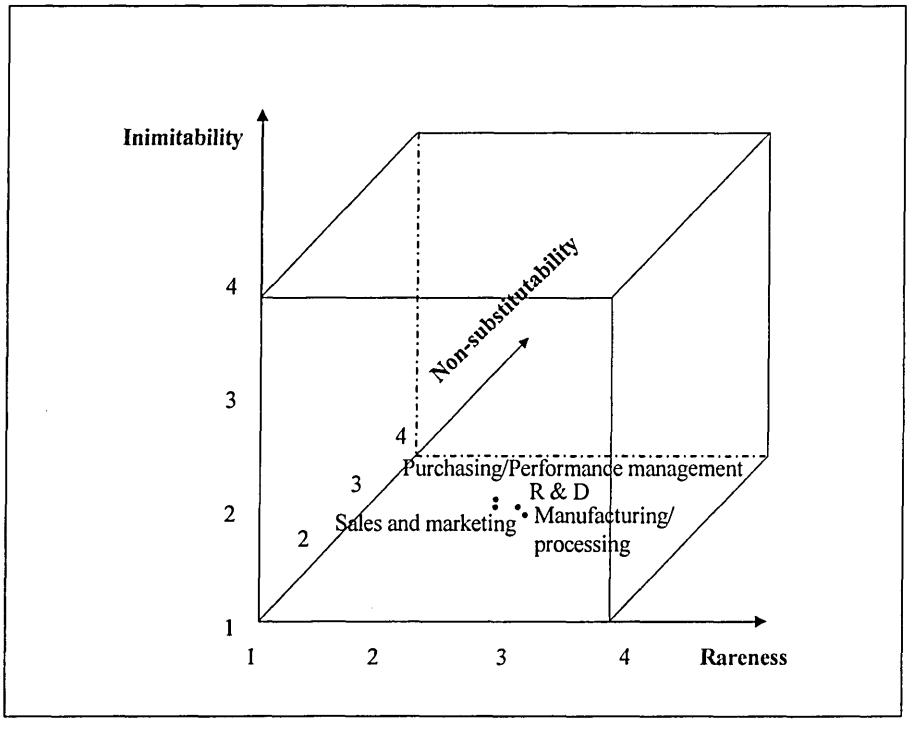


Figure 7.12 The determination of unique capabilities for non-manufacturing companies

7.5.4 Assessing the Unique Assets

The participants were asked to assess the company's physical, intellectual and cultural

assets against the attributes rareness, inimitability, and non-substitutability. A four-point scale was provided to assess each attribute where "1" represented "very low probability" and "4" represented "very high probability" of having that attribute in the chosen assets. A similar procedure to that described in the Section 5.3.4 was used to measure the uniqueness for assets.

- ***Manufacturing Companies***

Table 7.5 presents the average scores of the assets complied using the data for the 33 manufacturing companies for each of the attributes of uniqueness. The unique assets are determined using the three-dimension model as described at length in Section 5.3.4 and shown in Figure 7.13. The analysis revealed that intellectual assets (e.g., knowledge, employee skills, patent) scored the highest ratings for all the three attributes of uniqueness. This result is in line with the theory of core competence where intellectual assets are reported as most likely becoming rare and advocated as the major barrier to imitation (Kay, 1993; Hall, 1994). With regards to the cultural assets, they were assessed more rare and inimitable than physical assets.

	Rareness	Inimitability	Non-substitutability	Total
Physical assets	2.36	2.12	2.36	6.84
Intellectual assets	3.12	2.88	2.94	8.94
Cultural assets	2.48	2.27	2.3	7.05

Table 7.5 The uniqueness scores of assets for manufacturing companies

- ***Non-manufacturing Companies***

The analysis revealed that intellectual assets scored the highest ratings for the two attributes of uniqueness, rareness and inimitability. Although this kind of assets was

rated jointly high with respect to inimitability, its non-substitutability score was lower than that of physical assets. In fact, physical assets are rated highest with respect to the non-substitutability attribute. This reflected that most of the participants believed that physical assets are slightly more difficult to be substituted compared with the intellectual and cultural assets. The results do not show any difference between the intellectual and cultural assets for assessing the attributes of inimitability and non-substitutability. With regards to the cultural assets, they were assessed least rare among all the three kinds of assets.

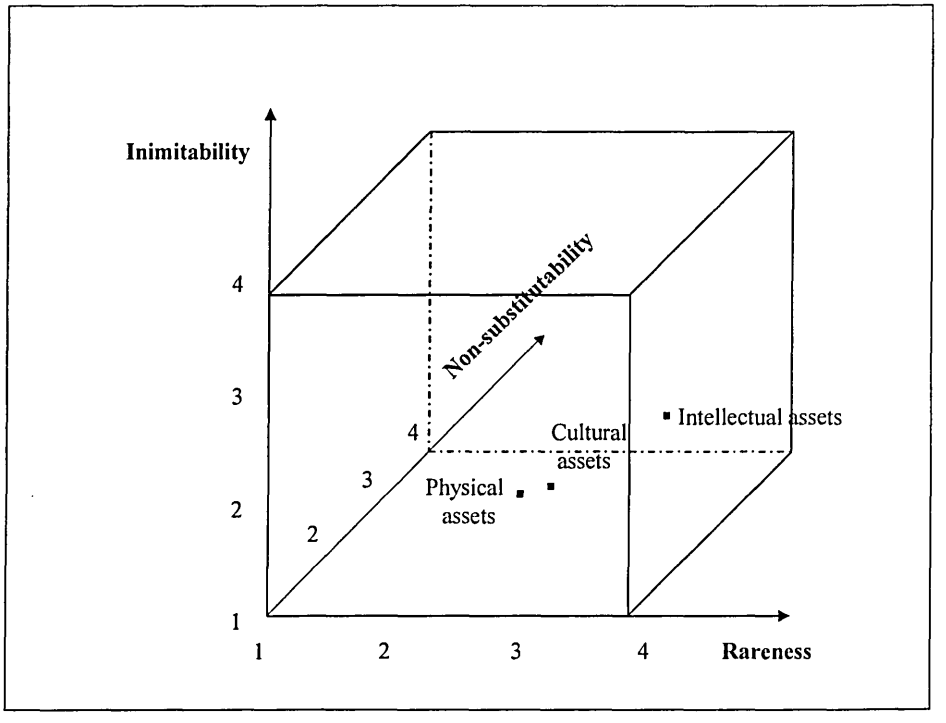


Figure 7.13 Unique assets determination for manufacturing companies

The results showed some contradictions to the findings from the literature review as well as from the manufacturing companies. The contradictions may be explained in two ways. First, with respect to the uniqueness of assets, there is a real perception gap existing between non-manufacturing and manufacturing industries and this has not been revealed by previous research work. Second, there is an understanding difference

existing between the manufacturing and non-manufacturing companies with regard to the definitions of the three categories of assets. Table 7.6 presents the average scores of the assets for each of the attributes of uniqueness. The unique assets are determined using the three-dimension model as shown in Figure 7.14.

	Rareness	Inimitability	Non-substitutability	Total
Physical assets	2.44	1.67	2.44	6.55
Intellectual assets	2.67	2.22	2.11	7.00
Cultural assets	2.11	2.22	2.11	6.44

Table 7.6 The uniqueness scores of assets for non-manufacturing companies

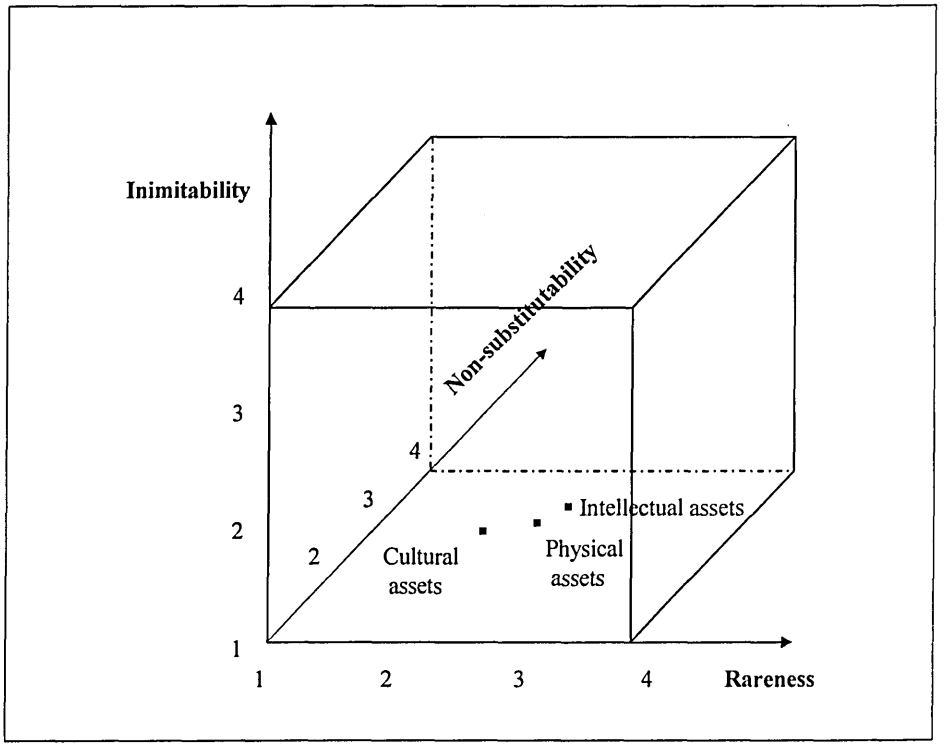


Figure 7.14 Unique assets determination for non-manufacturing companies

7.5.5 Assessing Strategic Flexibility

Strategic flexibility was assessed using the routine re-organisation and resource re-deployment attributes as explained in Section 6.3.1. The data was processed to gather

average scores under each attribute for the manufacturing and non-manufacturing companies.

- ***Manufacturing Companies***

Table 7.7 shows the strategic flexibility average scores obtained from the thirty-three manufacturing companies. Sales and marketing scored highest ratings for the both attributes of strategic flexibility, followed by purchasing and performance management. Manufacturing/processing, on the other hand, was rated as relatively low flexible capability. This reflects the real world situation as manufacturing/processing due to its tangible nature is regarded a rigid capability. Also the dimension of routine re-organisation secured overall higher weighting across the each capability column. This may be down to the reason that it is relatively easily implemented and perhaps a more practical scenario to that of resource re-deployment which is more capital and time intensive and requires major changes in the existing manufacturing set-up of a company. Note that the mean scores of the capabilities under the resource re-deployment and routine reorganization were 2.76 and 2.86, respectively. Using the method introduced in previous chapters, the core competence zone was determined representing total area of 7.89 under the curve with vertices at (4, 1.97) and (1.97, 4) as shown in Figure 7.15.

Comparing with the mean values it was easy to see that sales and marketing and R & D both had higher scores on the two attributes, whilst the other capabilities had lower scores. Therefore, they were relatively easily plotted into the matrix. The positions indicate that sales and marketing and R & D were perceived as the most likely candidates of core competencies by the manufacturing companies.

	Resource-redeployment	Routine re-organisation
Purchasing	2.73	2.85
Manufacturing/processing	2.67	2.67
Sales and marketing	2.91	3.06
R & D	2.78	2.90
Performance management	2.71	2.84

Table 7.7 The average strategic flexibility scores assigned by manufacturing companies

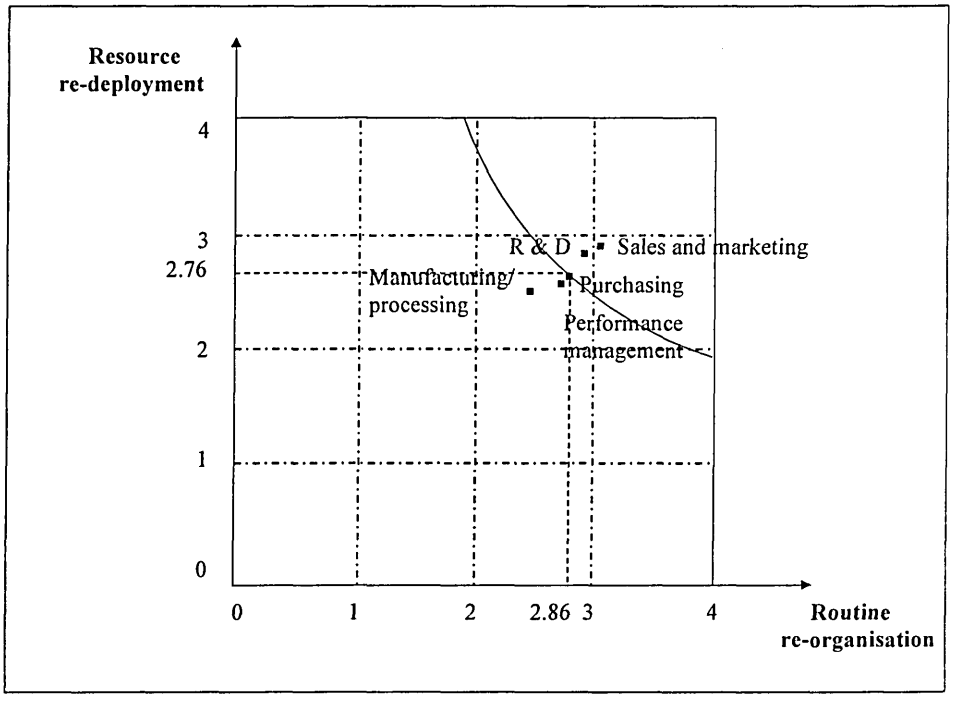


Figure 7.15 The determination of flexible capabilities for manufacturing companies

- *Non-manufacturing Companies*

Table 7.8 presents the average scores of strategic flexibility. For the non-manufacturing

companies, again, like their manufacturing counterparts sales and marketing was identified as relatively more flexible capability closely followed by performance management and R & D. The means calculated for the two attributes were 2.60 and 2.75, respectively. Therefore, the curve is drawn to represent the core competence zone. The curve is formed by those points whose area values are equal to 7.15 with vertices at (4, 1.79) and (1.79, 4). Since purchasing and manufacturing/processing scored lower cn the scale in the both dimensions, they were plotted outside the core competence zone. On the contrary, the other capabilities, namely, sales and marketing, R & D, and performance management, all secured higher scores, hence they were plotted inside the core competence zone. Again like manufacturing companies, non-manufacturing practitioners also gave higher weightings to the routine re-organisation dimension to the resource re-deployment for the same reasons explained for the manufacturing companies. Figure 7.16 shows the positions of the capabilities in the matrix.

	Resource-redeployment	**Routine re-organisation**
Purchasing	2.00	2.33
Manufacturing/processing	2.11	2.11
Sales and marketing	3.00	3.33
R & D	3.00	2.89
Performance management	2.89	3.11

Table 7.8 The average strategic flexibility scores assigned by non-manufacturing companies

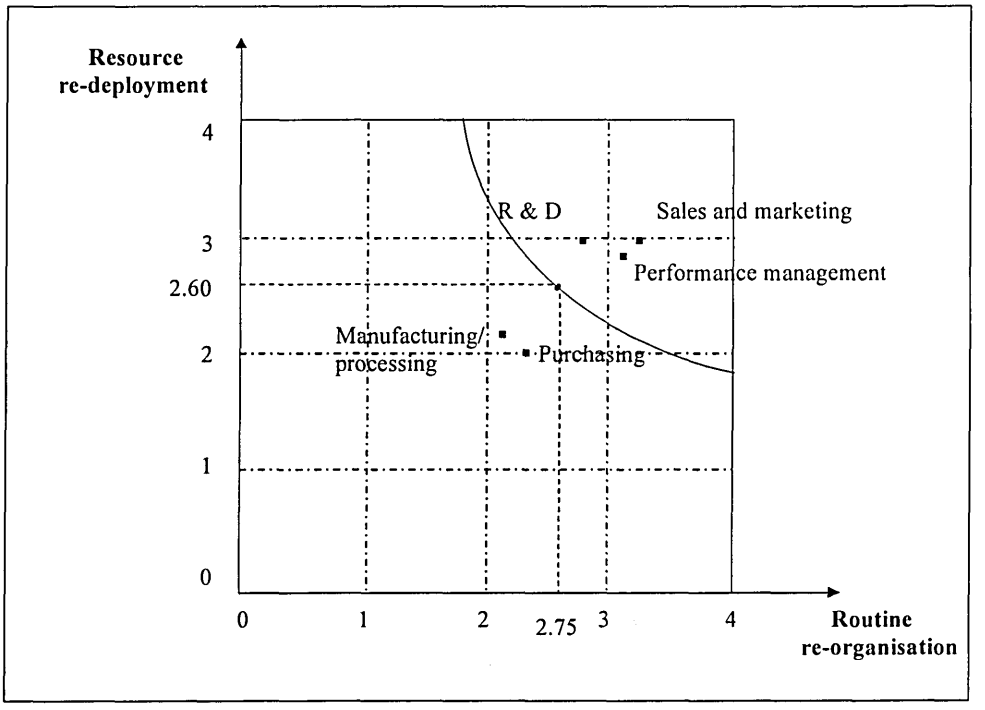


Figure 7.16 The determination of flexible capabilities

for non-manufacturing companies

7.6 Results and Discussion

As mentioned earlier, the questionnaire was directed to validate the stages 3 and 4, i.e., competence and core competence identifications, of the framework as shown in Figure 7.2. The identification results were obtained through processing the data collected from the questionnaire survey and were verified by the subjective core competence judgments of the respondents in the questionnaire. In the following two sections, the validation results are presented for manufacturing and non-manufacturing companies.

- ***Manufacturing Companies***

The data collected from each of the manufacturing companies was processed using the

procedures described in Chapters 5 and 6 to first identify competencies and then core competencies. The validation was carried out by comparing the results obtained against the subjective core competence assessment for each company. Table 7.9 presents the final assessment results for each company and the comparison results

Figure 7.17 illustrates the pattern of core competencies as perceived by the respondents. The pattern shows that about two thirds of the manufacturing companies perceived that manufacturing as one of their core competencies. Another favourite was sales and marketing. However, eight companies didn't subjectively make any selection of their core competencies from the five capability candidates or other capabilities. 'Not sure' or don't know' were identified as the main reason. Figure 7.18 illustrates the pattern of the core competencies identified using the framework. The results obtained through the analysis show that sales and marketing and R & D were identified as the two most common core competencies. However, the analysis also revealed that manufacturing/processing was identified as the core competence for only 10 companies against the perceptions of 22 companies. A justification for this mismatch is described in Section 8. 3. Individual company results are presented in the Appendix G (I).

- ***Non-manufacturing Companies***

The data collected from the nine non-manufacturing companies were processed using the described method. The core competence results were then verified by the perceptions of the respondents. Table 7.10 presents the identified core competencies and the perceptions of the companies.

Company	Identified core competencies (through framework)	Perceived core competencies (respondent's view)	Degree of match
No.1	Manufacturing/processing	Manufacturing/processing	High
No.2	R & D Sales and marketing	N/A	N/A
No.3	Sales and marketing	N/A	N/A
No.4	Sales and marketing	N/A	N/A
No.5	R & D Manufacturing/processing	N/A	N/A
No.6	Sales and marketing	N/A	N/A
No.7	Manufacturing/processing	N/A	N/A
No.8	R & D Manufacturing/processing	R & D Manufacturing/processing	High
No.9	Sales and marketing	N/A	N/A
No.10	R & D Sales and marketing	Manufacturing process development Product development Customer relationships	High

(Continued)

(Continued)

Company	Identified core competencies (through framework)	Perceived core competencies (respondent's view)	Degree of match
No.11	Sales and marketing	Experience High technology Working system	Low
No.12	Sales and marketing	N/A	N/A
No.13	Sales and marketing	Manufacturing/processing Sales and marketing	Medium
No.14	Sales and marketing	Manufacturing/processing Sales and marketing	Medium
No.15	Sales and marketing	Manufacturing/processing Sales and marketing	Medium
No.16	R & D Manufacturing/processing	R & D Manufacturing/processing	High
No.17	Manufacturing/processing Sales and marketing	Manufacturing/processing Sales and marketing	High

(Continued)

(Continued)

Company	Identified core competencies (through framework)	Perceived core competencies (respondent's view)	Degree of match
No.18	R & D Sales and marketing	R & D Manufacturing/processing	Medium
No.19	Sales and marketing	Manufacturing/processing Sales and marketing	Medium
No.20	R & D	Manufacturing/processing Sales and marketing	Low
No.21	Manufacturing/processing	Manufacturing/processing Sales and marketing	Medium
No.22	R & D Sales and marketing	Manufacturing/processing Sales and marketing	Medium
No.23	Sales and marketing	Manufacturing/processing Sales and marketing	Medium
No.24	Manufacturing/processing Sales and marketing	Manufacturing/processing Sales and marketing	High

(Continued)

(Continued)

Company	Identified core competencies (through framework)	Perceived core competencies (respondent's view)	Degree of match
No.25	R & D Performance management	Manufacturing/processing Sales and marketing	Low
No.26	R & D Sales and marketing	R & D Manufacturing/processing	Medium
No.27	R & D	R & D Manufacturing/processing	Medium
No.28	Manufacturing/processing	Manufacturing/processing Sales and marketing	Medium
No.29	R & D Sales and marketing	R & D Manufacturing/processing	Medium
No.30	Sales and marketing	R & D Manufacturing/processing	Low
No.31	R & D Sales and marketing	R & D Sales and marketing	High

(Continued)

(Continued)

Company	Identified core competencies (through framework)	Perceived core competencies (respondent's view)	Degree of match
No.32	R & D Sales and marketing	R & D Sales and marketing	High
No.33	Sales and marketing	Sales and marketing Performance management	Medium

Table 7.9 The validation results for manufacturing companies

Key: N/A = no answer

High = the results totally match with the perceptions

Medium = the results partially match with the perceptions

Low = the results don't match the perceptions at all

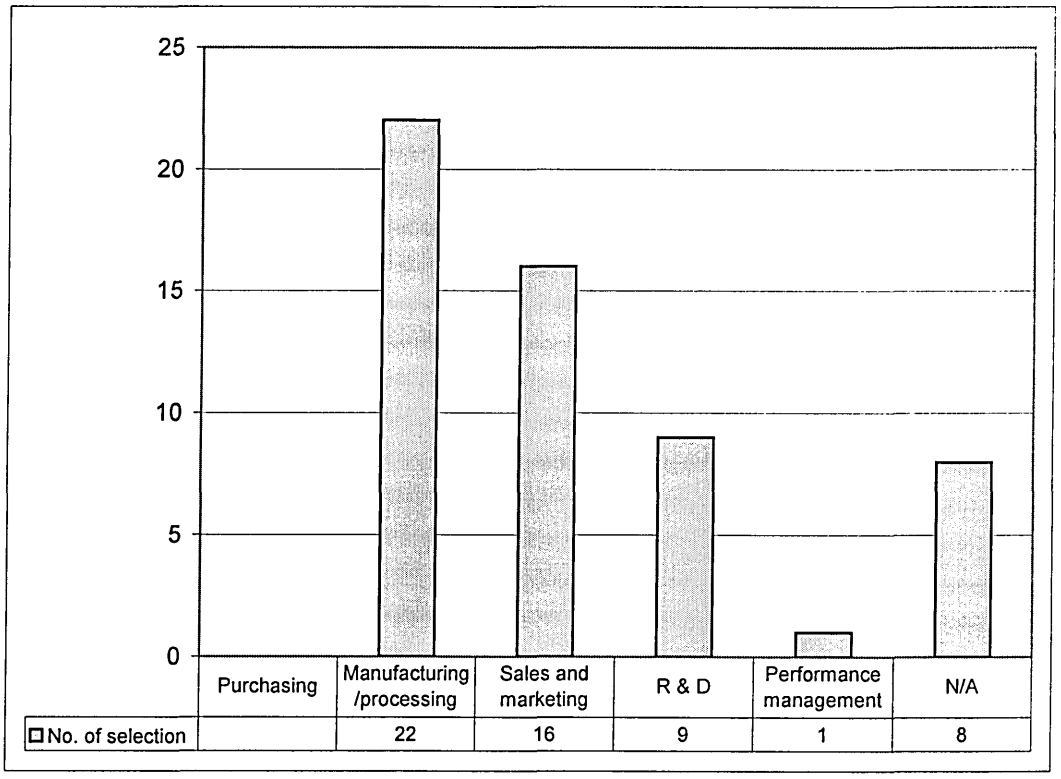


Figure 7.17 Perceived core competencies by manufacturing companies

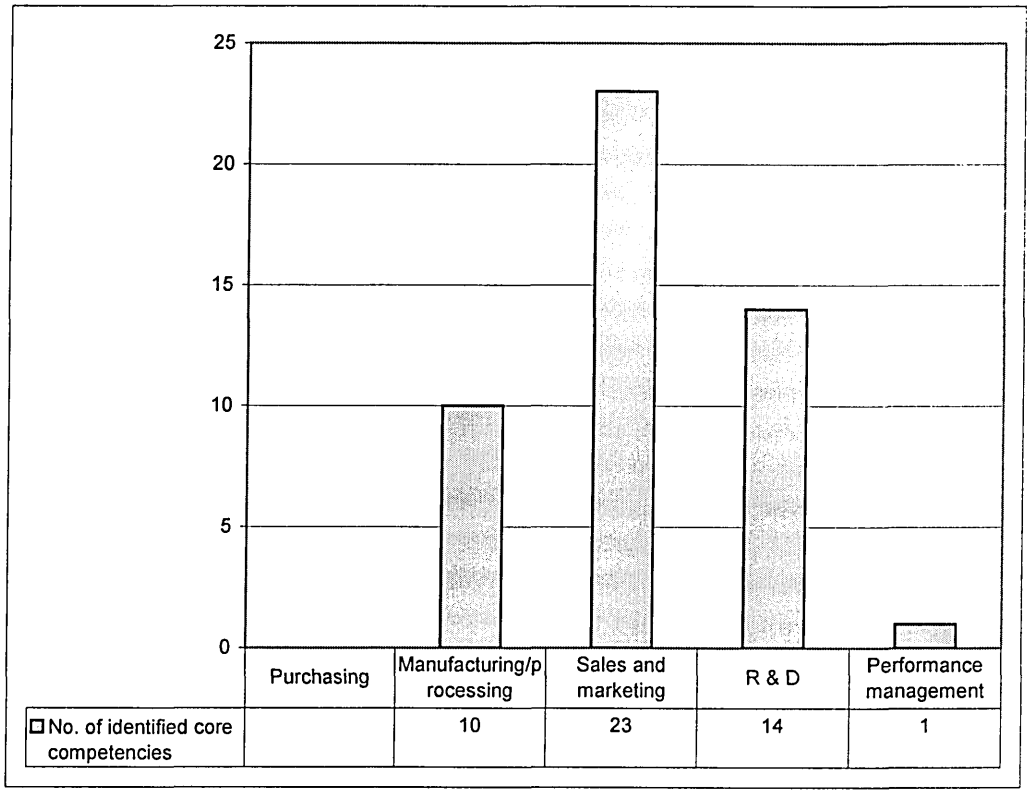


Figure 7.18 The identified core competencies for manufacturing companies

Company	Identified core competencies (through framework)	Perceived core competencies (respondent's view)	Degree of match
No.34	R & D Performance management	Intellectual property	Medium
No.35	Sales and marketing	N/A	N/A
No.36	R & D	Design	High
No.37	R & D Sales and marketing	R & D Performance management	Medium
No.38	R & D	N/A	N/A
No.39	Performance management	Sales and marketing Performance management	Medium
No.40	Sales and marketing	Sales and marketing	High
No.41	Sales and marketing Performance management	Sales and marketing Performance management	High
No.42	Sales and marketing	Sales and marketing	High

Table 7.10 The validation results for non-manufacturing companies

Key: N/A = no answer; High = the results totally match with the perceptions; Medium = the results partially match with the perceptions;

Low = the results don't match the perceptions at all

Figure 7.19 illustrates the pattern of core competencies as perceived by the non-manufacturing companies. It shows that two companies were unable to subjectively pinpoint their core competencies. Figure 7.20 presents the core competence results obtained through processing the individual company data.

Comparing the two patterns, the results revealed a strong match between the perceived core competencies and the identified core competencies. This strongly shows the validity of the framework in non-manufacturing sector. This also shows that the characteristics and attributes used for the analysis are appropriate to service sectors. Individual company results are presented in the Appendix G (II).

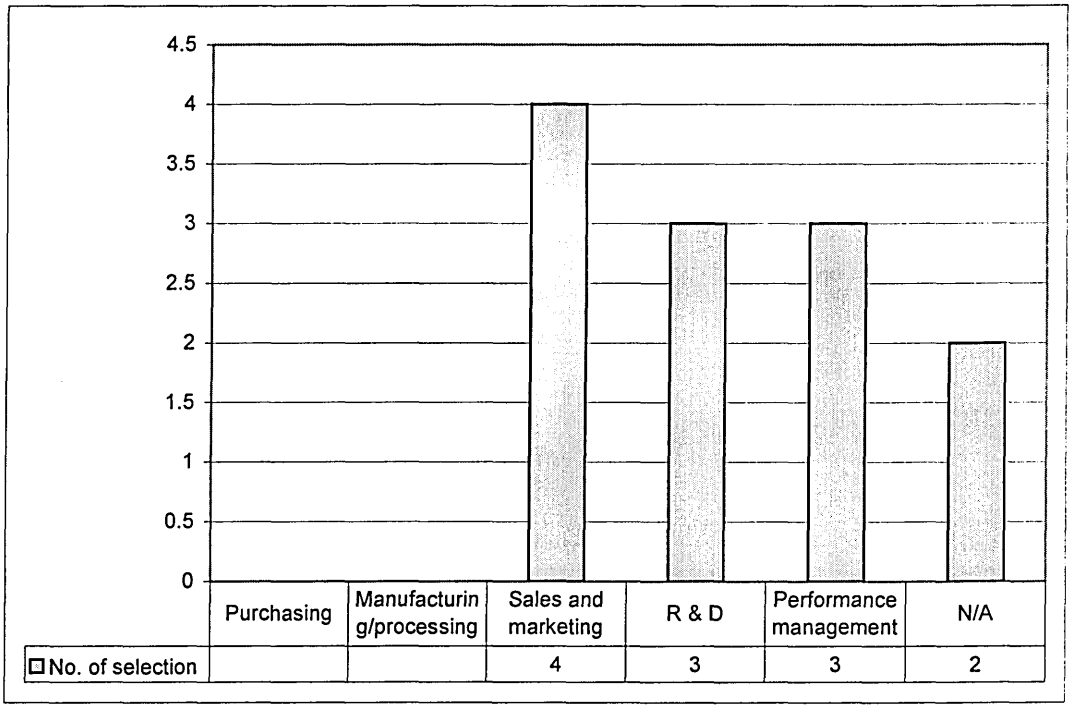


Figure 7.19 Perceived core competencies by non-manufacturing companies

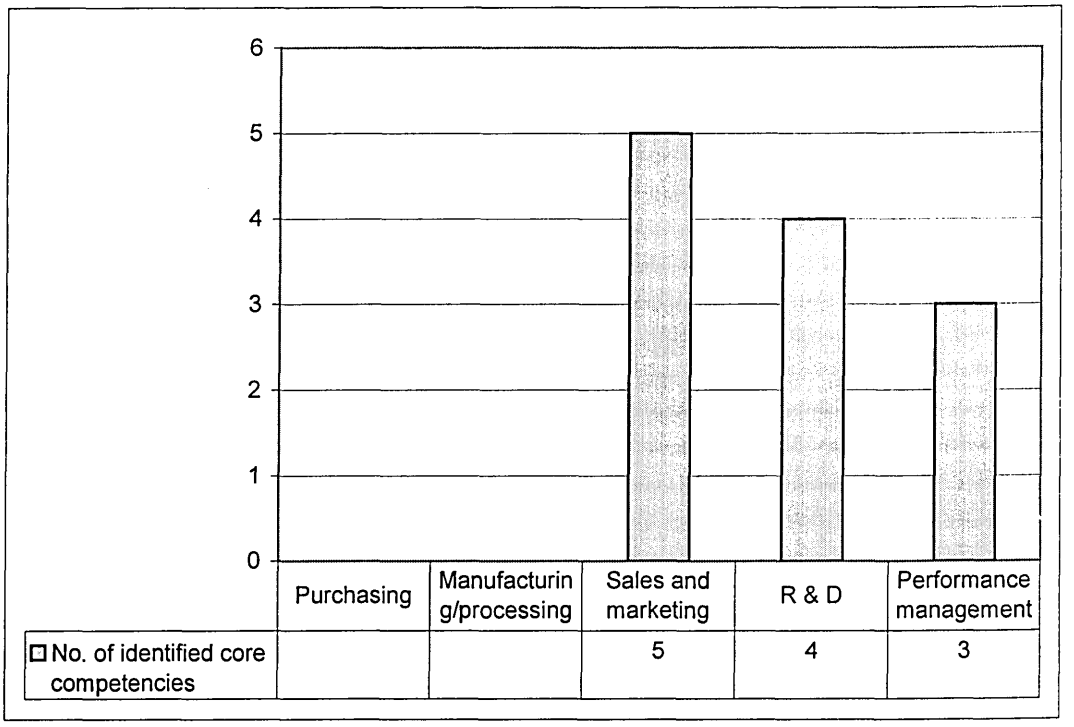


Figure 7.20. The identified core competencies for non-manufacturing companies

7.7 Summary

This chapter first introduces the architecture of core competence. The structure illustrates systematically the relationships between the concepts of key capability, competence and core competence. The provision of the structured relationships would help practitioners more easily understand the concept of core competence. Integrating the models proposed in previous chapters, an integrated framework for core competence evaluation is formed. The questionnaire survey method is selected and used to implement mainly the Stages 3 and 4, i.e., competence and core competence identifications, of the framework. The method is also determined to complement the case studies used in previous chapters for validating the models. In order to examine the

generic nature of the framework, the companies within UK manufacturing as well as non-manufacturing industry sectors are targeted.

Analysing the survey results has revealed that there are some perception differences existing between UK manufacturing and non-manufacturing sectors with regards to the concept of core competence. Whereas the survey has confirmed some theoretic findings, such as that intellectual assets are reported as most likely becoming rare, it also showed some results which seems to be contradicted to the literature, such as that for non-manufacturing companies physical assets are slightly more difficult to be substituted compared with the intellectual and cultural assets. Comparing the subjective perceptions of the practitioners on core competence with the core competence results identified through the framework, the validity of the framework has been examined.

CHAPTER 8

DISCUSSION AND CONCLUSION

Where adequate advancements have been realised within the theoretical quarters, more efforts are needed to develop practical tools helping firms to identify core competencies. One obstacle to this end has been the fact that the core competence concepts were poorly explained. A literature review conducted suggests that production competence and competence analysis process models are all workable in solving their designated problems, however, they have limitations. These are identified as vague definitions of terms, incomplete and unbalanced evaluation criteria, and lack of a detailed procedure for assigning subjective and objective weightings in the identification process (see Chapter 2). This study presents a structured, robust and practical framework for core competence evaluation.

8.1 Main Findings and Their Implications

The thesis has attempted to fill in a number of gaps between core competence theory and practice as highlighted in the following sub-sections.

8.1.1 Resource and Capability Relationship

As confirmed from the literature review, the author has not found a universally accepted definition for the two most important components of core competence: resource and capability. Very often diverse and even contradicted concepts are brought in and used by researchers. This can be clearly seen by looking at the competence identification

models presented in Chapter 2 and the definitions proposed by previous researchers shown in Chapter 3.

Although some researchers have tried to provide some working definitions, for example, Sanchez *et al.* (1996) have defined the terms like assets, resources, and capabilities, they have failed to explicitly distinguish capabilities from assets. For them, capabilities have 'doing' or 'activeness' characteristic but at the same time also belong to a special category of the assets which are "passive" and "static" in nature. When used for core competence identification purpose, such fuzzy relationship between asset and capability would cause problems for practitioners to determine precisely the candidates of core competence.

This thesis has clearly made major improvements with regard to this shortcoming. The relationship between firm resource (asset) and capability has been defined clearly. Here, firm resources are tangible or intangible assets owned or controlled by a firm. They are the input factors to capabilities. The results obtained from the case study of Company A have shown that firm resources not only can be classified into three kinds of assets, namely, physical assets, intellectual assets, and cultural assets, but also are the direct source to form capabilities. In fact, it has been shown that how some capabilities (e.g., R & D) use more proportion of a specific asset (e.g., intellectual assets) than the others. Such information would be particularly useful for companies about particular assets are to be acquired to develop a specific capability.

8.1.2 Resource and Capability Mapping

The resource and capability relationship also serves to postulate and later test an

important hypothesis that it is firm capabilities rather than resources are the direct source of core competence. This implies that an appropriate core competence identification process should be mainly focused on firm capabilities rather than resources (assets), and firm resources should be used only to analyse the characteristics of capabilities.

It is realised that an effective resource and capability mapping method is needed in order to identify core competencies of firm. However, a literature review has revealed that the methods used by previous researchers are not systematic or detailed enough (Chapters 2 and 3). For example, Lewis and Gregory (1996) have used a hierarchical method for mapping capabilities. According to them, the proposed top-level capabilities (e.g., quality, cost) are decomposed into sub-capabilities through analysing the underlined activities. However, the researchers did not describe the mapping process in detail. Specifically, two important points are missing from their descriptions. First, they did not describe clearly how to define the top-level capability for the mapping process. As the competitive priorities such as quality and cost are various, the practitioners may have difficulties to identify or define the capabilities. Second, they did not describe clearly that on which levels of activities the mapping process should be mainly focused. This occurs likely due to the fact that the authors have failed to incorporate "collective learning" characteristic into their core competence definition.

To circumvent such problems, this thesis has adopted a functional approach for identifying the capabilities residing within various levels of business structure. The mapping process starts from those business functions such as manufacturing and R & D. The functional capabilities are then decomposed into sub-levels to identify those residing sub-capabilities or activities. The thesis explicitly suggests that the mapping

process should be focused on those operational capabilities within the functions (see Section 3.3.4). The main advantages of this approach are that the top-level capabilities, i.e., business functions, are easier to define, and as the mapping is conducted through analysing only specific activities belonging to individual function, the identified sub-capabilities would be more accurate and complete.

This research has expanded this mapping approach to include mapping firm resources (assets). As firm resources are usually huge in quantity, the mapping process could be very complex as well. Using the proposed approach, the resources of a firm can be analysed and identified using three categories of assets, namely, physical assets, intellectual assets, and cultural assets under each of the business functions. The application is illustrated in Section 5.3.4.1 for the resource uniqueness assessment.

The functional mapping approach provides practitioners a convenient tool for mapping candidates of resources (assets) and capabilities for core competence analysis. The case studies have shown that the approach is suitable for both manufacturing and non-manufacturing companies.

8.1.3 Balanced Value Assessment Criteria

The literature has pointed out a number of times that to be core competence, a capability must be first of all valuable to the business. A valuable capability is termed key capability in this thesis. As a crucial step of core competence identification, a balanced and unbiased assessment is critical to the success of key capability determination.

However, previous researchers have very often used only financial measures to evaluate

the value characteristic of core competence candidates. As mentioned in Section 2.3.1, Tampoe (1994) designed his technical sub-system model using only financial measures for differentiating among the technologies embedded in products and services. Non-financial measures such as, new product introduction rate, customer satisfaction, are completely ignored. Such analysis could only present a biased view of the organisation in recognising the core competencies. For example, as R & D is usually capital intensive, using such biased model this capability could not be identified as key capability. However, R & D is very often one of the major contributors for strong non-financial business performance such as market share and new product introduction rate.

This thesis has employed financial as well as non-financial performance measures to interpret the characteristic of value. The key capability model is built upon the both performance assessments for capabilities. The financial measures include return on capital employed, sales growth, and operating profit, whereas the non-financial measures used in the assessment are market share, customer satisfaction, and new product introduction. The results of the five case studies have shown that using such balanced measures the model presents an unbiased procedure to identify key capabilities. For example, research capability of Company A secured high score (0.082) for non-financial performance evaluation but low score (0.035) for financial performance evaluation (see Section 4.4.2). According to the model proposed by Tampoe (1994), this capability would not qualify as key capability. However, using the model designed in the present study the capability has been identified valuable to the business performance.

8.1.4 Distinction between Competence and Core Competence

Many previous researchers have defined and used the concepts of competence and core

competence interchangeably. For these researchers, "being valuable to business" and "unique in competition" are the only two attributes which can be used to describe a core competence. This approach can be seen clearly from the previous research models shown in Chapter 2. Although Leonard-Barton (1992) has pointed out the potential problem that a current, inflexible 'core competence' could quickly turn into tomorrow's "core rigidity", little effort has been done to identify extra attributes to describe and emphasise the dynamic nature of core competence.

Using strategic flexibility as a new characteristic of core competence, this thesis has distinguished core competence from competence and provided a clear definition for core competence. Two attributes, namely, resource re-deployment and routine re-organisation, have been identified and used to represent the characteristics. The attributes are proposed based on the literature review and hence have sound theoretical basis. However, considering firm resources and capabilities (routines) are the two main factors determining the strategic flexibility, the attributes have been specially termed and defined to reflect the fact. The results obtained from two case studies and questionnaire survey have shown that the use of such characteristics is feasible.

8.1.5 Completed Set of Core Competence Attributes

In the literature, very often the characteristics of core competence are defined and used loosely and vaguely. Some characteristics are widely cited but no detailed explanations for the related attributes given. Klein *et al.* (1998) have pointed out that Prahalad and Hamel's "collective learning" characteristic of core competence is defined too general and has little use without giving it any detailed contents. In addition, although uniqueness has been widely recognised as one characteristic of core competence, its

attributes have been suggested divergently. For example, while Barney (1991) defined three such attributes, namely, rareness, inimitability, and non-substitutability, Lewis and Gregory (1996) used seven attributes for the uniqueness, in which two metrics of importance and codification are included.

Drawing from the literature, this thesis has identified a set of relatively complete attributes of core competence and has organised them in a systematic way. These attributes are used as the criteria for identifying key capabilities, competencies, and core competencies, respectively. With regard to the characteristic of "collective learning" that proposed by Prahalad and Hamel (1990), this research has employed three attributes, namely, across-product, across-function, and across-business, to materialise the characteristic. With regard to the uniqueness, Barney (1991)'s three attributes are perceived by the present author reflecting more accurately the meaning of uniqueness than Lewis and Gregory (1996)'s seven metrics, and hence are adopted as the criteria.

8.1.6 An Architecture of Core Competence

As mentioned earlier (see also Chapters 1, 2, and 3), there is lack of a universally accepted concept of core competence due to the following three reasons:

- confused and, sometimes, contradicted term definitions;
- diversely defined core competence attributes; and
- fragmented core competence structure.

This thesis has presented a clear and comprehensive architecture for core competence. In this architecture, firm *resources* are the inputs to form *capabilities* of a firm. While

all of the capabilities are useful to the firm's business, some capabilities play more important role than others in realising the business objectives. These are key capabilities of the firm. Note that only those key capabilities which are highly collective in business operation and relatively unique in competition are likely to become *competencies*. The difference between competencies and core competencies is that the latter must be strategically flexible or dynamic in nature.

The architecture has been used as the foundation of the core competence evaluation framework. The data analysis for the survey and case studies has revealed that the framework is able to evaluate the core competencies for both manufacturing and non-manufacturing companies. The validation results are generally in line with the perceptions of the practitioners. These proves the second and third hypotheses proposed in Chapter 1, that is, true core competencies of firms can be evaluated through a combination of attributes using some qualitative and quantitative assessment techniques, and the core competencies of both manufacturing and non-manufacturing firms can be identified using the same evaluation procedures.

8.2 The Implications of Validation Studies

This research has employed both case study and questionnaire survey method to validate or implement the four models: resource and capability relationship, key capability determination, competence evaluation, and core competence identification.

8.2.1 Combination of Case studies and Questionnaire Survey

As Nanda (1996) has pointed out that so far most of the competence-based competition

models are validated using case studies, and since such validations are deductive, the results tend to be non-robust, non-generalised and subject to sampling and observer biases. Therefore, this research has adopted questionnaire survey method to complement or in many places supplement the case studies.

The case study method is used to conduct an analytical study of a specific manufacturing or non-manufacturing company to test whether the proposed method is practical and the model can pick up right information. It provides a face-to-face interviewing opportunity for the present author to investigate the practitioners' understanding of core competence concept. Using the case studies the relevant feedbacks about the conceptual definitions and models are clearly and quickly obtained. For example, with regard to the strategic flexibility characteristic of core competence, the interviewee of Company A agreed this concept by saying "too rigid capabilities (e.g., a specific manufacturing technology) brought only short-term benefits to the business, though they were unique among the competitors". The case studies of Company A and IKEA have shown that the strategic flexibility of a competence is related to the structure of its resource base and the routines by which the competence is formed. The higher proportion of intangible assets used by the competence, the more flexible the competence is. The more rigid the routines are, the less flexible the competence is.

The questionnaire survey is designed and used to complement the case studies for examining the core competence concept understandings of UK manufacturing and non-manufacturing companies. The data and information are collected for the framework of core competence evaluation and then processed and evaluated against the perceptions of the practitioners to gain the snapshots for the UK industries.

The case studies as well as questionnaire survey method has been a wining combination. The present author believes that using only one method may not be able to obtain all the intended information. For example, if only the questionnaire survey has been used, the designed questionnaire would be very lengthily in order to obtain sufficient data and information for validating the key capability model. On the contrary, if only the case studies have been used, it would have had no opportunity for the framework to be tested against multiple UK industries and to filter out some biases as pointed out in the literature.

8.2.2 Decision-making Tools

8.2.2.1 The Analytic Hierarchy Process

As mentioned earlier, both financial and non-financial measures are used to represent the characteristic of value. The measures are multiple in number and quantitative as well as qualitative in nature. The previous researchers (e.g., Probert *et al.* (1993)) have suggested to use weights and scores approach for the assessments. This approach is effective if the levels and numbers of the criteria and alternatives are few and used carefully. However, it could introduce inconsistent information as well as it doesn't allow a mechanism for pairwise comparison among the alternatives. The consequence is that the identified key capabilities may not be accurate.

Analytic Hierarch Process (AHP) approach has been chosen for building the model. The AHP is selected because it has several advantages, including suitable for both qualitative and quantitative assessments and providing a consistency checking mechanism over other available approaches (e.g., cost/benefits ratio, knowledge-based

system). Particularly, using the AHP software the sensitivity of alternatives to the changes of criteria can be analysed quite comprehensively. In addition, as the AHP is computerised, it would be very convenient and easy for the firm to perform regular re-assessments of its key capabilities in line with the changes of business environment. In this thesis, the results obtained from the case studies have shown that the proposed AHP evaluation models serve well for both manufacturing and non-manufacturing companies with regard to key capability determination.

8.2.2.2 The Weights and Scores Method

As the attributes of strategic flexibility, i.e., resource re-deployment and routine re-organisation, are new in concept, the model for core competence identification itself is novel. At this level subjective attribute assessments are performed using weights and scores approach. The main characteristics of this approach are simple and easy to use. With this approach, the subjective assessments of strategic flexibility for competencies are turned into the quantitative results. The case studies and questionnaire survey have shown that the assessment method can help reduce the possibility of political argument with regard to the determination of core competencies.

8.2.2.3 The Method of Averaging Used

Three of the four stages of core competence evaluation procedure, namely, key capability determination, competence evaluation, and core competence identification, involve decision-makings how to determine which candidates are qualified after the assessments.

Two possible methods can be used available for the decision-makings: range taking or mean value. The range taking method refers to that using a certain range as the boundary to determine the qualification of candidates. For example, in Figure 6.2 of Section 6.3.2, the top-right hand cell of the matrix is a potential range which could be used for determining core competencies. In this thesis, this method alone is not adopted due to two main reasons. First, the method is perceived too rigid. As the assessment values could be quite different from firm to firm, a fixed range may fall out of realistic situations and hence bring difficulties for the decision-making. Second, the method provides no rules for dealing with those candidates plotted very closely around the range and hence could easily cause "political argument" for a firm. Rejecting such candidates could be a very costly mistake for a company.

In order to avoid the potential problems, a combination of the range and average methods is used for determining the boundary of key capability, competence and core competence zone. The method implies two rules. First, if a specific candidate, say, competence, is plotted in the top right hand cell (as shown in Figure 6.2), that is, it secures high scores (3 or 4) on the both attributes of strategic flexibility, then this competence is naturally identified as core competence. Second, for a competence which is plotted in the vicinity of the top right hand cell, that is, it only secures a high score on one of the attributes of strategic flexibility but low on the another, the average values calculated for each attribute are then used. The attribute scores of the competence are compared with the averages, and if the both scores are lower than the average, then the competence is not considered as core competence. However, if one of the scores is higher but another is lower than the average, then the cross multiplication of the two average values is used to draw the curve representing the boundary of core competence zone. For example, with regards to the sourcing capability of IKEA (see Section

6.4.1.2), its routine re-organisation score (4.0) was higher than the mean value (3.25). However, its resource re-deployment scored 2.0 and lower than the mean value (2.75). As its area value of 8 is less than the area value of the means (8.9375), therefore, it should not be considered as a core competence.

The method is rational and simple to use. Potentially it can be computerised (spreadsheet). The key capabilities identified for Company A and the core competencies identified for IKEA have both shown the combination is able to help firms to achieve more accurate results.

8.2.3 The Benefit of Sequential Filtering

For competence evaluation, the collectiveness and uniqueness characteristics are sequentially employed. The main rationale behind this arrangement is that the uniqueness assessment, due to the fact that it is an "external benchmarking" process, is more difficult than the collectiveness assessment (an "internal benchmarking process"), therefore, it would be more efficient to conduct the collectiveness exercise first of all. A reduced number of identified "collective" candidates is subsequently subjected to uniqueness assessment. This has simplified the procedures and has resulted in considerable amount of time saving.

8.2.4 Sensitivity Analysis

Using the procedure conducted for the case study of Company A (Section 4.4.3), the sensitivity of the identified key capabilities to the change of priority weights for the financial and non-financial measures has been performed and examined for the five

manufacturing and non-manufacturing companies. During the sensitivity analysis, the priority weights of each of the measures are altered by ± 50%. The analysis results have shown that the top two most preferred capabilities identified under each of the measures are in general not sensitive to priority change of ± 50%. A further analysis for a ± 10% change reveals that the sensitivity results are more resilient. However, since the criteria used for competence and core competence assessments are assigned equal weights for the sake of simplicity, the sensitivity for these two models is not performed in this thesis.

The sensitivity analysis has been used to test the robustness of the key capability determination model. The validation results show that there are no significant changes to the rankings of the identified key capabilities. This indicates that the AHP-based model is robust.

8.3 The Implications of Questionnaire Survey

As mentioned in Chapter 7, the questionnaire survey was conducted with three aims in mind: (i) to examine the generic nature of the framework as it is valid for the both manufacturing and non-manufacturing firms; (ii) the proposed models can be implemented as a self administered questionnaire format and pick up the right information; (iii) to examine the understandings of the UK manufacturing and non-manufacturing companies on the understanding and issues related to competence and core competence identifications.

The questionnaire survey has revealed some useful findings from UK manufacturing and non-manufacturing companies. The findings indicate the present understandings of

the practitioners on the issues related to core competence concept and identification.

8.3.1 Firm Resources (Assets) and Capabilities

The survey results have further confirmed the hypothesis proposed in Chapter 1, that is, firm resources (assets) are the source of capabilities and capabilities are the direct source of core competencies. In fact, the survey has revealed some interesting perceptions of the practitioners. For example, for both manufacturing and non-manufacturing companies, R & D uses more intellectual assets than other major functional capabilities, and performance management is the largest user of cultural assets. The findings in a way confirm the conceptual grounds of the theory of core competence. Most of the companies have confirmed that core competencies are actually firm capabilities, such as sales and marketing and manufacturing/processing, and not individual or fragmented assets.

8.3.2 The Collectiveness Attribute of Capabilities

While the manufacturing companies perceive that sales and marketing, R & D, and manufacturing/processing are relatively strong in the collectiveness characteristic, the non-manufacturing industry identified sales and marketing, R & D, and purchasing as highly collective capabilities. More details have been revealed by examining the individual scores. With regards to the attribute across-function, sales and marketing, R & D, and manufacturing/processing are rated relatively higher than the other capabilities. This confirms the theoretical findings as these capabilities have a strong tendency to integrate closely with other functional capabilities (Goold *et al.*, 1997). The analysis of the results has further revealed that the capabilities using intensive

intellectual assets tend to be assessed strong with regards to all the three attributes of collectiveness, namely, across-product, across-function, and across-business.

8.3.3 The Uniqueness Attribute of Capabilities

The survey has revealed that with regard to the attribute uniqueness, the manufacturing companies perceive differently to their non-manufacturing counterparts. For the manufacturing companies, R & D capability is rated relatively higher with respect to all the three attributes of uniqueness, followed by sales and marketing. Manufacturing/processing scored the least. It may be down to the reason that manufacturing being heavily dependent upon the physical assets, perceived less abstract and relatively easily copied and substituted, which is in line with the theoretical findings (Lado and Wilson, 1994).

However, for the non-manufacturing companies, on average the five capabilities have attained very similar scores. This reflects that for non-manufacturing practitioners the five capabilities are not differentiated against the uniqueness parameters. Specifically speaking, R & D with 2.13 was rated relatively higher with respect to inimitability, and manufacturing/processing was considered stronger in rareness and non-substitutability (2.47 and 2.23, respectively). However, the attribute of "rareness" was given overall a relatively higher weighting by the practitioners, followed by non-substitutability and inimitability.

8.3.4 The Uniqueness Attribute of Assets

The analysis revealed that the manufacturing companies have given intellectual assets

(e.g., knowledge, employee skills, patent) the highest ratings for all the three attributes of uniqueness. This result is in line with the theory of core competence where intellectual assets are reported as most likely becoming rare and advocated as the major barrier to imitation (Kay, 1992; Hall, 1994). With regards to the cultural assets, they were assessed more rare and inimitable than physical assets.

For the non-manufacturing companies, the analysis revealed that the intellectual assets scored the highest ratings for the two attributes of uniqueness, rareness and inimitability. However, the non-substitutability score this kind of assets was rated lower than that of physical assets. In fact, physical assets are rated highest with respect to the non-substitutability attribute. This reflected that most of the participants believed that physical assets are slightly more difficult to be substituted compared with the intellectual and cultural assets. With regards to the cultural assets, they were assessed the least rare among all the three kinds of assets. The results are contradicted to the findings from the literature review as well as from the manufacturing companies.

8.3.5 The Strategic Flexibility of Capabilities

With regards to the strategic flexibility, sales and marketing and R & D are commonly rated relatively high by the both manufacturing and non-manufacturing companies. The results indicate that the both capabilities are perceived flexible to re-deploy assets or re-organise the underlined routines to create new business opportunities for the firm.

8.3.6 The Practical Understandings of Core Competence

The analysis of the survey results reveal that many companies cannot make rational and

sound judgments on core competencies. Whilst some of them didn't provide any subjective assessments on their core competencies, the others were proved having identified their core competencies arbitrarily. For example, about 67% (22 out of 33) manufacturing companies perceived manufacturing as one of their core competencies. However, according to the data collected from the companies, the capability was neither identified as highly unique in competition nor indicated as strongly flexible. Thus, it shows that the companies' understanding of core competence concept is limited.

8.4 The Deliverables

In Chapter 1 the detailed objectives of this research were stated as follows:

1. To provide clear working definitions for the building blocks of a firm, such as resource, capability, and competence for understanding core competence concept.
2. To identify a set of static as well as dynamic characteristics to differentiate core competencies from firm capabilities.
3. To provide quantitative tools to help the subjective assessment procedures.
4. To construct a balanced procedure for assessing the candidates of core competence by incorporating financial as well as non-financial performance measures.
5. To develop, implement, and validate a generic framework for evaluating core competencies of manufacturing as well as non-manufacturing companies.

Each of the five objectives has been accomplished in this thesis. Drawn on the contemporary approaches of competence-based competition and the previous research work, Chapter 3 has provided a set of clear working definitions of the terms such as, firm resources, assets, and capabilities. In particular, firm resources are decomposed

into tangible and intangible assets. Intangible assets are further classified into intellectual assets and cultural assets. All these terminologies and classifications are supplemented by giving relevant examples. The relationship between firm resources and capabilities has been formulated and examined using a real-life example.

With the help of these clarified concepts, an Analytic Hierarchy Process (AHP) procedure is introduced in Chapter 4 for analysing the value of firm capabilities. Financial and non-financial performance measures are described and used for constructing the relevant AHP models. The effectiveness of the model has been tested through case studies.

Using the identified key capabilities, Chapter 5 describes a method for evaluating the competencies using 'collectiveness' and 'uniqueness' attributes. The characteristic 'collectiveness' comprises the attributes of across-product, across-function, and across-business. Similarly, The characteristic 'uniqueness' has three attributes, namely, rareness, inimitability, and non-substitutability. Competencies are evaluated by subjectively assigning relevant scores to all these characteristics. The successful implementation of this method has been demonstrated using two case studies. In addition, the method is also used for identifying unique resources of a firm.

Chapter 6 is devoted to emphasize the importance of differentiating the concept of 'core competence' from 'competence'. The strategic flexibility attributes namely, resource re-deployment and routine re-organisation, are introduced to evaluate the dynamic nature of firm competencies. A procedure is described how to assign relevant scores for each attribute. Core competence identification procedure is validated using two case studies. Chapter 7 serves the purpose to integrate various sub models described in Chapters 3 to

6 into a structured framework for core competence evaluation. The framework is then implemented in practice through a questionnaire survey. The results of the conducted survey have been used identify the core competence concept understandings of the practitioners and to validate the effectiveness of the framework. The framework is generic in nature as it is applicable to determine key capabilities, competencies, and core competencies for a manufacturing or non-manufacturing organisation.

In summary, this thesis has made important contributions to the knowledge related to the theory and practice of core competence-based competition. The framework developed for core competence evaluation has been proved useful in practice. Some important findings have been identified from UK manufacturing and non-manufacturing industries. Table 8.1 gives a summary of main findings and the strengths and weaknesses of this research work.

8.5 Recommendations for Future Research

In order to ensure the research work fully robust in nature and universally useful in practice it is necessary more research to be carried out. The author recommends that future research should investigate in more depth the following five areas.

8.5.1 The Units of Analysis

The present research has used only five functional capabilities as the units of analysis for questionnaire survey and case studies. As this is deemed to be reasonable for obtaining good responses from the practitioners, some detailed, useful survey information is not revealed. For example, as it is revealed in the strategic flexibility

	Achievements	Findings	Strengths	Weaknesses
Chapter 1	Determination of research objectives and methodology	1. The three contemporary approaches of core competence competition are supplementary to each other 2. The attributes of core competence need to be drawn from the three approaches	1. Comprehensive review of competence-based competition theory 2. Well defined research objectives	1. Limited number of research hypotheses
Chapter 2	Identification of implications and limitations of previous research work	1. Resources and capabilities are the units of analysis 2. Core competence can be determined based upon quantitative analysis 3. A set of criteria is required for assessment 4. The models proposed by previous research are prone to shortcomings	1. Comprehensive review of previous research work 2. Detailed strength and weakness analyses for the existing models	1. Limited number of previous research examples in the literature
Chapter 3	A model of resource and capability relationship	1. Capabilities are formed by using three categories of assets 2. The operational capabilities within manufacturing function are major users of physical assets	1. Clarified terminologies 2. Systematic analysis of resource and capability 3. An approach provided for mapping capabilities	1. Validation using a single case study 2. Only five functional areas are selected

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	Achievements	Findings	Strengths	Weaknesses
Chapter 4	A structured procedure for determining the key capabilities of a firm	1. Most individual capabilities did not secure high score simultaneously with respect to the both dimensions of performance evaluation. 2. Capabilities those secured high score with respect to only one dimension may still be determined as key capabilities	1. Adequate measures 2. Suitable for qualitative as well as quantitative evaluation 3. Stepwise procedure 4. Generic in nature 5. Computerised 6. Reliable results	1. Management should be able to identify the input capabilities correctly 2. Lengthy interviews due to AHP requirement
Chapter 5	A comprehensive method for identifying the competencies	1. Intellectual and cultural assets are less imitable. 2. Capabilities using relatively higher proportion of intangible assets are perceived highly collective. 3. Capabilities using higher proportion of intangible assets are perceived less imitable.	1. Comprehensive measures are used 2. Generic in nature 3. Suitable for both unique capability and resources evaluations	1. Equal weights are assigned to all evaluation measures
Chapter 6	A validated technique for evaluating core competencies	1. The strategic flexibility of a competence is related to the structure of its resource base 2. The strategic flexibility of a competence is related to the complexity of its routines	1. Measures include static as well as dynamic characteristic of core competence 2. Structured approach 3. Generic in nature	1. Equal weights are assigned to all evaluation measures 2. Management inputs could be 'biased'

(Continued)

(Continued)

	Achievements	Findings	Strengths	Weaknesses
Chapter 7	An integrated core competence identification framework	1. Intellectual assets secured relatively higher scores among the attributes of uniqueness 2. Capabilities using relatively higher proportion of intellectual assets are more unique 3. Capabilities using relatively higher proportion of intellectual assets are more strategically flexible	1. Structured approach 2. Generic in nature 3. Comprehensive 4. Robust 5. Practical 6. Combined static and dynamic attributes	1. Questionnaire is time consuming 2. Practitioners' perception about core competence is biased

Table 8.1 Main deliverables of the research

assessment, manufacturing/processing is perceived relatively low in the both attributes. However, if those more detailed operational capabilities within this function are used for the assessments, some of the capabilities may be identified as highly flexible ones, hence, the survey results would be more valuable and precise.

8.5.2 The Weights of Criteria

For the sake of simplicity, this thesis has employed equal weighted criteria for assessing competencies and core competencies. While it seems that this approach works well in practice, the validity of the assessment results may be further enhanced if the weights of the criteria can be differentiated through collecting practical data. The criteria include the attributes of collectiveness, uniqueness, and strategic flexibility.

8.5.3 The Sensitivity Analysis

In order to test the robustness of the key capability determination model, the sensitivity analysis has been performed. However, since the models developed for competence evaluation and core competence identification have adopted an equal weight approach for the assessment criteria, this research does not perform sensitivity analysis for the two models. After the data collected for differentiating criteria, the further research can conduct such analysis for the models to further test their robustness.

8.5.4 The Data Processing Technique

In the area of key capability determination, further research is recommended to test the sensitivity of the framework using more efficient multi-criteria decision-making

techniques, for example, multi-attribute utility theory (MAUT). A simpler procedure would minimise the length of the case studies and questionnaire survey, which was deemed a daunting factor in collecting the data and information. In addition, some other technique can be tried for competence and core competence assessments to determine if the currently used approach, weights and scores approach, is the best.

8.5.5 The Survey Sample

This research has presented some useful and important findings from UK manufacturing and non-manufacturing industries. However, due to the limited sample of the survey, some of the findings may not fully reveal the understandings of the practitioners. Particularly, since there were only nine non-manufacturing companies participating the questionnaire survey, the present author perceives that more solid conclusions could be reached if the sample is increased. Therefore, the further research can conduct a larger sample of questionnaire survey or involve more case studies for non-manufacturing companies to enhance the framework validation and findings.

Besides the further work on this research itself, some relevant areas of competence building and leverage need further attention. The efforts can be focused on developing methods for firms to seek optimum competence leveraging and building strategies using the characteristics of the framework. Some possible topics for such work are depicted in Figure 8.1.

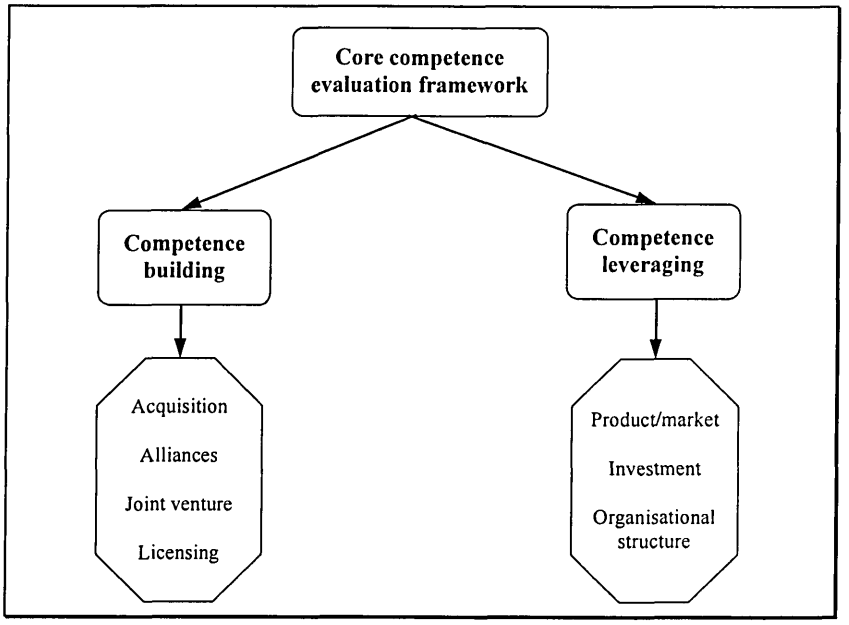

Figure 8.1 The potential application of the framework

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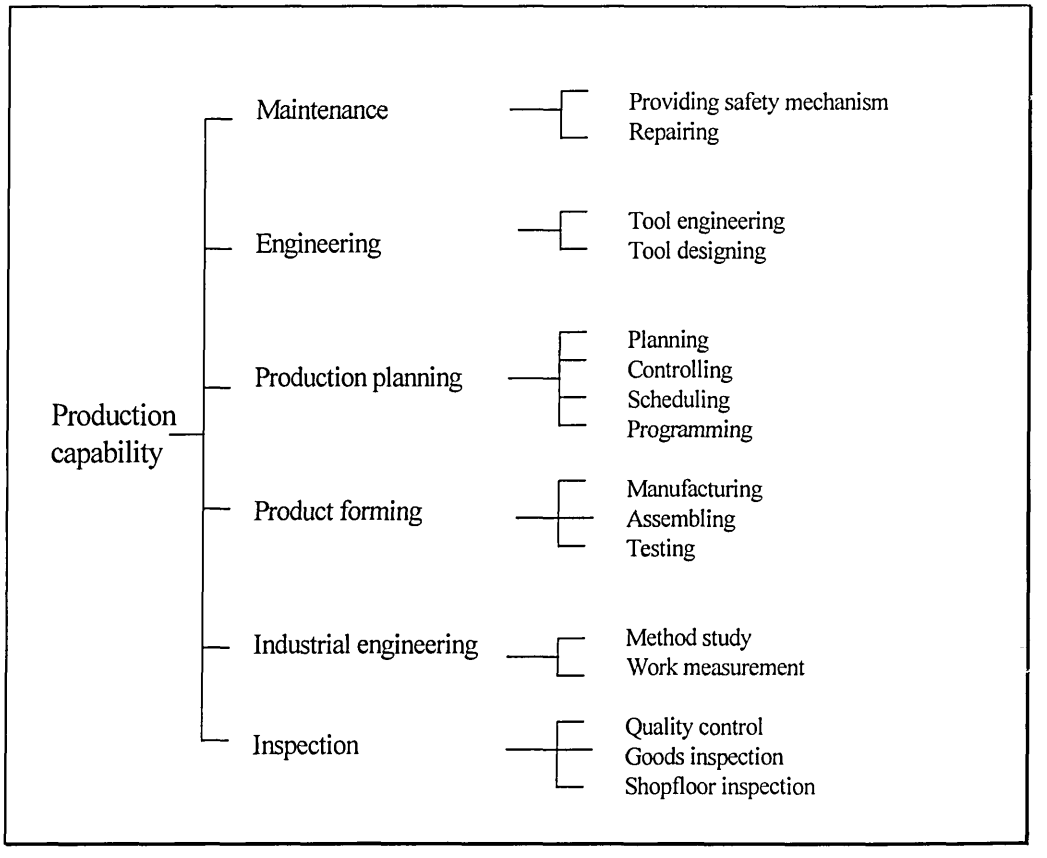
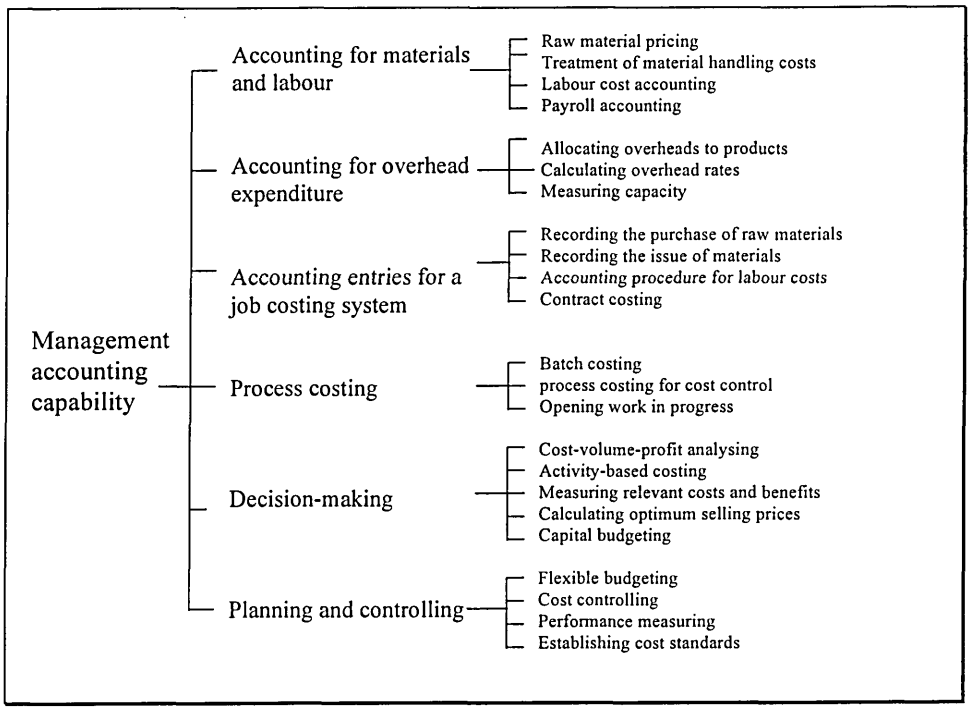
APPENDIX A

EXAMPLES OF FIRM CAPABILITY MAPPING

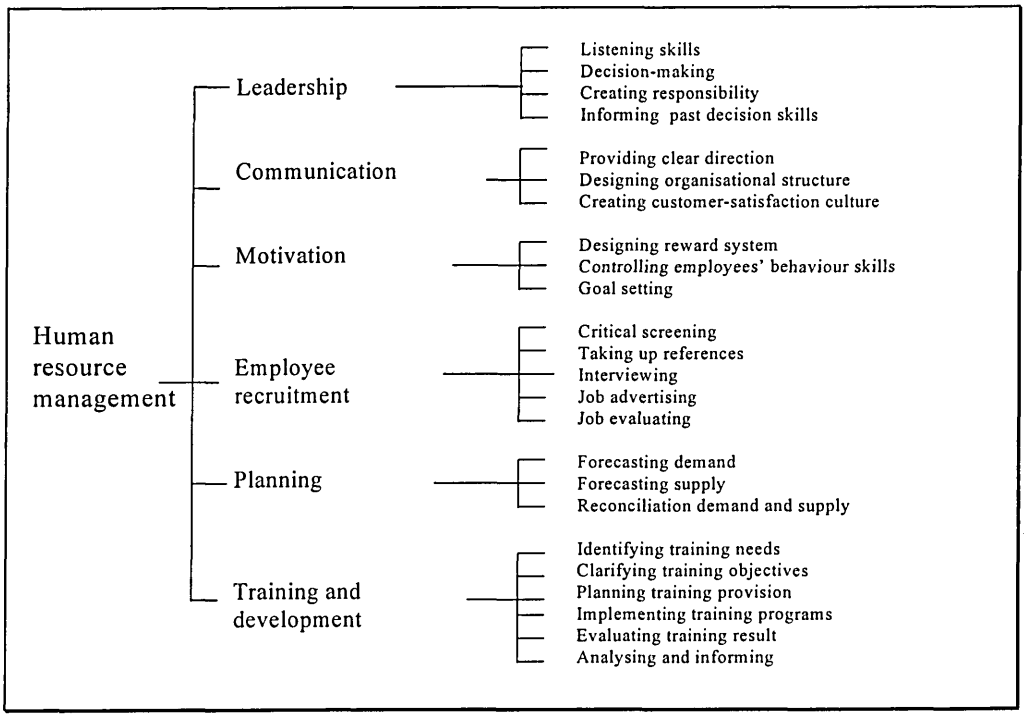
(I) Production



(II) Management accounting



(III) Human resource management



APPENDIX B

QUESTIONNAIRE FOR THE STRUCTURED INTERVIEW

1. Please compare the following performance measures in pair-wise style. For each pair of measures to be compared, first indicate which item in the pair is more important to your company and then record your judgement as to the magnitude of its importance over the other item in the pair. The response scale for magnitude of importance is as follows:

Intensity of importance	Definition	Explanation
1	Equal importance	Two criteria contribute equally to the evaluation of performance
3	Weak importance of one item over another	Experience and judgement slightly favour one criterion over another
5	Strong importance	Experience and judgement strongly favour one criterion over another
7	Very strong importance	A criterion is strongly favoured and its dominance is demonstrated in practice
9	Absolute importance	The evidence favouring one criterion over another is of the highest possible
2, 4, 6, 8	Intermediate values between the two adjacent judgements	When compromise is needed

Comparison pair	More important (which item)		Magnitude (1-9)
1. Return on capital employed Vs Sales growth	_____	by magnitude	_____
2. Return on capital employed Vs Operating profit	_____	by magnitude	_____
3. Sales growth Vs Operating profit	_____	by magnitude	_____

2. Please compare the following capabilities in pair-wise style. For each pair of capabilities to be compared, first indicate which capability in the pair is more important under each measure and then record your judgement as to the magnitude of its importance over the other item in the pair. The response scale for magnitude of importance is same to Question 1.

Comparison pair	More important (which item)		Magnitude (1-9)
(1) **To achieve operating profit**			
1. Purchasing Vs Manufacturing/processing	_____	by magnitude	_____

2. Purchasing Vs Sales and marketing _____ by magnitude _____

3. Purchasing Vs R & D _____ by magnitude _____

4. Purchasing Vs Performance management _____ by magnitude _____

5. Manufacturing/processing Vs Sales and marketing _____ by magnitude _____

6. Manufacturing/processing Vs R & D _____ by magnitude _____

7. Manufacturing/processing Vs Performance management _____ by magnitude _____

8. Sales and marketing Vs R & D _____ by magnitude _____

9. Sales and marketing Vs Performance management _____ by magnitude _____

10. R & D Vs Performance management _____ by magnitude _____

(2) **To achieve sales growth**

1. Purchasing Vs Manufacturing/processing _____ by magnitude _____

2. Purchasing Vs Sales and marketing _____ by magnitude _____

3. Purchasing Vs R & D _____ by magnitude _____

4. Purchasing Vs Performance management _____ by magnitude _____

5. Manufacturing/processing Vs Sales and marketing _____ by magnitude _____

6. Manufacturing/processing Vs R & D _____ by magnitude _____

7. Manufacturing/processing Vs Performance management _____ by magnitude _____

8. Sales and marketing Vs R & D _____ by magnitude _____

9. Sales and marketing Vs Performance management _____ by magnitude _____

10. R & D Vs Performance management _____ by magnitude _____

(3) **To achieve Return on capital employed**

1. Purchasing Vs Manufacturing/processing _____ by magnitude _____

2. Purchasing Vs Sales and marketing _____ by magnitude _____

3. Purchasing Vs R & D _____ by magnitude _____

4. Purchasing Vs Performance management _____ by magnitude _____

5. Manufacturing/processing Vs Sales and marketing _____ by magnitude _____

6. Manufacturing/processing Vs R & D _____ by magnitude _____

7. Manufacturing/processing Vs Performance management _____ by magnitude _____

8. Sales and marketing Vs R & D	_____	by magnitude	_____
9. Sales and marketing Vs Performance management	_____	by magnitude	_____
10. R & D Vs Performance management	_____	by magnitude	_____

3. Please compare the following measures in pair-wise style. For each pair to be compared, first indicate which measure is more important to your company and then record your judgement as to the magnitude of its importance over the other item in the pair. The response scale for magnitude of importance is same to Question 1.

Comparison pair	More important (which item)		Magnitude (1-9)
1. Market share Vs Customer satisfaction	_____	by magnitude	_____
2. Market share Vs New product introduction	_____	by magnitude	_____
3. Customer satisfaction Vs New product introduction	_____	by magnitude	_____

4. Please compare the following capabilities in pair-wise style. For each pair of capabilities to be compared, first indicate which capability in the pair is more important under each measure and then record your judgement as to the magnitude of its importance over the other item in the pair. The response scale for magnitude of importance is same to Question 1.

Comparison pair	More important (which item)		Magnitude (1-9)
(1) **To achieve market share**			
1. Purchasing Vs Manufacturing/processing	_____	by magnitude	_____
2. Purchasing Vs Sales and marketing	_____	by magnitude	_____
3. Purchasing Vs R & D	_____	by magnitude	_____
4. Purchasing Vs Performance management	_____	by magnitude	_____
5. Manufacturing/processing Vs Sales and marketing	_____	by magnitude	_____
6. Manufacturing/processing Vs R & D	_____	by magnitude	_____
7. Manufacturing/processing Vs Performance management	_____	by magnitude	_____
8. Sales and marketing Vs R & D	_____	by magnitude	_____
9. Sales and marketing Vs Performance management	_____	by magnitude	_____
10.R & D Vs Performance management	_____	by magnitude	_____

(2) **To achieve Customer satisfaction**

1. Purchasing Vs Manufacturing/processing	____	by magnitude	____
2. Purchasing Vs Sales and marketing	____	by magnitude	____
3. Purchasing Vs R & D	____	by magnitude	____
4. Purchasing Vs Performance management	____	by magnitude	____
5. Manufacturing/processing Vs Sales and marketing	____	by magnitude	____
6. Manufacturing/processing Vs R & D	____	by magnitude	____
7. Manufacturing/processing Vs Performance management	____	by magnitude	____
8. Sales and marketing Vs R & D	____	by magnitude	____
9. Sales and marketing Vs Performance management	____	by magnitude	____
10. R & D Vs Performance management	____	by magnitude	____

(3) **To achieve New product introduction**

1. Purchasing Vs Manufacturing/processing	____	by magnitude	____
2. Purchasing Vs Sales and marketing	____	by magnitude	____
3. Purchasing Vs R & D	____	by magnitude	____
4. Purchasing Vs Performance management	____	by magnitude	____
5. Manufacturing/processing Vs Sales and marketing	____	by magnitude	____
6. Manufacturing/processing Vs R & D	____	by magnitude	____
7. Manufacturing/processing Vs Performance management	____	by magnitude	____
8. Sales and marketing Vs R & D	____	by magnitude	____
9. Sales and marketing Vs Performance management	____	by magnitude	____
10. R & D Vs Performance management	____	by magnitude	____

5. Please indicate which **Two** of the following capabilities are more likely the key capabilities of your company.

Purchasing	Manufacturing	Sales & marketing	R & D	Performance management
☐	☐	☐	☐	☐

Others (please specify) _____

☐

6. What is the nature of the business carried out at your establishment?

Manufacturing	☐	Services	☐
Distribution	☐	Transport	☐
Retailing	☐	Agriculture	☐
Other (please specify)	_____		☐

7. Please provide the following information about you and your company.

Your name: _____ Tel: _____

Your position in the company _____

Your company name: _____

Number of employees at your company	under 100	100-199	200-499	500-999	over 1,000
	☐	☐	☐	☐	☐

Estimated sales of your company for the last financial year (£m, per annum)	under 5	5-50	50-500	over 500
	☐	☐	☐	☐

8. Please indicate whether you like to participate a further survey.

Yes	No
☐	☐

APPENDIX C

THE AHP EVALUATION RESULTS FOR COMPANIES B, C, D AND E

As mentioned in Chapter 4, the Analytic Hierarchy Process (AHP) can integrate different measures into a single overall score for ranking decision alternatives. The AHP evaluation process is divided into the following four steps (Saaty, 1994):

1. Develop a hierarchical structure of the decision problem. In a typical three-level hierarchical structure, the overall objective of the evaluation (e.g., choosing the best car) lies at the top level of the hierarchy, and the criteria (e.g., price) and decision alternatives (e.g., car manufacturers) are on each descending level of the hierarchy.
2. Determine the relative weights of criteria on pairwise basis that express their preference in relation to the overall objective.
3. Determine the relative weights of alternatives on pairwise basis that express their preference in relation to the criteria at the level above.
4. Calculate the overall weights of the alternatives.

Figures 1 and 2 present the models used for the AHP financial and non-financial evaluations for Companies B to E. The evaluation results of Companies B to E are presented in the following.

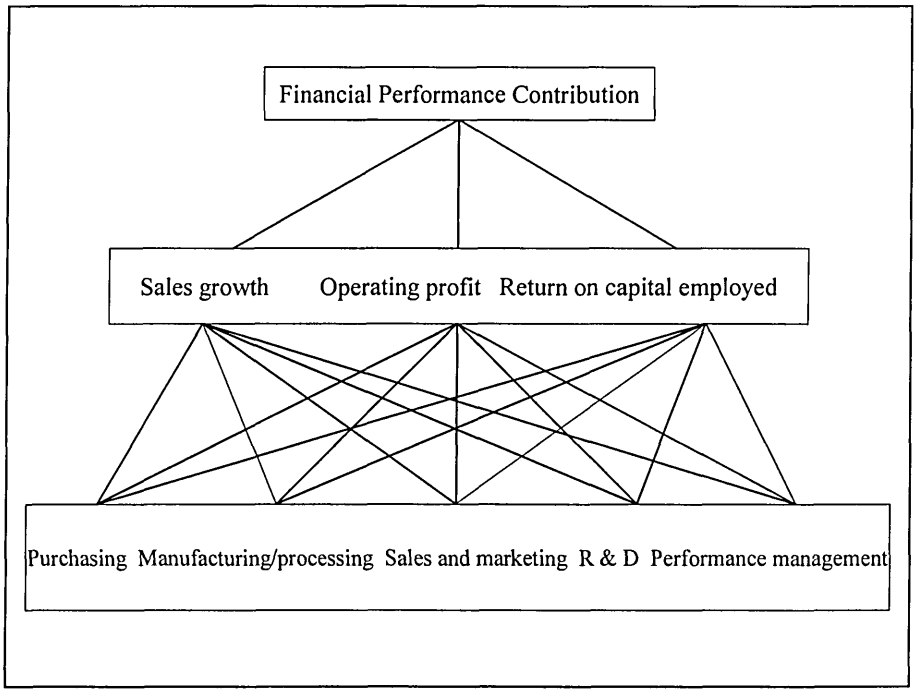


Figure 1 Financial performance evaluation model

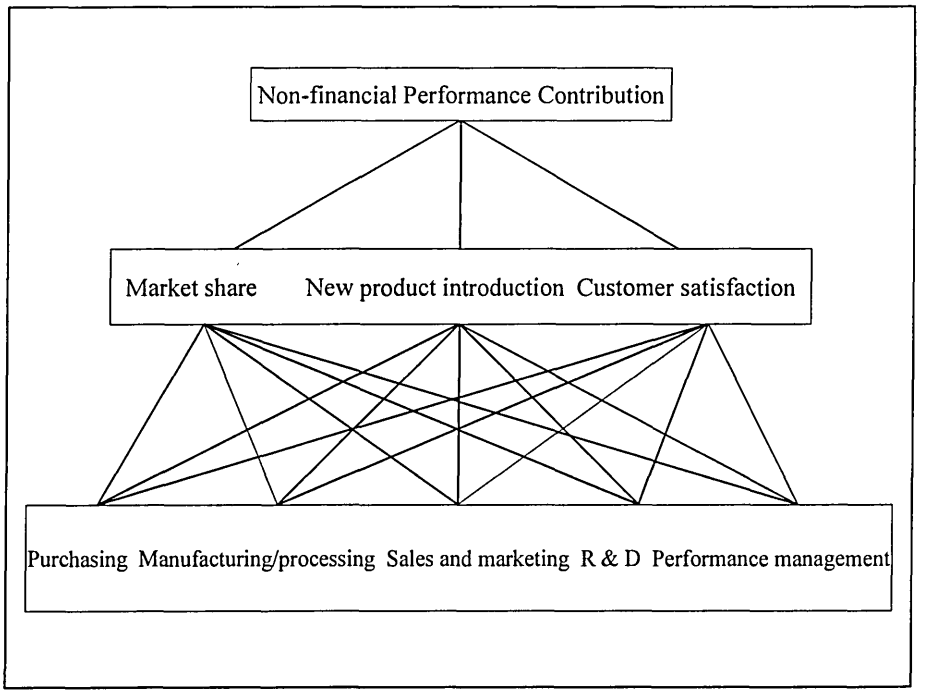


Figure 2 Non-financial performance evaluation model

(I) Company B

Company background

- Industry sector — Manufacturing
- Number of employees — Under 100
- Annual sales: — Under £5m
- Location of company: — England, UK
- Position of the participant: — General manager

The AHP financial performance evaluation

The pairwise comparisons start from the second level. The three criteria are compared pairwise with respect to the overall goal. The comparison is done using questions such as "Which criterion, sales growth or operating profit, is more important to accomplish the overall goal?" The pairwise comparisons then generate a preference matrix. Note that the element in the transpose position has the reciprocal value, i.e., aij = 1/aji. The relative weights of the criteria with respect to the goal were then calculated. Table 1 shows the pairwise comparison results and the relative weights. The inconsistency ratio is also provided to show the consistency of the comparisons.

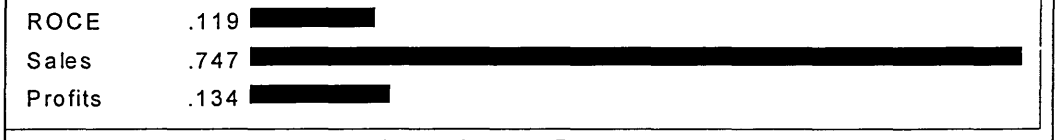
Node: 0

Compare the relative IMPORTANCE with respect to: GOAL

	Sales	Profits
ROCE	(7.0)	1.0
Sales		5.0

Row element is __ times more than column element unless enclosed in ()

Abbreviation	Definition
Goal	Financial performance
ROCE	Return on capital employed
Sales	Sales growth
Profits	Operating profits



Inconsistency Ratio =0.01

Table 1 The priority weights of financial measures for Company B

The next step is to make pairwise comparisons of each capability alternative, with respect to each of the criteria. For example, if the criterion of ROCE is considered, then the following questions are asked:

1. Which alternative, purchasing or manufacturing/processing, is more important with respect to ROCE, and by what scale (1 to 9)?
2. Which alternative, purchasing or sales and marketing, is more important with respect to ROCE, and by what scale (1 to 9)?
3. Which alternative, purchasing or R & D, is more important with respect to ROCE, and by what scale (1 to 9)?
4. Which alternative, purchasing or performance management, is more important with respect to ROCE, and by what scale (1 to 9)?
5. Which alternative, manufacturing/processing or sales and marketing, is more important with respect to ROCE, and by what scale (1 to 9)?
6. Which alternative, manufacturing/processing or R & D, is more important with respect to ROCE, and by what scale (1 to 9)?
7. Which alternative, manufacturing/processing or performance management, is more important with respect to ROCE, and by what scale (1 to 9)?
8. Which alternative, sales and marketing or R & D, is more important with respect to ROCE, and by what scale (1 to 9)?
9. Which alternative, sales and marketing or performance management, is more important with respect to ROCE, and by what scale (1 to 9)?
10. Which alternative, R & D or performance management, is more important with respect to ROCE, and by what scale (1 to 9)?

Similarly, the pairwise comparisons must be made with respect to each of the other two criteria. Then, three comparison matrices and three corresponding sets of relative

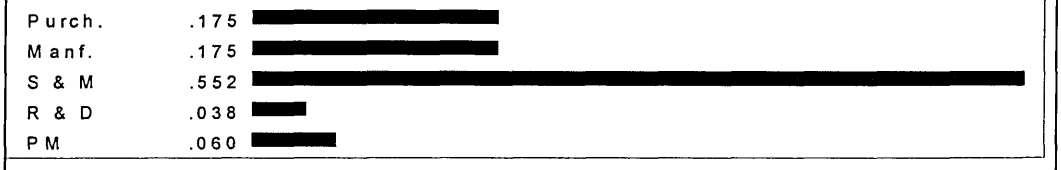
weights can be generated. Tables 2 to 4 show the pairwise comparison results with respect to the financial measures. Once all the corresponding sets of weights are obtained, the synthesised weights of the capability alternatives can be calculated. Table 5 presents the synthesis of the financial performance evaluation.

Node: 10000

Compare the relative IMPORTANCE with respect to: ROCE < GOAL

	Manf.	S & M	R & D	PM
Purch.	1.0	(5.0)	5.0	5.0
Manf.		(5.0)	5.0	5.0
S & M			7.0	7.0
R & D				(3.0)

Abbreviation	Definition
Goal	Financial performance
ROCE	Return on capital employed
Purch.	Puchasing
Manf.	Manufacturing/processing
S & M	Sales and marketing
R & D	Research and development
PM	Performance management



Inconsistency Ratio =0.09

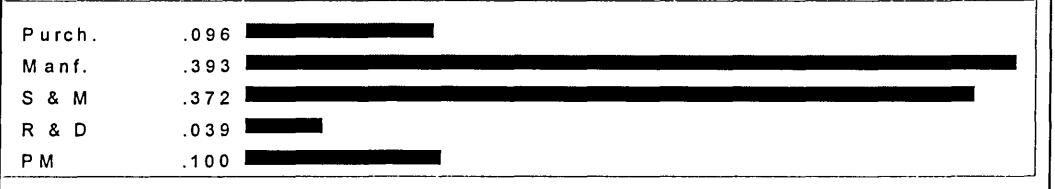
Table 2 The pairwise comparisons on ROCE for Company B

Node: 20000

Compare the relative IMPORTANCE with respect to: Sales < GOAL

	Manf.	S & M	R & D	PM
Purch.	(7.0)	(5.0)	5.0	1.0
Manf.		1.0	5.0	5.0
S & M			7.0	5.0
R & D				(5.0)

Abbreviation	Definition
Goal	Financial performance
Sales	Sales growth
Purch.	Puchasing
Manf.	Manufacturing /processing
S & M	Sales and marketing
R & D	Research and development
PM	Performance management



Inconsistency Ratio =0.09

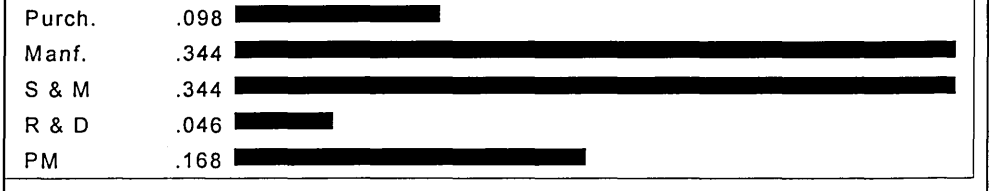
Table 3 The pairwise comparisons on sales growth for Company B

Node: 30000

Compare the relative IMPORTANCE with respect to: Profits < GOAL

	Manf.	S & M	R & D	PM
Purch.	(5.0)	(5.0)	5.0	(3.0)
Manf.		1.0	7.0	2.0
S & M			7.0	2.0
R & D				(2.0)

Abbreviation	Definition
Goal	Financial performance
Profits	Operating profits
Purch.	Puchasing
Manf.	Manufacturing/processing
S & M	Sales and marketing
R & D	Research and development
PM	Performance management



Inconsistency Ratio =0.08

Table 4 The pairwise comparisons on operating profit for Company B

Synthesis of Leaf Nodes with respect to GOAL

Ideal Mode

OVERALL INCONSISTENCY INDEX = 0.07

Abbreviation	Definition
S & M	Sales and marketing
Manf.	Manufacturing /processing
PM	Performance management
Purch.	Puchasing
R & D	Research and development

Table 5 The synthesis of the financial evaluation for Company B

The AHP non-financial performance evaluation

A similar procedure to that of financial performance evaluation is used to obtain the relative weights of criteria, the pairwise comparison, and the synthesis results with respect to the non-financial performance measures. Tables 6 to 10 show the evaluation results.

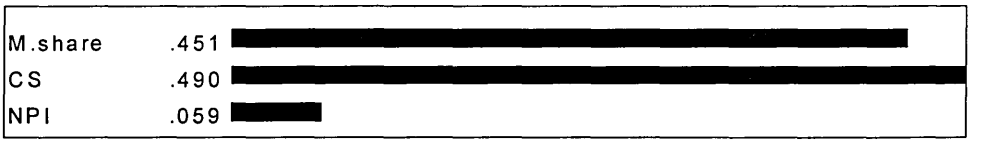
Node: 0

Compare the relative IMPORTANCE with respect to: GOAL

	CS	NPI
M.share	1.0	7.0
CS		9.0

Row element is __ times more than column element unless enclosed in ()

Abbreviation	Definition
Goal	Operational performance
M.share	Market share
CS	Customer satisfaction
NPI	New product introduction



Inconsistency Ratio =0.01

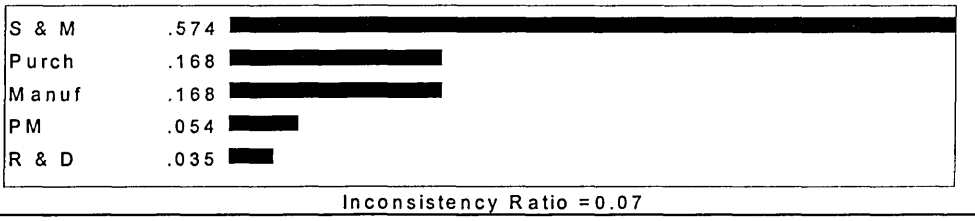
Table 6 The priority weights of non-financial measures for Company B

Node: 10000

Compare the relative IMPORTANCE with respect to: M.share < GOAL

	Purch	Manuf	PM	R & D
S & M	5.0	5.0	9.0	9.0
Purch		1.0	5.0	5.0
Manuf			5.0	5.0
PM				3.0

Abbreviation	Definition
Goal	Operational performance
M.share	Market share
S & M	Sales and marketing
Purch	Purchasing
Manuf	Manufacturing/processing
PM	Performacne management
R & D	Research and development



Inconsistency Ratio =0.07

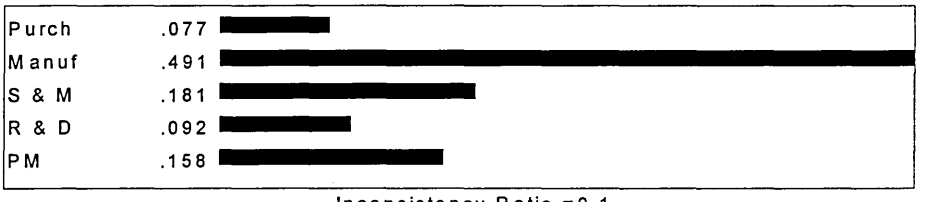
Table 7 The pairwise comparisons on market share for Company B

Node: 20000

Compare the relative IMPORTANCE with respect to: CS < GOAL

	Manuf	S & M	R & D	PM
Purch	(9.0)	(5.0)	1.0	1.0
Manuf		3.0	5.0	3.0
S & M			1.0	1.0
R & D				(3.0)

Abbreviation	Definition
Goal	Operational performance
CS	Customer satisfaction
Purch	Purchasing
Manuf	Manufacturing/processing
S & M	Sales and marketing
R & D	Research and development
PM	Performacne management



Inconsistency Ratio =0.1

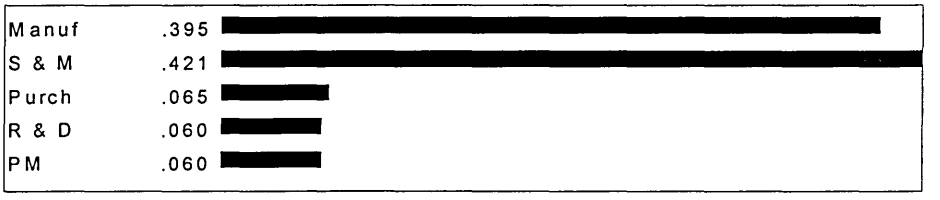
Table 8 The pairwise comparisons on customer satisfaction for Company B

Node: 30000

Compare the relative IMPORTANCE with respect to: NPI < GOAL

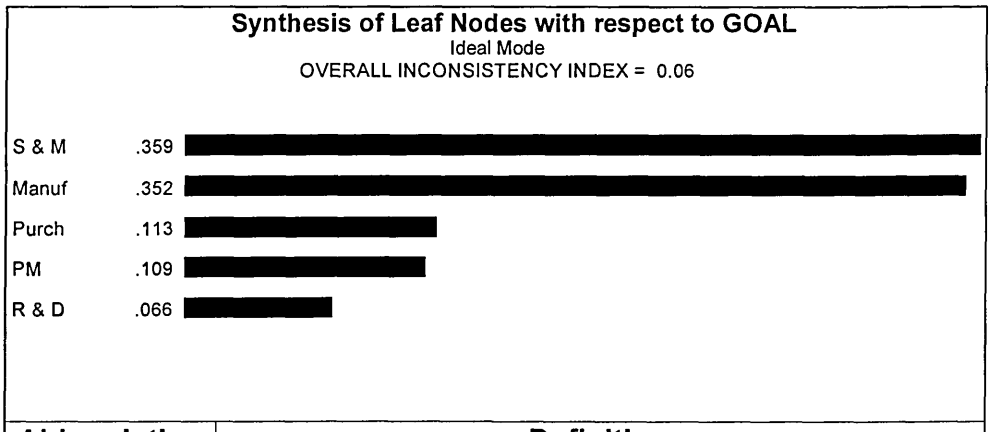
	S & M	Purch	R & D	PM
Manuf	1.0	5.0	7.0	7.0
S & M		7.0	7.0	7.0
Purch			1.0	1.0
R & D				1.0

Abbreviation	Definition
Goal	Operational performance
NPI	New product introduction
Manuf	Manufacturing /processing
S & M	Sales and marketing
Purch	Purchasing
R & D	Research and development
PM	Performacne management



Inconsistency Ratio =0.0

Table 9 The pairwise comparisons on new product introduction for Company B



Abbreviation	Definition
S & M	Sales and marketing
Manuf	Manufacturing /processing
Purch	Purchasing
PM	Performacne management
R & D	Research and development

Table 10 The synthesis of the non-financial evaluation for Company B

In order to determine key capabilities, the evaluation results from the two AHP models are plotted in the two-dimension matrix as shown in Figure 4.4 of Section 4.3.3. Figure 3 shows the positions plotted for the capability alternatives

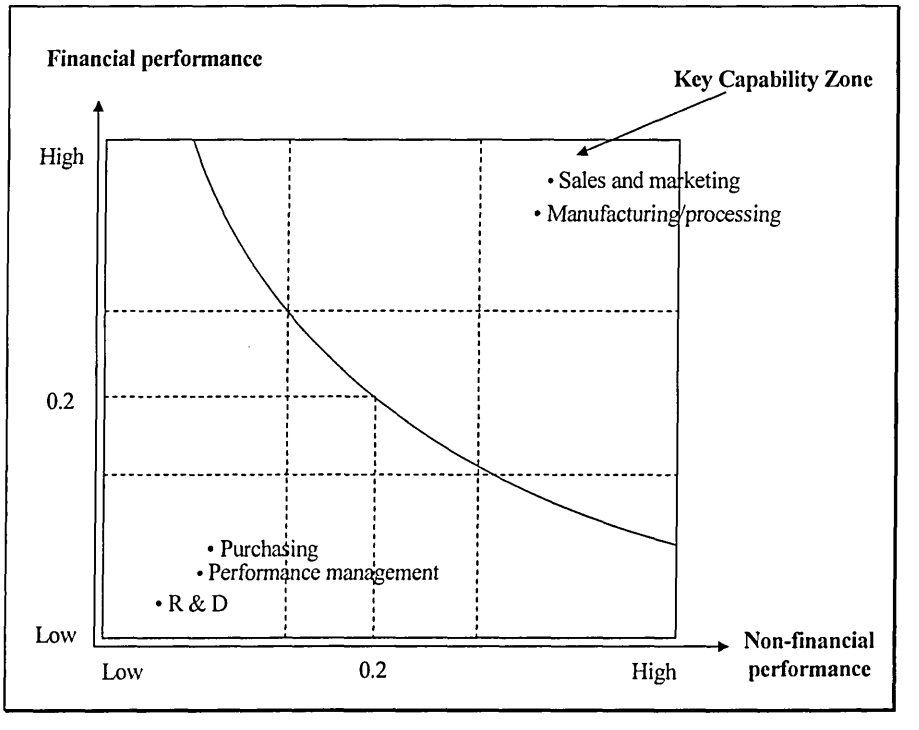


Figure 3 Determination of key capabilities for Company B

The key capabilities identified by the model

1. Manufacturing/processing
2. Sales and marketing

The key capabilities perceived by the company

1. Manufacturing/processing
2. Sales and marketing

Using the same procedures, the key capabilities are identified for Companies C to E. The AHP evaluation results and the identified key capabilities are presented in the following.

(II) Company C

Company background

- Industry sector Manufacturing
- Number of employees 100-199
- Annual sales: £5-50m
- Location of company: England, UK
- Position of the participant: Quality manager

The AHP financial performance evaluation

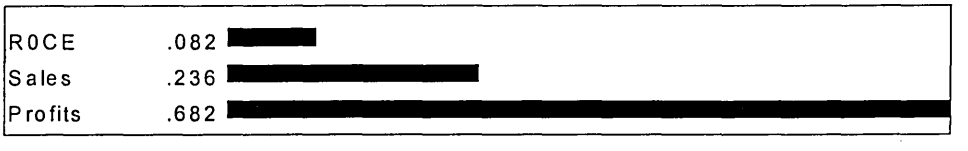
Node: 0

Compare the relative IMPORTANCE with respect to: GOAL

	Sales	Profits
ROCE	(4.0)	(6.0)
Sales		(4.0)

Row element is __ times more than column element unless enclosed in ()

Abbreviation	Definition
Goal	Financial performance
ROCE	Return on capital employed
Sales	Sales growth
Profits	Operating profits



Inconsistency Ratio =0.1

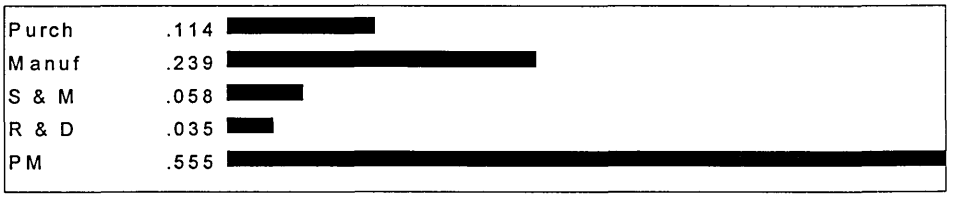
Table 11 The priority weights of financial measures for Company C

Node: 10000

Compare the relative PREFERENCE with respect to: ROCE < GOAL

	Manuf	S & M	R & D	PM
Purch	(3.0)	3.0	3.0	(4.0)
Manuf		6.0	7.0	(5.0)
S & M			3.0	(8.0)
R & D				(9.0)

Abbreviation	Definition
Goal	Financial performance
ROCE	Return on capital employed
Purch	Purchasing
Manuf	Manufacturing/processing
S & M	Sales and marketing
R & D	Research and development
PM	Performance management



Inconsistency Ratio =0.08

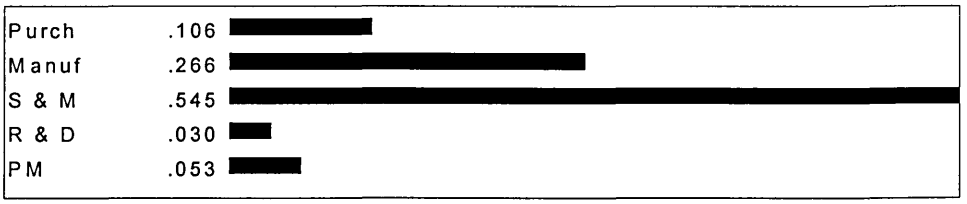
Table 12 The pairwise comparisons on ROCE for Company C

Node: 20000

Compare the relative PREFERENCE with respect to: Sales < GOAL

	Manuf	S & M	R & D	PM
Purch	(4.0)	(6.0)	5.0	3.0
Manuf		(4.0)	8.0	7.0
S & M			9.0	8.0
R & D				(3.0)

Abbreviation	Definition
Goal	Financial performance
Sales	Sales growth
Purch	Purchasing
Manuf	Manufacturing /processing
S & M	Sales and marketing
R & D	Research and development
PM	Performance management



Inconsistency Ratio =0.09

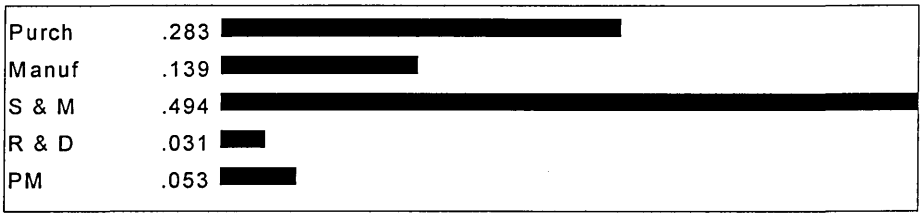
Table 13 The pairwise comparisons on sales growth for Company C

Node: 30000

Compare the relative PREFERENCE with respect to: Profits < GOAL

	Manuf	S & M	R & D	PM
Purch	4.0	(3.0)	7.0	6.0
Manuf		(5.0)	6.0	5.0
S & M			9.0	7.0
R & D				(3.0)

Abbreviation	Definition
Goal	Financial performance
Profits	Operating profits
Purch	Purchasing
Manuf	Manufacturing /processing
S & M	Sales and marketing
R & D	Research and development
PM	Performance management



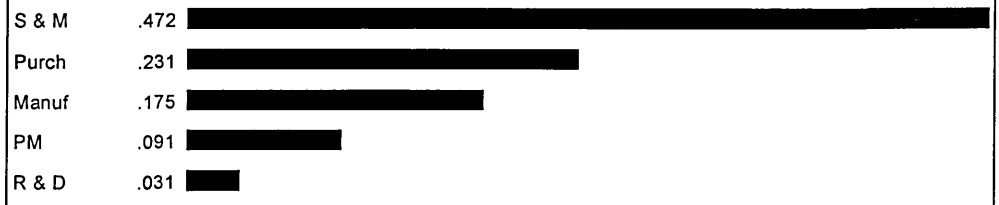
Inconsistency Ratio =0.1

Table 14 The pairwise comparisons on operating profit for Company C

Synthesis of Leaf Nodes with respect to GOAL

Ideal Mode

OVERALL INCONSISTENCY INDEX = 0.1



Abbreviation	Definition
S & M	Sales and marketing
Purch	Purchasing
Manuf	Manufacturing /processing
PM	Performance management
R & D	Research and development

Table 15 The synthesis of the financial evaluation for Company C

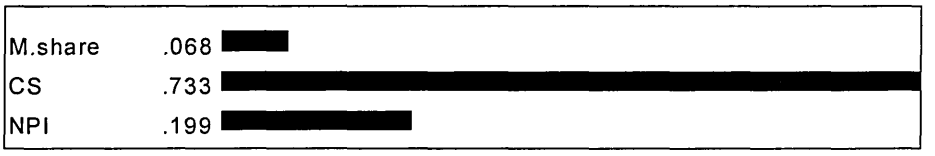
Node: 0

Compare the relative IMPORTANCE with respect to: GOAL

	CS	NPI
M.share	(8.0)	(4.0)
CS		5.0

Row element is __ times more than column element unless enclosed in ()

Abbreviation	Definition
Goal	Operational performance
M.share	Market share
CS	Customer satisfaction
NPI	New product introduction



Inconsistency Ratio =0.09

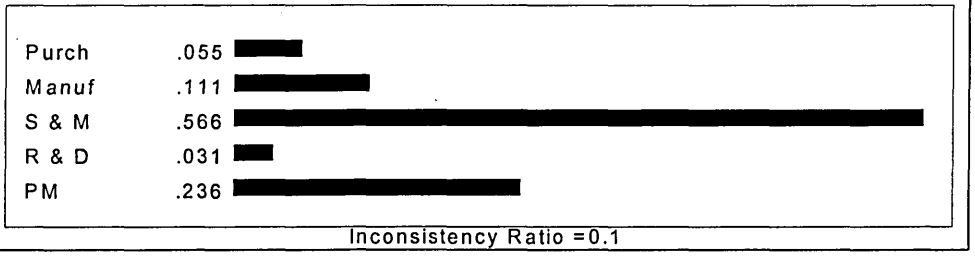
Table 16 The priority weights of non-financial measures for Company C

Node: 10000

Compare the relative PREFERENCE with respect to: M.share < GOAL

	Manuf	S & M	R & D	PM
Purch	(3.0)	(7.0)	3.0	(7.0)
Manuf		(6.0)	5.0	(3.0)
S & M			9.0	5.0
R & D				(7.0)

Abbreviation	Definition
Goal	Operational performance
M.share	Market share
Purch	Purchasing
Manuf	Manufacturing /processing
S & M	Sales and marketing
R & D	Research and development
PM	Performance management



Inconsistency Ratio =0.1

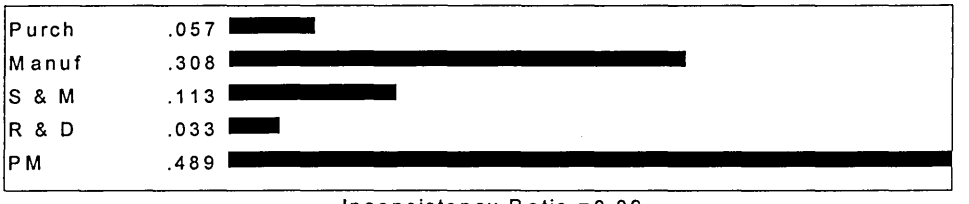
Table 17 The pairwise comparisons on market share for Company C

Node: 20000

Compare the relative PREFERENCE with respect to: CS < GOAL

	Manuf	S & M	R & D	PM
Purch	(7.0)	(3.0)	3.0	(7.0)
Manuf		5.0	7.0	(3.0)
S & M			5.0	(5.0)
R & D				(8.0)

Abbreviation	Definition
Goal	Operational performance
CS	Customer satisfaction
Purch	Purchasing
Manuf	Manufacturing/processing
S & M	Sales and marketing
R & D	Research and development
PM	Performance management



Inconsistency Ratio =0.09

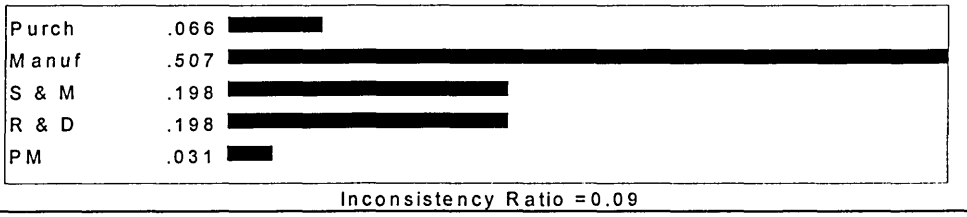
Table 18 The pairwise comparisons on customer satisfaction for Company C

Node: 30000

Compare the relative PREFERENCE with respect to: NPI < GOAL

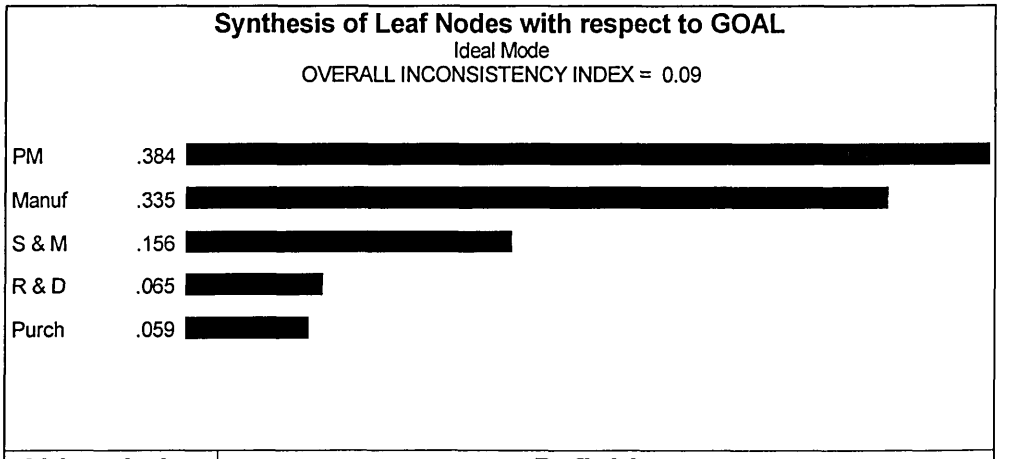
	Manuf	S & M	R & D	PM
Purch	(6.0)	(5.0)	(5.0)	4.0
Manuf		4.0	4.0	8.0
S & M			1.0	7.0
R & D				7.0

Abbreviation	Definition
Goal	Operational performance
NPI	New product introduction
Purch	Purchasing
Manuf	Manufacturing /processing
S & M	Sales and marketing
R & D	Research and development
PM	Performance management



Inconsistency Ratio =0.09

Table 19 The pairwise comparisons on new product introduction for Company C



Abbreviation	Definition
PM	Performance management
Manuf	Manufacturing /processing
S & M	Sales and marketing
R & D	Research and development
Purch	Purchasing

Table 20 The synthesis of the non-financial evaluation for Company C

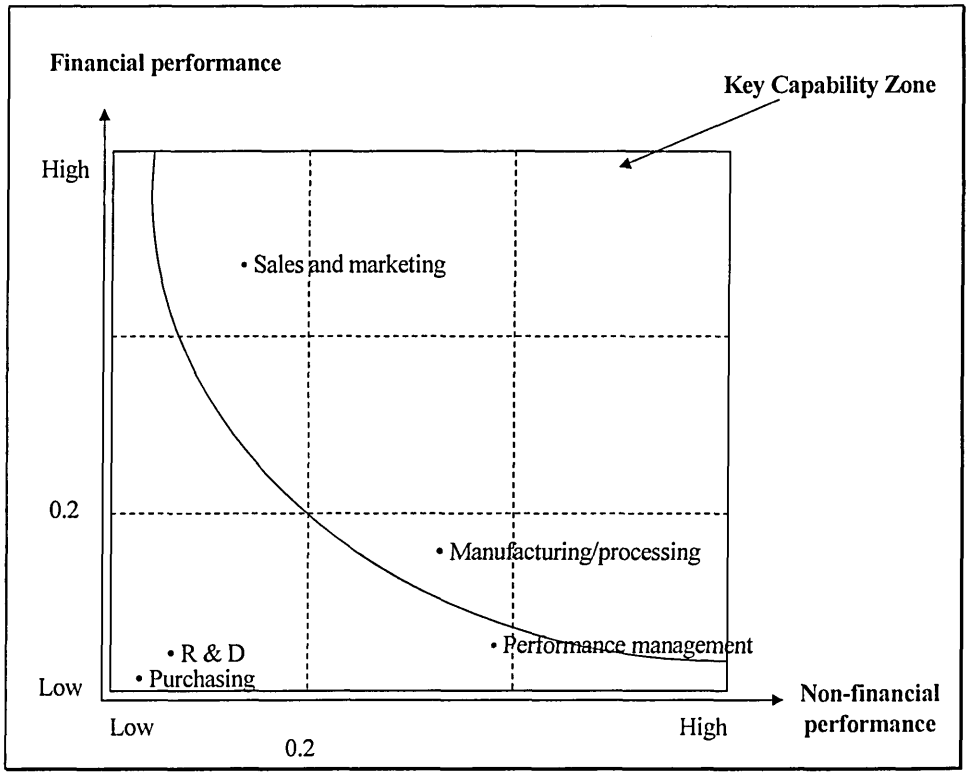


Figure 4 Determination of key capabilities for Company C

The key capabilities identified by the model

1. Sales and marketing
2. Manufacturing/processing

The key capabilities perceived by the company

1. Sales and marketing
2. Manufacturing/processing

(III) Company D

Company background

- Industry sector — Services
- Number of employees — Under 100
- Annual sales: — £5-50m
- Location of company: — England, UK
- Position of the participant: — Managing Director

The AHP financial performance evaluation

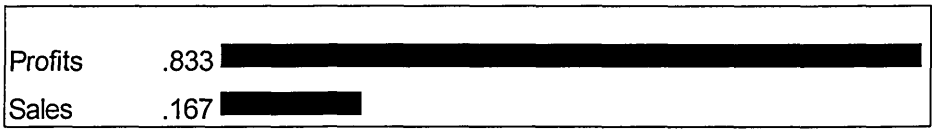
Node: 0

Compare the relative IMPORTANCE with respect to: GOAL

	Sales
Profits	5.0

Row element is __ times more than column element unless enclosed in ()

Abbreviation	Definition
Goal	Financial performance
Profits	Operating profits
Sales	Sales growth



Inconsistency Ratio =0.0

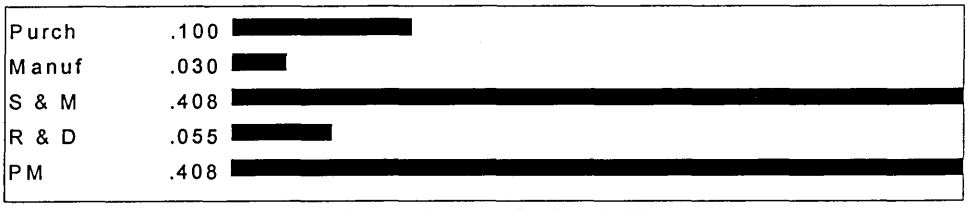
Table 21 The priority weights of financial measures for Company D

Node: 10000

Compare the relative PREFERENCE with respect to: Profits < GOAL

	Manuf	S & M	R & D	PM
Purch	5.0	(7.0)	3.0	(7.0)
Manuf		(9.0)	(3.0)	(9.0)
S & M			7.0	1.0
R & D				(7.0)

Abbreviation	Definition
Goal	Financial performance
Profits	Operating profits
Purch	Purchasing
Manuf	Manufacturing/processing
S & M	Sales and marketing
R & D	Research and development
PM	Performance management



Inconsistency Ratio =0.07

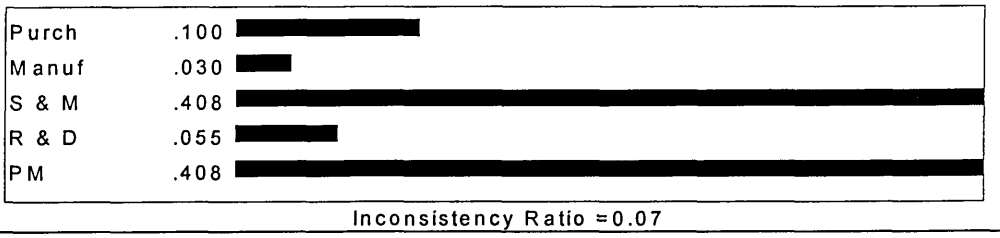
Table 22 The pairwise comparisons on operating profits for Company D

Node: 20000

Compare the relative PREFERENCE with respect to: Sales < GOAL

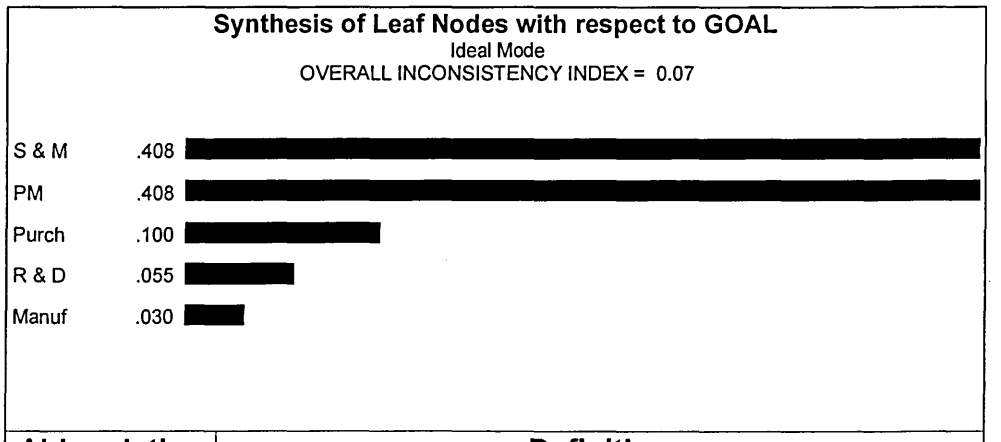
	Manuf	S & M	R & D	PM
Purch	5.0	(7.0)	3.0	(7.0)
Manuf		(9.0)	(3.0)	(9.0)
S & M			7.0	1.0
R & D				(7.0)

Abbreviation	Definition
Goal	Financial performance
Sales	Sales growth
Purch	Purchasing
Manuf	Manufacturing /processing
S & M	Sales and marketing
R & D	Research and development
PM	Performance management



Inconsistency Ratio =0.07

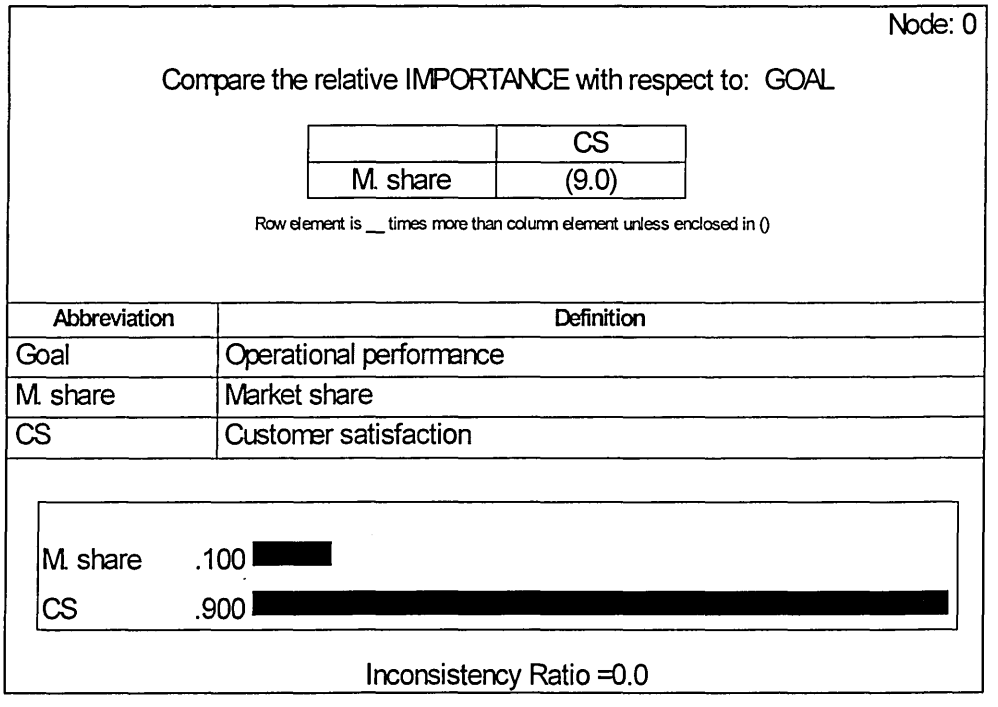
Table 23 The pairwise comparisons on sales growth for Company D



Abbreviation	Definition
S & M	Sales and marketing
PM	Performance management
Purch	Purchasing
R & D	Research and development
Manuf	Manufacturing /processing

Table 24 The synthesis of the financial evaluation for Company D

The AHP non-financial performance evaluation



Abbreviation	Definition
Goal	Operational performance
M. share	Market share
CS	Customer satisfaction

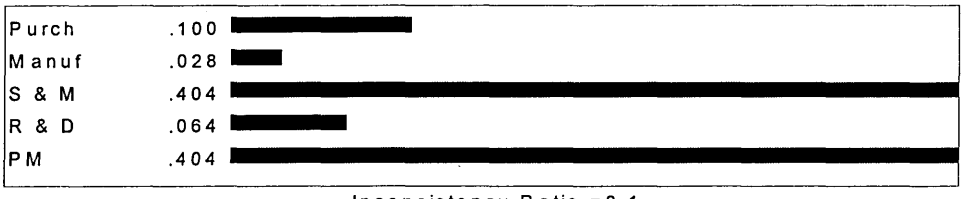
Table 25 The priority weights of non-financial measures for Company D

Node: 10000

Compare the relative PREFERENCE with respect to: M. share < GOAL

	Manuf	S & M	R & D	PM
Purch	5.0	(7.0)	3.0	(7.0)
Manuf		(9.0)	(5.0)	(9.0)
S & M			7.0	1.0
R & D				(7.0)

Abbreviation	Definition
Goal	Operational performance
M. share	Market share
Purch	Purchasing
Manuf	Manufacturing /processing
S & M	Sales and marketing
R & D	Research and development
PM	Performance management



Inconsistency Ratio =0.1

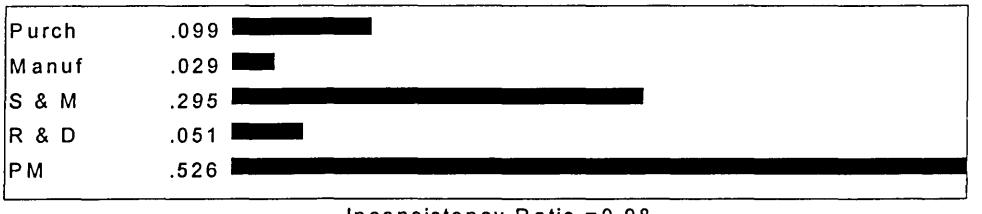
Table 26 The pairwise comparisons on market share for Company D

Node: 20000

Compare the relative PREFERENCE with respect to: CS < GOAL

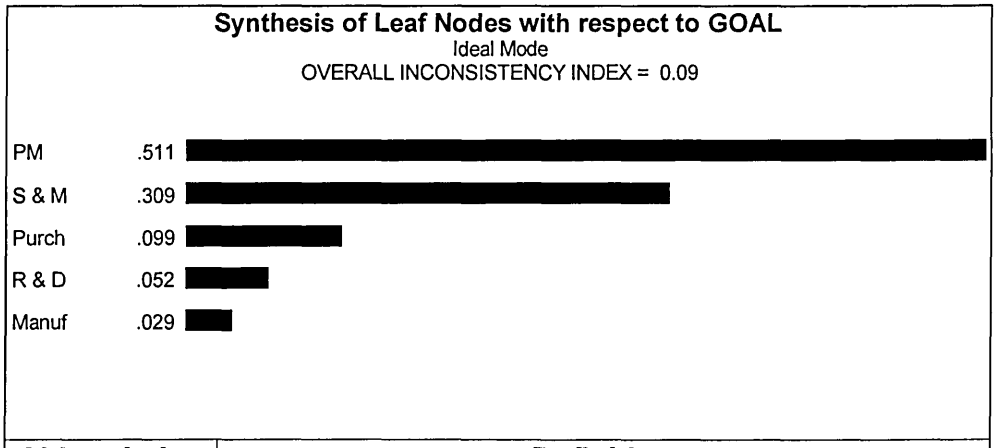
	Manuf	S & M	R & D	PM
Purch	5.0	(5.0)	3.0	(7.0)
Manuf		(9.0)	(3.0)	(9.0)
S & M			7.0	(3.0)
R & D				(9.0)

Abbreviation	Definition
Goal	Operational performance
CS	Customer satisfaction
Purch	Purchasing
Manuf	Manufacturing/processing
S & M	Sales and marketing
R & D	Research and development
PM	Performance management



Inconsistency Ratio =0.08

Table 27 The pairwise comparisons on customer satisfaction for Company D



Abbreviation	Definition
PM	Performance management
S & M	Sales and marketing
Purch	Purchasing
R & D	Research and development
Manuf	Manufacturing /processing

Table 28 The synthesis of the non-financial evaluation for Company D

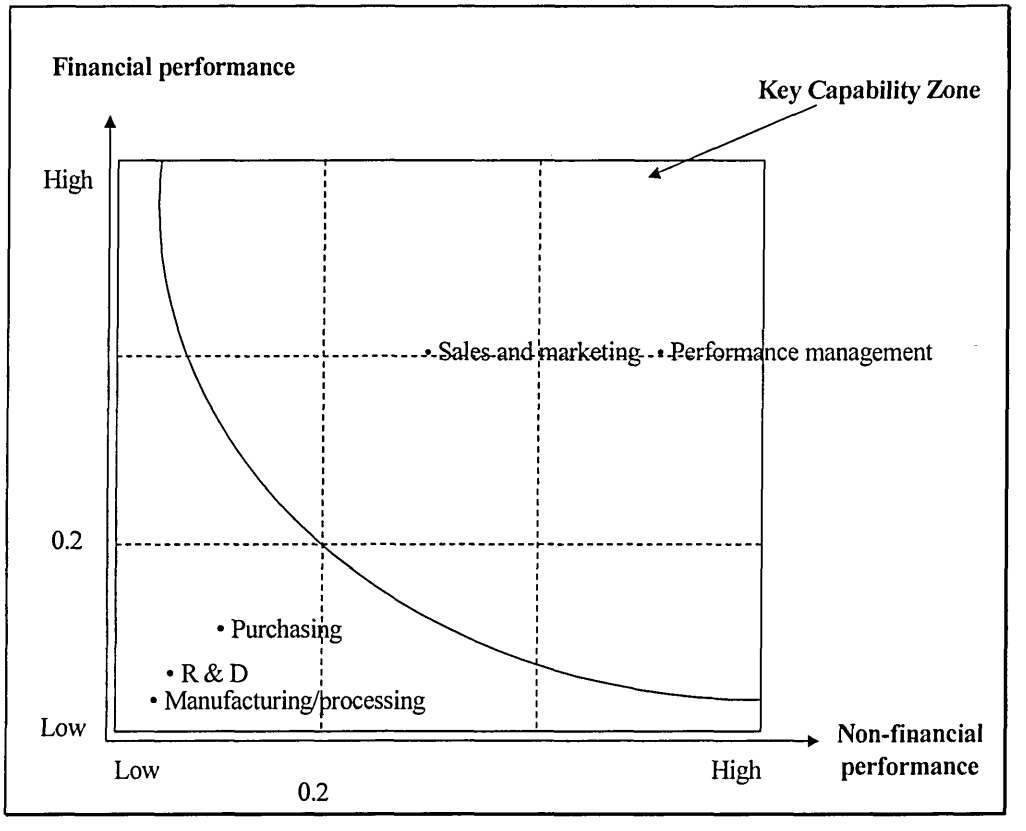


Figure 5 Determination of key capabilities for Company D

The key capabilities identified by the model

1. Sales and marketing
2. Performance management

The key capabilities perceived by the company

1. Sales and marketing
2. Performance management

(IV) Company E

Company background

- Industry sector — Services
- Number of employees — Over 1,000
- Annual sales: — Over £500m
- Location of company: — England, UK
- Position of the participant: — Senior manager

The AHP financial performance evaluation

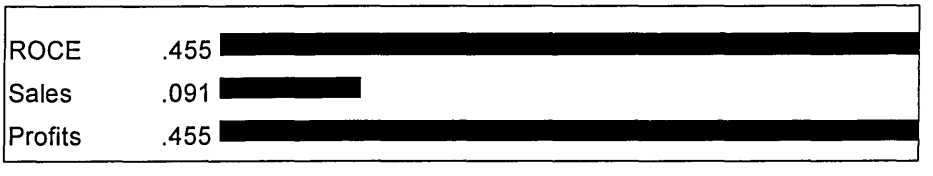
Node: 0

Compare the relative IMPORTANCE with respect to: GOAL

	Sales	Profits
ROCE	5.0	1.0
Sales		(5.0)

Row element is __ times more than column element unless

Abbreviation	Definition
Goal	Financial performance
ROCE	Return on capital employed
Sales	Sales growth
Profits	Operating profits



Inconsistency Ratio =0.0

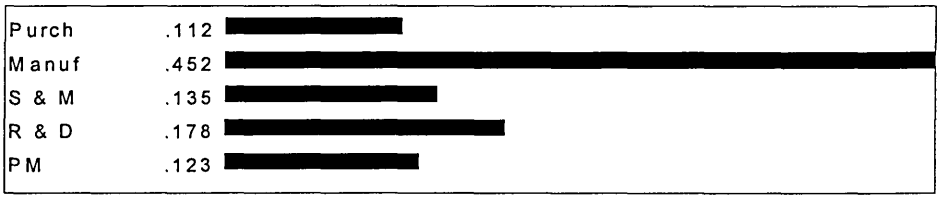
Table 29 The priority weights of financial measures for Company E

Node: 10000

Compare the relative PREFERENCE with respect to: ROCE < GOAL

	Manuf	S & M	R & D	PM
Purch	(3.0)	1.0	(3.0)	1.0
Manuf		3.0	3.0	5.0
S & M			1.0	1.0
R & D				1.0

Abbreviation	Definition
Goal	Financial performance
ROCE	Return on capital employed
Purch	Purchasing
Manuf	Manufacturing/processing
S & M	Sales and marketing
R & D	Research and development
PM	Performance management



Inconsistency Ratio =0.04

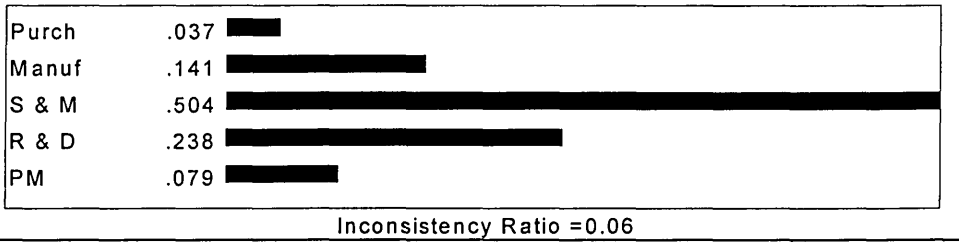
Table 30 The pairwise comparisons on ROCE for Company E

Node: 20000

Compare the relative PREFERENCE with respect to: Sales < GOAL

	Manuf	S & M	R & D	PM
Purch	(5.0)	(9.0)	(5.0)	(3.0)
Manuf		(5.0)	(3.0)	3.0
S & M			3.0	5.0
R & D				3.0

Abbreviation	Definition
Goal	Financial performance
Sales	Sales growth
Purch	Purchasing
Manuf	Manufacturing /processing
S & M	Sales and marketing
R & D	Research and development
PM	Performance management



Inconsistency Ratio =0.06

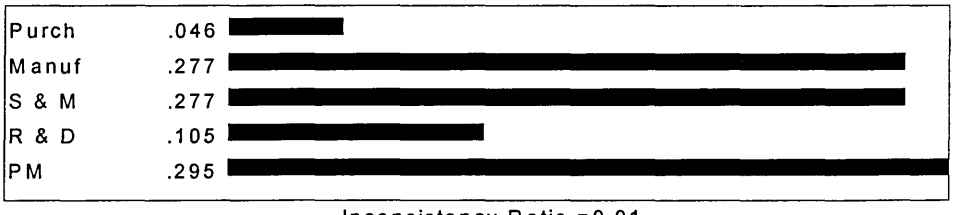
Table 31 The pairwise comparisons on sales growth for Company E

Node: 30000

Compare the relative PREFERENCE with respect to: Profits < GOAL

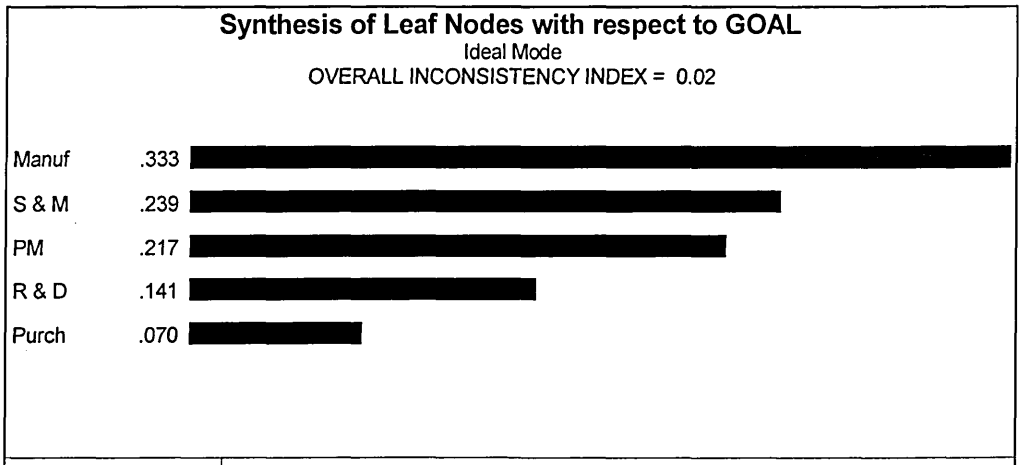
	Manuf	S & M	R & D	PM
Purch	(5.0)	(5.0)	(3.0)	(7.0)
Manuf		1.0	3.0	1.0
S & M			3.0	1.0
R & D				(3.0)

Abbreviation	Definition
Goal	Financial performance
Profits	Operating profits
Purch	Purchasing
Manuf	Manufacturing/processing
S & M	Sales and marketing
R & D	Research and development
PM	Performance management



Inconsistency Ratio =0.01

Table 32 The pairwise comparisons on operating profit for Company E



Abbreviation	Definition
Manuf	Manufacturing/processing
S & M	Sales and marketing
PM	Performance management
R & D	Research and development
Purch	Purchasing

Table 33 The synthesis of the financial evaluation for Company E

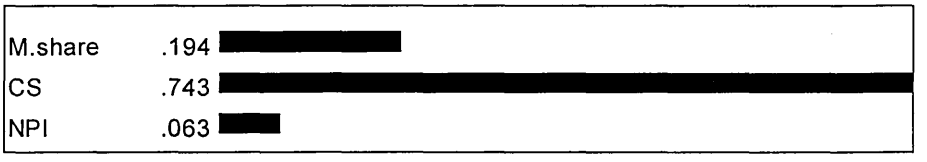
Node: 0

Compare the relative IMPORTANCE with respect to: GOAL

	CS	NPI
M.share	(5.0)	4.0
CS		9.0

Row element is __ times more than column element unless enclosed in ()

Abbreviation	Definition
Goal	Operational performance
M.share	Market share
CS	Customer satisfaction
NPI	New product introduction



Inconsistency Ratio =0.07

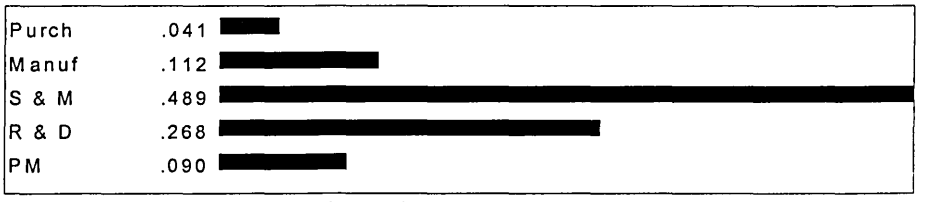
Table 34 The priority weights of non-financial measures for Company E

Node: 10000

Compare the relative PREFERENCE with respect to: M.share < GOAL

	Manuf	S & M	R & D	PM
Purch	(5.0)	(7.0)	(5.0)	(3.0)
Manuf		(5.0)	(3.0)	1.0
S & M			3.0	5.0
R & D				5.0

Abbreviation	Definition
Goal	Operational performance
M.share	Market share
Purch	Purchasing
Manuf	Manufacturing/processing
S & M	Sales and marketing
R & D	Research and development
PM	Performance management



Inconsistency Ratio =0.07

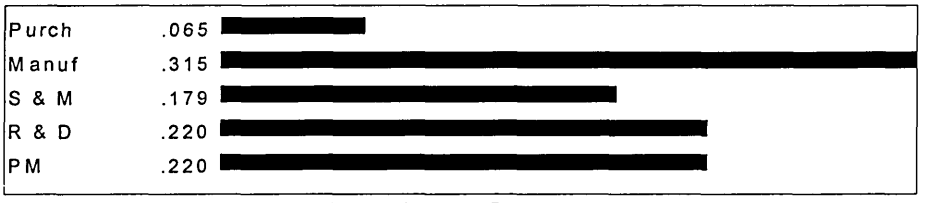
Table 35 The pairwise comparisons on market share for Company E

Node: 20000

Compare the relative PREFERENCE with respect to: CS < GOAL

	Manuf	S & M	R & D	PM
Purch	(5.0)	(3.0)	(3.0)	(3.0)
Manuf		3.0	1.0	1.0
S & M			1.0	1.0
R & D				1.0

Abbreviation	Definition
Goal	Operational performance
CS	Customer satisfaction
Purch	Purchasing
Manuf	Manufacturing/processing
S & M	Sales and marketing
R & D	Research and development
PM	Performance management



Inconsistency Ratio =0.03

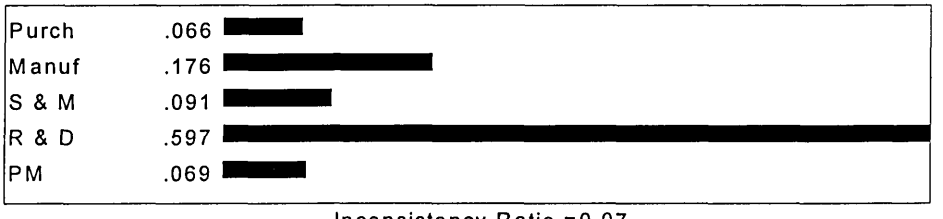
Table 36 The pairwise comparisons on customer satisfaction for Company E

Node: 30000

Compare the relative PREFERENCE with respect to: NPI < GOAL

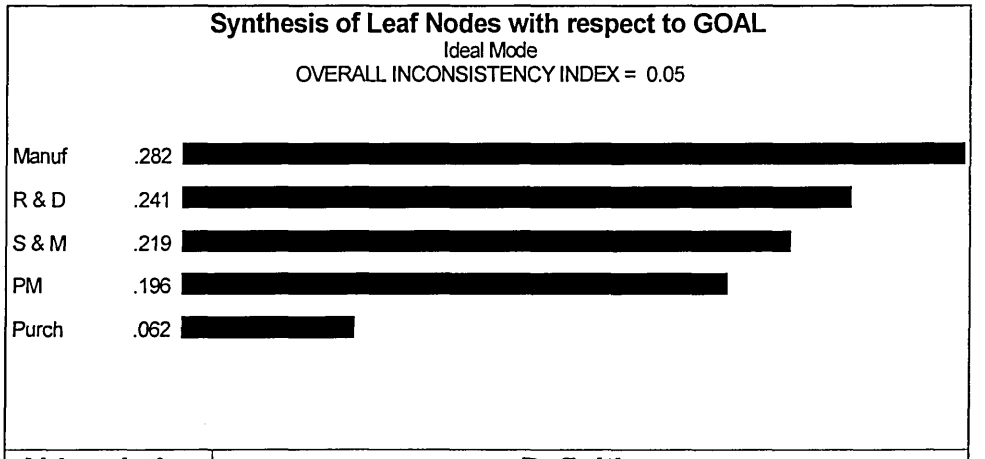
	Manuf	S & M	R & D	PM
Purch	(3.0)	1.0	(9.0)	1.0
Manuf		3.0	(7.0)	3.0
S & M			(3.0)	1.0
R & D				7.0

Abbreviation	Definition
Goal	Operational performance
NPI	New product introduction
Purch	Purchasing
Manuf	Manufacturing/processing
S & M	Sales and marketing
R & D	Research and development
PM	Performance management



Inconsistency Ratio =0.07

Table 37 The pairwise comparisons on new product introduction for Company E



Abbreviation	Definition
Manuf	Manufacturing/processing
R & D	Research and development
S & M	Sales and marketing
PM	Performance management
Purch	Purchasing

Table 38 The synthesis of the non-financial evaluation for Company E

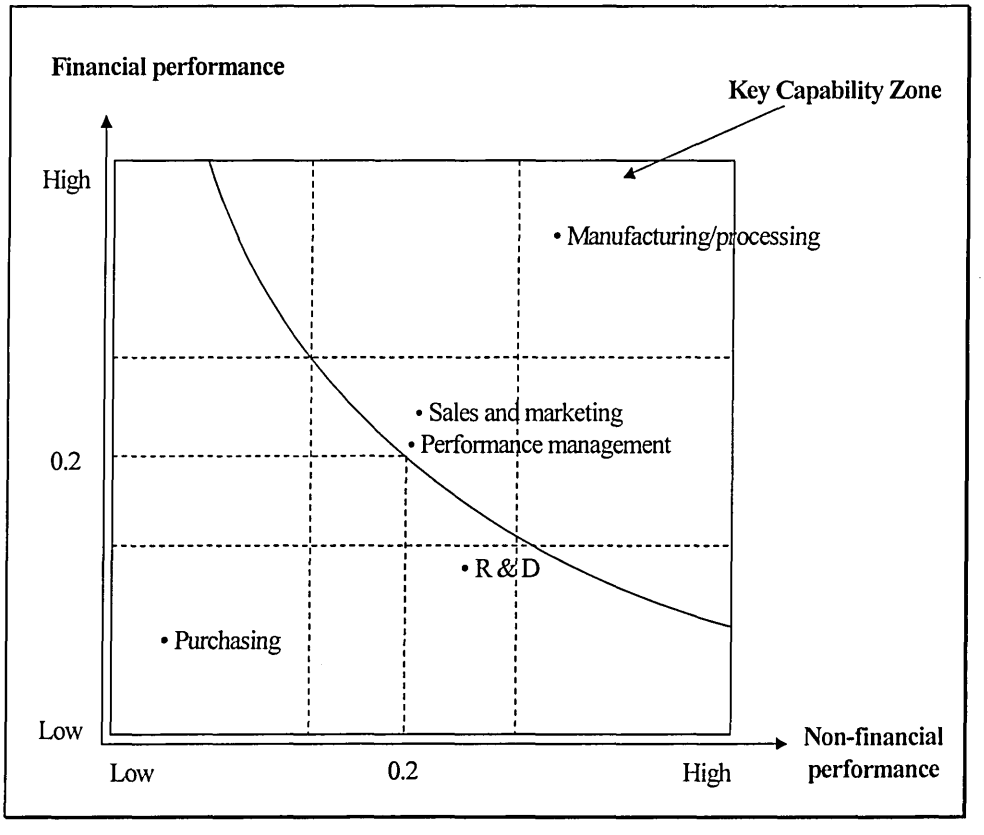


Figure 6 Determination of key capabilities for Company E

The key capabilities identified by the model

1. Manufacturing/processing
2. Sales and marketing
3. Performance management

The key capabilities perceived by the company

1. Manufacturing/processing
2. Sales and marketing
3. Performance management

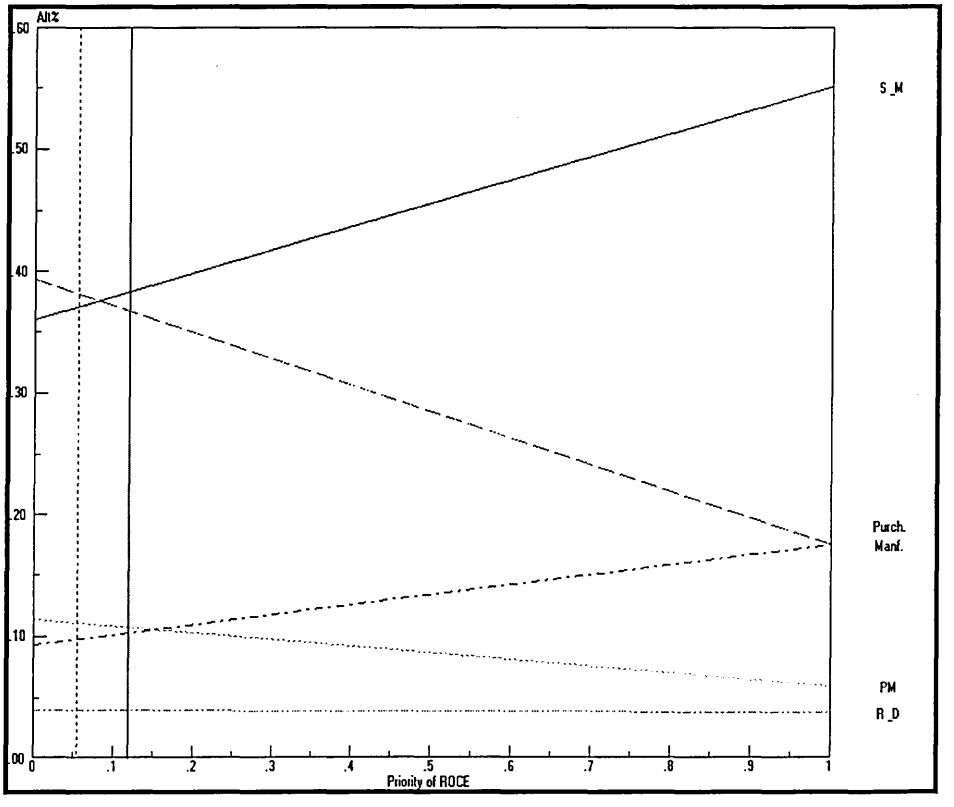
APPENDIX D

THE SENSITIVITY ANALYSIS RESULTS OF COMPANIES B TO E

(I) Company B

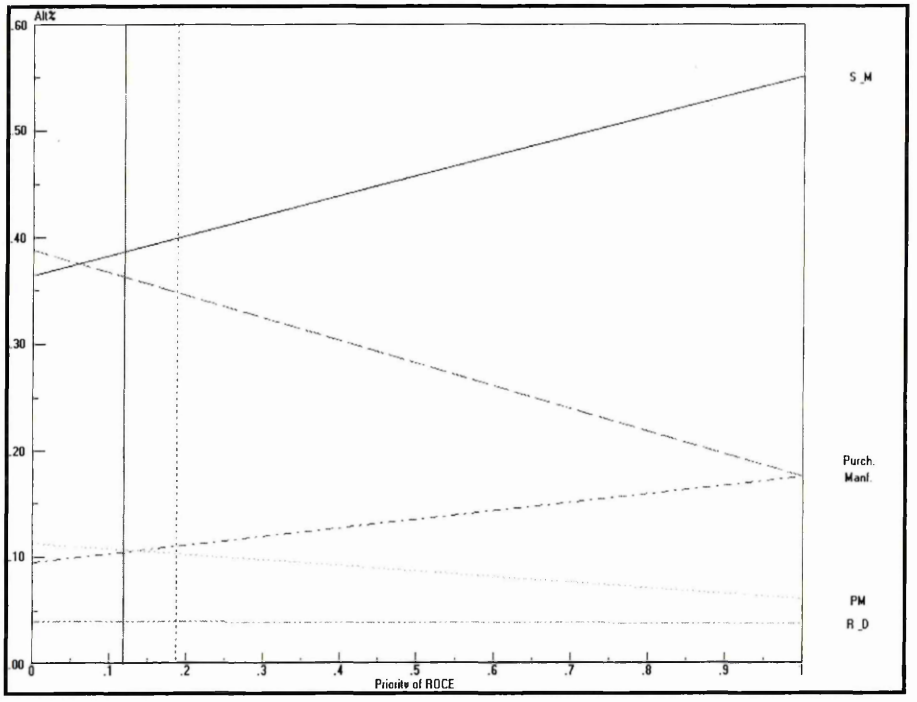
(A) The Financial Performance Evaluation

- - 50% Change of the Priority Weight of ROCE

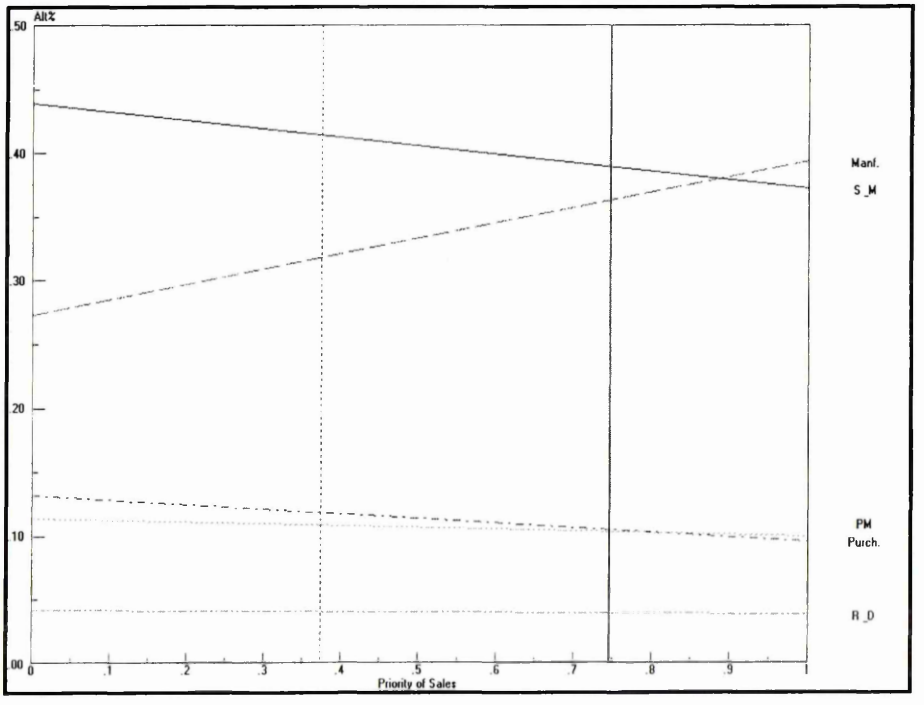


Note: in this Appendix, the key is used as the following:
Purch = purchasing;
Manf = manufacturing
S - M = sales and marketing
R - D = R & D
PM = performance management

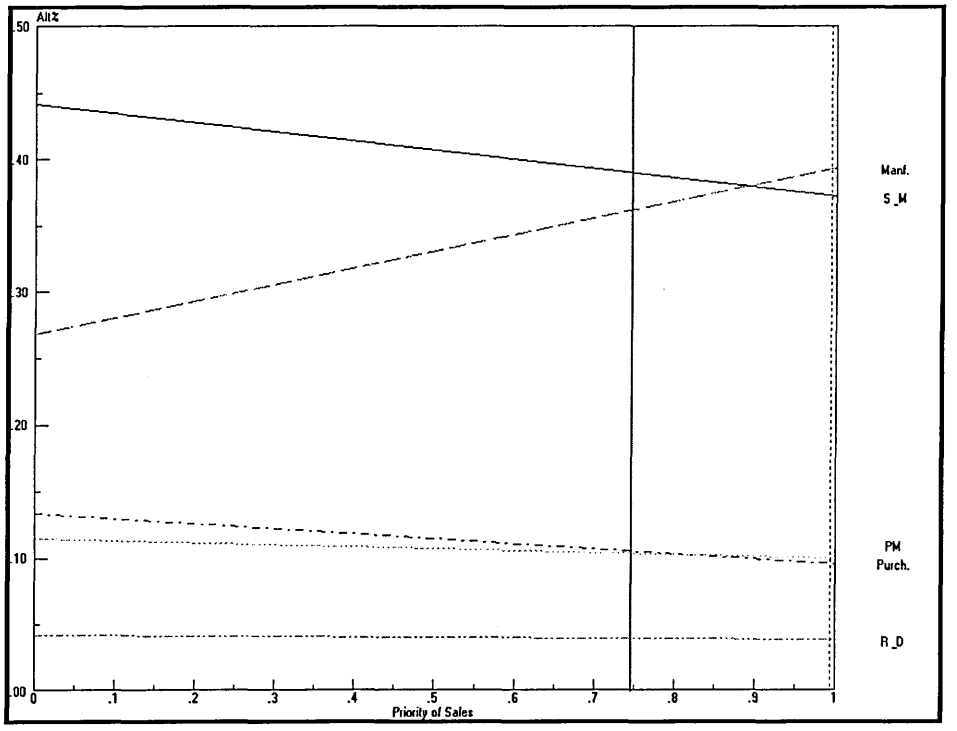
- + 50% Change of the Priority Weight of ROCE



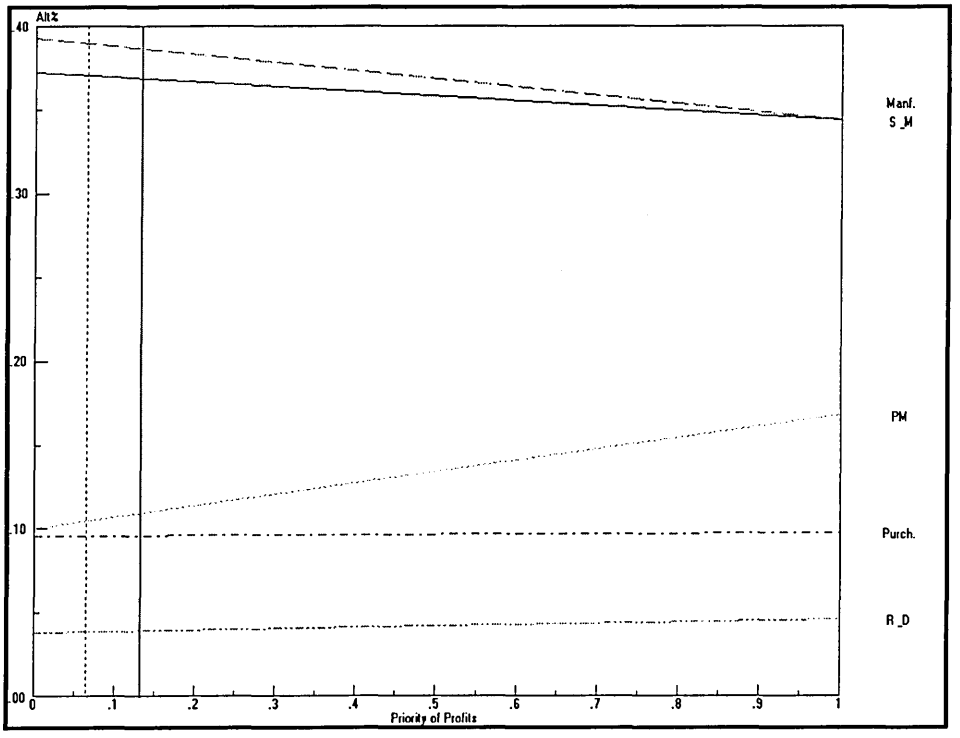
- - 50% Change of the Priority Weight of Sales Growth



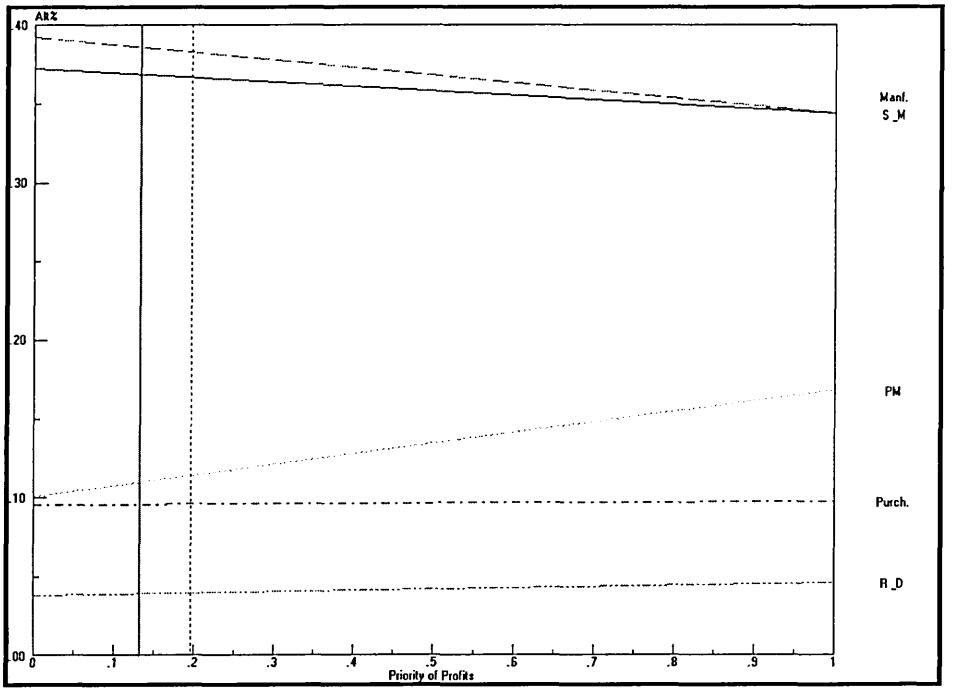
- + 50% Change of the Priority Weight of Sales Growth



- - 50% Change of the Priority Weight of Operating Profits

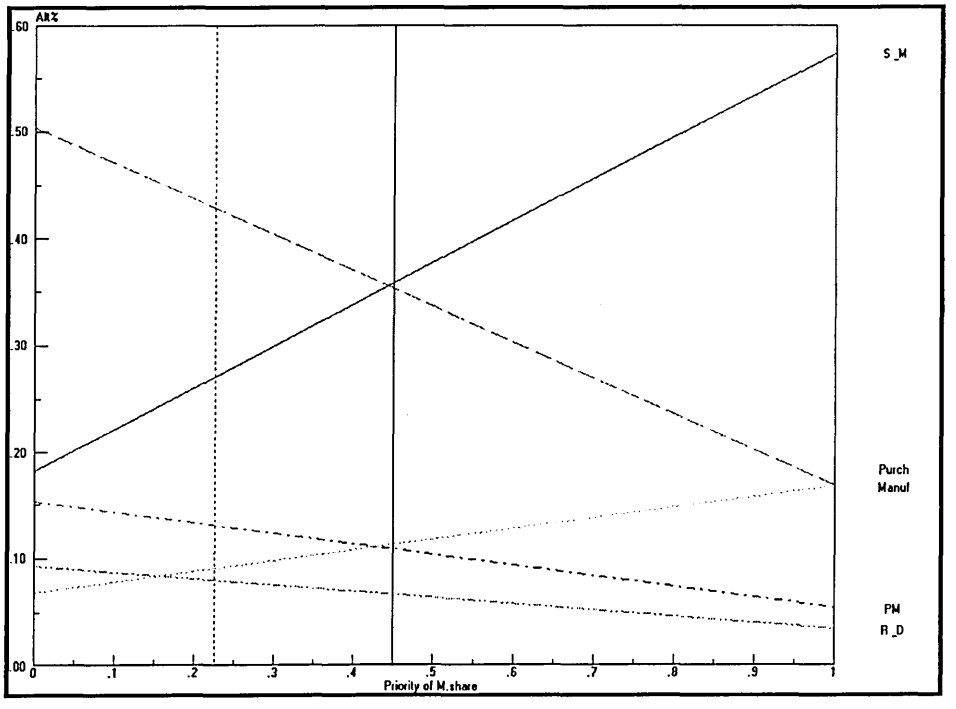


- + 50% Change of the Priority Weight of Operating Profits

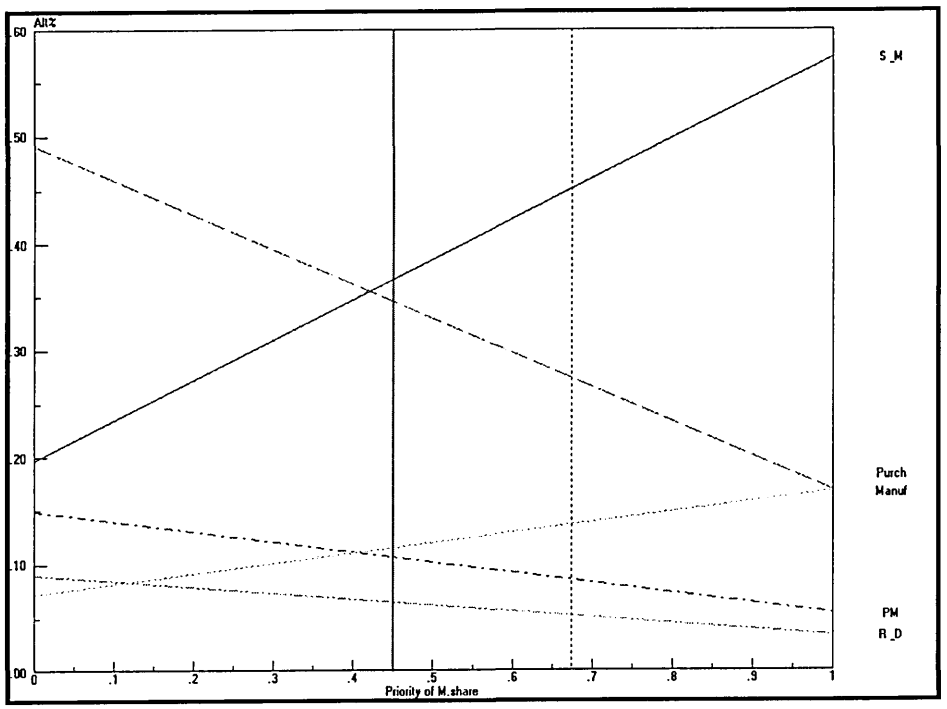


(B) The Non-financial Performance Evaluation

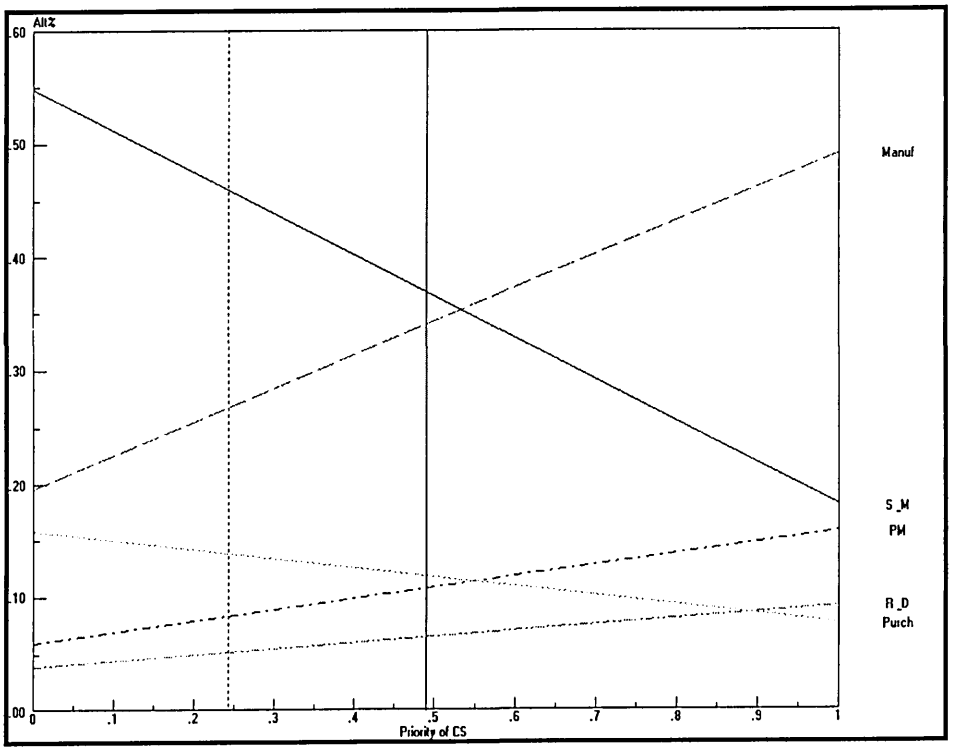
- - 50% Change of the Priority Weight of Market Share



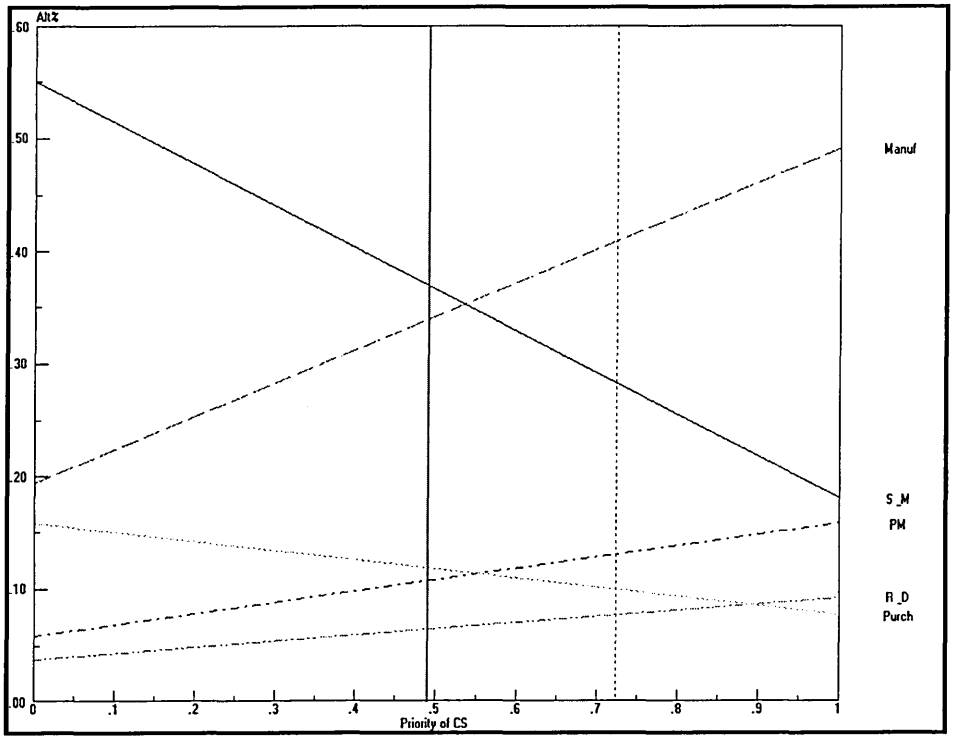
- + 50% Change of the Priority Weight of Market Share



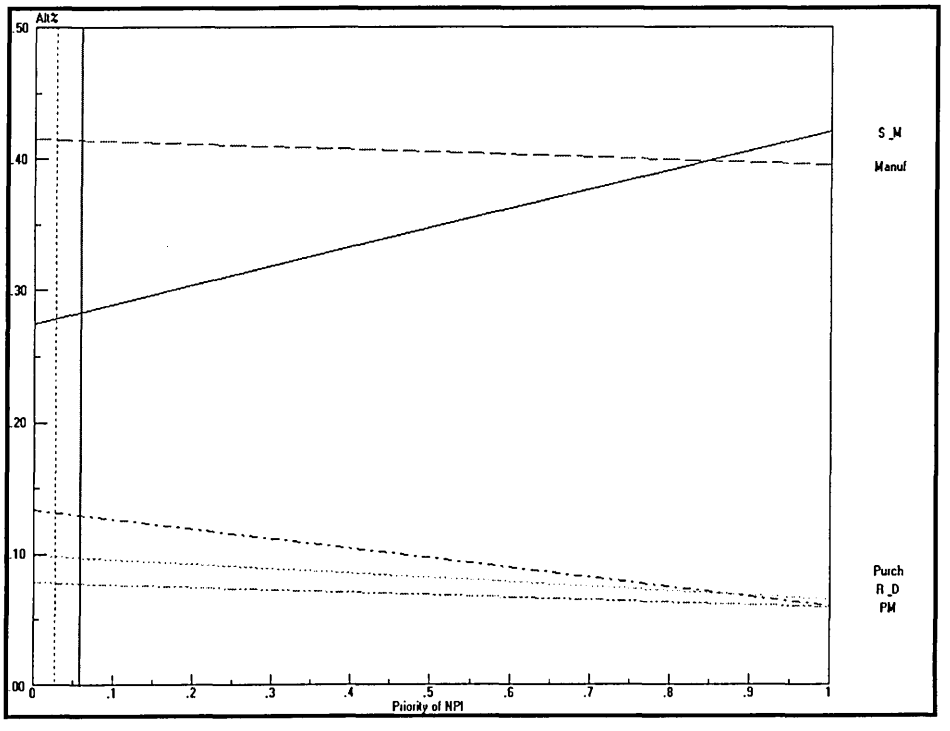
- - 50% Change of the Priority Weight of Customer Satisfaction



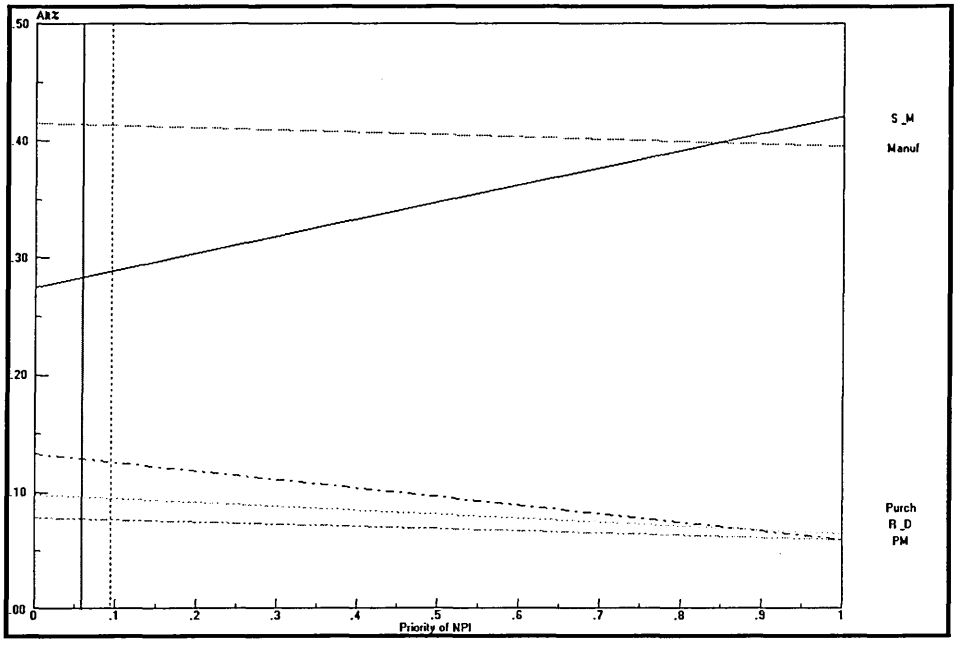
- + 50% Change of the Priority Weight of Customer Satisfaction



- - 50% Change of the Priority Weight of New Product Introduction



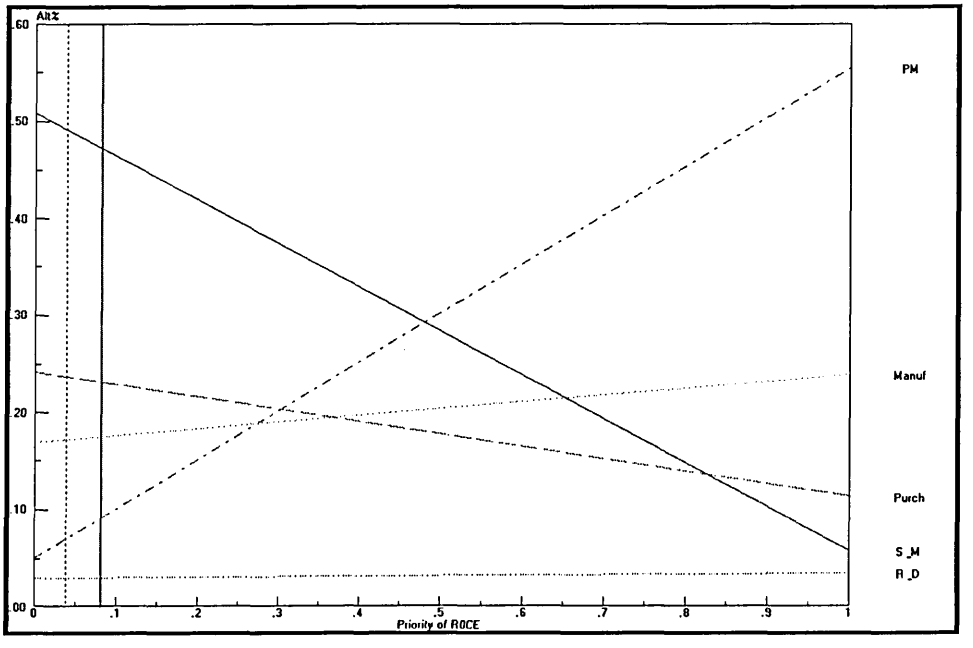
- + 50% Change of the Priority Weight of New Product Introduction



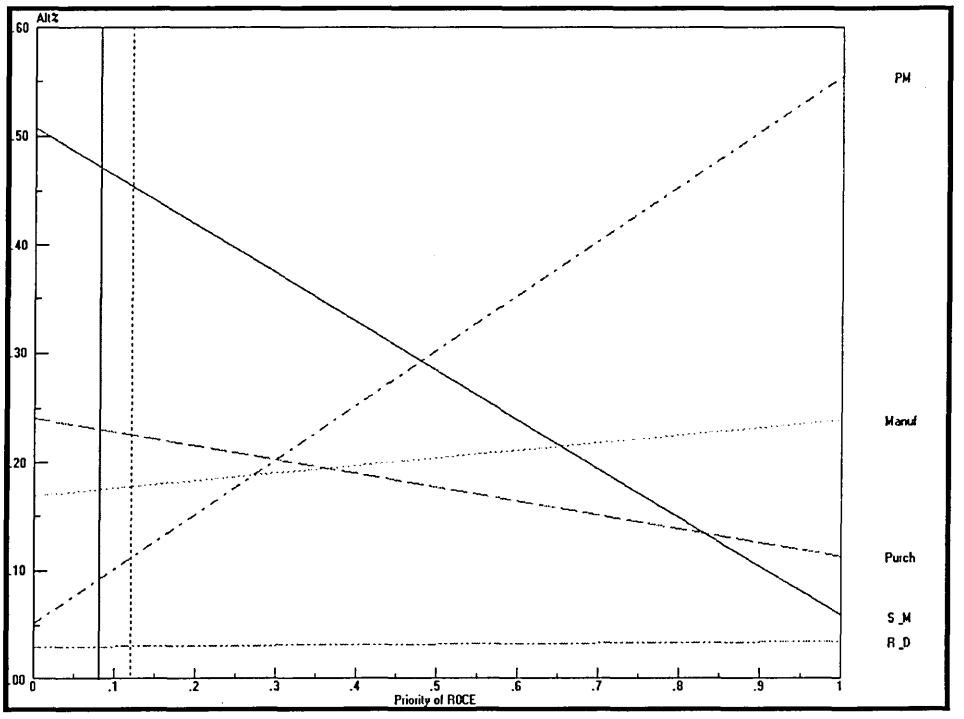
(II) Company C

(A) The Financial Performance Evaluation

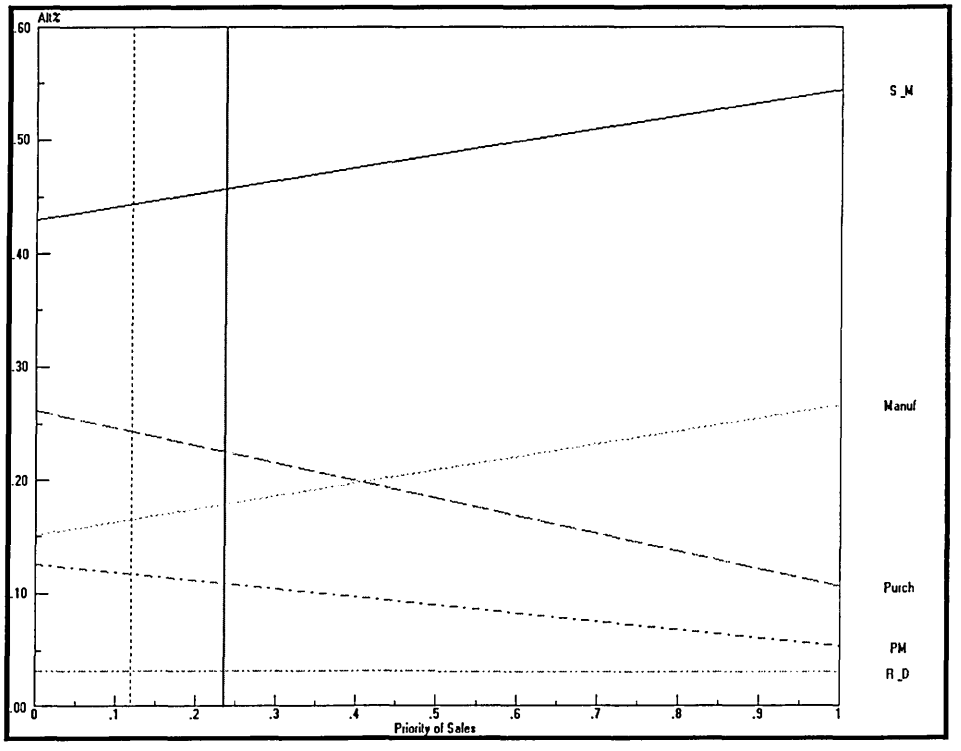
- - 50% Change of the Priority Weight of ROCE



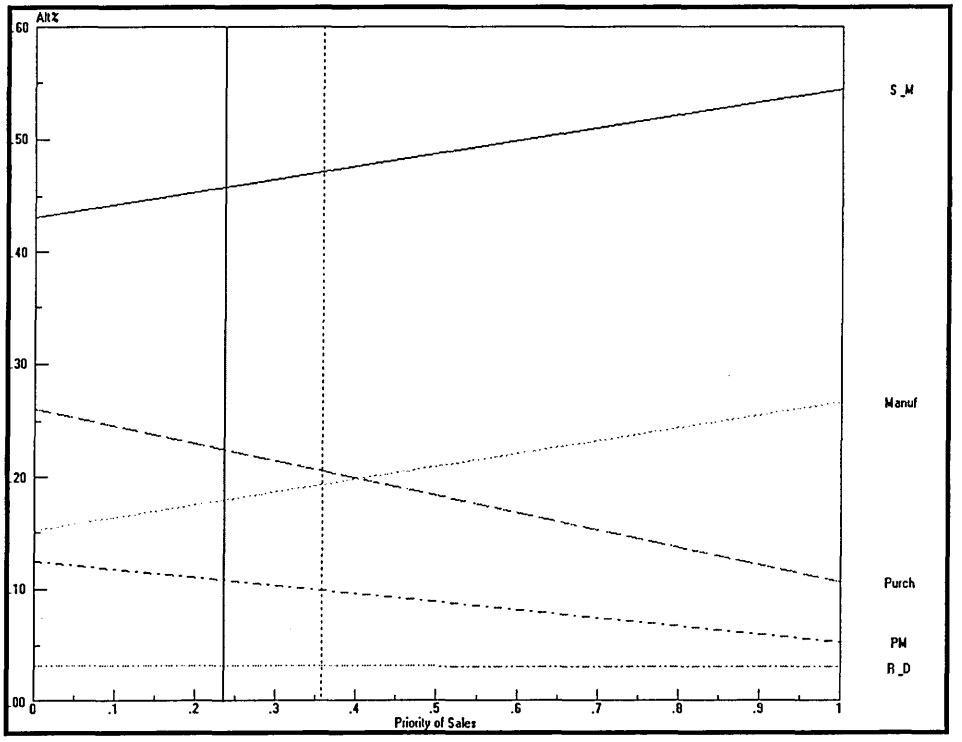
- + 50% Change of the Priority Weight of ROCE



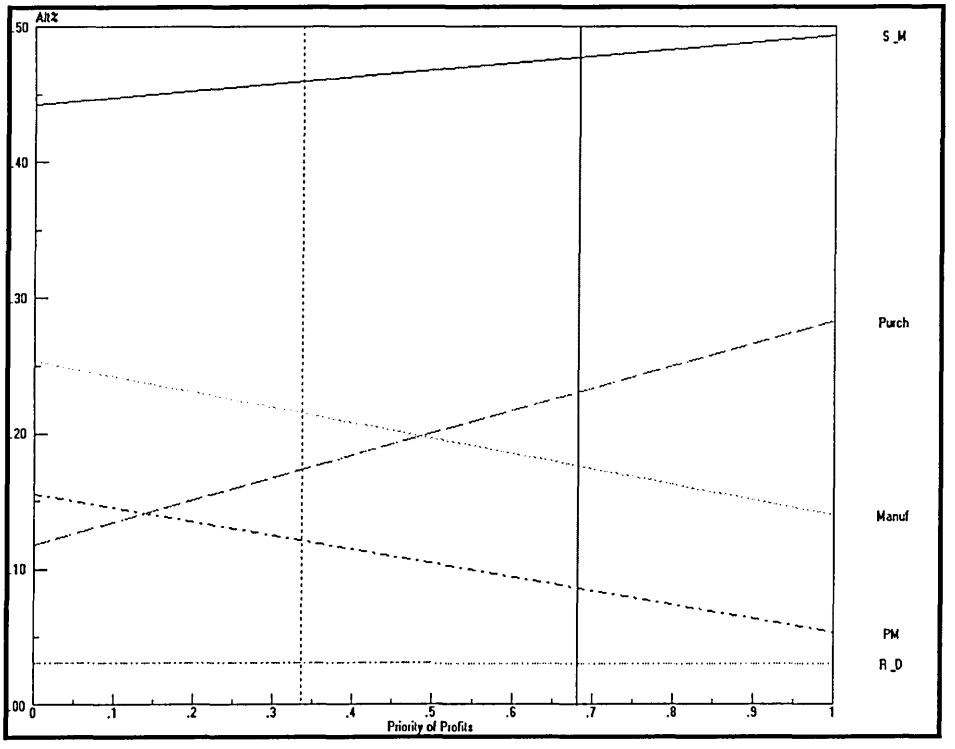
- - 50% Change of the Priority Weight of Sales Growth



- + 50% Change of the Priority Weight of Sales Growth

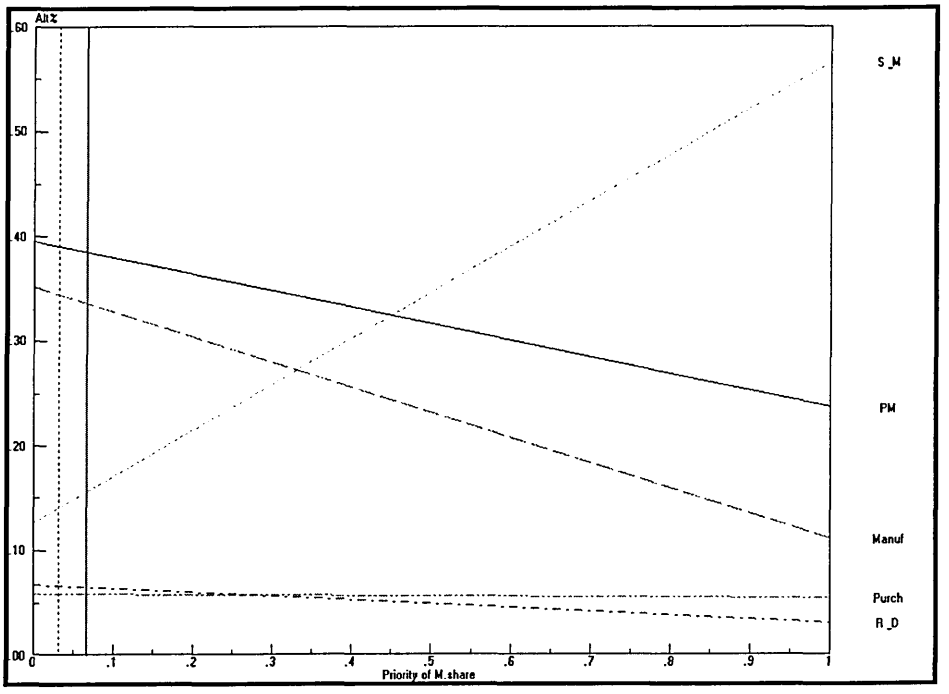


- - 50% Change of the Priority Weight of Operating Profits

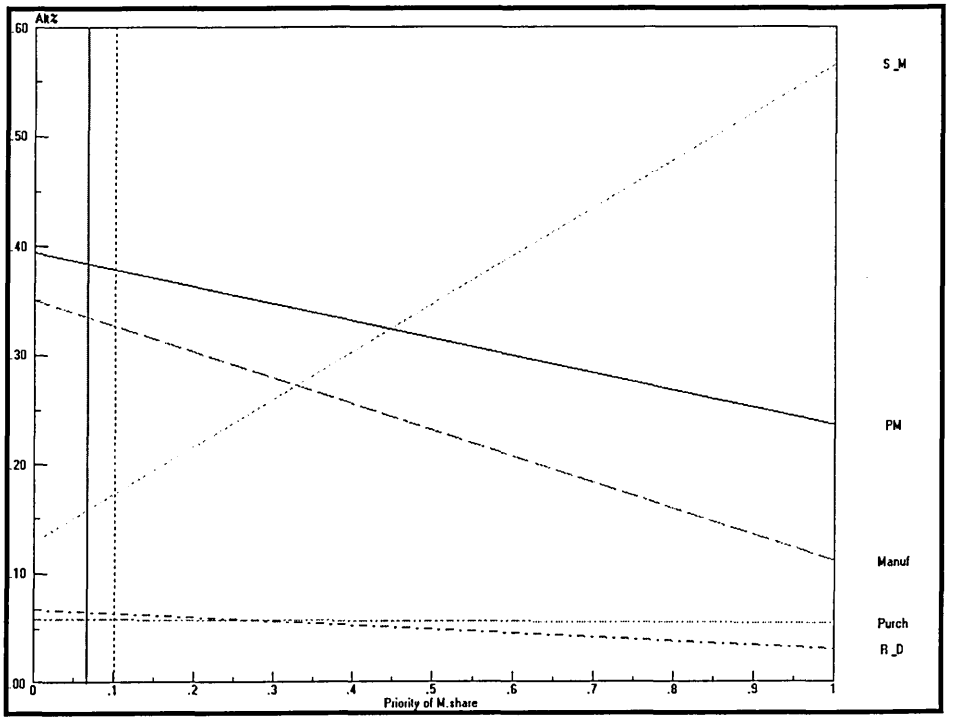


(B) The Non-financial Performance Evaluation

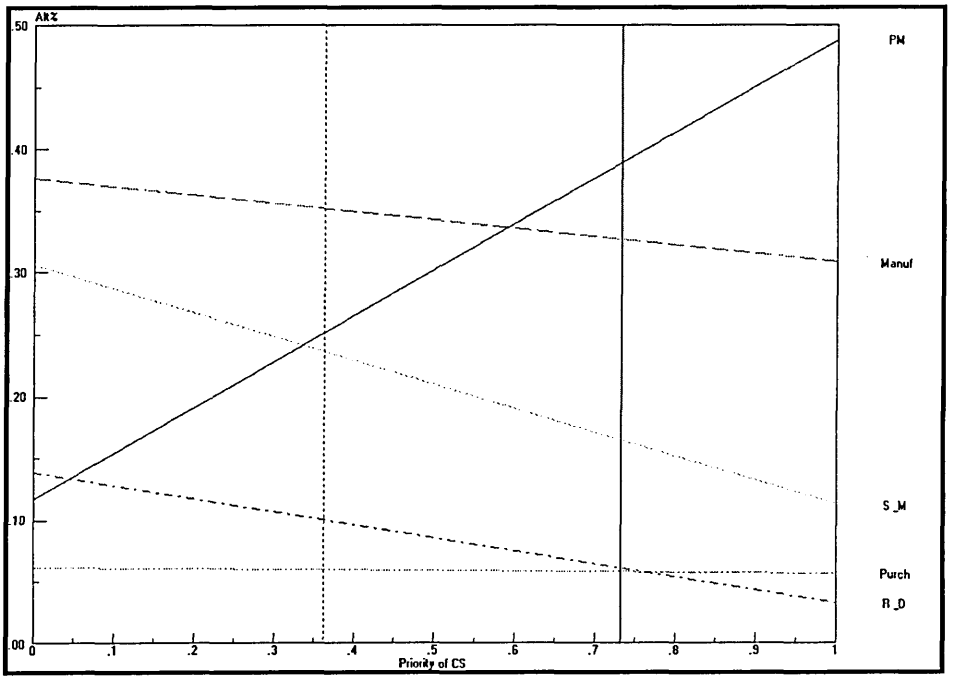
- - 50% Change of the Priority Weight of Market Share



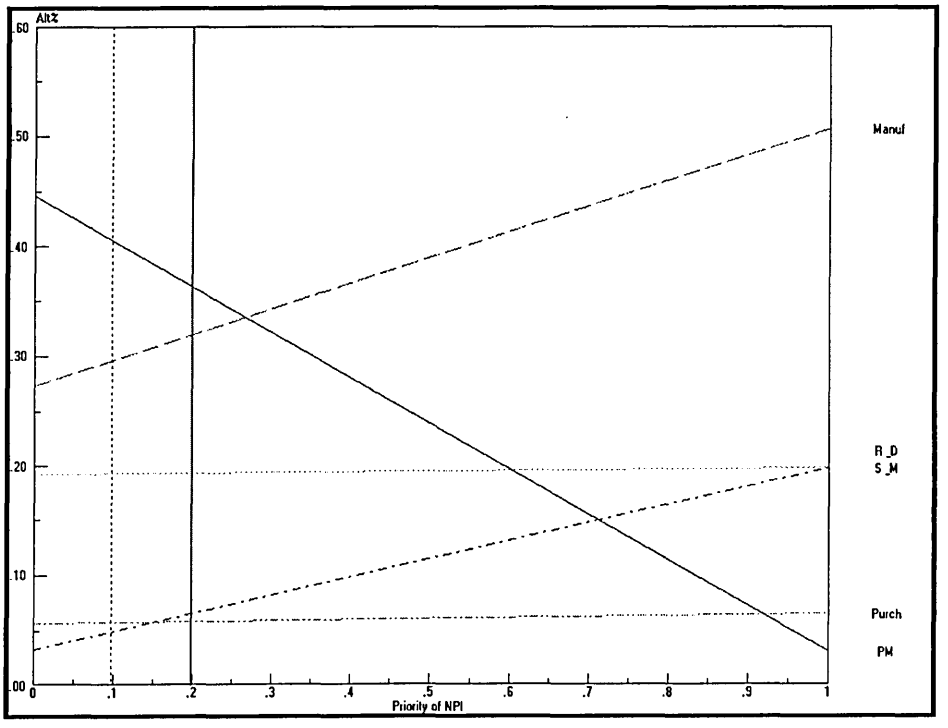
- + 50% Change of the Priority Weight of Market Share



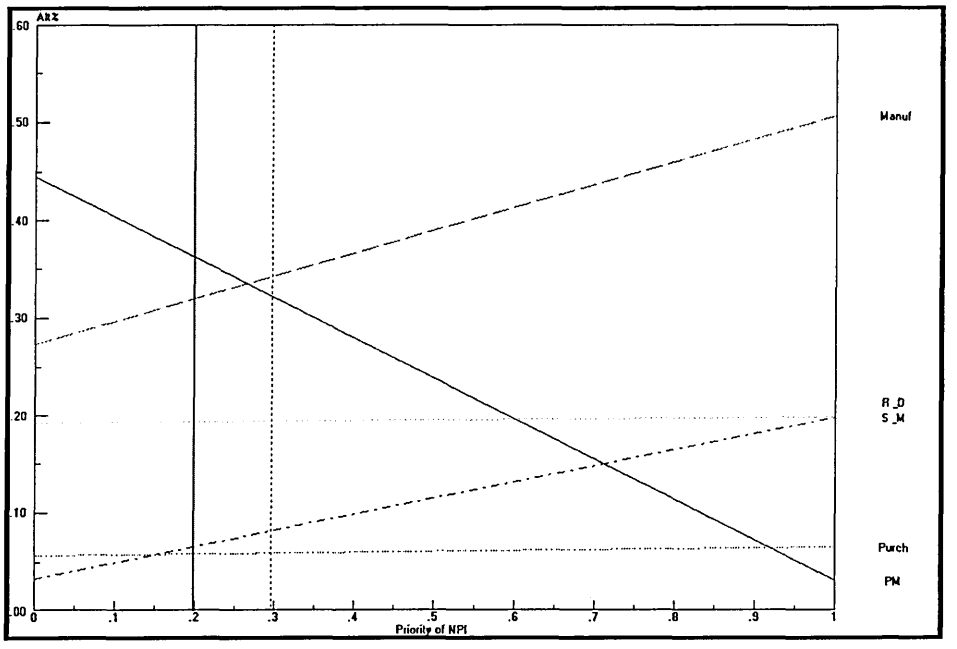
- - 50% Change of the Priority Weight of Customer Satisfaction



- + 50% Change of the Priority Weight of New Product Introduction



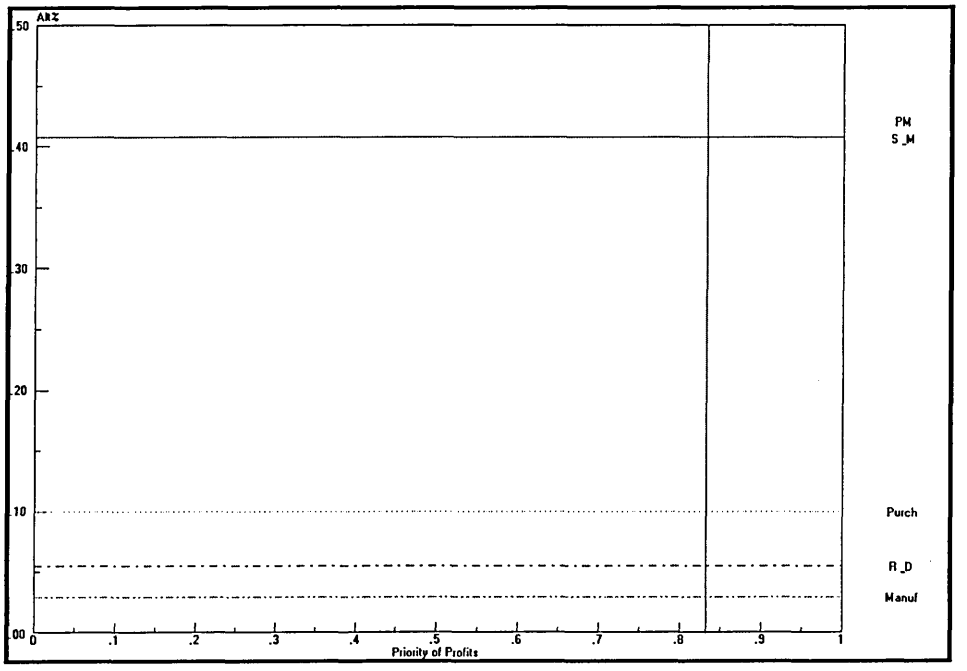
- + 50% Change of the Priority Weight of New Product Introduction



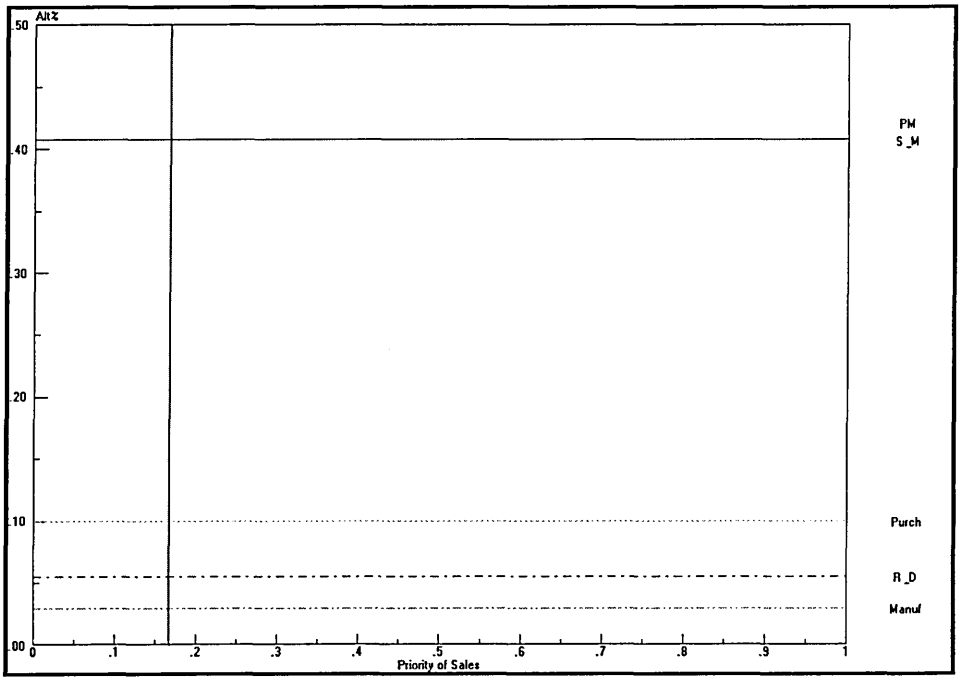
(III) Company D

(A) The Financial Performance Evaluation

- ± 50% Change of the Priority Weight of Operating Profits

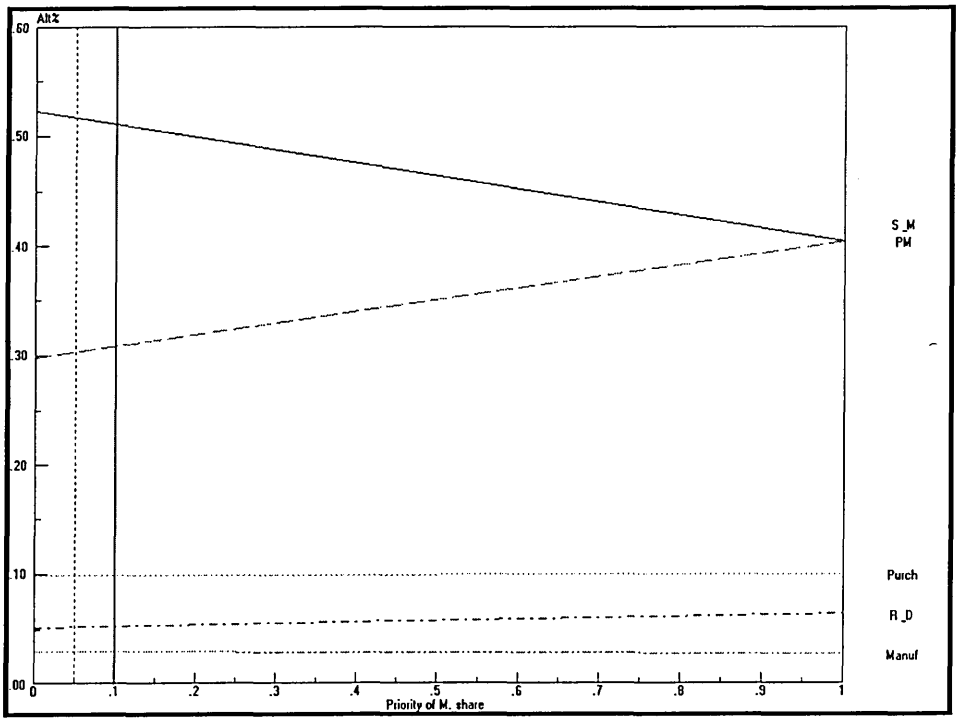


- ± 50% Change of the Priority Weight of Sales Growth

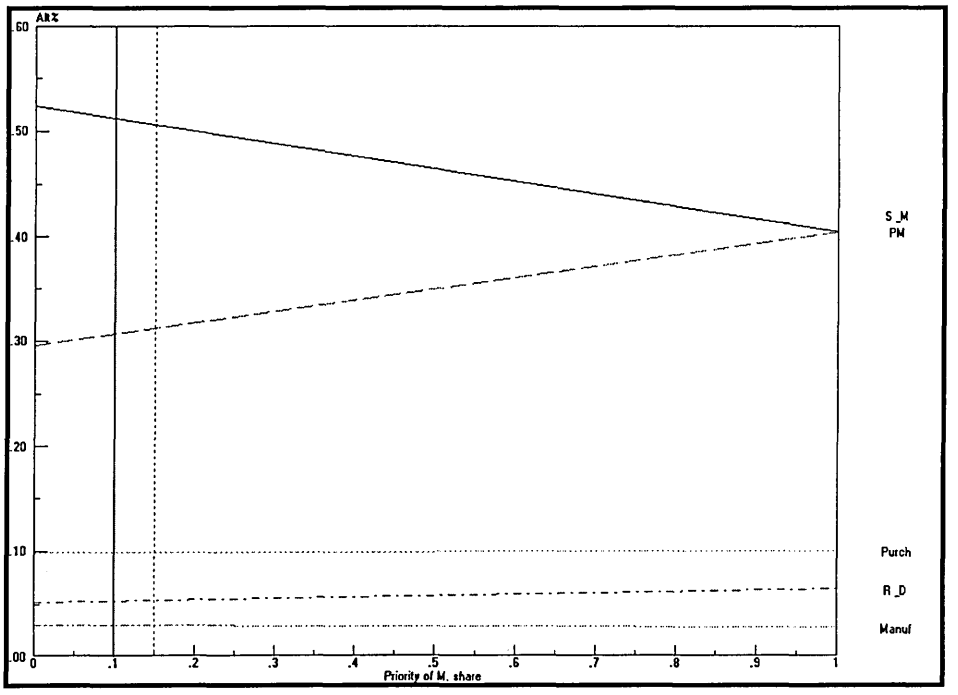


(B) The Non-financial Performance Evaluation

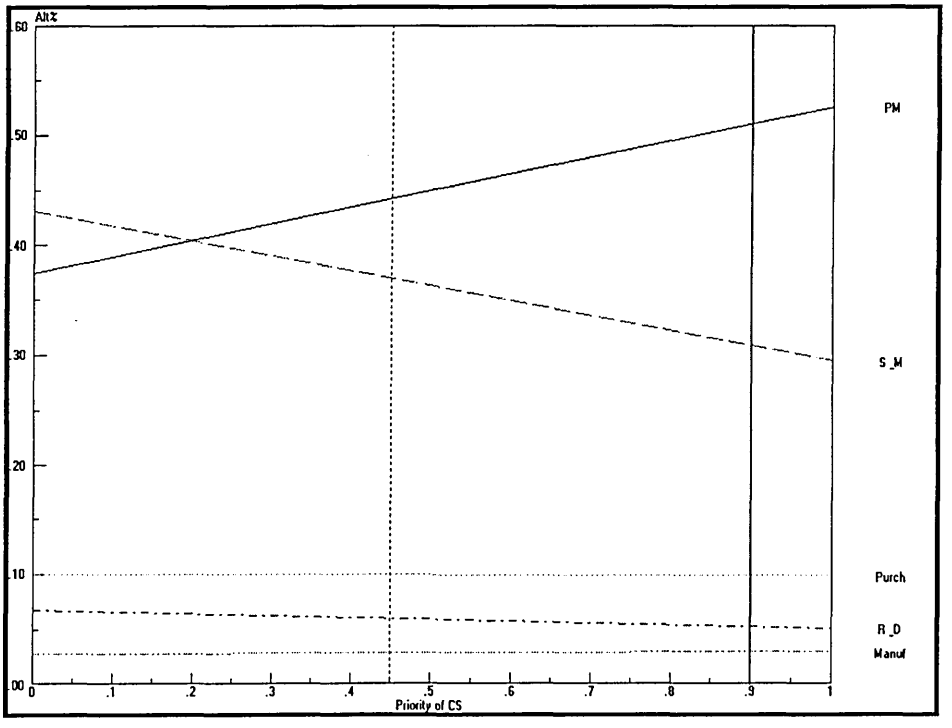
- - 50% Change of the Priority Weight of Market Share



- + 50% Change of the Priority Weight of Market Share



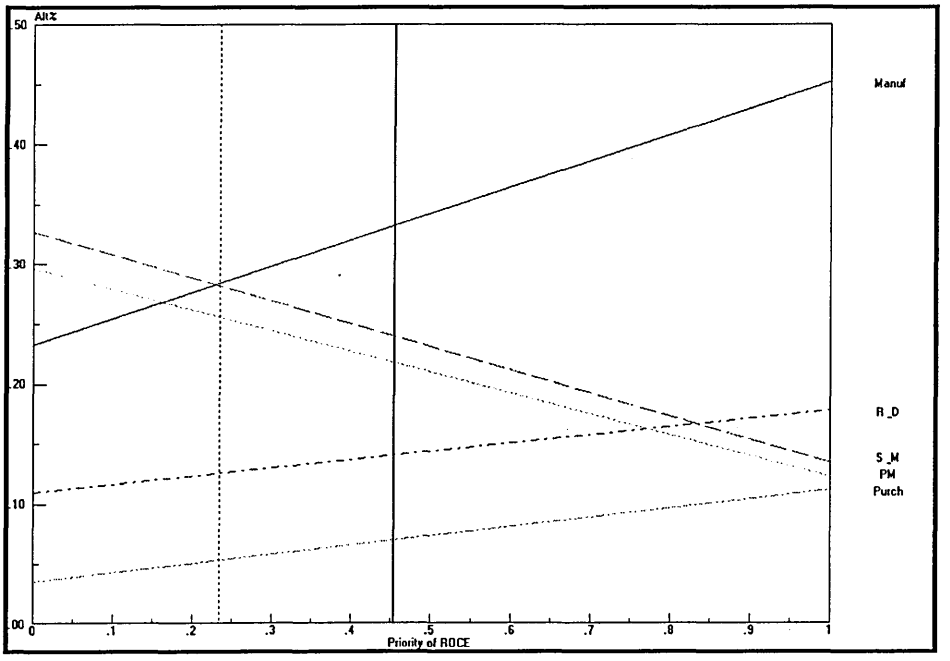
- ± 50% Change of the Priority Weight of Customer Satisfaction



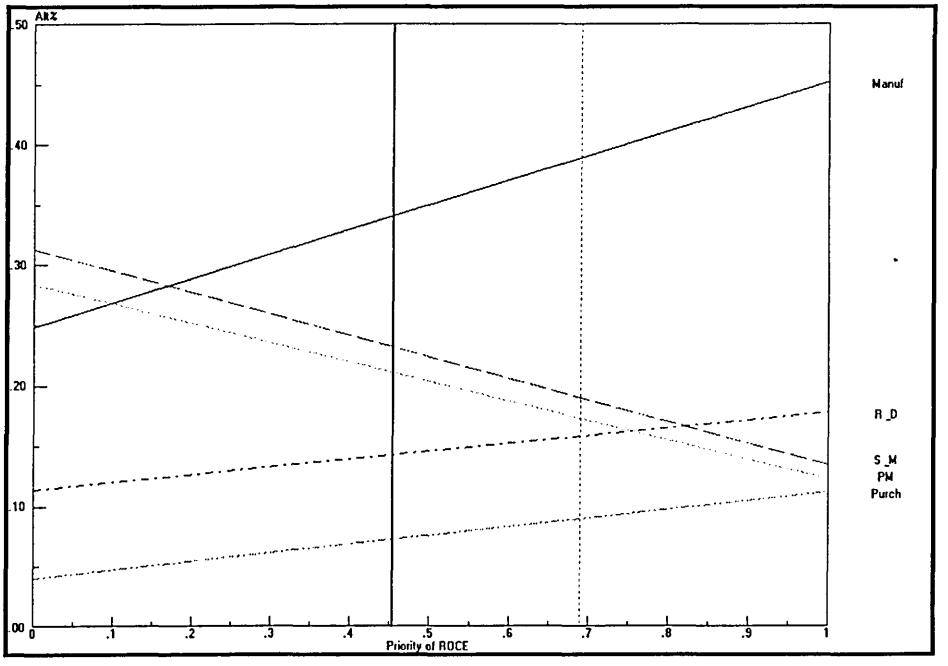
(IV) Company E

(A) The Financial Performance Evaluation

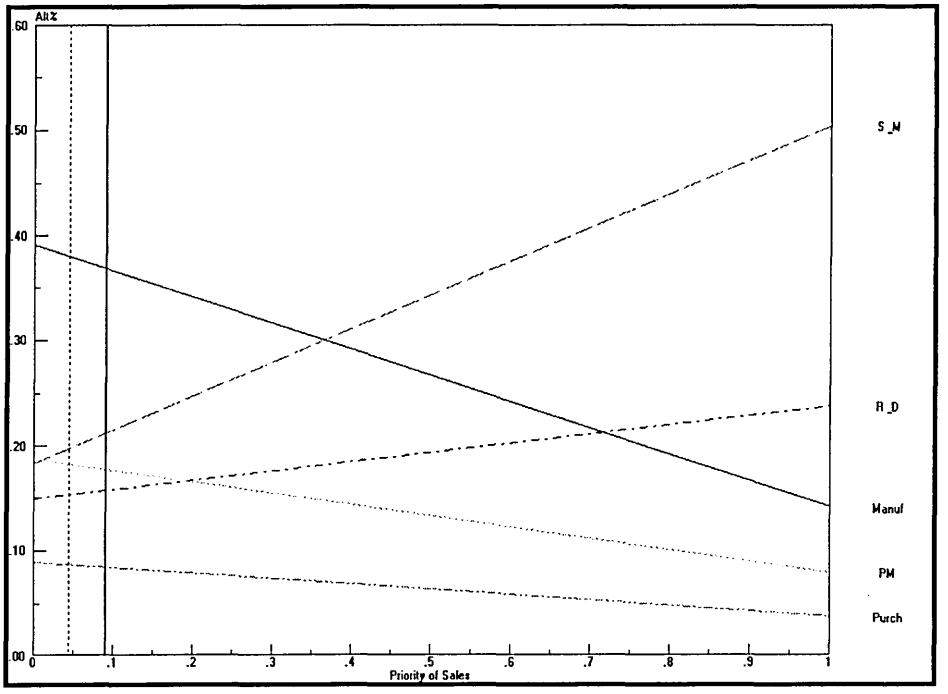
- - 50% Change of the Priority Weight of ROCE



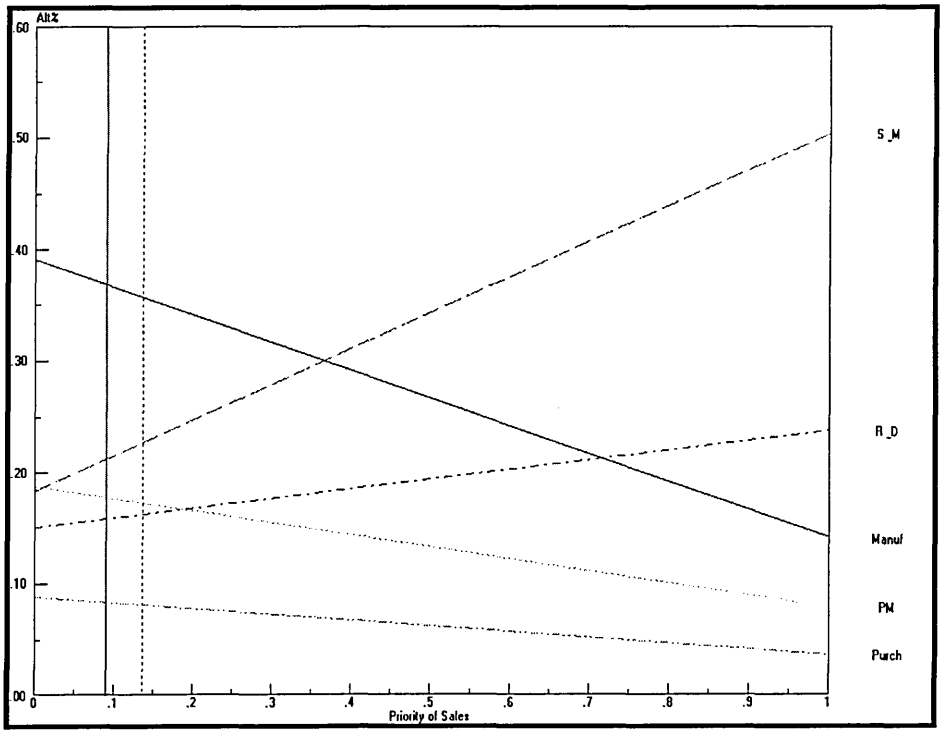
- + 50% Change of the Priority Weight of ROCE



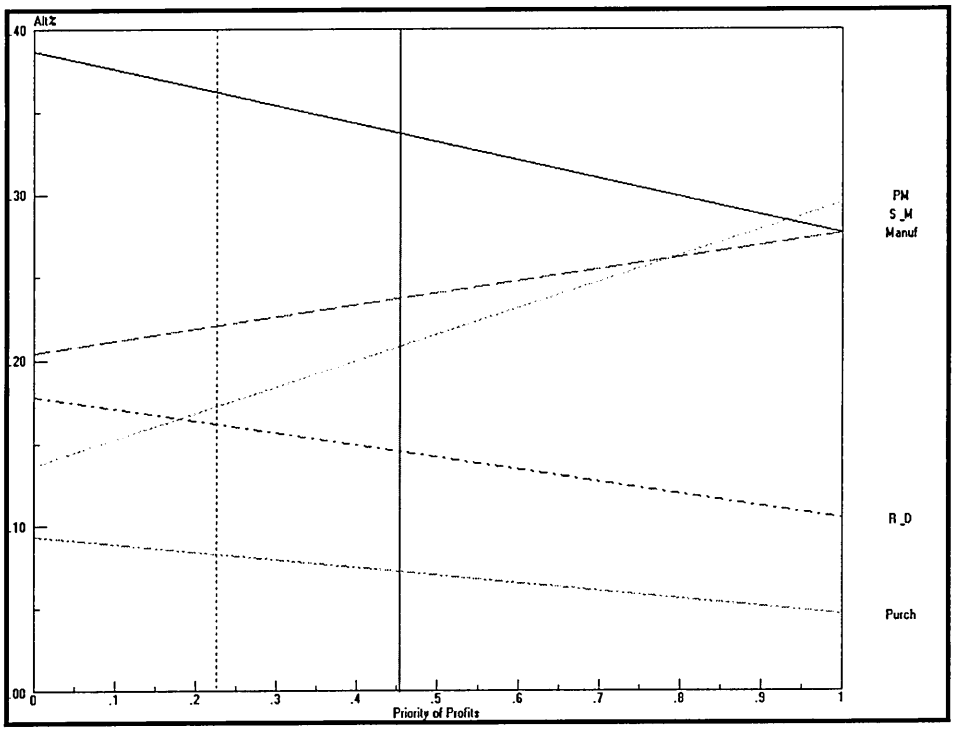
- - 50% Change of the Priority Weight of Sales Growth



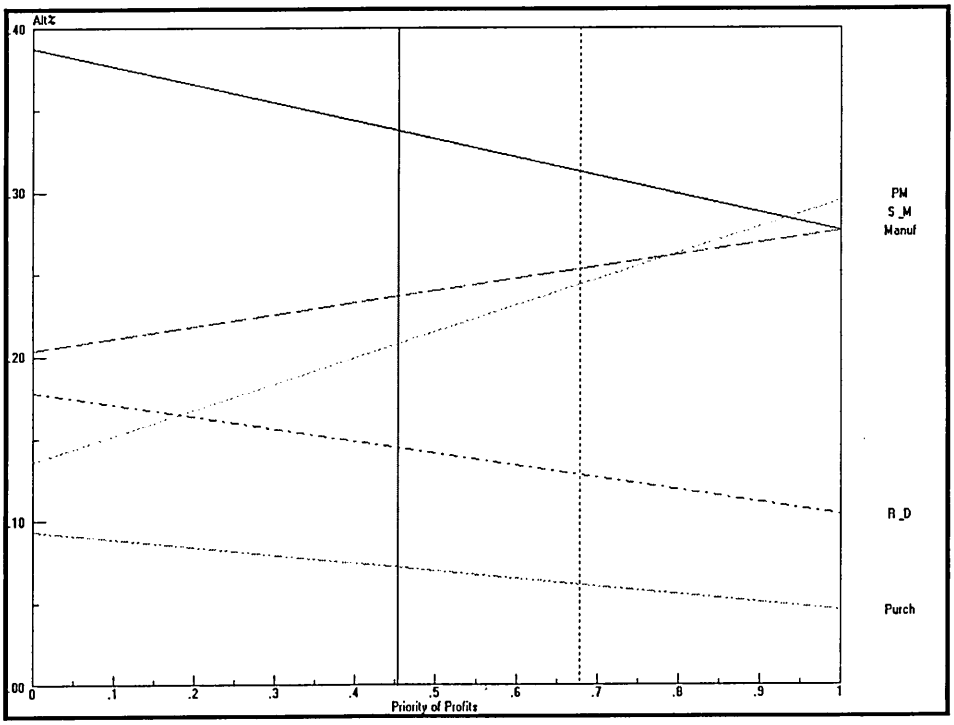
- + 50% Change of the Priority Weight of Sales Growth



- - 50% Change of the Priority Weight of Operating Profits

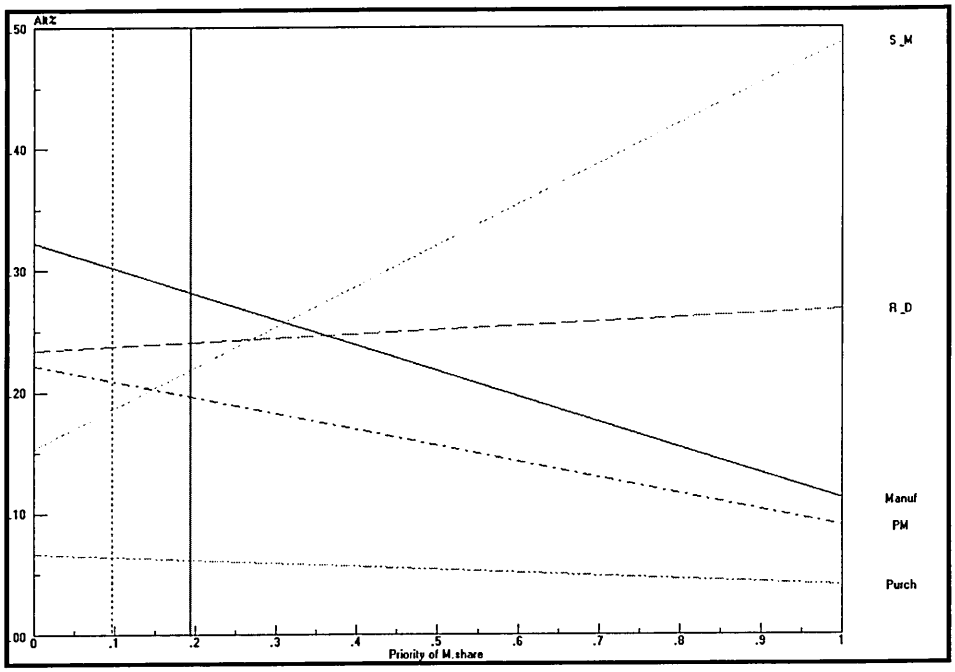


- + 50% Change of the Priority Weight of Operating Profits

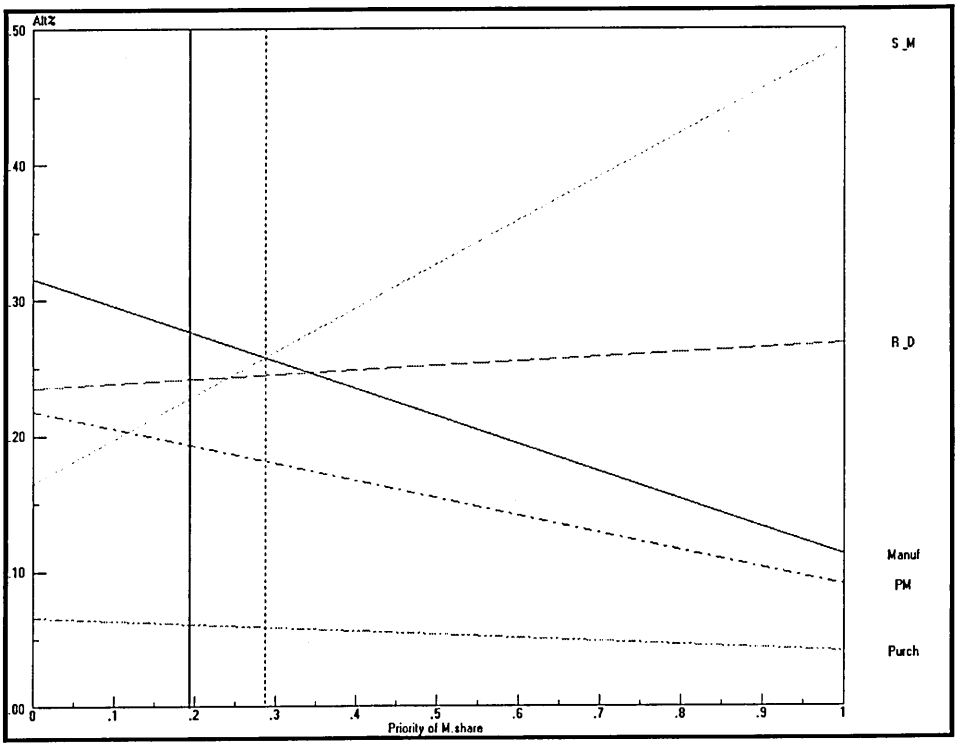


(B) The Non-financial Performance Evaluation

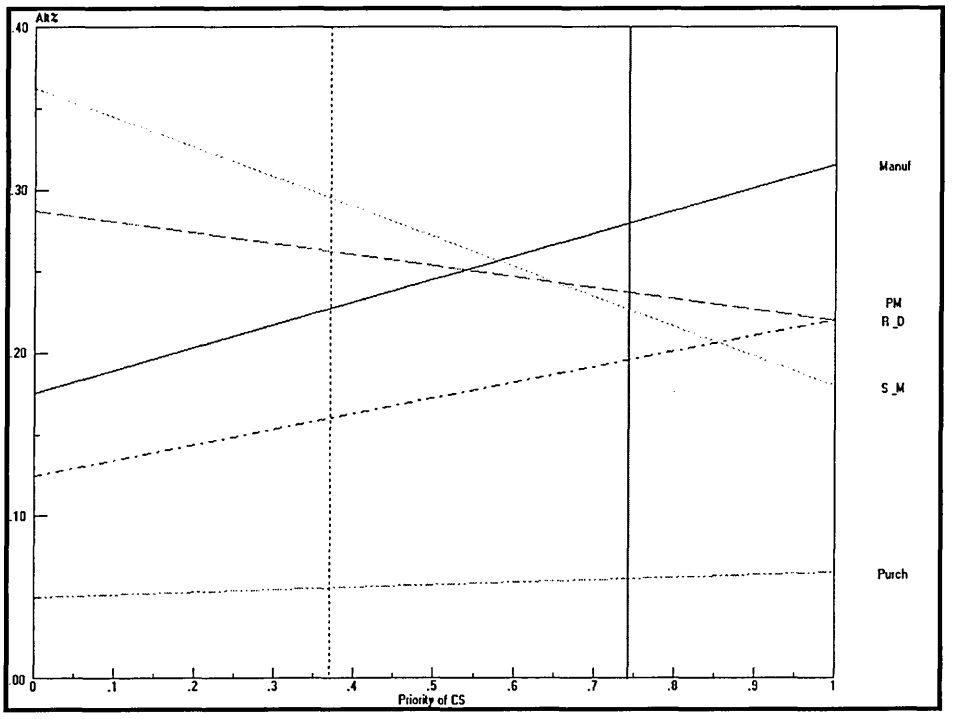
- - 50% Change of the Priority Weight of Market Share



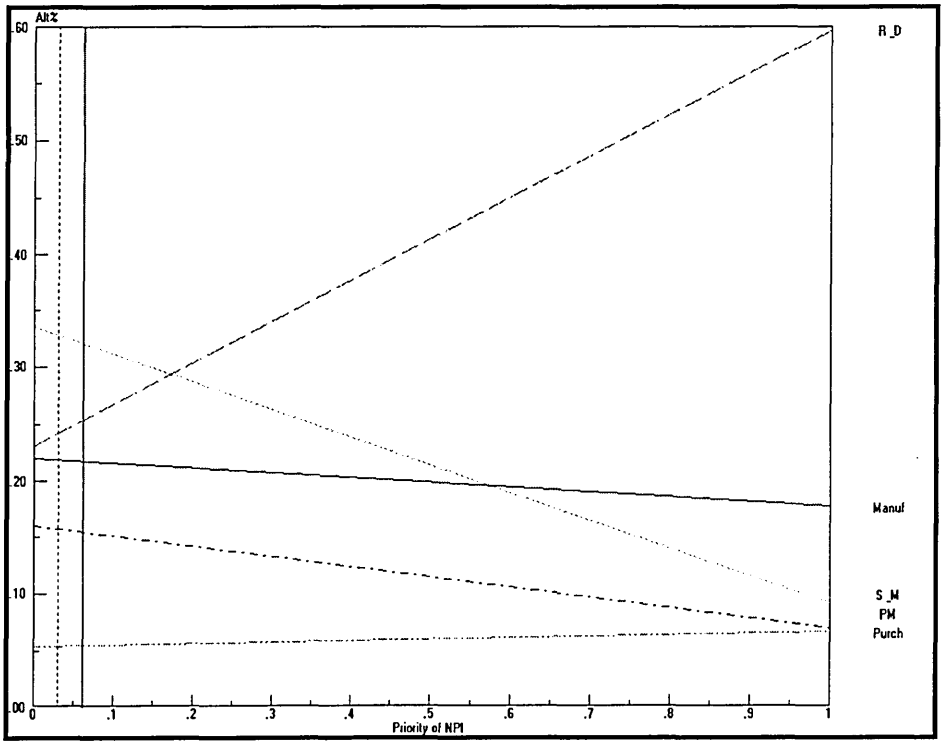
- + 50% Change of the Priority Weight of Market Share



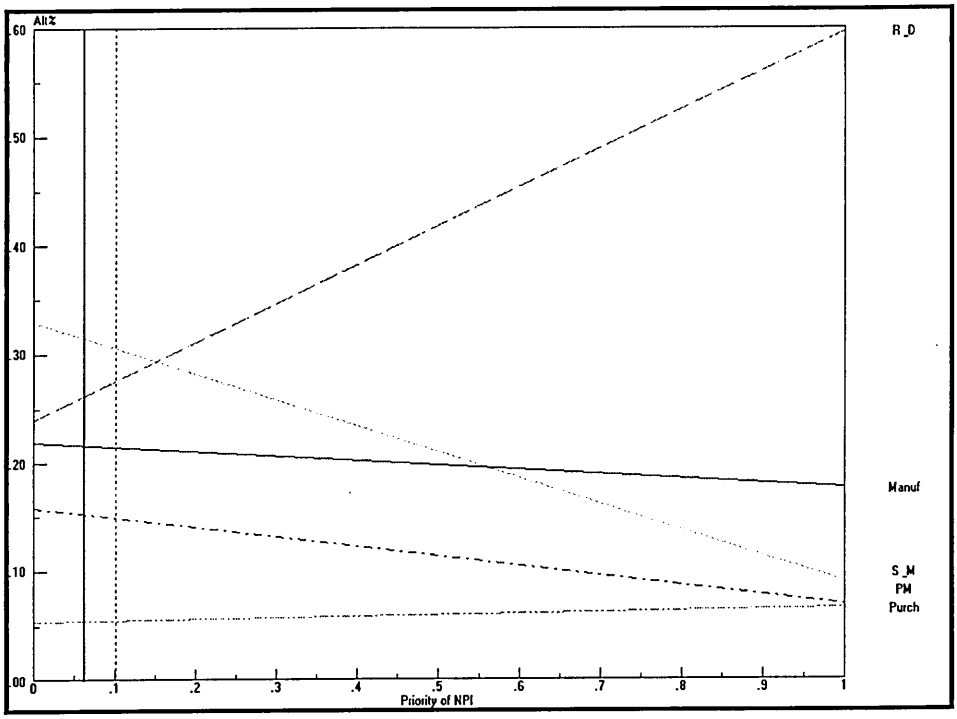
- - 50% Change of the Priority Weight of Customer Satisfaction



- - 50% Change of the Priority Weight of New Product Introduction



- + 50% Change of the Priority Weight of New Product Introduction



APPENDIX E

THE PROFILE OF IKEA

(I) IKEA'S UK Financial Record (1995-1997)

IKEA LIMITED			
	08/97	08/96	08/95
	12 Months	12 Months	12 Months
	th GBP	th GBP	th GBP
Turnover	362869	285364	228814
Profit (Loss) before Tax	33816	25266	12825
Net Tangible Assets (Liab.)	90430	102338	84103
Shareholder Funds	27350	19904	15802
Profit Margin (%)	9.32	8.85	5.6
Return on Shareholder Funds (%)	123.64	126.94	81.16
Return on Capital Employed (%)	37.39	24.69	15.25
Liquidity Ratio	0.22	0.44	0.48
Gearing (%)	373.85	533.7	532.8
Number of Employees	1642	1313	1024
PROFIT & LOSS ACCOUNT			
	08/97	08/96	08/95
	12 Months	12 Months	12 Months
	th GBP	th GBP	th GBP
Turnover	362869	285364	228814
UK Turnover	362869	285364	
Export Turnover	0	0	
Cost of Sales	-246179	-191506	-157897
Total Expenses			
Gross Profit	116690	93858	70917
Depreciation	-6923	-5870	-4838
Other Expenses	-71790	-57870	-49725
Operating Profit	37977	30118	16354
Other Income	1730	2467	1224
Exceptional Items	0	0	0
Profit (Loss) before Interest	39707	32585	17578
Interest Paid	-5891	-7319	-4753
Profit (Loss) before Tax	33816	25266	12825
Taxation	-9370	-7164	-5331
Profit (Loss) after Tax	24446	18102	7494
Extraordinary Items	171	0	0
Profit (Loss) for Period	24617	18102	7494
Dividends	-17000	-14000	-7000
Retained Profit(Loss)	7617	4102	494
Discontinued Operations			
Audit Fee	31	32	32
Remuneration	28127	23227	17887
Directors' Remuneration	107	109	101
Highest Paid Director		101	
Number of Employees	1642	1313	1024

(II) IKEA's facts and figures

Year		87/88	88/89	89/90	90/91	91/92	92/93	93/94	94/95	95/96	96/97	%
Turnover (Skrbn)		17.04	20.65	22.09	26.61	28.64	29.90	31.64	33.48	37.74	45.76	+168
Growth (%)		17.2	17.50	6.5	17.00	7.10	4.20	5.50	5.50	11.3	17.5	
Product (000)						10.7					12.0	+12
Customer (m)		70	73	83	94	103	110	125	131	140	161	+130
Store	No.	83	87	93	102	120		123		131	139	+67
	Ctry			17		24	25			27	28	+65
Supplier	000		1.5			1.8		2.3			2.4	+60
	Ctry					45					65	+60
Catalogue	m					45					65	+60
	Lan					10				17	20	+100
Investing (%)								15				
Profit-margin (%)					8-10						9	
Employee (000)										35.0	36.4	

APPENDIX F

The SURVEY QUESTIONNAIRE

(I) The cover letter

27 January 1999

Dear Sir/Madam,

CORE COMPETENCE OF YOUR COMPANY

Core competencies are those capabilities which would give your company real competitive advantage. Usually these capabilities are rare, and not easily imitated or substituted by your competitors. In fact, core competencies are crown jewels of your company and should be carefully maintained in-house and nurtured.

We at the Sheffield Hallam University are devising a generic model to help firms identify their core competencies and to provide a framework for maintaining, nurturing, and/or outsourcing various capabilities. This short questionnaire is designed to collect data by which means we can identify your competencies. Please fill it in, or pass it on to the best qualified individuals who would be able to fill it in. Alternatively, you can make a few copies and give it to the relevant people in your company. More responses we would have, statistically we would be more confident to validate your competencies (a pre-paid S.A.E. is included).

All responses would be treated in strict confidence and no names would be identified. We would send you a copy of the analysis for your company.

Thank you.

Yours sincerely,

Dr. Khalid Hafeez
Director of studies

Mr. YanBing ZHANG
Researcher

(II) The questionnaire

1. Capability is defined as the capacity for a team of assets to perform some task or activity. The definitions of the assets and the relevant examples are provided in Table 1. By following the example shown in Table 2, please assign the % contribution of the assets to the functional capabilities shown in Table 3.

Resources	Examples
Physical assets	Plant, raw materials, location, equipment, machine, tools, etc.
Intellectual assets	Brand name, reputation, patent, knowledge, copyright, relationship, etc.
Cultural assets	Belief, value, attitude, moral, perception, etc.

Table 1 Definitions and examples of assets

Capability	% Physical asset	% Intellectual asset	% Cultural asset	Total
Human resource management	20	35	45	100%

Table 2 Example of the assignment

	% Physical asset	% Intellectual asset	% Cultural asset	Total
Purchasing				100%
Manufacturing/processing				100%
Sales and marketing				100%
R & D				100%
Performance management				100%

Table 3 The form for asset assignment

2. The definition of each uniqueness attribute is given in Table 4. Please put a circle on the appropriate number shown in Table 5 to indicate the degree of asset uniqueness.

Uniqueness	Definition
Rareness	The degree to which a particular asset is distinctive in competition
Inimitability	The degree to which a particular asset is inimitable by competitors
Non-substitutability	The degree to which a particular asset cannot be replaced by other assets

Table 4 The definitions of uniqueness attributes

	Rareness				Inimitability				Non-substitutability			
Physical assets (e.g., plant, machine, material)	1	2	3	4	1	2	3	4	1	2	3	4
Intellectual assets (e.g., patent, brand name, knowledge)	1	2	3	4	1	2	3	4	1	2	3	4
Cultural assets (e.g., belief, value, attitude)	1	2	3	4	1	2	3	4	1	2	3	4

Table 5 Uniqueness assessment for assets
Key: 1 = Very low; 2 = Low; 3 = High; 4 = Very high.

3. The definition of each uniqueness attribute has been given in Table 4. Please put a circle on the appropriate number shown in Table 6 to indicate the degree of capability uniqueness.

	Rareness	Inimitability	Non-substitutability
Purchasing	1 2 3 4	1 2 3 4	1 2 3 4
Manufacturing/processing	1 2 3 4	1 2 3 4	1 2 3 4
Sales and marketing	1 2 3 4	1 2 3 4	1 2 3 4
R & D	1 2 3 4	1 2 3 4	1 2 3 4
Performance management	1 2 3 4	1 2 3 4	1 2 3 4

Table 6 Uniqueness assessment for capabilities
Key: 1 = Very low; 2 = Low; 3 = High; 4 = Very high.

4. The definition of each collectiveness attribute is given in Table 7. Please put a cross in the appropriate box shown in Table 8 to indicate the degree to which each capability has the attributes.

Collectiveness	**Definition**
Across-function	The extent to which a capability is an indispensable element of one or more cross-functional processes
Across-product	The extent to which a capability is shared by various products
Across-business	The extent to which a capability is an indispensable element of various business units

Table 7 The definitions of collectiveness attributes

	Across-function	Across-product	Across-business
Purchasing	1 2 3 4	1 2 3 4	1 2 3 4
Manufacturing/processing	1 2 3 4	1 2 3 4	1 2 3 4
Sales and marketing	1 2 3 4	1 2 3 4	1 2 3 4
R & D	1 2 3 4	1 2 3 4	1 2 3 4
Performance management	1 2 3 4	1 2 3 4	1 2 3 4

Table 8 The collectiveness assessment for functional capabilities
Key: 1 = Very low; 2 = Low; 3 = High; 4 = Very high.

5. The definition of each strategic flexibility attribute is given in Table 9. Please put a cross in the appropriate box shown in Table 10 to indicate the degree to which each capability has the attributes.

Strategic flexibility	**Definition**
Resource re-deployment	The ease with which baseline resources of a competence may be re-deployed to develop new capabilities
Routine re-organisation	The ease with which the manifested routines may be re-organised to support future business development

Table 9 The definitions of strategic flexibility attributes

	Resource re-deployment	Routines re-organisation
Purchasing	1 2 3 4	1 2 3 4
Manufacturing/processing	1 2 3 4	1 2 3 4
Sales and marketing	1 2 3 4	1 2 3 4
R & D	1 2 3 4	1 2 3 4
Performance management	1 2 3 4	1 2 3 4

Table 10 The strategic flexibility assessment for functional capabilities
Key: 1 = Very low; 2 = Low; 3 = High; 4 = Very high.

6. Please indicate which **TWO** of the functional capabilities are more likely the core competencies of your company.

Purchasing ☐ Manufacturing/processing ☐

Sales and marketing ☐ R & D ☐

Performance management ☐ Other (Please specify) _____ ☐

7. What is the nature of the business carried out at your establishment?

Manufacturing ☐ Services ☐

Distribution ☐ Transport ☐

Retailing ☐ Agriculture ☐

Other (Please specify) _____ ☐

8. Please provide the following information about you and your company.

Your name: _____ Tel: _____

Your position in the company _____

Your company name: _____

Number of employees at your company: under 100 ☐ 100-199 ☐ 200-499 ☐ 500-999 ☐ over 1,000 ☐

Estimated sales of your company for the last financial year (£m, per annum): under 5 ☐ 5-50 ☐ 50-500 ☐ over 500 ☐

9. Please indicate whether you like to participate a further survey.

Yes	No
☐	☐

APPENDIX G

SURVEY RESULTS FOR FORTY-TWO COMPANIES

(I) MANUFACTURING COMPANIES

COMPANY No.1

Company background

- Industry sector: Manufacturing
- Number of employees: Over 1,000
- Annual sales: Over £500 millions
- Location of company: Mexico, North America
- Position of the respondent: Manufacturing manager

The identified competencies and core competencies

- Competence

Competencies
R & D Manufacturing/processing Sales and marketing

- Core competence

Core competencies
Manufacturing/processing

The perception of respondent

Core competencies
Manufacturing/processing

COMPANY No.2

Company background

- Industry sector: Manufacturing
- Number of employees: 100-199
- Annual sales: £50-500 millions
- Location of company: England, UK
- Position of the respondent: Test engineer

The identified competencies and core competencies

- Competence

Competencies
R & D Manufacturing/processing Sales and marketing

- Core competence

Core competencies
R & D Sales and marketing

The perception of respondent

Core competencies
N/A

COMPANY No.3

Company background

- Industry sector: Manufacturing
- Number of employees: 100-199
- Annual sales: £5-50 millions
- Location of company: England, UK
- Position of the respondent: Electronics technician

The identified competencies and core competencies

- Competence

Competencies
R & D Sales and marketing

- Core competence

Core competencies
Sales and marketing

The perception of respondent

Core competencies
N/A

COMPANY No.4

Background

- Industry sector: Manufacturing
- Number of employees: 200-499
- Annual sales: £5-50 millions
- Location of company: England, UK
- Position of the respondent: Instrumentation technician

The identified competencies and core competencies

- Competence

Competencies
R & D Sales and marketing

- Core competence

Core competencies
Sales and marketing

The perception of respondent

Core competencies
N/A

COMPANY No.5

Company background

- Industry sector: Manufacturing
- Number of employees: 100-199
- Annual sales: £50-500 millions
- Location of company: England, UK
- Position of the respondent: Systems engineer

The identified competencies and core competencies

- Competence

Competencies
R & D Manufacturing/processing Sales and marketing

- Core competence

Core competencies
R & D Manufacturing/processing

The perception of respondent

Core competencies
N/A

COMPANY No.6

Company background

- Industry sector: Manufacturing
- Number of employees: Over 1,000
- Annual sales: Over £500 millions
- Location of company: England, UK
- Position of the respondent: Project engineer

The identified competencies and core competencies

- Competence

Competencies
Purchasing Sales and marketing

- Core competence

Core competencies
Sales and marketing

The perception of respondent

Core competencies
N/A

COMPANY No.7

Company background

- Industry sector: Manufacturing
- Number of employees: 100-199
- Annual sales: £50-500 millions
- Location of company: England, UK
- Position of the respondent: Industrial engineer

The identified competencies and core competencies

- Competence

Competencies
Manufacturing/processing Sales and marketing

- Core competence

Core competencies
Manufacturing/processing

The perception of respondent

Core competencies
N/A

COMPANY No.8

Company background

- Industry sector: Manufacturing
- Number of employees: Over 1,000
- Annual sales: Over £500 millions
- Location of company: England, UK
- Position of the respondent: Technician

The identified competencies and core competencies

- Competence

Competencies
R & D Manufacturing/processing Performance management

- Core competence

Core competencies
R & D Manufacturing/processing

The perception of respondent

Core competencies
R & D Manufacturing/processing

COMPANY No.9

Company background

- Industry sector: Manufacturing
- Number of employees: Under 100
- Annual sales: Under £5 millions
- Location of company: England, UK
- Position of the respondent: Engineer

The identified competencies and core competencies

- Competence

Competencies
Sales and marketing

- Core competence

Core competencies
Sales and marketing

The perception of respondent

Core competencies
N/A

COMPANY No.10

Company background

- Industry sector: Manufacturing
- Number of employees: 500-999
- Annual sales: £5-50 millions
- Location of company: England, UK
- Position of the respondent: Manufacturing manager

The identified competencies and core competencies

- Competence

Competencies
R & D Sales and marketing

- Core competence

Core competencies
R & D Sales and marketing

The perception of respondent

Core competencies
Manufacturing process development Product development Customer relationships

COMPANY No.11

Company background

- Industry sector: Manufacturing
- Number of employees: Over 1,000
- Annual sales: Over £500 millions
- Location of company: England, UK
- Position of the respondent: Manager

The identified competencies and core competencies

- Competence

Competencies
Sales and marketing Performance management

- Core competence

Core competencies
Sales and marketing

The perception of respondent

Core competencies
Experience High technology Working system

COMPANY No.12

Company background

- Industry sector: Manufacturing
- Number of employees: 100-199
- Annual sales: £5-50 millions
- Location of company: England, UK
- Position of the respondent: Engineer

The identified competencies and core competencies

- Competence

Competencies
Purchasing Sales and marketing

- Core competence

Core competencies
Sales and marketing

The perception of respondent

Core competencies
N/A

COMPANY No.13

Company background

- Industry sector: Manufacturing
- Number of employees: 500-999
- Annual sales: £50-500 millions
- Location of company: England, UK
- Position of the respondent: Control manager

The identified competencies and core competencies

- Competence

Competencies
R & D Sales and marketing

- Core competence

Core competencies
Sales and marketing

The perception of respondent

Core competencies
Manufacturing/processing Sales and marketing

COMPANY No.14

Company background

- Industry sector: Manufacturing
- Number of employees: 100-199
- Annual sales: £5-50 millions
- Location of company: England, UK
- Position of the respondent: Logistics manager

The identified competencies and core competencies

- Competence

Competencies
Purchasing Sales and marketing

- Core competence

Core competencies
Sales and marketing

The perception of respondent

Core competencies
Manufacturing/processing Sales and marketing

COMPANY No.15

Company background

- Industry sector: Manufacturing
- Number of employees: 500-999
- Annual sales: 50-500
- Location of company: England, UK
- Position of the respondent: Trainee manager

The identified competencies and core competencies

- Competence

Competencies
Sales and marketing Performance management

- Core competence

Core competencies
Sales and marketing

The perception of respondent

Core competencies
Manufacturing/processing Sales and marketing

COMPANY No.16

Company background

- Industry sector: Manufacturing
- Number of employees: Under 100
- Annual sales: Under £5 millions
- Location of company: England, UK
- Position of the respondent: Quality manager

The identified competencies and core competencies

- Competence

Competencies
R & D Manufacturing/processing Sales and marketing

- Core competence

Core competencies
R & D Manufacturing/processing

The perception of respondent

Core competencies
R & D Manufacturing/processing

COMPANY No.17

Company background

- Industry sector: Manufacturing
- Number of employees: Over 1,000
- Annual sales: Over £500 millions
- Location of company: England, UK
- Position of the respondent: Production manager

The identified competencies and core competencies

- Competence

Competencies
R & D Manufacturing/processing Sales and marketing

- Core competence

Core competencies
Manufacturing/processing Sales and marketing

The perception of respondent

Core competencies
Manufacturing/processing Sales and marketing

COMPANY No.18

Company background

- Industry sector: Manufacturing
- Number of employees: 500-999
- Annual sales: £50-500 millions
- Location of company: England, UK
- Position of the respondent: Manufacturing manager

The identified competencies and core competencies

- Competence

Competencies
R & D Manufacturing/processing Sales and marketing

- Core competence

Core competencies
R & D Sales and marketing

The perception of respondent

Core competencies
R & D Manufacturing/processing

COMPANY No.19

Company background

- Industry sector: Manufacturing
- Number of employees: 500-999
- Annual sales: £50-500 millions
- Location of company: England, UK
- Position of the respondent: Technical team leader

The identified competencies and core competencies

- Competence

Competencies
Sales and marketing

- Core competence

Core competencies
Sales and marketing

The perception of respondent

Core competencies
Manufacturing/processing Sales and marketing

COMPANY No.20

Company background

- Industry sector: Manufacturing
- Number of employees: 200-499
- Annual sales: N/A
- Location of company: England, UK
- Position of the respondent: Technician

The identified competencies and core competencies

- Competence

Competencies
R & D Manufacturing/processing Performance management

- Core competence

Core competencies
R & D

The perception of respondent

Core competencies
Manufacturing/processing Sales and marketing

COMPANY No.21

Company background

- Industry sector: Manufacturing
- Number of employees: N/A
- Annual sales: N/A
- Location of company: England, UK
- Position of the respondent: Technician

The identified competencies and core competencies

- Competence

Competencies
Manufacturing/processing Sales and marketing

- Core competence

Core competencies
Manufacturing/processing

The perception of respondent

Core competencies
Manufacturing/processing Sales and marketing

COMPANY No.22

Company background

- Industry sector: Manufacturing
- Number of employees: 500-999
- Annual sales: £50-500 millions
- Location of company: England, UK
- Position of the respondent: Manager

The identified competencies and core competencies

- Competence

Competencies
R & D Manufacturing/processing Sales and marketing

- Core competence

Core competencies
R & D Sales and marketing

The perception of respondent

Core competencies
Manufacturing/processing Sales and marketing

COMPANY No.23

Company background

- Industry sector: Manufacturing
- Number of employees: 500-999
- Annual sales: £50-500 millions
- Location of company: England, UK
- Position of the respondent: Technician

The identified competencies and core competencies

- Competence

Competencies
Purchasing Manufacturing/processing Sales and marketing

- Core competence

Core competencies
Sales and marketing

The perception of respondent

Core competencies
Manufacturing/processing Sales and marketing

COMPANY No.24

Company background

- Industry sector: Manufacturing
- Number of employees: 500-999
- Annual sales: £50-500 millions
- Location of company: England, UK
- Position of the respondent: Production manager

The identified competencies and core competencies

- Competence

Competencies
Purchasing Manufacturing/processing Sales and marketing

- Core competence

Core competencies
Manufacturing/processing Sales and marketing

The perception of respondent

Core competencies
Manufacturing/processing Sales and marketing

COMPANY No.25

Company background

- Industry sector: Manufacturing
- Number of employees: 100-199
- Annual sales: £5-50 millions
- Location of company: England, UK
- Position of the respondent: Services engineer

The identified competencies and core competencies

- Competence

Competencies
R & D Sales and marketing Performance management

- Core competence

Core competencies
R & D Performance management

The perception of respondent

Core competencies
Manufacturing/processing Sales and marketing

COMPANY No.26

Company background

- Industry sector: Manufacturing
- Number of employees: 500-999
- Annual sales: £50-500 millions
- Location of company: England, UK
- Position of the respondent: Product design engineer

The identified competencies and core competencies

- Competence

Competencies
R & D Sales and marketing

- Core competence

Core competencies
R & D Sales and marketing

The perception of respondent

Core competencies
R & D Manufacturing/processing

COMPANY No.27

Company background

- Industry sector: Manufacturing
- Number of employees: 200-499
- Annual sales: Under £5 millions
- Location of company: England, UK
- Position of the respondent: Hardware/software engineer

The identified competencies and core competencies

- Competence

Competencies
R & D Manufacturing/processing

- Core competence

Core competencies
R & D

The perception of respondent

Core competencies
R & D Manufacturing/processing

COMPANY No.28

Company background

- Industry sector: Manufacturing
- Number of employees: 200-499
- Annual sales: Under £5 millions
- Location of company: England, UK
- Position of the respondent: Quality engineer

The identified competencies and core competencies

- Competence

Competencies
Purchasing Manufacturing/processing Sales and marketing

- Core competence

Core competencies
Manufacturing/processing

The perception of respondent

Core competencies
Manufacturing/processing Sales and marketing

COMPANY No.29

Company background

- Industry sector: Manufacturing
- Number of employees: Under 100
- Annual sales: Under £5 millions
- Location of company: England, UK
- Position of the respondent: Technical services engineer

The identified competencies and core competencies

- Competence

Competencies
R & D Sales and marketing

- Core competence

Core competencies
R & D Sales and marketing

The perception of respondent

Core competencies
R & D Manufacturing/processing

COMPANY No.30

Company background

- Industry sector: Manufacturing
- Number of employees: Under 100
- Annual sales: Under £5 millions
- Location of company: England, UK
- Position of the respondent: Mechanical engineer

The identified competencies and core competencies

- Competence

Competencies
Manufacturing/processing Sales and marketing

- Core competence

Core competencies
Sales and marketing

The perception of respondent

Core competencies
R & D Manufacturing/processing

COMPANY No.31

Company background

- Industry sector: Manufacturing
- Number of employees: 200-499
- Annual sales: £50-500 millions
- Location of company: England, UK
- Position of the respondent: Senior engineer

The identified competencies and core competencies

- Competence

Competencies
R & D Manufacturing/processing Sales and marketing

- Core competence

Core competencies
R & D Sales and marketing

The perception of respondent

Core competencies
R & D Sales and marketing

COMPANY No.32

Company background

- Industry sector: Manufacturing
- Number of employees: 100-199
- Annual sales: £5-50 millions
- Location of company: England, UK
- Position of the respondent: Sales engineer

The identified competencies and core competencies

- Competence

Competencies
R & D Sales and marketing

- Core competence

Core competencies
R & D Sales and marketing

The perception of respondent

Core competencies
R & D Sales and marketing

COMPANY No.33

Company background

- Industry sector: Manufacturing
- Number of employees: 100-199
- Annual sales: £5-50 millions
- Location of company: England, UK
- Position of the respondent: Quality manager

The identified competencies and core competencies

- Competence

Competencies
Sales and marketing Performance management

- Core competence

Core competencies
Sales and marketing

The perception of respondent

Core competencies
Sales and marketing Performance management

(II) NON-MANUFACTURING COMPANIES

COMPANY No.34

Company background

- Industry sector: Public service
- Number of employees: 200-499
- Annual sales: N/A
- Location of company: England, UK
- Position of the respondent: Manager

The identified competencies and core competencies

- Competence

Competencies
R & D Manufacturing/processing Performance management

- Core competence

Core competencies
R & D Performance management

The perception of respondent

Core competencies
Intellectual property

COMPANY No.35

Company background

- Industry sector: Public service
- Number of employees: Over 1,000
- Annual sales: £50-500 millions
- Location of company: England, UK
- Position of the respondent: Service support manager

The identified competencies and core competencies

- Competence

Competencies
Sales and marketing Performance management

- Core competence

Core competencies
Sales and marketing

The perception of respondent

Core competencies
N/A

COMPANY No.36

Company background

- Industry sector: Public service
- Number of employees: 200-499
- Annual sales: N/A
- Location of company: England, UK
- Position of the respondent: Design engineer

The identified competencies and core competencies

- Competence

Competencies
R & D Purchasing

- Core competence

Core competencies
R & D

The perception of respondent

Core competencies
Avionics design

COMPANY No.37

Company background

- Industry sector: Public service
- Number of employees: Over 1,000
- Annual sales: N/A
- Location of company: England, UK
- Position of the respondent: Bio-medical engineer

The identified competencies and core competencies

- Competence

Competencies
R & D Sales and marketing Performance management

- Core competence

Core competencies
R & D Sales and marketing

The perception of respondent

Core competencies
R & D Performance management

COMPANY No.38

Company background

- Industry sector: Service
- Number of employees: 200-499
- Annual sales: £5-50 millions
- Location of company: England, UK
- Position of the respondent: Project engineer

The identified competencies and core competencies

- Competence

Competencies
R & D Performance management

- Core competence

Core competencies
R & D

The perception of respondent

Core competencies
N/A

COMPANY No.39

Company background

- Industry sector: Service
- Number of employees: Under 100
- Annual sales: £5-50 millions
- Location of company: England, UK
- Position of the respondent: Managing director

The identified competencies and core competencies

- Competence

Competencies
Sales and marketing Performance management

- Core competence

Core competencies
Performance management

The perception of respondent

Core competencies
Sales and marketing Performance management

COMPANY No.40

Background

- Industry sector: Service
- Number of employees: Over 1,000
- Annual sales: Over £500 millions
- Location of company: England, UK
- Position of the respondent: Senior manager

The identified competencies and core competencies

- Competence

Competencies
Sales and marketing Performance management

- Core competence

Core competencies
Sales and marketing

The perception of respondent

Core competencies
Sales and marketing

COMPANY No.41

Company background

- Industry sector: Utilities
- Number of employees: Under 100
- Annual sales: N/A
- Location of company: England, UK
- Position of the respondent: Engineer assistant

The identified competencies and core competencies

- Competence

Competencies
Sales and marketing Performance management

- Core competence

Core competencies
Sales and marketing Performance management

The perception of respondent

Core competencies
Sales and marketing Performance management

COMPANY No.42

Company background

- Industry sector: Distribution
- Number of employees: 500-999
- Annual sales: £50-500 millions
- Location of company: England, UK
- Position of the respondent: Manager

The identified competencies and core competencies

- Competence

Competencies
Manufacturing/processing Sales and marketing

- Core competence

Core competencies
Sales and marketing

The perception of respondent

Core competencies
Sales and marketing