



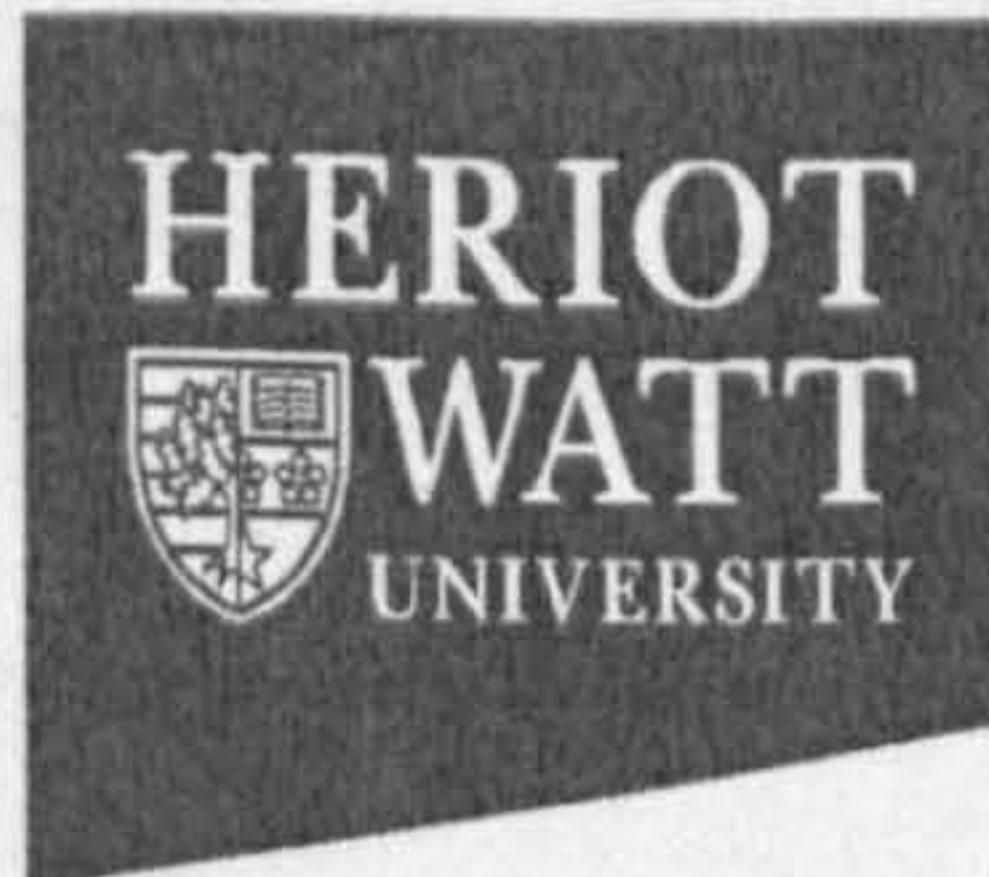
The Competitiveness of Logistics Service Providers:

An Investigation in China and the UK

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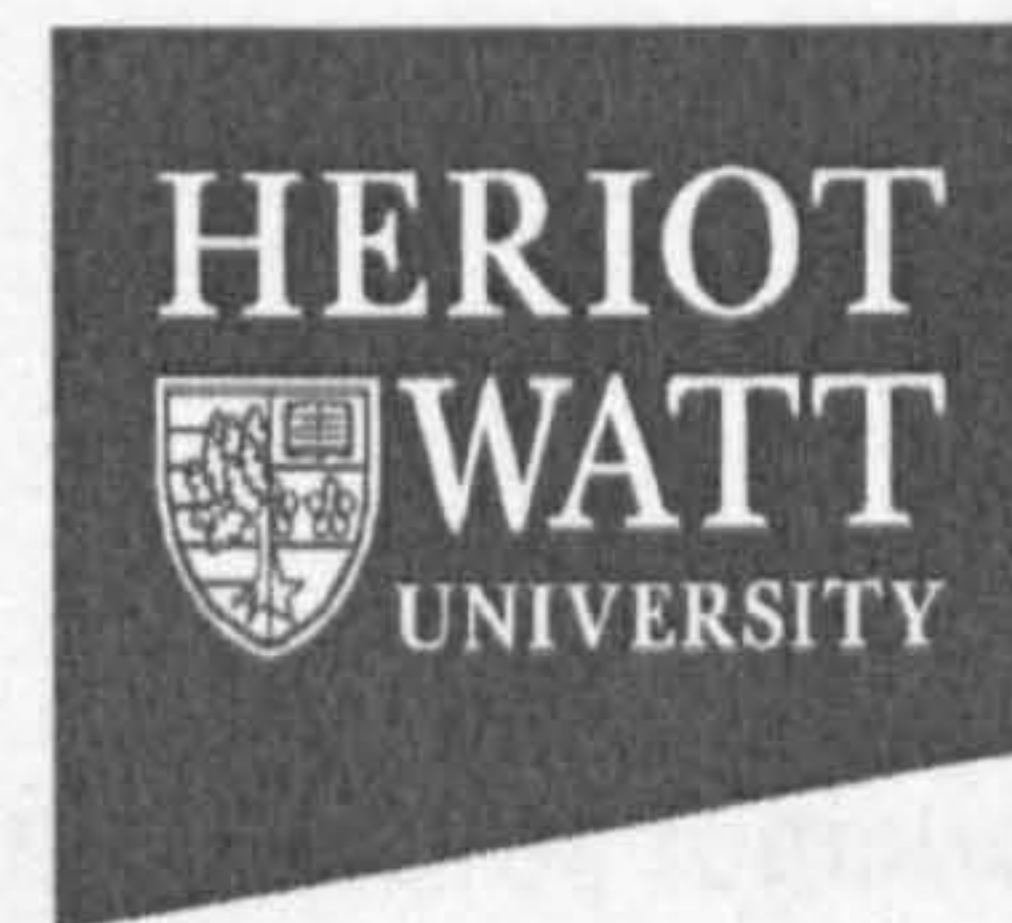
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ABSTRACT

The aim of this study is to investigate systematically the competitiveness of logistics service providers (LSPs). Competitiveness is not a new topic in business research but has received little discussion in the logistics literature. This study helps to fill this gap in the literature.

In contrast to most previous studies of third-party logistics which have viewed the subject from the user's perspective, this study investigates the LSP's point of view. The thesis has both theoretical and empirical sections. The theoretical part reviews the work of economists and strategists on firm-level competitiveness, in particular, the resource-based view (RBV) and Porter's competitive theory of strategic management. Partly on the basis of this review it constructs a research model for the analysis of LSPs' competitiveness based on primary sources, contributing factors and performance measures. A series of seven research propositions are derived relating to various aspects of the subject. The empirical work undertaken to test the validity of these propositions used a combination of quantitative and qualitative approaches and involved comparative surveys in two countries: China and the UK. This survey work comprised three phases: piloting, validation and main survey. Four kinds of research methods were used to collect both quantitative and qualitative data: telephone interviews, e-mail survey, semi-structured face-to-face interviews and large-scale postal questionnaire survey. A range of different descriptive and inferential statistical techniques were employed to analyse these data, including two that appear not to have been widely applied in the field of logistics research (the application of factor scores in exploratory factor analysis and factor analysis regression).

The empirical results confirm the applicability of both the resource-based view (RBV) and Porter's theory of competitiveness to LSPs. They indicate, nevertheless, that the RBV is the more appropriate in this context. Generally speaking, the study indicates that the competitiveness of an LSP does not simply depend on external forces but can be strongly influenced by the LSP own actions. Capabilities are identified as the most important source of competitiveness by respondents in both countries. This not only supports the RBV, but is also in line with numerous other concepts of firm-level competitiveness.

The study reveals a high degree of similarity in the views of competitiveness expressed by Chinese and British LSPs, though several important differences emerged. Some of these variations can be attributed to differences in cultural backgrounds and economic systems.

In the light of the theoretical and empirical research a procedure is outlined which LSPs might employ to assess and improve their level of competitiveness.

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CHAPTER 1 INTRODUCTION

1.1 Research Background

With increasing globalization, the advent of the networked economy, greater customization of products and services, more frequent mergers/acquisitions (M&A), the development of E-commerce and tightening environmental controls, logistics service providers (LSPs) are facing greater challenges to remain competitive. Total logistics expenditure is rising and an increasing proportion of this spend is being outsourced, thus the market for logistics services is expanding. It is also diversifying and presenting LSPs with the question of deciding where to position themselves to maximise future growth opportunities.

Partly as a result of the huge growth of logistics outsourcing over the past 25 years, LSPs have become indispensable in helping companies manage their transport and warehousing operations. They are clearly playing an increasingly important role in the supply chain. As surveyed by Lieb and Bentz (2004), 80 percent of Fortune 500 companies were using LSPs in 2004. LSPs can help companies to secure a competitive edge through cost savings, customer service improvements and greater focusing on the core business (Berglund *et al.*, 1999; Boyson *et al.*, 1999; Larrhoven *et al.*, 2000; McKinnon, 2003; Razzaque and Sheng, 1998; PE consulting, 1996; Persson and Virum, 2001; Zineldin and Bredenl ow, 2003). Moreover, through close understanding and collaboration with companies, LSPs are also able to improve their overall supply chains (Panayides and So, 2005).

Due to this pronounced influence, LSPs have been widely discussed in the logistics and supply chain literature. Some studies, primarily based on surveys, describe LSPs' evolution and growth over several decades. For example, on the basis of meta-analysis of two annual surveys: "Lieb Series" and "Langley Series" conducted by Lieb and Langley and their colleagues respectively, Ashenbaum *et al.* (2005) reveal that over the last decade annual average growth rates for LSPs in the US have been between 5 and 10 percent.

Other studies have viewed third part logistics (3PL) from the standpoint of companies outsourcing logistics activities, such as: (1) the reasons for companies to employ LSPs; (2) the specific functions of LSPs; (3) the process and criteria for selecting LSPs; (4)

success factors or barriers influencing the relationship with LSPs; (5) measurement of performance related to LSPs for companies; and (6) contracts with LSPs (Maloni and Carter, 2006; Selviaridis and Spring; 2007). On the basis of a comprehensive review of LSP literature, Maloni and Carter (2006) examined forty-five papers from 1989 to 2004 and found: of these papers, thirty-four (76%) are from the user's standpoint, while eight (18%) adopt an LSP's view, the remaining two (4.4%) examine both perspectives. The discussions are mostly centred on how companies gain competitive advantage by employing LSPs. Very little research, however, has considered how the LSPs themselves gain competitive advantage.

The pressures on LSPs to survive and their desire to gain competitive advantage are no less than those of their customers. Customers' requirements for higher levels of complexity and sophistication are causing LSPs to rethink what they must do to become more competitive. Some LSPs are adapting more effectively than others to this changing business environment and will in turn survive, while others are failing to safeguard their competitive position and may go out of business. There are still new companies continuously entering this arena and further intensifying competition.

The question is, within this highly competitive LSP market, why do some LSPs outperform others? Pressures and challenges arising in the external world have forced LSPs to compete more aggressively. Is it these exogenous factors that are the main drivers of competition in the market? What are the internal determinants of an LSP's competitiveness? What are the main success factors and how are they measured? Unfortunately, the existing LSP literature does not provide adequate answers to these questions.

For this reason, this study investigates the issue of LSPs' competitiveness. Competitiveness is not a new topic in business research but is little discussed in the LSP literature. The purpose of this study is to improve understanding of an LSP's competitiveness. As distinct from most studies of third party logistics which view it from the user's perspective, this research adopts the LSP's point of view.

1.2 Research Questions

In academia, the study of competitiveness is fraught with debates and controversies. There is not even a universally agreed and adopted definition of competitiveness.

“Despite its acknowledged importance, the concept of competitiveness is often misunderstood” (Porter, 2003, p. 23).

Various discussions on firm-level competitiveness have been ongoing since the early 1980s. While numerous researchers have presented insights, most of them are conceptual approaches which are limited to the analysis of concepts or indicators. This has increased the knowledge of some aspects of firm-level competitiveness, but not led to a comprehensive understanding of a firm’s competitiveness. This study seeks a deeper understanding of the sources of competitiveness in the LSP market by digging beneath the standard concepts and indicators. It addresses four sets of research questions:

- (1) What are the primary sources of an LSP’s competitiveness? To what extent does an LSP’s competitiveness depend on the exogenous and endogenous factors?
- (2) What specific factors can contribute to an LSP’s competitiveness? Some determinants of an LSP’s success have been identified in the LSP literature by case study or survey. What is the relative contribution of these identified determinants to an LSP’s competitiveness?
- (3) What are the possible measures that LSPs can use to assess their competitiveness? To what extent can they be quantified?
- (4) What are the management practices that LSPs should be adopting to enhance their competitiveness? What procedure should they adopt to measure and improve competitiveness?

Because research was undertaken in two countries (China and the UK) it has also been possible to measure the extent to which LSPs’ perceptions of and attitudes to competitiveness vary internationally.

1.3 Context of the Study

The context of the study is the LSP market of China and the UK. China and the UK are two countries with completely different cultural and economic backgrounds, the former a rapidly developing country moving from a centrally-planned to free market economy and the latter a well-developed country with an advanced economy. In China, the logistics service market is relatively young and currently undergoing major restructuring, partly as a result of market liberalisation but also in response to the rapid growth of its economy. The UK has, by comparison, a much more mature logistics service market

and its LSPs are generally considered to be among the most efficient and innovative in the world.

Therefore, the research is also an attempt to reveal similarities and differences between Chinese and UK LSPs in their understanding and pursuit of competitiveness in two different market contexts. If they are similar, there is greater justification for generalization. If there are large differences, it would be useful to further explore the impact of cultural background and economic system on LSP competitiveness.

1.4 Layout of the Thesis

The thesis is divided into two parts dealing with conceptual issues and empirical results. The conceptual work is contained in four chapters (chapters 2 to 5), while the empirical investigation is contained in five chapters (chapters 6 to 10). The last chapter, Chapter 11 provides a conclusion to the whole thesis.

1.4.1 Conceptual work

The objective of the conceptual work is to develop a research model for the empirical investigation. Chapter 2 discusses the general issue of firm-level competitiveness based on the numerous insights of economists and strategists. This includes a review of previous research on the primary sources of competitiveness plus contributing factors and measures. Chapter 3 examines the development of the LSP market. It also differentiates the characteristics of LSPs from those of other types of firms, showing how LSPs have different competitive attributes from other production and service companies. Chapter 4 traces the different development courses of Chinese and UK LSPs within completely different market contexts. Chapter 5 develops the conceptual model and postulates research propositions. The dimensions of LSPs' competitiveness are derived from two sources: previous studies of LSPs' success as reported in the logistics literature and borrowing from other disciplines' research on firm-level competitiveness.

1.4.2 Empirical investigation

Chapter 6 outlines the research methodology used in this study. The research objectives, strategy, philosophical stance, approach and methods undertaken in the thesis are all introduced. The survey strategy is guided by a combination of quantitative and qualitative approaches and based, respectively, on positivist and phenomenological paradigms. A three-phase survey carried out in both China and the UK is described.

This includes one phase of piloting and two sequential phases comprising the main survey.

Chapter 7 presents and discusses the results of the first stage of the main survey consisting of semi-structured face-to-face interviews with twenty-one China-based LSPs and two UK-based LSPs. This interview survey prepares the foundations for a large-scale postal questionnaire survey.

Chapter 8 presents the results of the postal questionnaire survey. The profiles of the UK and Chinese samples are outlined prior to a discussion of the preliminary results of a statistical analysis of the questionnaire data.

Chapter 9 discusses the findings of a much deeper analysis of the relationship between LSP competitiveness and contributing factors. Inferences are made from the application of three more advanced analytical techniques (multiple regression, exploratory factor analysis and factor analysis regression).

Chapter 10 discusses the wider implications of the research findings reported in Chapters 7-9. It proposes some refinement to the original conceptual model. The views of the Chinese and UK LSPs are compared and several important differences noted. The chapter concludes by outlining a formal procedure that LSPs can use to enhance their competitiveness.

The final chapter summarizes the main findings, discusses the limitations of the work and explains how they might be overcome in future research.

CHAPTER 2 COMPETITIVENESS AT THE FIRM LEVEL

2.1 Introduction

In this chapter a critical review of existing literature regarding numerous discussions on firm-level competitiveness will be established. This review encompasses concepts, primary sources, contributing factors and measurement in relation to a firm's competitiveness. The aim of this review is to establish the current state of knowledge of firm-level competitiveness which may help to develop a comprehensive understanding of logistics service providers' (LSPs) competitiveness.

2.2 Concepts of Competitiveness

The focus of this section is firm-level competitiveness. However, in order to differentiate firm-level competitiveness from other types of competitiveness, macro-level competitiveness and competitiveness at other levels will be briefly discussed.

2.2.1 Micro-economic competitiveness

Firm-level competitiveness is also referred to as micro-economic competitiveness (OECD, 1992). Various government bodies and authors have offered different perspectives of competitiveness at this level. OECD (The Organization for Economic Cooperation and Development) links competitiveness at this level to the capacity of firms in competition.

In micro-economics, the term 'competitiveness' refers to the capacity of firms to compete and, on the basis of their success or 'competitiveness', to gain market shares, increase their profits and grow (OECD, 1992, p. 239).

Altenburg *et al.* (1998) delineate firm-level competitiveness and place emphasis on the sustainability of competitiveness.

At the company level, competitiveness refers to the ability to sustain a market position. This ability requires the simultaneous achievement of several targets. The firm must supply products of adequate quality on time and at competitive prices. Moreover, it must as a rule be in a position to provide sufficiently diversified products to meet a differentiated demand, and it must respond quickly to changes in demand behavior. Beyond this, success is contingent on a firm's innovative capacity, its ability to build up an effective marketing system, to establish a brand name, and so on (Altenburg *et al.*, 1998, p. II).

Prahalad and Hamel (1990) suggest that a firm's competitiveness may originate from core competences which reside in the firm. They state that competitiveness applies to two time scales.

In the short run, a company's competitiveness derives from the price/performance attributes of current products. In the long run, competitiveness derives from an ability to build, at lower cost and more speedily than competitors, the core competencies that spawn unanticipated products (Prahalad and Hamel, 1990, p. 81).

Feurer and Chaharbaghi (1994) summarize a holistic definition of firm-level competitiveness.

Competitiveness is relative and not absolute. It depends on shareholder and customer values, financial strength which determines the ability to act and react within the competitive environment and the potential of people and technology in implementing the necessary strategic changes. Competitiveness can only be sustained if an appropriate balance is maintained between these factors which can be of a conflicting nature (Feurer and Chaharbaghi, 1994, p. 58).

In response to this holistic approach, Feuerer and Chaharbaghi (1994) claim that the definition of competitiveness should embody diversified considerations, such as relativity, sustainability, integration of customer values, shareholder values, the ability to adapt the business environment and the potential of people and technology.

Hitt *et al.* (2003) propose a concept of strategic competitiveness on the basis of a strategic management standpoint, meaning how firms use resources, capabilities, and core competences arising from capabilities to create strategic competitiveness.

The above discussions address meaningful information of firm-level competitiveness and include five main aspects, as displayed in Table 2.1.

First of all, micro-economic or firm-level competitiveness is related to ability or capacity. It is the ability or capacity that firms possess in using resources and creating capabilities and core competitiveness (Hitt *et al.*, 2003), sustaining market position (Altenburg *et al.*, 1998, OECD, 1992), outperforming their competitors (OECD, 1992; Prahalad and Hamel, 1990), and reacting to the competitive environment (Feurer and Chaharbaghi, 1994). Secondly, the generation of competitiveness, to a large extent, relies on building important capabilities, such as superior product/service quality or

competitive price/cost (Altenburg *et al.*, 1998; Hitt *et al.*, 2003; OECD, 1992; Prahalad and Hamel, 1990). Thirdly, the measurement of a firm's competitiveness is linked up with market performance or financial performance (OECD, 1992; Feurer and Chaharbaghi; 1994; Prahalad and Hamel, 1990). Fourthly, competitiveness does not have a one-dimensional focus; sustainability is an important attribute of a firm's competitiveness (Feurer and Chaharbaghi; 1994; Prahalad and Hamel, 1990). Lastly, a firm's competitiveness is associated with the environment in which it is based (Altenburg *et al.*, 1998).

Table 2.1 Various Understandings of Firm-level Competitiveness

Understanding of firm-level competitiveness	OECD (1992)	Altenburg <i>et al.</i> (1998)	Prahalad and Hamel (1990)	Feurer and Chaharbaghi (1994)	Hitt <i>et al.</i> (2003)
Firm-level competitiveness is related to ability or capacity	✓	✓	✓	✓	✓
The generation of competitiveness relies on building important capabilities	✓	✓	✓		✓
Competitiveness is manifest in market performance or financial performance	✓		✓	✓	
The sustainability of competitiveness			✓	✓	
Firm-level competitiveness is associated with environment		✓			

2.2.2 Macro-economic competitiveness

In contrast to competitiveness at the micro-economic level, competitiveness at the macro-economic level is associated with national state (OECD, 1992). It is more difficult to give a definition of competitiveness at this level because the "notion of competitiveness originated in micro-economics and was later transferred, with some awkwardness, to the level of national economics" (OECD, 1992, p. 238). In addition, the difficulty in definition, to a large extent, is relevant to the tradition of viewing macro-economic competitiveness with prices, costs and exchange rates. Under this tradition, the competitiveness of a nation is evaluated by the ability of a nation to maintain a positive trade balance. However, even the very poorest nations can well realize such a trade balance (OECD, 1992).

Krugman (1994) explains the difficulty in defining the concept of competitiveness at the national level, and also sheds light on the differentiation between the macro-economic level and the micro-economic level.

In fact, however, trying to define the competitiveness of a nation is much more problematic than defining that of a corporation. The bottom line for a corporation is literally its bottom line: if a corporation cannot afford to pay its workers, suppliers, and bondholders, it will go out of business. So when we say that a corporation is uncompetitive, we mean that its market position is unsustainable - that unless it improves its performance, it will cease to exist. Countries, on the other hand, do not go out of business. They may be happy or unhappy with their economic performance, but they have no well-defined bottom line. As a result, the concept of national competitiveness is elusive (Krugman, 1994, p. 31).

On the base of numerous studies and hearings, OECD (1992) set out a working definition of national competitiveness as follows:

Competitiveness for a nation is the degree to which it can, under free and fair market conditions, produce goods and services that meet the test of international markets while simultaneously maintaining and expanding the real income of its citizens. Competitiveness is the basis for a nation's standard of living. It is also fundamental to the expansion of employment opportunities and a nation's ability to meet its international obligations (OECD, 1992, p. 242).

This definition refutes the traditionally narrower measures and switches the focus to national competitiveness reflecting "a nation's ability to meet the challenges of international markets while increasing the real income of its citizen" (OECD, 1992, p. 242).

In fact, as at the micro-economic level, there has been much disagreement and debate about macro-level competitiveness in recent years. Porter (1990) connects national competitiveness to national productivity, whereas Samuelson (1998), from an economist's standpoint, suggests that national competitiveness is "the extent to which a nation's goods can compete in the marketplace; this depends primarily upon the relative prices of domestic and foreign products. Competitiveness, however, is quite distinct from a nation's productivity, which is measured by the output per unit of input" (p. 727). In addition, the WEF (World Economic Forum) and IMD (International Institute of Management Development) define and rank national competitiveness in their annual competitiveness reports, i.e. "Global Competitiveness Report" and "World

Competitiveness Yearbook” respectively. The two studies establish two sets of well-known indices to rank and measure countries’ competitiveness: the “Global Competitiveness Index” developed by the WEF and “Swiss Competitiveness Indices”, also called “Competitiveness Scoreboard”, developed by the IMD. These indices quantify national economic competitiveness with respect to numerous criteria.

These discussions reflect the divergence in viewing macro-economic competitiveness. Nevertheless, there are differences between micro-economic and macro-economic competitiveness, as defined by OECD (1992).

2.2.3 Competitiveness at other levels

In addition to the above two categories, in practice, the notion of competitiveness has been applied to other entities such as regions, industries, products and brands. Overall, the concept of other levels of competitiveness can be differentiated from firms’ competitiveness for different contexts. For example, OECD (1992) puts forward the concept of ‘structural competitiveness’ for the interaction between companies and their external environment in which they compete. It is presented as follows.

While the competitiveness will obviously reflect successful management practice by entrepreneurs or corporate executives, it will also stem from the strength and efficiency of a national economy’s productive structure, the corresponding long-term trends in the rate and structure of capital investment (Mistral, 1978 and 1983), the technical infrastructure and other factors determining the ‘externalities’ on which firms can learn (OECD, 1992, p. 243).

The focus of ‘structural competitiveness’ is the relationship between firms’ competitiveness and macro-economic features, called ‘structural factors’. National competitiveness is not simply the collection of its firms’ competitiveness, but many ‘structural factors’ in nations may impact on firms’ competitiveness (OECD, 1992, p. 243).

Another example is ‘systemic competitiveness’ proposed by Altenburg *et al.* (1998):

Systemic competitiveness refers to nations, regions, industrial sectors or subsectors rather than individual companies. It should be noted that the notion of competitiveness applied to such aggregates is not synonymous to the concept of competitiveness of companies, as defined above, although nations (as well as other aggregates) just as corporations have a more or less sustainable market position (Altenburg *et al.*, 1998, p. II).

The emphasis of ‘systemic competitiveness’ is the meso level about the micro and macro levels, where the impact of specific policies and institutions on industrial competitiveness is stressed (Altenburg *et al.*, 1998). To some extent, the focus of ‘systemic competitiveness’ is similar to OECD (1992) since it also addresses factors outside a firm.

2.2.4 Summing Up

As shown by the above discussions, overall there is no consensus on the concept of competitiveness; Ezeala-Harrison (1999) concluded that “competitiveness has always been a somewhat difficult and controversial concept. There is very little agreement regarding its precise definition” (p. 47).

The subjects of competitiveness at micro-economic, macro-economic and other levels are different. This difference caused by the subjects may lead to different focuses exhibited in the concepts. For firm-level competitiveness, the concept is concerned with a firm’s ability/capability manifested in many ways and important capabilities outperforming competitors, such as superior product/service quality, competitive price/cost, good market/financial performance, the sustainability for persistent development, and the impact of the environment.

Armed with this conceptual understanding of firm-level competitiveness, it is possible for this study to explore the nature and implications of firms’ competitiveness. This will be presented in the following sections, where primary sources, contributing factors and measurement of a firm’s competitiveness will be discussed.

2.3 Two Influential Perspectives in Strategic Management

The concern to the sources of firms’ competitiveness may come to the field of strategic management. In this field, the central research question is how firms achieve and sustain competitive advantage (Barney and Arikan, 2001; Teece *et al.*, 1997). Around this central question, identifying sources of a firm’s competitive advantage¹ has become a major issue in research (Rumelt, 1984; Porter, 1985; Barney, 1991). Porter’s theory and the resource-based view (RBV) are two influential perspectives involved in this issue.

¹ Day (1994) uses competitiveness rather than competitive advantage. In fact, there is no special distinction between competitive advantage and competitiveness in many discussions.

The focuses of the two perspectives are external environment and internal resources/capabilities respectively.

2.3.1 Porter's theory

Appearing in the early 1980s and dominating nearly all research in the field of strategy since then is Michael Porter's competitive strategy and competitive advantage theory. The essence of Porter's theory is that the environment, and in particular, the industry or industries in which firms compete, may strongly influence the availability of competitive advantage (Porter, 1980, 1985). From this starting point, Porter proposes the five forces framework and value-chain analysis to analyze a firm's competitive advantage.

(1) Five forces framework

Specifically, Porter suggests that the five attributes of the industry structure can affect the ability of a firm to create and maintain competitive advantage. The five forces refer to: (1) the rivalry among existing competitors; (2) the bargaining power of suppliers; (3) the bargaining power of buyers; (4) the threat of substitute products or services; and (5) the threat of new entrants. This is widely known "five forces framework". Figure 2.1 shows this five forces model.

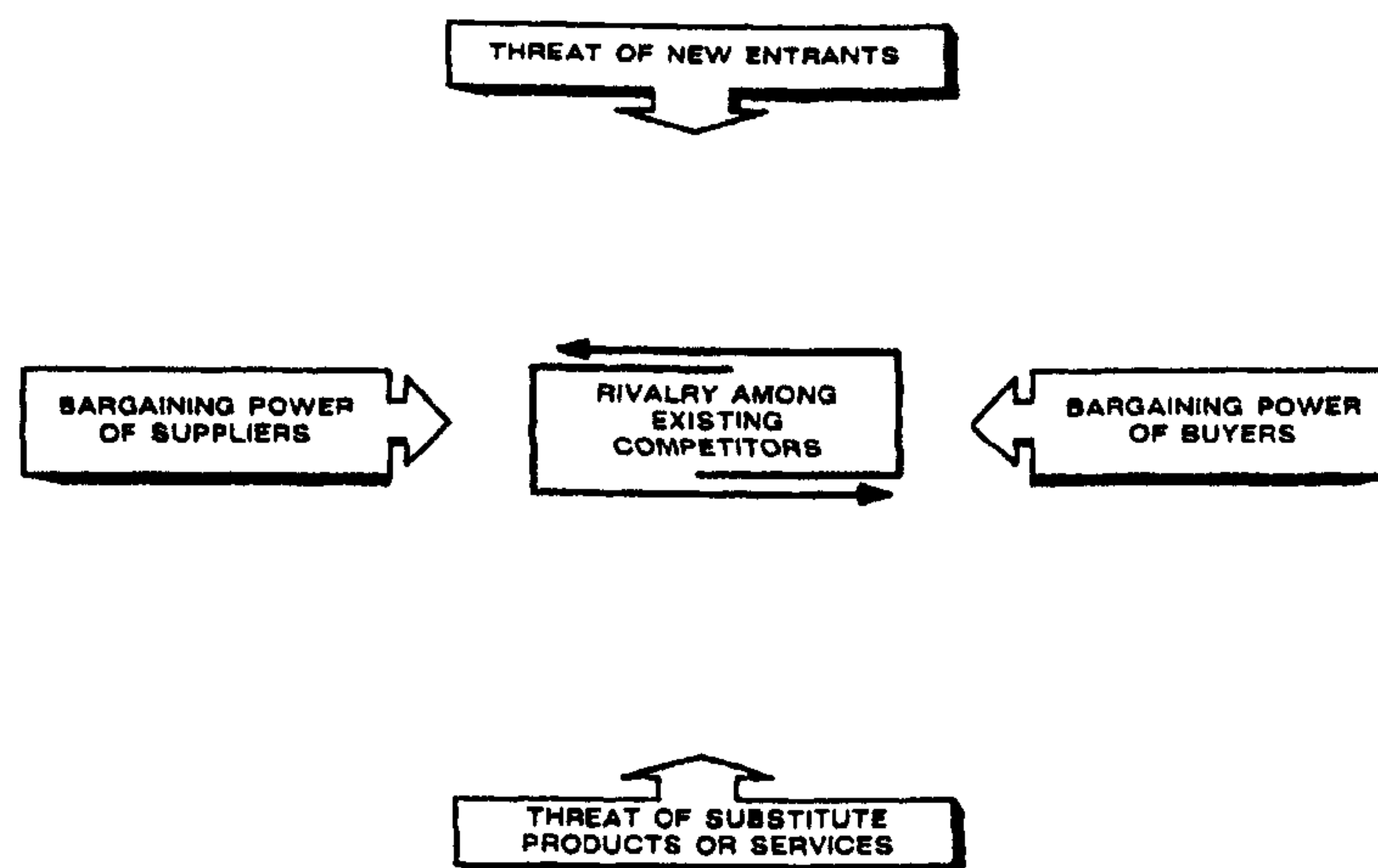


Figure 2.1 Five Forces: Summary of Key Drivers

Source: Porter (1991, p. 101)

The five forces model describes the most common threats, called competitive forces, which a firm will face in creating and maintaining its competitive advantage. The five forces not only determine industry profitability but also have a strong impact on the profitability of individual firms by influencing the prices, costs, and required investment

of firms in an industry. One firm may find a position in an industry which can defend itself against these competitive forces or influence them (Porter, 1980, 1985). The key is how a firm distinguishes its ability to cope with the five competitive forces successfully and thereby generate competitive advantage (Porter, 1980, 1985). To this end, a firm may take three generic strategies to outperform its rivals. The three generic strategies are: (1) overall cost leadership, (2) differentiation, and (3) focus (cost focus and differentiation focus).

Porter (1985) identifies two basic types of competitive advantage: low cost and differentiation. Put in detail, it is the “lower cost than rivals, or the ability to differentiate and command a premium price that exceeds the extra cost of doing so” (Porter, 1991, p. 101). The two types of advantages are considered to be stemming from the industry structure. They result from “a firm’s ability to cope with the five competitive forces better than its rivals” (Porter, 1985, p. 11). Further, Porter (1985) claims that competitive advantage should come from the many discrete activities a firm performs. These activities can contribute to either cost advantage or differentiation advantage. To best manifest the contribution of each activity, Porter (1985) proposes the value chain.

(2) Value chain and value system

Porter (1985) suggests that a firm is a collection of discrete and interrelated activities and these activities can be schematically displayed in what Porter terms the value chain and value system, as shown in Figure 2.2. Here, value refers to the amount that customers are willing to pay for what a firm offers them.

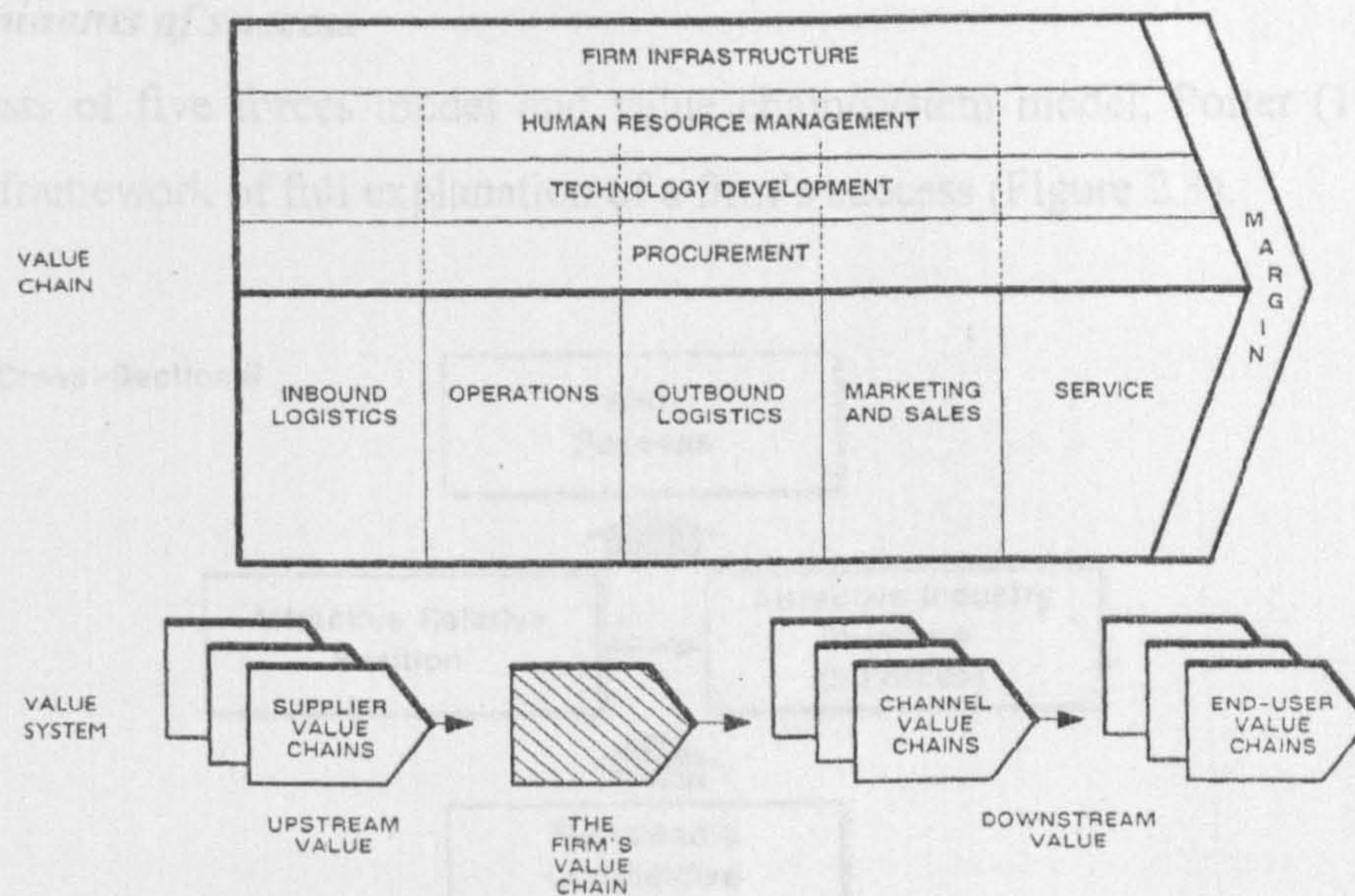


Figure 2.2 Value Chain and Value System

Source: Porter (1991, p. 103)

In value chain analysis, a firm is disaggregated into “strategically relevant activities in order to understand the behaviour of costs and the existing and potential sources of differentiation” (Porter, 1985, p. 33). These strategically important activities are distinguished with primary and support activities in terms of their importance which is vital to competitive advantage. Primary activities are composed of those that directly produce, market and deliver the product and those that create or source inputs for producing (Porter, 1985). This includes five distinct activities, i.e. inbound logistics, operations, outbound logistics, marketing and sales, and service. Support activities are integral to the process to be implemented by supporting primary activities (Porter, 1985). As with primary activities, there are also four distinct activities involved in this category; these include procurement, technology development, human resource management and firm infrastructure. Therefore, all activities are interdependent against the value chain. Different firms have different value chains. The difference among value chains between a firm and its rivals is the key source of competitive advantage (Porter, 1985).

Porter (1985) further stresses that a firm’s value chain is the part of a larger stream of activities, where the cost or effectiveness of one activity performed by the firm can be influenced by others, such as suppliers, channels and buyers. Porter calls it a value system, suggesting the close relationship between a firm and the external environment, as shown in the bottom portion of Figure 2.2. The emphasis of the value system is that gaining and sustaining competitive advantage relies on understanding not only the value chain but also how the firm fits into the whole value system (Porter, 1985).

(3) Determinants of success

On the basis of five forces model and value chain/system model, Porter (1991) puts forward a framework of full explanation of a firm's success (Figure 2.3).

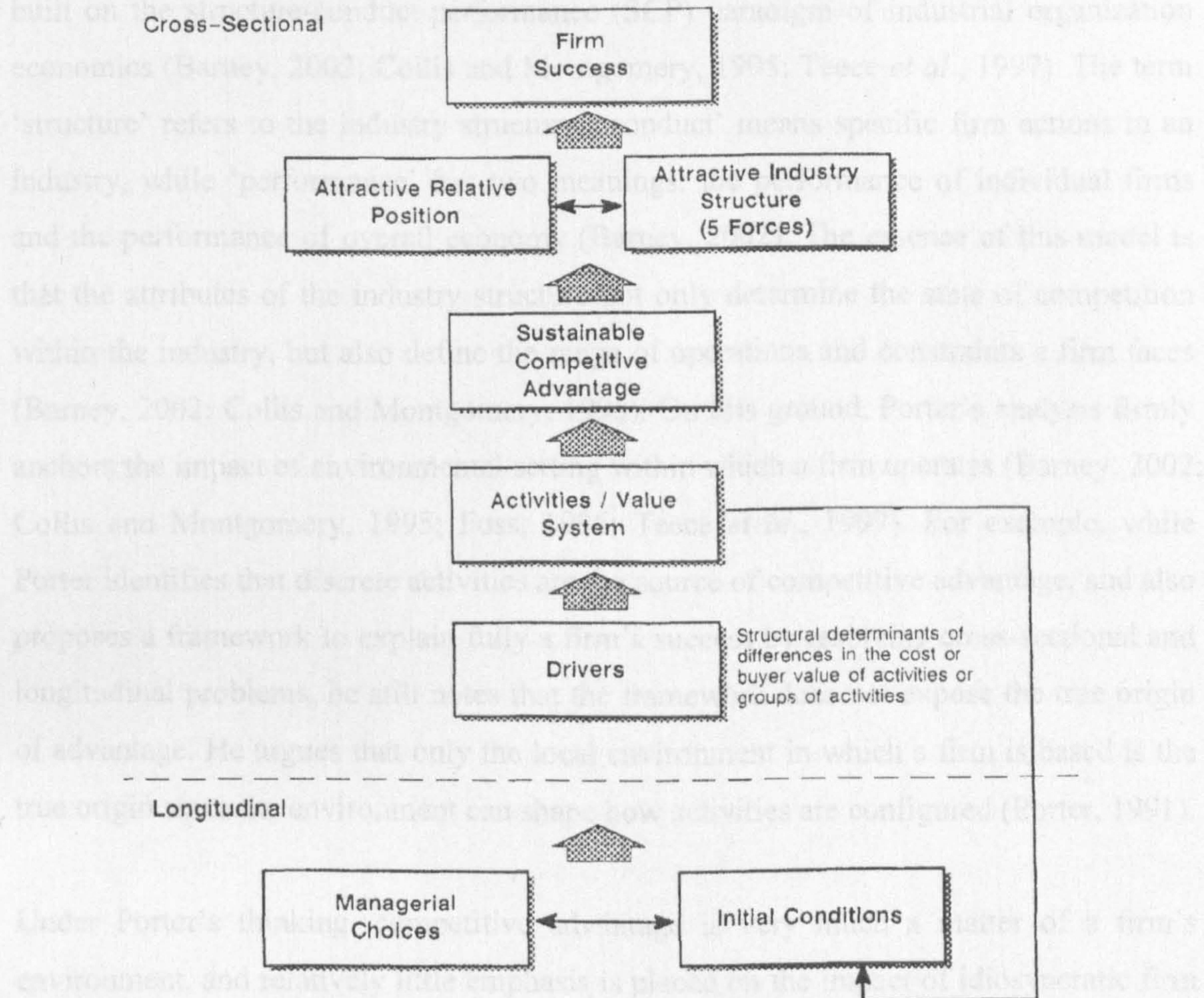


Figure 2.3 The Determinants of Success in Distinct Businesses

Source: Porter (1991, p. 100)

Figure 2.3 is composed of two portions: cross-sectional and longitudinal. The two portions place different emphases on understanding a firm's success through resolving two different problems. As Porter (1991) explains, the cross-sectional answers the "causes of superior firm performance at a given point in time", while the longitudinal answers the "dynamic process by which positions are created" (p. 96). Put straightforwardly, the cross-sectional focuses on how a firm knows its position by understanding external threats and opportunities, whereas the longitudinal pinpoints why a firm is able to get into an advantaged position and sustain/not sustain it (Porter, 1991). With respect to the relationship between the two processes, the former is prior to

the consideration of the latter. However, Porter suggests that the longitudinal takes prime importance.

Porter's work regarding competitive strategy and competitive advantage for a firm is built on the structure-conduct-performance (SCP) paradigm of industrial organization economics (Barney, 2002; Collis and Montgomery, 1995; Teece *et al.*, 1997). The term 'structure' refers to the industry structure; 'conduct' means specific firm actions in an industry, while 'performance' has two meanings: the performance of individual firms and the performance of overall economy (Barney, 2002). The essence of this model is that the attributes of the industry structure not only determine the state of competition within the industry, but also define the range of operations and constraints a firm faces (Barney, 2002; Collis and Montgomery, 1995). On this ground, Porter's analysis firmly anchors the impact of environmental setting within which a firm operates (Barney, 2002; Collis and Montgomery, 1995; Foss, 1996; Teece *et al.*, 1997). For example, while Porter identifies that discrete activities are the source of competitive advantage, and also proposes a framework to explain fully a firm's success by resolving cross-sectional and longitudinal problems, he still notes that the framework does not expose the true origin of advantage. He argues that only the local environment in which a firm is based is the true origin since the environment can shape how activities are configured (Porter, 1991).

Under Porter's thinking, competitive advantage is very much a matter of a firm's environment, and relatively little emphasis is placed on the impact of idiosyncratic firm attributes (Barney, 1991, Foss, 1996). Two implicit assumptions are made in his analysis: (1) firms within an industry (or within a strategic group) are identical in terms of the resources they possess (resource homogeneity); and (2) resource heterogeneity may be very short lived since resources are highly mobile (resource mobility) (Barney, 1991). The two assumptions are conducive to clarifying the understanding of the impact of environment, but they are unable to help in understanding the state of competitive advantage where firms within an industry are heterogeneous (Barney, 1991). It is the limitation of Porter's theory in analyzing a firm's competitive advantage under the two assumptions. This limitation has also been recognized in research, and especially in some empirical work that tests Porter's model (Barney, 1991; Hansen and Wernerfelt, 1989; Rumelt, 1991). It leads researchers to cast doubt about the ability of the Porter model to explain a firm's competitive advantage.

2.3.2 Resource-based view (RBV)

There are different labels regarding the resource-based view, such as ‘theory’, ‘perspective’, ‘view’, ‘approach’, ‘model’, as found by Acedo *et al.* (2006). However, this is not an important issue (Priem and Butler, 2001). The present study uses the term from Wernerfelt’s (1984) “Resource-Based View of the Firm”. It is also the frequently quoted term in the literature.

(1) Evolution of RBV

In contrast to Porter’s theory, the resource-based view (RBV) is built on the development of numerous researchers’ contributions. The origin of this view is from Penrose’s seminal work, “The Theory of the Growth of the Firm”. Penrose perceives a firm as “a collection of resources” (Penrose, 1959, p. 77). A firm’s growth is limited by its resource endowment. As the nature and range of these resources vary from firm to firm, so do the resource constraints (Penrose, 1959). Based on the works of Penrose and other researchers, Wernerfelt’s (1984) “Resource-Based View of the Firm” is considered the main conceptual work on this approach. Henceforth, a series of scholars (Amit and Schoemaker, 1993; Barney, 1986b, 1991, 1995; Day, 1994; Day and Wensley, 1988; Dierickx and Cool, 1989; Grant, 1991; Peteraf, 1993; Prahalad and Hamel, 1990; Rumelt, 1984; Teece *et al.*, 1997; Wernerfelt, 1995) augment and deepen this view in their individual insights. Table 2.2 displays some works of RBV scholars and their contributions.

Table 2.2 Some Works of Resource - Based View (RBV)

Authors (year)	Major contribution
Penrose (1959)	Firms as bundle of resources, firm's growth based on firm's resources and limited by managerial resources
Wernerfelt (1984)	Firms as bundles of resources
Rumelt (1984)	Strategic theory of the firm based on the idea of firms as resource
Barney (1986b)	Characteristics of the factors market determine possibilities for a firm to earn rents
Day and Wensley (1988); Aaker (1989); Wernerfelt (1989); Grant (1991)	Strategic formulation models that have firm resources as the central concept and as the sources of sustainable competitive advantage
Dierickx and Cool (1989)	Sustainability of a firm's asset position hinges on how easily assets can be substituted or imitated.
Pahalad and Hamel (1990)	Core-competence as the sources of competitiveness, it is essential for a firm to identify, cultivate and exploit the core competences
Hansen and Wernerfelt (1989); Rumelt (1991)	Empirical studies that support the hypothesis that firm - specific resources or organizational factors are more important than industry variables for explaining superior performance
Barney (1991)	Key strategic resources can be sources of sustained competitive advantage if they are valuable, rare, inimitable, non-substitutable
Peteraf (1993)	An integrative resource-based framework of sustainable competitive advantage. Proposes that firms obtain superior performance by earning rents from scarce and efficient resources and/or from market power in the product markets
Brumagim (1994)	Extending resource-based view of the firm by presenting a four-level hierarchy of corporate resources. Propose that both idiosyncratic and flexible resources are needed to sustain competitive advantage.
Day (1994)	Capabilities framework of competitive advantage. Distinguish between outside-in, spanning and inside-out capabilities. Suggests that market-driven organizations possess better outside-in capabilities, particularly market-sensing and customer linking, which influence the rest of the organization. Logistics and customer - order fulfillment capabilities are included in the framework
Collis and Montgomery (1995); Barney (1995)	Most recent managerially-oriented reviews of the resource-based view of the firm
Teece, Pisano and Shuen (1997)	Dynamic capabilities as the sources corporate competitive advantage by analyzing three paradigms, which is competitive force and strategic conflict emphasizing the exploitation of market power, and resource-based perspective emphasizing efficiency
Barney (2001)	Further discuss positioning the resource-based view relative to Structure-Conduct-Performance (SCP) - based theories of competitive advantage (Porter, 1980)
Makadok (2001)	A synthesis of views on resource and capability for rent creation. Two tent - creation mechanisms, i.e. resource - picking and capability - building are complementary in some circumstances but substitutes in others.

Source: Based on Olavarrieta and Ellinger (1997, p. 562)

As explained at the start of this section, the RBV focuses on the individual resources of a firm rather than its environment as a factor influencing the firm's competitive advantage. As with Porter's theory, there are also two assumptions adopted in the RBV: (1) firms within an industry may be heterogeneous with respect to the resources they possess (resource heterogeneity); and (2) resources may be immobile and heterogeneity can be long lasting (resource immobility) (Barney, 1991). Under these two assumptions, the concept of a firm's resources is defined broadly and various forms could be included. For example, Wernerfelt (1984) describes a firm's resources as "tangible and intangible assets...such as brand names, in-house knowledge of technology, employment of skilled personnel, trade contacts, machinery, efficient procedures, capital" (p. 172). This concept did not give further finer categories of resources and just simply refer to many things as resources (Barney and Akikan, 2001). Barney (1991, 2002) also gives a broader concept of resources as follows:

Firm resources are all assets, capabilities, competencies, organizational processes, firm attributes, information, knowledge, and so forth that are controlled by a firm and that enable the firm to conceive of and implement strategies designed to improve its efficiency and effectiveness. (Barney, 2002, p. 155).

As with Wernerfelt (1984), Barney (1991) adopts the term 'resources' and does not give detailed categories; however, Barney (2002) has used resources and capabilities interchangeably and often treats them in parallel, pinpointing the significance of capabilities. Collis and Montgomery (1995) recognize valuable resources within a firm as three categories: physical asset, intangible asset and organizational capabilities. Each category could be given further details. Table 2.3 displays relevant classifications regarding resources suggested by some RBV scholars.

Table 2.3 A Classification of the Firm's Resource Pool

Author	The firm's resource bundle		
	Tangible assets	Intangible assets	Capabilities
Wernerfelt (1984)	Fixed assets	Blueprints	Cultures
Hall (1992)		Intangible assets	Intangible capabilities
Hall (1993)		Assets	Competencies
Prahalad and Hamel (1990)		Core competencies	
Itami (1987)			Invisible assets
Amit and Schoemaker (1993)			Intermediate goods
Collis and Montgomery (1995)	Physical assets	Brand names	Organizational capabilities
Irvin and Michaels (1989)			Core skills

Adapted from Fahy (2000, p. 98)

Table 2.3 shows that there is no consensus on the classification of resources within a firm. Nevertheless, many RBV scholars (e.g. Amit and Schoemaker, 1993, Barney, 2001, Day, 1994, Grant, 1991, Peteraf, 1993, Prahalad and Hamel, 1990, and Teece *et al.*, 1997) clarify the distinction between capabilities and other resources as a result of their different roles in generating competitive advantage, as will be discussed below. In some sense, this distinction further refines the classification of resources.

(2) Resources

Amit and Schoemaker (1993) define the resources as follows:

The firm's *Resources* will be defined as stocks of available factors that are owned or controlled by the firm ... These resources consist, *inter alia*, of knowhow that can be traded (e.g., patents and licenses), financial or physical assets (e.g., property, plant and equipment), human capital, etc. [italics in the original] (Amit and Schoemaker, 1993, p. 35)

Grant (1991), one proponent of the distinction between resources and capabilities, describes the resources within a firm when analysing the implications of the RBV to competitive advantage.

Resources are inputs into the production process - they are the basic units of analysis. The individual resources of the firm include items of capital equipment, skills of individual employees, patents, brand names, finance, and so on (Grant, 1991, p. 118).

The above two definitions share similar perceptions in understanding resources. In general, resources are referred to the fundamentally physical, financial, individual and

organizational capital attributes for a firm (Amit and Schoemaker, 1993). Resources are necessary inputs for producing the final product or service and form the basis for a firm's profitability (Amit and Schoemaker, 1993; Grant, 1991). Resources may be considered with both tangible assets such as plants and equipment, and intangible assets such as brand names and technological know-how (Collis and Montgomery, 1995; Fahy, 2000). Resources can be traded (Amit and Schoemaker, 1993). However, few resources are productive (Grant, 1991). They are converted into a final product or service only when they are applied (Amit and Schoemaker, 1993; Day, 1994; Grant, 1991).

(3) Capabilities

The separation of capabilities from resources, to a great extent, could be understood by the need to highlight the unusual role of capabilities in generating competitive advantage. Compared with resources, capabilities are more difficult to delineate. Amit and Schoemaker (1993) distinguish capabilities from resources as follows.

Capabilities, in contrast, refer to a firm's capacity to deploy *Resources*, usually in combination, using organizational processes, to effect a desired end. They are information-based, tangible or intangible processes that are firm-specific and are developed over time through complex interactions among the firm's *Resources*. They can abstractly be thought of as 'intermediate goods' generated by the firm to provide enhanced productivity of its *Resources*, as well as strategic flexibility and protection for its final product or service. [italics in the original] (Amit and Schoemaker, 1993, p. 35)

This is the definition based on the comparison with resources. In fact, in order to emphasize the significance of capabilities, many scholars also define capabilities within a firm using different ways. Learned *et al.* (1969), who originally propose the SWOT model (i.e. strength, weakness, opportunity and threat), have recognized capabilities of a firm. They connect capabilities to the strength of a firm, i.e. "its demonstrated and potential ability to accomplish against the opposition of circumstance or competition, whatever it sets out to do. Every organization has actual and potential strengths and weaknesses; it is important to try to determine what they are and to distinguish one from the others" (p. 179). Andrews (1987) reiterates this opinion with a similar view. Grant (1991) describes capabilities with "the capacity for a team if resources to perform some task or activity" (p. 119). MaKadok (2001) argues that capabilities are the special type of resource which aims to improve the productivity of other resources. Similarly, Barney (2002) differentiates capabilities from other resources by defining them thus:

“capabilities, in contrast, include only those internal firm attributes that enable a firm to coordinate and exploit its other resources” (p. 157). Hitt *et al.* (2003) also do the same work as Amit and Schoemaker (1993), asserting that “capabilities are the firm’s capacity to deploy resources that have been purposely integrated to achieve a desired end state” (p. 85). Day (1994) examines the role of capabilities in market-oriented organizations, where capabilities are “complex bundles of skills and collective learning, exercised through organizational processes that ensure superior coordination of functional activities” (p. 38). Teece *et al.* (1997) develop a dynamic capability approach to explore a firm’s competitive advantage in a rapidly changeable environment, in which capabilities are emphasized as dynamic, this being the requirements of a changing environment to strategic management.

All the above discussions attach high importance to capabilities. In nature, capabilities are also resources. In contrast to other resources, capabilities are more likely to be dynamic as opposed to static. As described by Day (1994), capabilities are the “glue” to bring other resources together and deploy them advantageously (p. 38). Unlike the other resources, capabilities cannot be given a monetary value and traded (Day, 1994). In addition, capabilities are deeply embedded in the organizational routines and practices (Day, 1994; Grant, 1991).

Capabilities are emphasized as being more likely to be the most important source of competitive advantage. Grant (1991) stresses that capabilities are the main source of a firm’s competitive advantage, while resources are the source of capabilities. Collis (1994) also maintains that capabilities are the most likely source of sustainable competitive advantage. Kay (1993a) suggests that a firm’s success is based on three distinctive capabilities: innovation, architecture and reputation. Innovation means the ability to innovate; architecture refers to the network of relationship within a firm or between the firm and outside, such as suppliers and customers; the focus of reputation is aimed at endurance. Prahalad and Hamel (1990) suggest that the root of competitive advantage lies in the core competences a firm possesses. Core competences refer to “collective learning in the organization, especially how to coordinate diverse production skills and integrate multiple streams of technologies” (Prahalad and Hamel, 1990, p. 82). There are three features of core competences: (1) potential accession to various markets; (2) significantly contribute to customer benefits of the final product; and (3) difficult for competitors to imitate (Prahalad and Hamel, 1990). In regard to the category of core

competence, Fahy (2000) puts it as either the intangible assets or capabilities, while Henderson and Mitchell (1997) simply consider it as capabilities.

Nonetheless, whether in the literature or in practice, the distinction between resources and capabilities is often blurred. Both are used interchangeably in some contexts or capabilities are classified as resources. For example, Ray *et al.* (2004) adopt resources and capabilities interchangeably when empirically testing the relationship among capabilities, business processes and competitive advantage. Thus, the real understanding of the concepts of resources/capabilities, where it is adopted by a broader way (i.e. capabilities are included in resources) or a finer way (i.e. capabilities are separated from resources), should depend on the specific context discussed.

(4) Sustained/sustainable competitive advantage²

The sustained/sustainable competitive advantage is highlighted in the RBV theory. Barney (1991) makes a distinction between competitive advantage and sustained competitive advantage.

A firm is said to have a *competitive advantage* when it is implementing a value creating strategy not simultaneously being implemented by any current or potential competitors. A firm is said to have a *sustained competitive advantage* when it is implementing a value creating strategy not simultaneously being implemented by any current or potential competitors and when these other firms are unable to duplicate the benefits of this strategy [italics in the original] (Barney, 1991, p. 102).

Barney (1991) further stresses that “whether or not a competitive advantage is sustained depends upon the possibility of competitive duplication” rather than “the period of calendar time during which a firm enjoys a competitive advantage” (p. 102). In order to understand sources of sustained competitive advantage, Barney (1991) suggests four attributes of resources: value, rareness, imitability and substitutability; in detail, in order to have the potential of sustained competitive advantage, a firm resource must have the four attributes: (1) it must be valuable in exploring opportunities or neutralizing threats in a firm’s environment; (2) it must be rare among a firm’s current and potential competition; (3) it must be imperfectly imitable; and (4) there cannot be substitutes for this resource. There are two notes here. The first one is that with respect to sustained

² Barney (1991) and Grant (1991), respectively, uses the terms “sustained competitive advantage” and “sustainable competitive advantage” in the same year. The two terms appear in the literature but both can be interpreted in the same way (Fahy, 2000).

competitive advantage in the RBV, Barney (2001) considers it much closer to the notion of sustainability. The other note is that Barney (1991) uses 'firm resources' in discussion. However, he also uses 'firm resources or capabilities' in repeating the same issue in some of his later studies, e.g. Barney's (2002) "Gaining and Sustaining Competitive Advantage".

Another RBV scholar, Grant (1991), who uses the term 'sustainable competitive advantage', also suggests that there are four characteristics of resources and capabilities which influence the sustainability of competitive advantage: durability, transparency, transferability and replicability. The explanation for these four characteristics is as follows. Unlike Barney (1991), Grant (1991) clearly uses the term 'sustainability'.

- (1) Durability is the rate at which competitive advantage gained from underlying resources and capabilities becomes eroded. Capabilities can be more durable than resources since the latter wear out and need replacing and can also be more easily duplicated.
- (2) Transparency is the extent to which firms' competitive advantage can be observed, analyzed and understood. A firm's ability to sustain its competitive advantage over time relates to the speed with which its rivals can imitate. This imitation requires rivals to overcome two problems: information and strategy duplication. In the former case, a firm which wishes to imitate a rival must gain insights into its capabilities and resources. In the latter case, a capability involving a complex coordination of diverse resources will be more difficult to be imitated than one requiring the exploitation of a single resource.
- (3) Transferability describes to the extent to which resources and capabilities underlying competitive advantage are freely transferable so that rivals may replicate them. Some factors, such as geographical immobility, imperfect information, firm-specific resources and capabilities intrinsic to the business are likely to make the transference difficult, and help a firm maintain its competitive advantage.
- (4) Replicability addresses the extent that some resources and capabilities are able to be imitated through replication. Capabilities based on highly complex organizational routines are certainly much less easily to replicate.

Overall, despite different criteria being used, sustainability of competitive advantage is generally considered to be whether resources/capabilities are easily duplicated/replicated (Dierickx and Cool, 1989; Fahy, 2000).

In summary, like many theories the RBV still needs to be fully operationalized, particularly in practice, and not simply treated as a conceptual model. In addition, the empirical research is still needed to attract more attentions for validating some key propositions of the RBV (Fahy, 2000).

2.3.3 Inherent relationship between Porter's theory and RBV

As discussed above, Porter's theory and the RBV explain the sources of a firm's competitive advantage from different perspectives. In Porter's view, activities are the primary source of a firm's competitive advantage, particularly as they relate to the environment outside a firm. The RBV, on the other hand, recognizes internal resources/capabilities as the primary sources of competitive advantage. In addition to this result, there are other differences deriving from the two perspectives, such as theoretical grounds and analysis unit. Table 2.4 compares Porter's theory and the RBV.

Table 2.4 Comparison of Porter's Theory and Resource-Based View

	Porter's theory	Resource-based view (RBV)
Origins	Mason (1949) Bain (1959)	Chamberlin (1933) Robinson (1933) Penrose (1959)
Economic Model	SCP of industry organization economics	Models of strategy emphasizing efficiency
Representative	Porter (1980, 1985, 1990,1991)	Wernerfelt (1984) Rumelt (1984) Barney (1986b,1991) Grant (1991) Amit and Schoemaker (1993) Peteraf (1993) Teece, Pisano and Shuen (1997)
Feature	Five competitive forces Three generic strategies Value chain	Firm-heterogeneity Firm-specific resources
Assumptions	Within industry, firms homogeneous (resource homogeneity; resource mobility)	Within industry, firms heterogeneous (resource heterogeneity; resource immobility)
Unit of analysis	Industry	Firm
Primary source	Activities/environment	Resources/capabilities
Role of industry structure	Exogenous	Endogenous
Focal concern	Structural conditions and competitor positioning	Idiosyncratic and costly to imitate resources
Primary strategic implications	Barriers to entry	Efficiency orientation

As shown in Table 2.4, the two perspectives are rooted in economics. Porter's theory is built on the SCP paradigm of industrial organization economics, which has been discussed earlier. This paradigm is developed by Mason (1949) and Bain (1959), which emphasizes the impact of industry structure, and firms can take action to defend its position against competitive forces (Barney, 2001; Fahy, 2000; Foss, 1996; Teece *et al.*, 1997). The RBV is founded in older theory. Its origin lies in the early economic models of monopolistic competition (Chamberlin, 1933; Robinson, 1933) and is further developed by Penrose (1959) (Foss, 1996; Peteraf, 1993; Teece *et al.*, 1997). These economists focus on firm heterogeneity and suggest that firm-specific resources may lead to the attainment of competitive advantage (Fahy, 2000; Foss, 1996; Teece *et al.*, 1997). On the basis of different theoretical grounds, the two perspectives therefore build different assumptions: Porter treats firms identically in terms of their resources and thus

presumes resource homogeneity and resource mobility, whereas the RBV supposes firms within industry may be heterogeneous in line with resources they control, hence resource heterogeneity and resource immobility. In addition, the two perspectives have different starting points of the analysis unit: Porter's theory is industry-oriented, stressing the impact of the industry structure on industry-level profitability and firm profitability, while the RBV points to firms, noting the role of unique resources a firm possesses to lead to superior profits (Barney, 1991). Therefore, the concern for Porter is the state of the industry structure and firms' competitive position, but the RBV is concerned with idiosyncratic and costly-to-imitate resources. Consequently, the two perspectives reflect different strategic implications: the interest of Porter's theory is how to create entry barriers for protecting advantage, and the RBV focuses on how to build enduring advantage through efficiency (Foss, 1996; Teece *et al.*, 1997).

Notwithstanding the difference between Porter's theory and the RBV, in fact, an inherent connection is found between the two perspectives if one considers the history of strategic management, in particular, the SWOT framework.

In the early period of strategic management, a number of researchers, in particular, Andrews (1971), Ansoff (1965), and Hofer and Schendel (1978), have made great contribution on the development of this emerging field since the 1960s (Barney, 1991, 2002). The influential SWOT analysis, proposed by Learned, Christensen, Andrews and Guth in 1969, was generated in this period. The SWOT analysis suggests that a firm's success and gaining competitive advantages are determined by four elements: (1) a firm's strengths; (2) its weaknesses; (3) opportunities in competition; and (4) threats in competition. The former two elements point to the internal analysis of a firm, while the latter two target at the external analysis. Generally, the SWOT framework states that a successful firm's theory of how to compete successfully and gain competitive advantage should be considered with the four aspects included in the SWOT analysis. In some sense, the thinking of the SWOT framework reflects a trend in traditional strategic management (Barney, 1991, 2002). However, although the SWOT framework poses the questions of the importance of strengths, weaknesses, opportunities and threats, it "provides almost no guidance in identifying these four elements for a particular firm" and limits its usefulness for managements (Barney, 2002, p. 21). In addition, the SWOT framework does not indicate its underlying theory applied in analysis (Barney, 2002).

The work of Porter in 1980 is considered to be the first important revolution in strategic management (Barney, 2002; Collis and Montgomery, 1995). Applying the theory of economics, i.e. the SCP (structure-conduct-performance) model of IO (industrial organization) economics, Porter (1980, 1985) provides a theoretical structure of how to identify the critical threats and opportunities facing a firm in a competitive environment (Barney, 2002; Collis and Montgomery, 1995). However, this reflects only one side of the SWOT framework, i.e. external analysis. Unlike Porter's model, the RBV, regarded as the second revolution in strategic management (Barney, 2002), engages in the internal analysis which penetrates another side of the SWOT framework, suggesting the exploitation of idiosyncratic, costly-to-imitate resources/capabilities may bring a firm competitive advantage. The relationship between the two perspectives is shown in Figure 2.4.

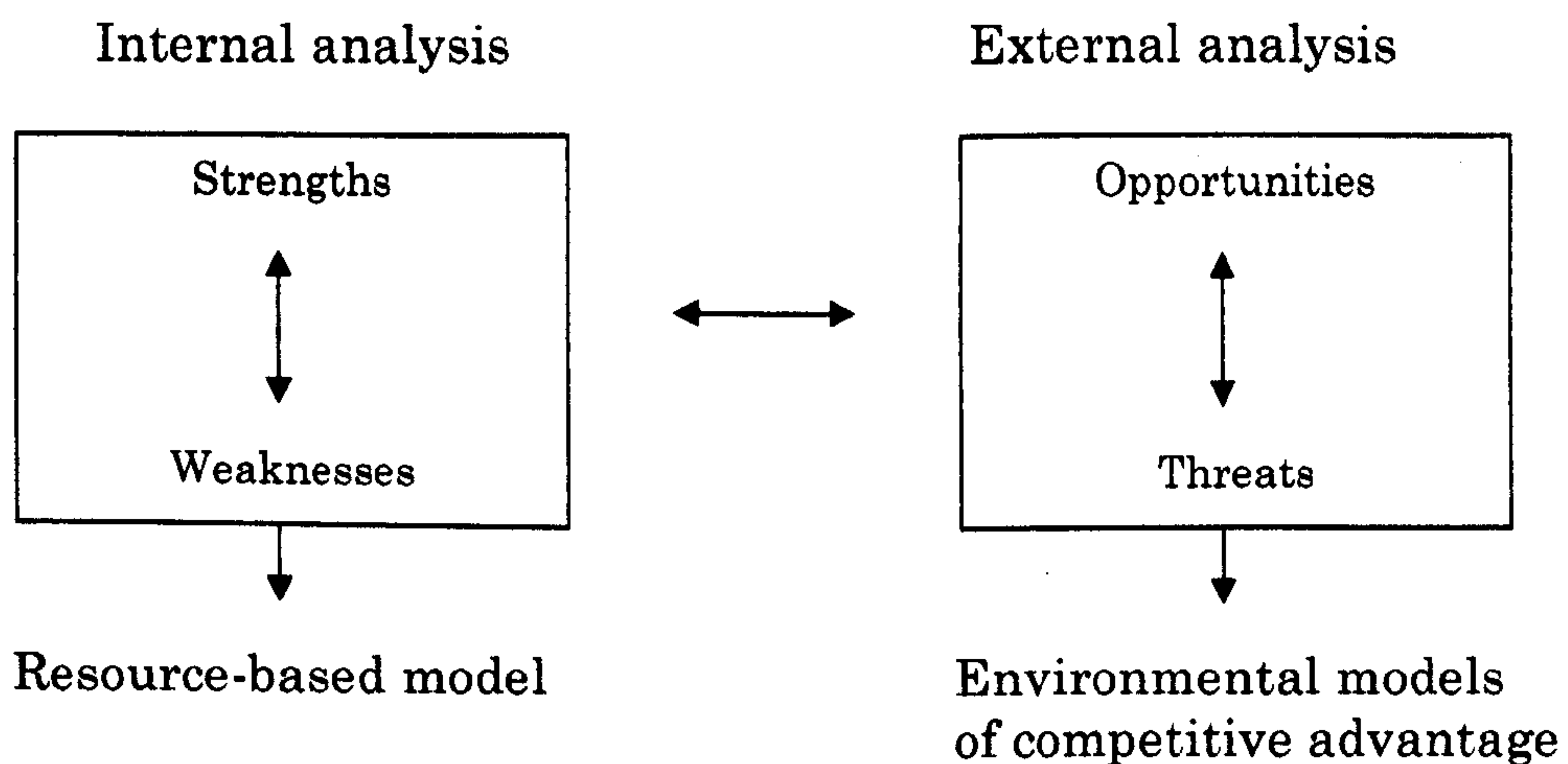


Figure 2.4 The Relationship between Traditional “Strengths-Weaknesses Opportunities-Threats” Analysis, the Resource-Based Model, and Models of Industry Attractiveness

Source: Barney (1991, p. 100)

Since this relationship is reflected in the historical origin, to a great extent, Porter's thinking can conduce to enlightening RBV scholars when developing the RBV since Porter's work began earlier. For example, for the purpose of analysis, Wernerfelt (1984) uses Porter's five competitive forces when he initiated his works on the RBV. Barney (2001) explains that his positioning on the RBV is pertinent to the SCP-based theories of competitive advantage which Porter has adopted, rather than others, such as neo-classical microeconomics or evolutionary economics, when he wrote the works of “Firm Resources and Sustained Competitive Advantage” in 1991. On the other hand, Porter's

thinking also has been evolving over time (Foss, 1996). Porter's thinking on competitive advantage, generally speaking, is reflected in three books, each with introducing a new framework: "Competitive Strategy" in 1980 with the five forces framework; "Competitive Advantage" in 1985 with the value-chain analysis; "The Competitive Advantage of Nations" in 1990 with the diamond framework (Foss, 1996). In fact, the work of Porter in 1990 relates in some ways to the RBV, as embodied in later works regarding "Towards a Dynamic Theory of Strategy" (1991) (Foss, 1996). For example, in Figure 2.3 above, which describes the determinants of success in distinct businesses through cross-sectional and longitudinal parts, Porter has extended structural determinants into managerial choices and initial conditions which manifest the thinking of the RBV (Foss, 1996).

Building on this inherent connection, it should be no surprise that the two perspectives may share communalities and complementariness, as has been observed by Porter himself and some RBV researchers. For example, although Porter views activities as being the primary source of a firm's competitive advantage, he also acknowledges that a firm is both a collection of activities and a set of resources/capabilities.

Activities are what firms do, and they define the resources and capabilities that are relevant. Activities provide the connections between factor markets and product market positions. Activities are observable, operational and directly connected to cost and differentiation...If resources or capabilities are isolated from activities, strategy, and industry, companies become inward-looking (Porter, 1985, 2004 edn, p. x ix).

Furthermore, Porter also admits the significance of the RBV in the environment, suggesting that the greatest value of the RBV lies in assessing opportunities for diversification, provided the two perspectives (i.e. Porter's theory and the RBV) are integrated (Porter, 1991).

These communalities and complementariness, in fact, reflect on-going theoretical development because neither Porter's theory nor the RBV, on its own, can say it is a universal theory without any shortcomings, as shown in Table 2.5. Accordingly, this may suggest that integrating the two perspectives can probably help to interpret the sources of a firm's competitive advantage.

Table 2.5 Strengths and Weaknesses of Two Perspectives

THEORETICAL PERSPECTIVE	CONCEPT	STRENGTH	WEAKNESSES
Resource-Based View (RBV)	Firm possess inimitable resources that can be the source of sustainable competitive advantage	Focus on the firm level and manager identified sources of competitive advantage relative to competitors	Does not provide guidelines for determining what these resources are, and whether or not they are truly unique
Porter's Competitive Advantage	The characteristics, culture and resources of different nations provide native companies in particular industries with competitive advantages in the global marketplace	Identifies characteristics that influence competitive dynamics within industries that more traditional economic approaches fail to consider	Creates potential to overgeneralize regarding that competitive nature of industries Focus is still at a very broad level of abstraction

Source: Adapted from Thomas, Pollock and Gorman (1999, p. 72)

2.4 Diversified Contributing Factors of Competitiveness

Different perspectives offer different interpretations on the critical factors of a firm's success. Porter's theory focuses on the external environment of a firm, importantly, the influence of the industry structure, thus factors in marketplace such as bargaining power of supplier, bargaining power of customer, rivalry between players, the threat of substitutes, the threat of new entrants, called the five forces, may become critical factors resulting in a firm's success. However, as emphasized by Porter himself, the key issue is how firms cope with the five forces according to their own differing abilities (Porter, 1980).

The RBV concentrates on internal resources which can yield competitive advantage. Valuable, rare, and costly-to-imitate resources are crucially important for a firm to gain competitive advantage (Barney, 1991). Among resources, capabilities are accorded high emphasis to be the source of competitive advantage (Day, 1994; Grant, 1991; Teece *et al.*, 1997). Barney and Arikan (2001) summarize numerous empirical tests of the RBV in strategic management, human resources, marketing, entrepreneurship, management information systems, operations management, technology and innovation management, in which various resources and capabilities are identified as having a significant impact on the success of firms. Table 2.6 exhibits some empirical work in relation to resources and capabilities.

Table 2.6 Various Resources and Capabilities and Their Impacts

Researcher	Resources and capabilities	Impacts
Schular and MacMillan (1984)	Aligning HRM practice to formulated strategy and helping suppliers and distributors with their HRM practices	Create competitive advantage
Hall (1992, 1993)	The intangible resources identified, such as company reputation, product reputation, employee know-how, perception of quality standards, and the ability to manage change	A source of sustainable competitive advantage and create capabilities differentials
Bates and Flynn (1995)	Innovation capability rests on accumulated expertise and skills	There is a strategy of building resources
Powell (1995)	Certain tacit, behavioural, imperfectly-imitable features such as an open culture, empowerment, and executive commitment	A source of competitive advantage
Glunk and Wilderom (1998)	Top management capital (inspiration, competence, and communication) and organizational capital (external, professional, employee orientation and networking, financial management, market focus)	The major predictors of organizational performance
Maskell (1998)	Access to intangible, localized capabilities	Increases survival profitability and sustained competitiveness
McEvily and Zabeer (1999)	Embeddedness in a network of ties in the acquisition of competitive capabilities	An important source of variation
Lorenzoni and Lipparini (1999)	Relational capability (the ability to interact with other companies)	Affects company growth and innovativeness
Capron and Hulland (1999)	Three marketing resources (brands, sales force, and general marketing management) are redeployed after horizontal acquisitions.	Effects of redeployment on performance measures of product costs, product quality, geographical coverage, market share, and profitability are tested
Ray (2000)	Service climate and managerial IT knowledge Only firm-specific managerial IT knowledge	Have significant impact on customer service performance a source of sustainable competitive advantage
Ray, Barney and Muhanna (2004)	Effectiveness of the customer service business processes	Distinct advantages observed in processes

Source: Condensed and adapted from Barney and Arikan (2001, pp. 147-169)

As presented in Table 2.6, success factors stem from diversified resources/ capabilities, HRM, operations management, innovation, culture, network, customer service, relationship, quality, process management, financial management, IT, marketing and the others.

Similarly, the OECD (1992) identified six contributing factors to a firm's competitiveness: (1) the successful management of production; (2) successful organization of effective integrating various mechanisms; (3) the capacity of blending R&D and innovation-related activities inside or outside firms; (4) the capability to formulate strategies based on demand characteristics and the evolution of markets; (5) the capability of organizing relationships with suppliers upstream and with retailers downstream; and (6) investments on the vocational training of human resource and cultivation of employee's responsibility. These six aspects are associated with firms' resources/capabilities in the light of the RBV, capabilities, in particular.

On the basis of the above discussions, it may be seen that there are many factors contributing to a firm's competitiveness. However, capabilities possibly dominate this contribution.

2.5 Various Measurements of Competitiveness

The measurement of a firm's competitiveness is an issue which is also discussed extensively in the literature. The aim of the measurement is to make a firm rank itself and compare it with its rivals by means of some quantified measures. These measures can make competitiveness more visible.

An examination of the literature shows that a variety of approaches has been adopted to measure a firm's competitiveness. These various approaches define competitiveness in diversified dimensions, each dimension capturing one particular aspect of understanding competitiveness and including different attributes of measures. As pointed out by Ezeala-Harrison (1999), there is no consensus about the measurement of competitiveness.

2.5.1 Multiple dimensions of competitiveness

Buckley *et al.* (1988) consider that competitiveness is a relative concept and must be judged in terms of historical period, comparator and counter-factual position. They put

forward a set of three-category measures of competitiveness: competitive performance, competitive potential and management process (see Figure 2.5). This set of measures is based on different views on competitiveness: some see competitiveness as the ability to perform well, others view competitiveness as the generation and maintenance of competitive advantages and the rest equate competitiveness with the adaptation of the right management process.

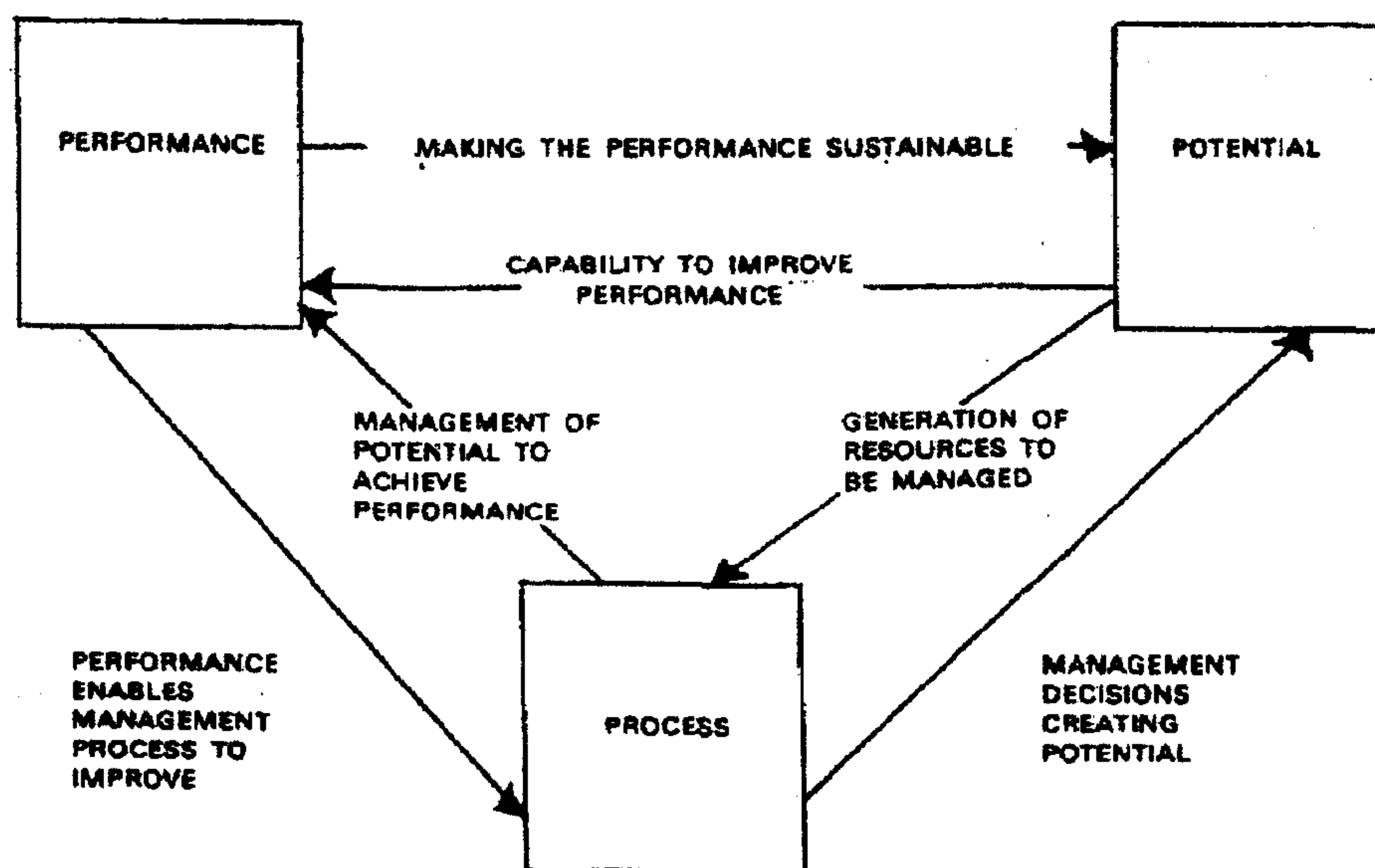


Figure 2.5 The Interrelationship between Measures of Competitiveness

Source: Buckley *et al.* (1988, p. 178)

As shown in Figure 2.5, potential measures denote the inputs into the operation, performance measures mean the outcome of the operation and process measures assess the management of the operation. They interact to capture the nuance of competitiveness since each dimension reflects different measuring areas, as described by Buckley *et al.* (1988):

If only performance measures are considered, the question of the sustainability of such performance remains unanswered. Too many uncertainties remain concerning the management of success, and the regeneration and maintenance of competitive potential which is part of the process of planning for future competitiveness. Conversely, where only competitive potential is measured, no indication is given of whether or not this potential is turn into performance (Buckley *et al.*, 1988, p. 178).

Feurer and Chaharbaghi (1994) adopt a holistic approach to measure an organization's competitiveness. The measurement system they propose includes five dimensions: (1) customer values; (2) shareholder values; (3) financial strength; (4) technology; and (5)

people. From the starting point of a holistic approach, Feurer and Chaharbaghi (1994) perceive competitiveness as having the characteristics of relativity and sustainability. Specifically, the competitiveness of an organization should be in relation to the organization itself, customers, competitors and shareholders. Moreover, the sustainability characteristic is a measure to describe the potential of the organization improving and maintaining competitive position from the viewpoint of customers and shareholders. This suggests that customer values, shareholder values and financial strength need to be assessed. More important, measuring the potential of technology and people comprises an indispensable part in this measurement system for sustainability.

Gorynia (2001) considers operationalization when he empirically examines the competitiveness of Polish firms. Drawing on many previous studies on competitiveness, he presents three-dimensional categories including competitive position, competitive potential and competitive strategy to measure Polish firms' competitiveness. The aim of this set is to reflect the complexity of firms' rivalling behaviour in competition. In this set, competitive position is related to the market's assessment of firms. It may be measured with market share and financial situation. Competitive potential is defined in two ways: narrow and broad. In a narrow way, competitive potential points to the resources used or available to be used. In a broad way, competitive potential includes culture, resources, organizational structure, strategic vision and process of creating strategy. With regard to competitive strategy, Gorynia (2001) explains that it is "an analytical category facilitating transition from competitive potential, i.e. potential competitiveness (*ex ante*) to the real competitiveness" (p. 50). Each of three dimensions is further composed of a number of measures respectively. This will be discussed later.

Porter (1985) uses the term 'above-average performance', indicating a firm's relative position within its industry and its profitability. In addition, he also notes that sustainable competitive advantage is the fundamental basis of above-average performance in the long term, suggesting the importance of sustainability. The ultimate advantages of a firm will be shown in lower cost and differentiation by achieving above-average performance.

In the light of the RBV, competitiveness may be recognized through its superior performance outperforming its rivals. In turn, superior performance stems from competitive advantage or sustained competitive advantage through the use of

resources/capabilities and adaptation to the business environment. Like Porter, Barney (2002) adopts the term ‘above-normal performance’ reflecting a firm’s competitive advantage, where performance for a firm is defined “by comparing the value that an organization creates using its productive assets with the value that owners of these assets expect to obtain” (p. 26). Apart from above-normal performance, Barney also defines normal performance and below-normal performance reflecting the state of competitive parity and discompetitive advantage respectively. Barney (2002) indicates that this approach is in line with microeconomics and most definitions which have been developed in organization theory and organizational behaviour. However, Barney (2002) also points out that this definition is hard to measure. In addition, Prahalad and Hamel (1990), the originators of the term ‘core competence’, adopt two time scales, i.e. the short term and the long term, suggesting that competitiveness may be assessed by price or performance traits embedded in products in the short term and an ability to build the core competences spawn in products in the long term. Some approaches are outlined in Table 2.7.

Table 2.7 Some Perspectives for Measurement of a Firm’s Competitiveness

Researcher	Approach	Domain of measurement
Buckley <i>et al.</i> (1988)	three-category measures	competitive performance, competitive potential, management process
Feurer and Chaharbaghi (1994)	holistic	customer values, shareholder values, financial strength, technology, people
Gorynia (2001)	operationalization	competitive position, competitive potential, competitive strategy
Porter (1985)	above-average performance in short run and long run	relative position, sustainability reflected on lower cost, differentiation
Barney (2002)	above-normal performance for competitive advantage	survival as measure, stakeholder approaches, simple accounting measures, adjusting accounting measures
Prahalad and Hamel (1990)	two time scales (short run and long run)	price/performance attributes of products, an ability to build core competences

All these studies suggest that multiple dimensions rather than one dimension may be used to measure a firm’s competitiveness in order to catch the nuance and complexity of competitiveness. In addition, within these studies, sustainability is explicitly or implicitly taken into account in the measurement.

2.5.2 Diversified measures of competitiveness

The above discussions have shown the multiple dimensions used to measure competitiveness. This indicates the possible domain used in measuring a firm's competitiveness. The domain may be identified with different dimensions. Further, these dimensions could be specified with diversified measures to assess a firm's competitiveness. It may be seen from the aforementioned three studies.

Buckley *et al.* (1988) adopt three categories to measure a firm's competitiveness. Measures of performance are suggested using factors such as market share and profitability; measures of potential could be cost, productivity, price and technology indicators; management process measures could be ownership advantage, commitment to international business, marketing aptitude, management relations, closeness to customer, economics of scale and scope.

Applying an operational approach, Gorynia (2001) presents three dimensions, each including a wider set of measures. Competitive position includes eight measures (i.e. profitability, cost level, market share, feature of product, awareness of firm and its products' existence, customer loyalty and brand loyalty, costs of shifting to other suppliers, and existence of likelihood of substitutes). Competitive potential includes three measures (i.e. primary, secondary and performance resources) in narrow meaning, and five measures (i.e. corporate culture, firm's resources, organizational structure, strategic vision, and process of creating strategy) in a broad meaning. Competitive strategy includes nineteen measures.

Barney (2002) suggests four major approaches which could be adopted in the measurement of a firm's competitiveness: (1) survival as a measure; (2) stakeholder approaches; (3) simple accounting measures; and (4) adjusted accounting measures, as shown in Table 2.7. An approach regarding survival measures is considered using two further measures: strengths and weaknesses of survival measures. The multiple stakeholders approach is close to the conceptual definition of performance. It assesses the performance of a firm based on the view of stakeholders. These stakeholders include "customers, labour, management, top executives, suppliers, partners, equality holders, debt holders, labour, management and society" (p. 30). Firms are viewed in three states: high performer, mediocre performer and performing poorly. However, since different stakeholders may use different criteria to see a firm's performance,

notwithstanding its popularity, it is difficult to apply this approach in real strategic analysis. The simple accounting measures of historical performance include various ratio analyses, such as profitability, liquidity, leverage and activity. With regard to the adjusted accounting measures, this approach includes numerous complex accounting analysis tools treated as measures. Each approach has its strengths and weaknesses and therefore it is suggested that multiple measures be employed in the analysis (Barney, 2002).

Some studies did not explicitly classify the domain regarding the measurement of competitiveness and present measures directly. For example, OECD (1992) points out that a range of indicators may assess a firm's competitiveness. These measures are not limited to price factors only but also include non-price factors, as suggested by corporate surveys and industrial case studies conducted over recent years.

These disciplines use a wide range of indicators (market shares, profits, dividends, investment, etc) to assess the competitiveness of firms. Corporate survey and industrial case studies carried out over the last 20 years have found that: i) in most industrial branches and sectors competitiveness cannot simply be viewed as centred on prices and the cost of inputs, notably labour inputs (e.g. wages and indirect labour costs); and ii) a variety of non-price factors lead to difference in the productivity of labour and capital (scale economies, process systems, size of inventories, management, labour relations, etc.) and in the quality and performance of products (OECD, 1992, p. 239).

In addition, McFetridge (1995) proposes four measures which may be used to measure firm-level competitiveness: profitability, cost, productivity and market share. The four measures have also been suggested by many studies (e.g. Barney, 2002, Buckley *et al.*, 1988; Gorynia, 2001; OECD, 1992).

Table 2.8 presents a summary of the above discussions of measures yielded through different ways.

Table 2.8 Diversified Measures of Firms' Competitiveness

Researcher	Dimension or approach	Measure
Buckley <i>et al.</i> (1988) Three dimensions	Performance	4 measures
	Potential	4 measures
	Management process	6 measures
Gorynia (2001) Three dimensions	Competitive position	8 measures
	Competitive potential	3 measures for narrow meaning 5 measures for broad meaning
	Competitive strategy	19 measures
Barney (2002) Four major approaches	Survival measures	2 measures
	Multiple stakeholders views	3 measures
	Simple accounting measures	numerous accounting tools
	Adjusted accounting measures	numerous accounting tools
OCED (1992)		Both price measures and non-price measures
McFetridge (1995)		4 measures including profitability, cost, productivity and market share

The performance of a firm's competitiveness may be assessed by various measures, as shown in Table 2.8. No consensus criteria have been adopted in the measurement of competitiveness. To some extent, the establishment of the measurement of a firm's competitiveness is dependent on different views on competitiveness. However, as noted by OECD (1992), the measures suggested are probably built on either economic or managerial analysis of competitiveness. Some are from theory building, while some are from empirical studies.

In addition, when measuring a firm's competitiveness, measures may reflect historical characteristics and are probably different in different times, as stated by Buckley *et al.* (1988), Feurer and Chaharbaghi (1994) and Pace and Stephan (1996). The reason is that historical point of time is one of the characteristics in conceiving of competitiveness (Buckley *et al.*, 1988). For example, Pace and Stephan (1996) suggest the measurement of competitiveness has changed through time and propose four paradigms of competitiveness within which competitiveness is measured by different standards, as shown in Table 2.9. Obviously, different paradigms dominate thinking about competitiveness at different time periods. This implies that the measures of a firm's competitiveness are also evolving along with time.

Table 2.9 Elements of Competitiveness

	PARADIGM 1	PARADIGM 2	PARADIGM 3	PARADIGM 4
Era Agenda	Craftsmanship	Productivity	Quality	Immediacy
Competitive Edge	No Imperfections	No Shortages	No Complaints	No Delays
Key Characteristic	Artfulness	Quantity	Excellence	Directness
Basic Need	Hire Skilled Individuals	Design Production Lines	Create Self-directed Work Teams	Develop Energized Workers

Source: Pace and Stephan (1996, p. 9)

2.5.3 Attributes of Measures

Various measures, in nature, have different attributes. These attributes may be classified in four ways: (1) quantitative measures and qualitative measures (i.e. “hard” measures and “soft” measures); (2) financial measures/indicators or non-financial measures/indicators; (3) statistical measures/other indicators; (4) subjective and objective measures.

Quantitative measures are normally those that can be quantifiably or readily measured, e.g. quantity and size. Quantitative information may provide a historical perspective of what has happened in a period of time. Normally, quantitative measures are associated with financial indicators or statistical indicators. In contrast, qualitative measures are more likely to be considered as subjective judgement. Firms’ competitiveness is a complicated phenomenon. Quantitative and qualitative measures used concurrently may help to understand this phenomenon fully. For example, Buckley *et al.* (1988) adopt three categories to measure a firm’s competitiveness. Each dimension is composed of many measures. These measures are manifested with different attributes. All these measures are either quantitative (e.g. market share, cost and price) or qualitative (e.g. ownership and marketing aptitude). Quantitative measures may explain the fruit of comparison, while qualitative measures conduce to explaining some more details of the ability to compete as well as reasons for success (Buckley *et al.*, 1988). Feurer and Chaharbaghi (1994) also place emphasis on using both quantitative and qualitative measures in a measurement system, such as return on equity, earnings per share, payout ratio and the dividend yield to measure shareholder value. Qualitative measures are used to assess the reputation or the potential for strategic alliances. In addition, although qualitative measures are not quantifiable, e.g. the Likert scale, they can be used by using qualitative ratings.

Financial measures have the advantages of being accurate and convenient when measuring actual performance. The limitation is that they cannot measure intangible things which are often important determinants of a firm's success (Barney, 2002). Financial measures are also considered to be "lagging indicators with an internal focus which may encourage myopic decision making" (Caplice and Sheffi, 1995, p. 64). Therefore, non-financial measures are still suggested since they may indicate future performance (Caplice and Sheffi, 1995).

Sharma and Fisher (1997) adopt two types of measures - objective and subjective - in examining the relationship between functional strategies and a firm's competitiveness. Objective measures include market share, return on assets and growth rates. Subjective measures include management's perceptions of market share, profitability, productivity and customer satisfaction in relation to competitors. Subjective measures are often used when the accurate objective measures are not available (Dess and Robinson, 1984; Sharma and Fisher, 1997).

2.6 Summary

This chapter has reviewed a variety of discussions of firm-level competitiveness in the literature. These discussions involve firms' competitiveness pertaining to concept, primary sources, contributing factors and measurement. Overall, a firm's competitiveness can be understood in different ways:

Conceptual definitions of competitiveness at different levels initiate the perception of firms' competitiveness. These various definitions reveal that the concept of firm-level competitiveness has its features distinct from those of other levels. The concept of firm-level is considered as a relative rather than absolute concept, and dynamic as opposed to static concept. The concern of the concept is focused mainly on a firm's ability of outperforming its rivals in competition. The ability may be manifest in many aspects, such as superior product/service quality, competitive price/cost, good market/financial performance and adapting environment. However, sustainability is the important attribute in the concept.

On the basis of conceptive recognition of firms' competitiveness, further understanding of the meaning behind concept was revealed. Two competing perspectives of competitive advantage in strategic management exhibit different answers. Porter's

theory suggests that activities/environment are the sources built on industry unit analysis, whereas the RBV stresses that resources/capabilities are the main sources on the basis of firm unit analysis. However, attempts have been made to integrate these two perspectives when interpreting firms' competitiveness. A firm's competitiveness may be determined by many success factors. To a great extent, these success factors are relevant to various resources/capabilities, in particular, capabilities. This suggests that, compared with resources, capabilities are more likely to be the most important factors contributing to competitiveness. A firm's competitiveness, ultimately, will be manifested in its performance. The measurement of competitiveness may make this manifestation more visible by means of quantified tools. Given different starting points, there are different ways to measure firms' competitiveness. Some identify the possible domain of firms' competitiveness and further specify the measures of each dimension within the domain, while others specify the measures directly. Given the complexity of firms' competitiveness, a diverse set of measures as opposed to a single measure is suggested by these discussions. In addition, all these measures show different attributes, such as (1) quantitative measure and qualitative measure (i.e. "hard" and "soft" measure), (2) financial measures/indicators or non-financial measures/indicators, (3) statistical measures/other indicators, (4) subjective and objective measures, since different attributes can play different roles in measuring and can be combined for use.

Overall, the literature argues that theoretical understanding of firms' competitiveness is still evolving. This suggests that the understanding of LSPs' competitiveness may be developed on the basis of this evolution.

CHAPTER 3 LOGISTICS SERVICE PROVIDERS

3.1 Introduction

Over the past two decades, logistics service providers (LSPs) have experienced major transformations. Driven by numerous factors, such as ever-changing customer needs, the advent of global economy and e-society, wide application of IT and deregulation, many substantial changes have affected LSPs' organizational structure, operational scale, service range and geographical coverage. There is no doubt that LSPs will continue to evolve in response to a range of internal and external requirements. Therefore, from an historical perspective, this chapter will review LSPs, as a particular type of service industry. This includes the evolution, characteristics and in particular, the final product of LSPs, i.e. various service offerings and the relative capabilities to provide these services. Current trends in the development of LSPs will also be discussed.

3.2 Definition of LSPs

Since the role of logistics services providers was identified in the early 1980s, different usages of this term have appeared in the literature, such as third party logistics services provider (3PL, 3PLP) (Coyle *et al.*, 1996; CSCPM, 2006; Daugherty *et al.*, 1996; Lieb *et al.*, 1993; Murphy and Poist, 2000), TPL provider (TPLP) (Berghlund *et al.*, 1999; Hertz and Alfredsson, 2003), logistics service provider (LSP) (Lai, 2004; Lemoine and Dagnæs, 2003; Lynagh *et al.*, 2001; McKinnon, 2003; Panayides and So, 2005; Persson and Virum, 2001; Sum and Teo, 1999), logistics firms/companies (Gibson and Cook, 2001; Gunasekaran and Ngai, 2003).

Correspondingly, there have been many definitions and interpretations for this term. Table 3.1 presents some definitions which are often quoted in the literature.

Table 3.1 Some Views on the Definition of Logistics Service Providers

Author	Definition
Lieb <i>et al.</i> (1993)	Third-party logistics is the use of external companies to perform logistics functions which have traditionally been performed within an organization. The functions which have traditionally been performed by the third-party firm can encompass the entire logistics process or selective activities within that process.
Lieb and Randall (1996)	It involves outsourcing logistics activities that have traditionally been performed in an organization. The functions performed by the third party can encompass the entire logistics process, or more commonly, selected activities within that process.
Coyle <i>et al.</i> (1996)	A third-party logistics firm may be defined as an external supplier that performs all or part of a company's logistics function.
Murphy and Poist (1998, 2000)	A 3PL is defined a relationship between a shipper and third party which, compared with basic services, has more customized offerings, encompasses a broader number of service functions and is characterized by a longer-term, more mutually beneficial relationship.
Berglund <i>et al.</i> (1999)	Third-party logistics (TPL) are activities carried out by a logistics service provider on behalf of a shipper and consisting of at least management and execution of transportation and warehousing (if warehousing is part of the process).
Hertz and Alfredsson (2003)	A TPL provider is an external provider who manages, controls, and delivers logistics activities on behalf of a shipper.
Bedeman and Gattorna (2003)	Owns/leases and operates a vehicle fleet, and may also use a substantial contracted fleet; owns/leases and operates warehouses; employs a large number of blue-collar workers; provides a range of added-value services around labour or capital intensive tasks, for example packing, labelling and sub-assembly; can manage international movements; has operational IT industry mostly in the form of point solutions for WMS, routing and scheduling; pricing is based primarily on task-oriented tariffs, with some open-book arrangements, and involves a combination of fixed-income and benefits-sharing relationships at or below the level of supply chain director.
CSCMP (Updated October 2006)	A firm which provides multiple logistics services for use by customers. Preferably, these services are integrated, or "bundled" together by the provider. These firms facilitate the movement of parts and materials from suppliers to manufacturers, and finished products from manufacturers to distributors and retailers. Among the services which they provide are transportation, warehousing, cross-docking, inventory management, packaging, and freight forwarding.

Overall there are common features described in the above definitions, as shown in Table 3.2.

Table 3.2 Features of Logistics Service Providers

Providers of logistics services	Features
	<ul style="list-style-type: none"> • Integrate more than one logistics function • Normally do not own inventory • Normally control physical equipment such as vehicles, warehouses • Offer speciality services, such as inventory management, product preparation, assembly/consolidation, and so on

Source: adapted from Coyle *et al.* (1996, pp. 550-551)

Despite general agreement on the above characteristics, opinions still diverge. For example, Murphy and Poist (2000) stress that a long-term service relationship is a focus of contemporary 3PL. Halldórsson and Skjøtt-Larsen (2004) argue that definitions from Scandinavia are normally broader than those from the US; the reason is that Scandinavian managers traditionally have close and long-term co-operation with external partners.

In addition, the definition of logistics service providers is getting more confused since the concept of 4PL was introduced by Accenture around 1996. Accenture defines 4PL as “an integrator that assembles the resources, capabilities, and technology of its own organization and other organizations to design and run comprehensive supply chain solutions” (Bedeman and Gattorna, 2003, p. 473). Bedeman and Gattorna (2003) claim that a 4PL is “in effect the ‘brains’ or central nervous system of the participating organizations” (p. 481), and have revised Accenture’s definition of 4PL as follows:

A 4PL is an integrator that assembles the resources, capabilities, and technology of its own organization and other organizations to design, build and run comprehensive supply chain solutions and which have the cultural sensitivity, political and communication skills, and the commercial acumen, not only to find value, but to create motivating and sustainable deals that offer incentives to all the parties involved (Bedeman and Gattorna, 2003, p. 482).

One will note that the first half part of this definition is the same as that of Accenture, while the second half part is newly added. According to Bedeman and Gattorna (2003), productivity as opposed to asset or partnership is an essential issue in clarifying 3PL from 4PL. In addition, the value creation by 4PL and 3PL is also suggested for consideration, owing to their individual attributes (see Figure 3.1).

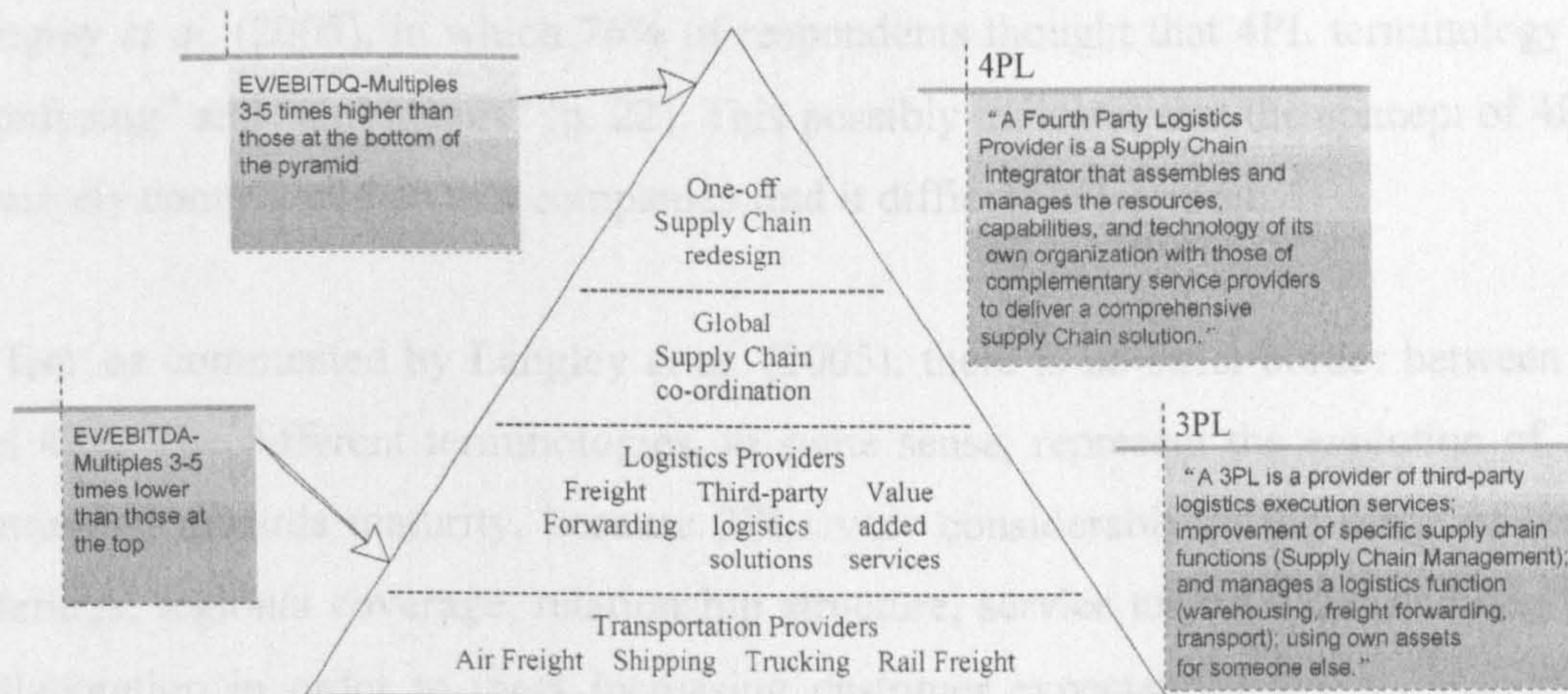


Figure 3.1 Value Generated by 4PL Providers

Source: Vogel, Lehman Bros. Report (2001), cited in Bedeman and Gattorna (2003, p. 474)

In terms of Figure 3.1, a 4PL is a supply chain integrator, while a 3PL is a provider focusing on specific supply chain functions based on its assets. In addition, 4PL is less than 3PL by quantity.

Langley *et al.* (2004, 2005) also present an explanation of 4PL. Differing from Bedeman and Gattorna (2003), they emphasize that 4PL is the consequence of an evolution of a business model which migrates from LSPs to 3PL providers, to LLPs, and finally to 4PL providers, as shown in Figure 3.2. According to Langley *et al.* (2004), the emergence of 4PL suggests that the logistics market is maturing.

The Change in Key Attributes as 3PL Service Offerings Migrate			
Relationship & Pricing Models	Service Offerings	Logistics Outsourcing Models	Key Attributes
<ul style="list-style-type: none"> Partnership Value Based 	Advanced Services	Fourth-Party Logistics Provider (4PL)	<ul style="list-style-type: none"> Strategic relationship Broad supply chain expertise Knowledge- and information-based Shared risk and reward Advanced technology capability Adaptive, flexible, and collaborative
<ul style="list-style-type: none"> Contractual Risk Sharing 	Lead Logistics	Lead Logistics Provider (LLP)	<ul style="list-style-type: none"> Project management/contract management Single point of contact 3PL technology integration
<ul style="list-style-type: none"> Contractual Fixed and Variable 	Value-Added	Third-Party Logistics Provider (3PL)	<ul style="list-style-type: none"> Enhanced capabilities Broader service offerings
<ul style="list-style-type: none"> Commodity Transaction 	Basic Services	Logistics Service Provider (LSP)	<ul style="list-style-type: none"> Focused cost reduction Niche services

Figure 3.2 The Change in Key Attributes as 3PL Service Offerings Migrate

Source: Langley *et al.* (2004, p. 23)

In practice, the distinction between 3PL and 4PL is still not quite clear, as surveyed by Langley *et al.* (2005), in which 76% of respondents thought that 4PL terminology was “confusing” and “ambiguous” (p. 22). This possibly indicates that the concept of 4PL is relatively complicated so that companies find it difficult to interpret.

In fact, as commented by Langley *et al.* (2005), there is no strict border between 3PL and 4PL. The different terminologies, in some sense, represent the evolution of 3PLs continuing towards maturity, because 3PLs vary considerably in the range of service offerings, regional coverage, relationship structure, service expectations and degree of collaboration in order to meet increasing customer expectations and gain additional market share. In nature, they are all providers of logistics service in a broader way. There is a wide variety of LSPs and this makes it difficult to define the service portfolio.

The present study will use the term ‘logistics service providers’ (LSPs), as used by many authors (e.g. Lemoine and Dagnæs, 2003; McKinnon, 2003; Panayides and So, 2005; Persson and Virum, 2001), to discuss many concepts presented in the literature (i.e. 3PL, LSP, 3PL, LLP or even other terminologies, such as logistics company/firm).

3.3 Classification of LSPs

There are various techniques used for classifying LSPs (Sink *et al.*, 1996): for example the type of specialized services offered; by the marketplace’s recognition of core competences; by workforce demographics-union versus non-union; by the type of industries served and by the scope of geographical operation. In general, there are five main classifications of LSPs.

(1) By geographical coverage

In line with the scope of geography where each LSP is located, LSPs are classified at a global, inter-continental (e.g. European LSPs, North American LSPs) or country level (e.g. UK-based LSPs, China-based LSPs).

(2) By business origin

Many LSPs have a tradition of operating in a particular field that may decide their service offerings. On this basis, Coyle *et al.* (1996) classify LSPs into transportation-based, warehouse/distribution-based, forwarder-based, ship/management-based, and financial/information-based suppliers. Despite different focuses, as noted by Coyle *et al.*

(1996), these different types of suppliers have in fact extended beyond their traditional operations to provide a more comprehensive set of logistics offerings.

(3) By asset

Muller (1993) initially proposes two basic types of contract LSPs: operation-based and information-based third-party logistics vendors. Muller further modifies this classification and converts these two categories into four types: (a) asset-based vendors; (b) management-based vendors; (c) integrated vendors; and (d) administration-based vendors (Razzaque and Sheng, 1998). Africk and Calkins (1994) argue that asset-based and non-asset-based providers are the two main types of LSPs. Bowersox *et al.* (2002) explain that the distinction between the two types of providers lies in that asset-based providers operate by their own assets, such as transportation equipment and warehousing buildings. In contrast, non-asset-based providers specialize in offering of comprehensive information services that facilitate supply chain management. They may integrate services of those asset operators on behalf of their customers.

(4) By service offerings

According to primary service offerings, Gibson and Cook (2001) identify four types of LSPs: (1) integrated logistics service providers, providing logistics services related to multiple logistics functions (e.g. transportation services plus warehousing services); (2) transportation service provider, providing transportation services (e.g. shipment consolidation, fleet management, shipment tracking); (3) warehouse service provider, providing warehousing services (e.g. warehouse management, order fulfilment, repackaging); and (4) specialized service provider (e.g. freight forwarding, customs support, information, financial or environmental services).

Cooper *et al.* (1991) provide a comprehensive classification of third-party haulage and distribution services, where two dimensions are used: management and capacity. The management dimension indicates the relationship between the user and provider of logistics services, whereas capacity dimension reflects the extent to which capacity can be shared among users, such as common and shared users, or customer dedicated. In this context, service offerings are therefore categorized. Each service is distinguished from the other services according to the two dimensions. For example, the category regarding general haulage and storage is a common user service. The provider offers both transport services and storage facilities for various customers. General haulage is

another common user service, but the provider, in this case, performs a transport operation only without warehousing service. According to this classification, LSPs are defined in line with the service offerings they provide.

(5) By business model (3PL/4PL)

This classification has been used in recent years of 3PL and 4PL. As discussed above, 4PL is presented as a higher level of business model than 3PL and is in turn different from 3PL.

3.4 Evolution of LSPs

The emergence of LSPs is closely associated with the outsourcing phenomenon which appeared in the early 1980s (Boyson *et al.*, 1999; Knemeyer and Murphy, 2005; Lieb, 1992; McGinnis *et al.*, 1995; Sheffi, 1990). Companies outsourced all or part of logistics activities performed in-house previously to one or more specialised firms in order to concentrate on their core competences. These companies were usually manufacturers or retailers, while those specialized firms were called third-party logistics providers (3PL) (Coyle *et al.*, 1996; Berglund *et al.*, 1999; Leahy *et al.*, 1995; Menon *et al.*, 1998; Sink *et al.*, 1996). 3PL are often called logistics service providers (LSPs) in recent years (McKinnon, 2003). The most radical change that these LSPs undertook was to integrate their traditional single function and service such as transportation, warehousing and packaging, into multiple functions and value-added services (Bowersox *et al.*, 2002). Simultaneously, the traditional transaction-based relationship has been transformed to a contract-based and long-term partner relationship (Murphy and Poist, 1998).

The evolution of LSPs is influenced by many factors stemming from both demand and supply sides. Among these factors, some are fundamental and widespread, while others are possibly related to the development in individual countries (McKinnon, 1994, 2003). On the demand side, from America, Sheffi (1990) asserts that increased competition, international supply and distribution networks caused by globalization trends, company restructuring, higher customer service expectation, are all the causing factors. Based on previous research, Berglund *et al.* (1999) contend that three factors, i.e. asset reduction, distribution structure restructuring and reduction of labour cost - with the exception of generic reasons, such as competitive pressure and globalization - are the drivers behind demand. More specifically, Razzaque and Sheng (1998) not only identify twenty

reasons discussed in the literature for outsourcing, but also further highlight four drivers: globalization of business, the increasing popularity of just-in-time (JIT) principles, emerging technology and versatility of third parties (Razzaque and Sheng, 1998). Building on surveys, PE consulting (1996) and Peters *et al.* (1998b) discuss diversified factors. Table 3.3 displays these factors arising from the demand side.

Table 3.3 Drivers from the Demand Side

Research	On the demand side
Sheffi (1990)	increased competition, international supply distribution networks, corporate restructuring, high levels of service expectation
PE Consulting (1996)	improve service, reduce cost, increase flexibility, avoid investment, non-core activity, obtain specialist management, improvement control
Peters <i>et al.</i> (1998b)	lower cost, greater flexibility, improved operational efficiency, ability to focus on core business, improved customer service, improved expertise/market knowledge and access to data
Razzaque and Sheng (1998)	globalization of business, increasing popularity of just-in-time (JIT) principles, emerging technology, versatility of third parties
Berglund <i>et al.</i> (1999)	competitive pressure, globalization, reduction of asset intensity, restructuring distribution structure, reduction of labour costs

On the supply side, Sheffi (1990) emphasizes two factors: worldwide deregulation, and information and communication technology. The term 'deregulation' refers to freight deregulation which happened in many countries, such as Australia (1954), Britain (1968), America (in the early 1980s), Canada (1985) and Germany (1998) (Bowersox *et al.*, 2002; Cooper, 1991; McKinnon, 1998; Sheffi, 1990). The deregulation made it possible for companies to provide logistics services since many regulations enacted by the government were removed and a free transportation market was generated (Berglund *et al.*, 1999, Bowersox *et al.*, 2002; Cooper, 1991; McKinnon, 1998, Sheffi, 1990). In addition to the above two reasons, Berglund *et al.* (1999) consider that declining profit margins in traditional services and low returns on capital are the other two reasons. McKinnon (2003) analyzes the reasons more deeply on the basis of the characteristics of LSPs' business origin. He points out that many LSPs are derived from traditional transport and warehousing firms characterized by "low entry costs, high rates of entry and exit, intense competition, heavy reliance on spot hiring, low returns on capital and slim profit margins" (p. 217). By offering integrated logistics, these companies may: (a) escape general trading market where profit margins are very low; (b) lock clients into long-term contracts; and (c) raise entry barriers where more capital is

needed, and ultimately improve their profitability and growth prospects (McKinnon, 2003). These factors coming from the supply side are presented in Table 3.4.

Table 3.4 Drivers from the Supply Side

Researcher	On the supply side
Sheffi (1990) Cooper (1991) McKinnon (1998, 2003) Berglund <i>et al.</i> (1999) Bowersox <i>et al.</i> (2002)	deregulation
Sheffi (1990)	information and communication technology
Berglund <i>et al.</i> (1999)	declining profit margins, low return on capital
McKinnon (2003)	escape general trading market by offering value-added services, create niche markets with higher entry costs, secure longer-term contracts with clients

Nevertheless, as emphasized by Berglund *et al.* (1999), the strongest drivers for the rise of LSPs are declining margins, tougher competitive environment and positive attitude of shippers towards outsourcing.

Driven by both demand and supply pressures, LSPs have developed rapidly. They have evolved through several stages over twenty years. Berglund *et al.* (1999) summarize this evolution in three waves, where different features pertaining to the quantity and variety increases of LSPs, and ever-expanding scope of service offerings are described (see Table 3.5). In addition, in terms of many perceptions on LSPs in the 2000s, in particular, the discussion on 4PL, the next wave is added. Generally speaking, players in the first and the second waves tended to operate traditional activities, i.e. transportation, warehousing or running a scheduled network, whereas players in the third and the next waves are prone to build different skills, such as IT and financial services, in order to provide higher-level services for their customers.

Table 3.5 The Evolution of LSPs

Wave of entrants	Time	Type of Players	Feature of functions
The first wave	1980s or even earlier	Emergence of logistics service providers	Building their strength on traditional logistics activities such as transportation, warehousing or running a scheduled network
The second wave	Early 1990s	A number of network players, mainly parcel and express companies such as DHL, TNT and UPS, started their logistics service activities	
The third wave	Late 1990s	A number of players entering the logistics service market from unexpected areas, such as information technology, management consultancy and financial services	Based on different skills such as IT, consultancy or financial skills There is a gradual shift from asset-based to skill or systems based players LSPs focus their activities on one of the market segments
The next wave	2000s	Knowledge-based players who can provide comprehensive supply chain solutions	Based on a consortium of consultancy, IT, financial and logistics business Provide higher-level strategic support for customers

Source: concluded from Berglund *et al.* (1999) and McKinnon (2003)

A large body of research has assessed the evolution of LSPs within conceptual and empirical frameworks. Conceptual research tends to explain the development in different contexts and their roles in supply chain management. For example, O'Laughlin *et al.* (1993) discuss the development of European LSPs within the whole European logistics service market. There have been other investigations of LSPs' development from an empirical standpoint. Carbone and Stone (2005) report the growth and relational strategies of European LSPs by examining the leading twenty European LSPs between 1998 and 2004 under Europeanization, in which the relationship between LSPs and their users, strategic development for service provision, self growth and performance are discussed. Lieb and his colleagues have continued to conduct annual surveys since 1994 (Lieb and Bentz, 2004). These surveys reveal the status and future prospects of LSPs based on the perspectives of CEOs of both LSPs and large manufacturers in the US and North American. Similarly, Langley and his colleagues have been conducting surveys of third party logistics since 1996 (Langley *et al.*, 2005). These surveys focus on users and involve many participants in the world. In the UK, the three periodic surveys conducted by PE International between 1990 and 1996 reflected the needs, satisfaction, and expectation of users for LSPs. In the Asia-Pacific region, as an emerging logistics service market, China-based LSPs are receiving more attention. The surveys conducted by CCTA³ and TLI-AP⁴ (2002, 2003) examine the development of LSPs under economic transition from a centrally planned economy to a market-orientation economy in China.

As examined by empirical surveys, the overall trend for LSPs is to be dynamic (Lieb and Miller, 2002), and, as concluded by Langley *et al.* (2004), LSPs continue to evolve and show signs of maturity when moving forward.

3.5 Service Offerings and Capabilities of LSPs

The logistics service market is a heterogeneous market (Persson and Virum, 2001; Carbone and Stone, 2005), in which there are different types of LSPs. These LSPs offer various services to meet the ever-changing requirement of customers on the basis of their own resource bases and capabilities.

³ 1. CCTA is the abbreviation of China Communications and Transportation Association. It belongs to the State Development and Reform Commission (SDRC) in China.

⁴ 2. TLI-AP is the abbreviation of The Logistics Institute - Asia Pacific. It is a collaboration between the National University of Singapore and Georgia Institute of Technology for research and educational programmes in global logistics.

3.5.1 Diversified logistics service provision

Diversified logistics service provision is a noticeable phenomenon in the logistics service market. Each LSP attempts to provide unusual services for customers so as to distinguish itself from other players, hence the diversification of service provision. Over the past few years, many surveys have revealed service offerings in logistics service markets. Table 3.6 presents service varieties from a provider perspective.

Table 3.6 Provider Perspective of Service Portfolio

Researcher	Perspective	Service portfolio
Peters <i>et al.</i> (1998a)	CEO in Europe	logistics information systems, order processing; product returns, re-labelling/repacking; shipment consolidation; warehouse management/operations; customer spare parts; inventory management; order fulfilment; product assembly and carrier selection services; product testing; fleet management/operations services
CCTA and TLI-AP (2002)	CEO in China	warehousing; distribution; transportation; total logistics solution; Insurance agent; consolidation; customer clearance; freight forwarding; IT-support; inventory management; order management; packing and repacking; import/export; express shipping; Assembling and installation
Lieb and Bentz (2004)	CEO in North America	import processing; international freight forwarding; Customer brokerage; De-consolidation facilities; IT; RFID technology

The attributes in various service offerings are different. Some are traditional services such as transportation and warehousing which are frequently outsourced, while others are value-added services in line with customer-specific requirements such as order processing, inventory management (Berglund *et al.*, 1999, Hertz and Alfredsson, 2003; Langley *et al.*, 2006). Moreover, to strengthen their service capabilities, LSPs are still broadening their service offerings into areas such as home delivery responding to E-commerce development, one-stop service, and international logistics services required by the globalization of manufacturing operations (Lieb and Bentz, 2004). This diversified service portfolio not only reflects various customer needs, but also mirrors the heterogeneity of LSPs. This could be explained by demand-driven diversification and supply-driven diversification.

(1) Demand-driven diversification

Many surveys have demonstrated that a wide range of service needs is always required by different customers. In the 11th annual report of LSPs, Langley *et al.* (2006) investigate the service needs by users which involve four regions in the world: North America, Western Europe, Asia-Pacific and Latin America, as shown in Table 3.7.

Table 3.7 User Perspective for Service Needs

Logistics Activities	Outsourced Logistics Services				
	All Regions	North America	Western Europe	Asia-Pacific	Latin America
Transportation	90%	83%	95%	95%	90%
Warehousing	74	74	76	77	77
Customs Clearance and Brokerage	70	71	59	83	65
Forwarding	54	55	54	66	15
Shipment Consolidation	47	44	50	53	35
Reverse Logistics (Defective, Repair, Return)	35	28	44	36	30
Cross-Docking	34	36	40	30	18
Transportation Management	34	27	36	48	18
Freight Bill Auditing/Payment	33	55	22	18	17
Product Labelling, Packaging, Assembly, Kit	33	26	45	33	20
Fleet Management	19	13	20	21	30
Supply Chain Consultancy by 3PL Provider	18	21	16	16	10
Order Entry, Processing, and Fulfilment	14	14	10	14	19
LLP/4PL Service	11	12	13	6	15
Customer Service	10	8	9	13	10

Source: Langley *et al.* (2006, p. 8)

The extent that the service needs, as reported by Langley *et al.* (2006), is different across or within regions. For example, transportation service is more significant in Western Europe and Asia-Pacific than in North America, while forwarding service in Latin America is less in demand compared with the other three regions. Within individual regions, traditional services such as transportation and warehousing are still the important outsourced services for users. On the contrary, more sophisticated services such as supply chain consultancy and customer service appear not to be eagerly required. These results reflect the differentiated attitudes of users between or within the four regions in treating outsourced services and present the diversification of service needs. This situation suggests that the presence of diversified LSPs is needed because different customer needs and country specifics could be met in this case.

(2) Supply-driven diversification

In contrast to diversified customer needs, two aspects may explain the supply-driven diversification: (1) unique characteristics of LSPs and their resource bases; (2) the strategic consideration on service diversification for LSPs.

Carbone and Stone (2005) propose that many factors could affect each LSP's service provision. These factors include historical development, management culture and stakeholder origin. In nature, these factors are probably relevant to the unique characteristics of LSPs and their resource bases. Each LSP may have its business origin different from others. For those derived from traditional transportation or warehouse companies, they may have well-established physical assets and relative management techniques built on long-term historical development. In this case, it is beneficial for them to operate business on the basis of these advantages because: (1) it is an easy way for them to offer services, e.g. companies with assets in warehouse may like to develop their services around warehousing functions such as storage, cross-docking and inventory management; (2) it is a safe way for them to win in competition. In terms of the RBV theory discussed in the previous chapter, these advantages are in fact the resource bases of these companies. They can become important sources for companies to acquire competitive advantage and enjoy superior performance in their businesses.

In addition, Carbone and Stone (2005) also note that the market positioning of LSPs may have an impact on the logistics service provision. Driven by market dynamics, LSPs may position themselves in different segments with the services required. On the basis of the empirical investigation of UK international freight forwarders, Markides and Holweg (2006) found the diversification of international freight forwarders in the UK in terms of the services offered. Furthermore, service diversification is an important strategic need in corporate business, particularly for those larger companies having wider asset bases. The drivers for companies to implement service diversification basically include: (1) opportunities for higher profit margins; (2) customers requiring additional services; and (3) to gain market presence in new emerging sectors or markets (Markides and Holweg, 2006). The results reveal that the diversification is related to the service offerings which are likely to be determined by the unique characteristics of individual companies, as discussed above. In addition, the diversification results from the strategic consideration of companies since the taken strategy might distinguish them from their competitors.

3.5.2 Differentiated capabilities of LSPs

Supply-driven diversification of service provision may reflect different service capabilities in individual LSPs, as discussed by some studies. Coyle *et al.* (1996) consider that many services offerings, in fact, are included within the core activities and potential value-added activities of companies (see Table 3.8).

Table 3.8 Third-Party Logistics Activities

Examples of 'Core' Capabilities
<ul style="list-style-type: none"> • Transportation <ul style="list-style-type: none"> LTL and TL Dedicated Intermodel Global sourcing/distribution • Warehousing • Inventory management and control • Information systems <ul style="list-style-type: none"> Order processing Logistics systems • Consolidation and distribution • Freight management services <ul style="list-style-type: none"> Carrier selection and rate negotiation Freight bill auditing and control • Consulting assistance
Examples of "Value-Added" Capabilities
<ul style="list-style-type: none"> • Pick and pack • Marking, tagging, and labelling • Product returns and reverse distribution • Packaging and repackaging • Salvage and scrap disposal • Telemarketing

Source: Coyle *et al.* (1996, p. 550)

Two groups are involved in core capabilities and value-added capabilities under the title of third party logistics activities shown in Table 3.8. Despite no explanation of the two types of capabilities being presented, according to Coyle *et al.* (1996), both types of capabilities are possibly equal to service offerings or activities. Therefore, the differentiation of capabilities between LSPs may be viewed from their service offerings or activities. Similarly, in the surveys conducted by Langley *et al.* (2005, 2006), service offerings and capabilities are jointly used without distinction. This implies that recognizing capabilities between LSPs may be based on their service offerings.

Applying the RBV theory, Lai (2004) empirically examines the different types of LSPs according to different service capabilities, and LSPs with better service capabilities may lead to better service performance. In Lai's (2004) study, service capability is defined as

“the ability of LSPs to create and deploy resources to satisfy the logistics needs of their customers in pursuit of better service performance” and is identified as a critical resource for LSPs to attain competitive advantage (p. 387). The differentiation of service capabilities between LSPs, in this study, is assumed according to the differences of LSPs in creating and deploying resources, whereby RBV logic is the theoretical rationale behind this proposition.

The above discussions indicate that there might be differentiated capabilities between LSPs. This differentiation is likely to be found in different types of LSPs, different service offerings and activities.

3.5.3 Gap between LSPs’ capabilities and customer expectations

Although LSPs have been improving their capabilities to help their customers reduce costs and improve service, some surveys reveal that there are still gaps between customer expectations and LSPs’ capabilities.

PE Consulting (1990, 1993 and 1996) successively examined customer satisfaction of the LSPs’ performance based on the perceptions of British industries. As an update to the trends established by PE Consulting eight years before, Jaafar and Rafiq (2005) conducted a survey to evaluate the LSPs’ performance. Figure 3.3 presents their investigations.

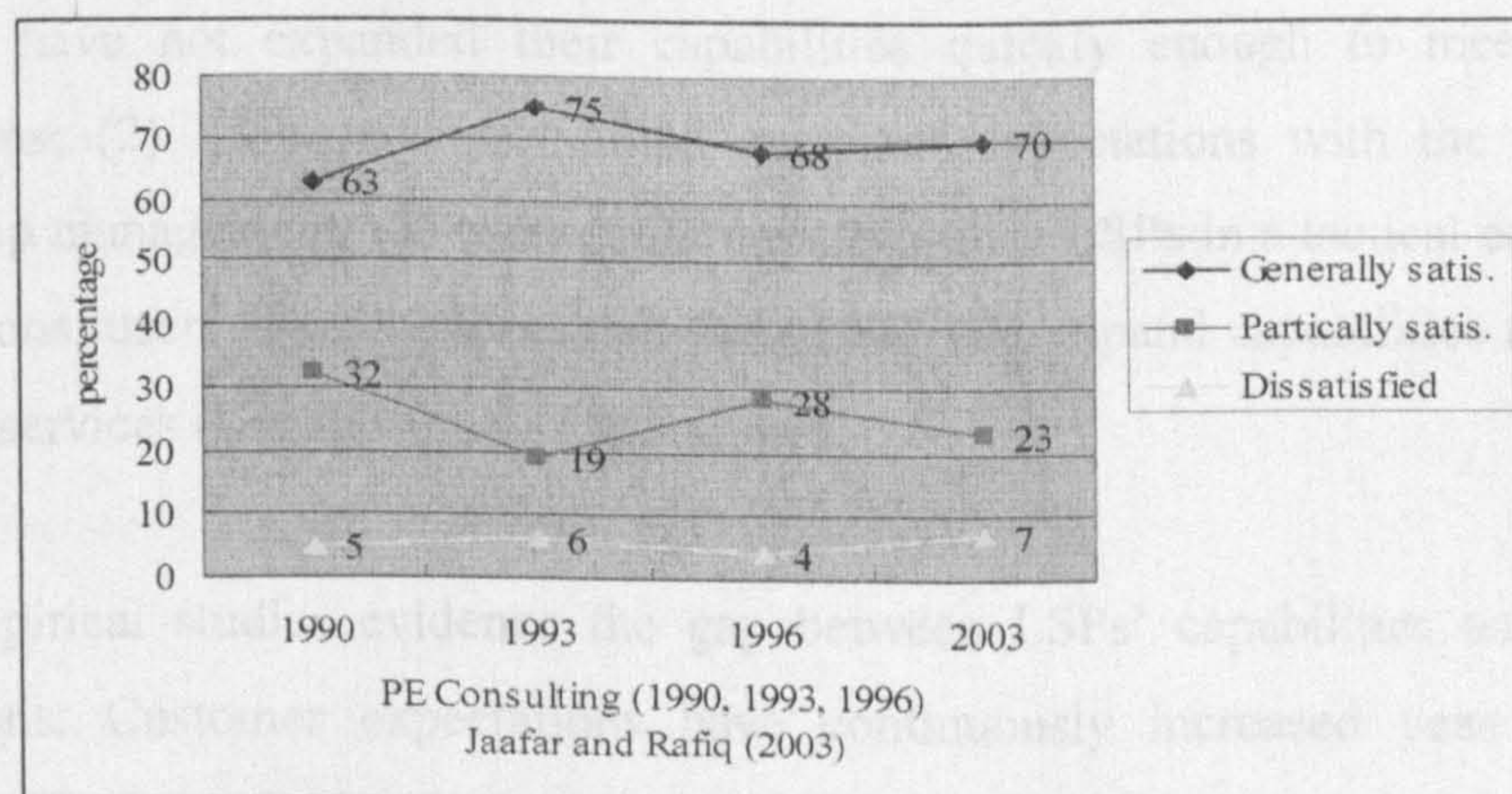


Figure 3.3 Trends in the Level of Satisfaction from 1990 to 2005

Source: PE Consulting (1996) and Jaafar and Rafiq (2005)

In PE Consulting (1990, 1993 and 1996) and Jaafar and Rafiq (2005), the level of customer satisfaction is classified into three categories: generally satisfied, partially satisfied and dissatisfied. The definition of generally satisfied denotes that companies have minor concerns with their providers to resolve; partially satisfied indicates that companies consider that there is significant scope for the improvement in the current arrangements, while dissatisfied means that the operation is not working as expected and major changes are required (Jaafar and Rafiq, 2005; PE Consulting, 1996). According to both surveys, around 60-70% of customers are generally satisfied, 20-30% partially satisfied and less than 10% dissatisfied with LSPs performance respectively. As shown in Figure 3.3, there is little change in the level of customer satisfaction in the period between 1990 and 2003. These results reveal that overall LSPs have not adequately met the expectation of customers (Jaafar and Rafiq, 2005; PE Consulting, 1990, 1993 and 1996). The results also reflect increasing customer expectation for LSPs. For example, as surveyed by PE Consulting (1996), the operational capabilities of LSPs have not been able to satisfy their customers; provision of much more proactively strategic and innovative offerings has still been required by their customers. Most important, in an increasingly demanding marketplace, this requirement may lead to the success or failure of an LSP.

Langley *et al.* (2005) also observe the deficiency between LSPs' capabilities and customer expectations. By examining six regions, i.e. North American, Western Europe, Asia Pacific, Latin America, South Africa and Middle East, Langley *et al.* (2005) found: (1) LSPs have not expanded their capabilities quickly enough to meet customer expectations; (2) LSPs have not allied customer expectations with the appropriate relationship management; (3) users preferentially utilize LSPs in a tactical capacity. For these reasons, users always expect that their LSPs can expand capabilities and provide advanced services (Langley *et al.*, 2005, 2006).

These empirical studies evidence the gap between LSPs' capabilities and customer expectations. Customer expectations have continuously increased year after year, whereas LSPs have to develop new capabilities pressed by the need for profitability (Langley *et al.*, 2005). As Bedeman and Gattorna (2003) comment:

In the last 25 years, outsourcing has steadily grown in most first world countries, but at the high rate initially expected. This is because the expectations of the customer base have stayed ahead

of the capability of 3PL providers to develop the required performance, and the ability to demonstrate that the perceived risks are unbiased (Bedeman and Gattorna, 2003, p. 484).

3.6 Current Trends in the Development of LSPs

Langley *et al.* (2005) give a strategic assessment of LSPs' development from 1996 to 2005 on the basis of ten years' survey results (see Table 3.9).

Table 3.9 Successes and Challenges of LSPs

KEY SUCCESSES	CHALLENGES
Value satisfaction	Disappointment with an LSP's abilities to develop advanced services
Sustained growth	Need for relationship reinvention, mechanisms for continual improvement, and solution innovation
LSPs awareness and usages	Increasing importance of repeatable and leveraged solutions
Service and capability advancements	Emerging role of supply chain integration
	Global evolution of LSP usage

Source: Langley *et al.* (2005, pp. 31-33)

The development of LSPs is potentially full of successes and challenges. LSPs have had a sustained growth over the past years and also become far more global than they were under globalization and networked economy. Nevertheless, because of the gap between LSPs and customer expectations, LSPs are being, or will always be, required to expand their service portfolio in either geography or varieties in response to continuously growing customer needs. There are some common trends that LSPs are exhibiting.

3.6.1 Adjusting to changes in the external environment

As manifested in many studies, the external environment plays an important role in shaping LSPs' formation and development. This operates at global, continental and national levels. Different levels of changes interact and have an aggregated effect on LSPs' development.

(1) Global changes

Globalization and the advance of information technology (IT) are two of the most significant drivers for the development of LSPs since they are renewing economic environment for LSPs within networked and digital economies.

Under globalization and the advance of IT, it is evident that the economic world has moved into a global and more interdependent marketplace from former clusters of national economies (Lemoine and Dagnæs, 2003). Accordingly, business and markets are no longer restricted to geographical boundaries; instead, they may be bonded with a complex worldwide network. Furthermore, with the advent of electronic commerce caused by the advance of IT, traditional businesses have been able to make radical changes. To some extent, these changes may influence the way of companies' operations and call for new business models to cope with the new business environment.

In logistics and supply chain management, globalization of traditional business is one of the most important changes. Influenced by globalization, "market expansion, new sources of supply, advanced security processes, continual improvement initiatives, and redesigning logistics and supply chains for greater efficiency and effectiveness" may have all become the new considerations for LSPs to operate their business (Langley *et al.*, 2005, p. 23). For example, large LSPs have been challenged to expand their service network to the global level to respond the needs of a customer base with increasingly global sourcing, manufacturing, sale and distribution (Lieb and Bentz, 2005). With the advance of IT, the most important difference for LSPs is that IT-based services are being integrated into operations simultaneously by both users and themselves. This integration is conducive to LSPs to synchronize and coordinate complex supply chain activities across their users and the other sub-tier suppliers. IT capability has thus been an essential element of overall LSPs' expertise (Langley *et al.*, 2005, 2006).

(2) Continental changes

The effect of continental changes involves groups of countries. For example, with the formation of EU in 1 January 1993, deregulation was prompted and many border controls were consequently abolished. International road transportation and freedoms of intra EU trade were also greatly facilitated (Peters *et al.*, 1998b). Accordingly there have been many significant advances which have benefited LSPs' strategic development and operations within Europe, such as transport deregulation, the harmonization of legislation across different countries, the reduction of tariff barriers, the elimination of cross-border customs requirements and tax harmonization (Browne and Allen, 1994, 2003; Rushton *et al.*, 2000). Also, these benefits provide opportunities for LSPs to speed up their cross-border expansion within the EU.

(3) National changes

In response to global and continental changes, more and more countries are integrating into the world market and increasing their presence on the world stage. For example, China's accession to the WTO in 2001 has had a profound impact on Chinese LSPs since many regulations have been removed. The benefits for Chinese LSPs to enjoy the protection from the government will be reduced gradually. They will therefore have to face more intensive competition with wholly-owned foreign counterparts while enjoying some new freedoms from the WTO. More illustration of the changes on LSPs in China will be presented in later chapters.

3.6.2 Facing more and more sophisticated customer needs

Customers, i.e. business customers and consumers, today are becoming more and more sophisticated. This imposes a huge pressure on LSPs. The causes of changing customer needs are viewed possibly from four major developments, as O'Laughlin *et al.* (1993) explain. However, as they note, these changes are not exclusive to Europe. The four developments are presented as follows.

- (1) *Focus on core competencies and capabilities-based competition.* Companies have concentrated on their core competencies and capabilities that have been redefined with an emphasis on business processes which provide superior value to customers.
- (2) *Desire for value-added logistics services.* In order to enhance the attractiveness of their products to customers, companies seek providers who can add value by their operations rather than simply reduce costs to a minimum. In response to this desire, providers broadly extend their services, as discussed earlier.
- (3) *Interest in supply-chain partnerships.* For users, traditional transactional arrangements often prove inadequate in a supply chain context; instead, partnerships are more important than before.
- (4) *Refocusing logistics operations.* In response to external changes, e.g. the formation of EU, restructuring logistics operations from national to cross-border supply chains or from one industrial sector to another is necessary for providers.

Rushton *et al.* (2000) observe five key features in the changing demand for logistics services, as shown below. All these characteristics increase the complexity of logistics

services and lead LSPs to the expansion of their service capabilities and maintain this improvement.

- (1) *The growth in customer expectations:* service fulfilment has thus become a priority for any successful strategy.
- (2) *The growing professionalism of buyers:* many buyers of logistics services now recognize the importance of service quality as well as price.
- (3) *Markets have become increasingly service-sensitive:* there is little else to differentiate between products.
- (4) *The diminution of brand loyalty:* where immediate product availability is the vital factor.
- (5) *The development of new ideas:* such as relationship marketing where fulfilling service expectation is the key and customer retention is a priority.

All the above factors have come to become today's fact facing LSPs: customers are becoming more and more sophisticated.

3.6.3 Expansion of LSPs

It is difficult to determine the true size of LSPs in reality. Several reasons can explain the difficulty of the estimation: (a) many LSPs are components of big companies and without individual statistics of their revenue having been published; (b) few governmental statistics have been collected on logistics services; (c) many LSPs subcontract a portion of their work to lower tier providers; (d) several confusions of terminology still exist; for example, transportation companies may bill themselves as logistics companies (Berglund *et al.*, 1999).

In order to establish the actual size of LSPs, researchers have used various quantitative techniques. For example, based on the value of transportation and distribution sector in the Netherlands calculated by governmental statistics, Berglund *et al.* (1999) estimated the size of the Dutch LSP sector at \$300 million in 1995. In addition, another method of the estimation they used is to consider the number of EDCs (European Distribution Centres) and the activities conducted there. This yielded a value of \$3 billion for total revenues fulfilled by LSPs in outsourced EDCs in the Netherlands. In the US, a calculation has been built on the total amount spent in the US on logistics and an outsourcing percentage or the estimate of the revenue of all US-based LSPs.

Nonetheless, as Berglund *et al.* (1999) note, all these estimates might be lower than actual status.

With respect to the expansion of LSPs, Berglund *et al.* (1999) use an S-curve showing that the LSPs sector was in the growth stage in 1998, as Figure 3.4 exhibits. According to the S-curve, LSPs will continuously grow until reaching their maturity in the future.

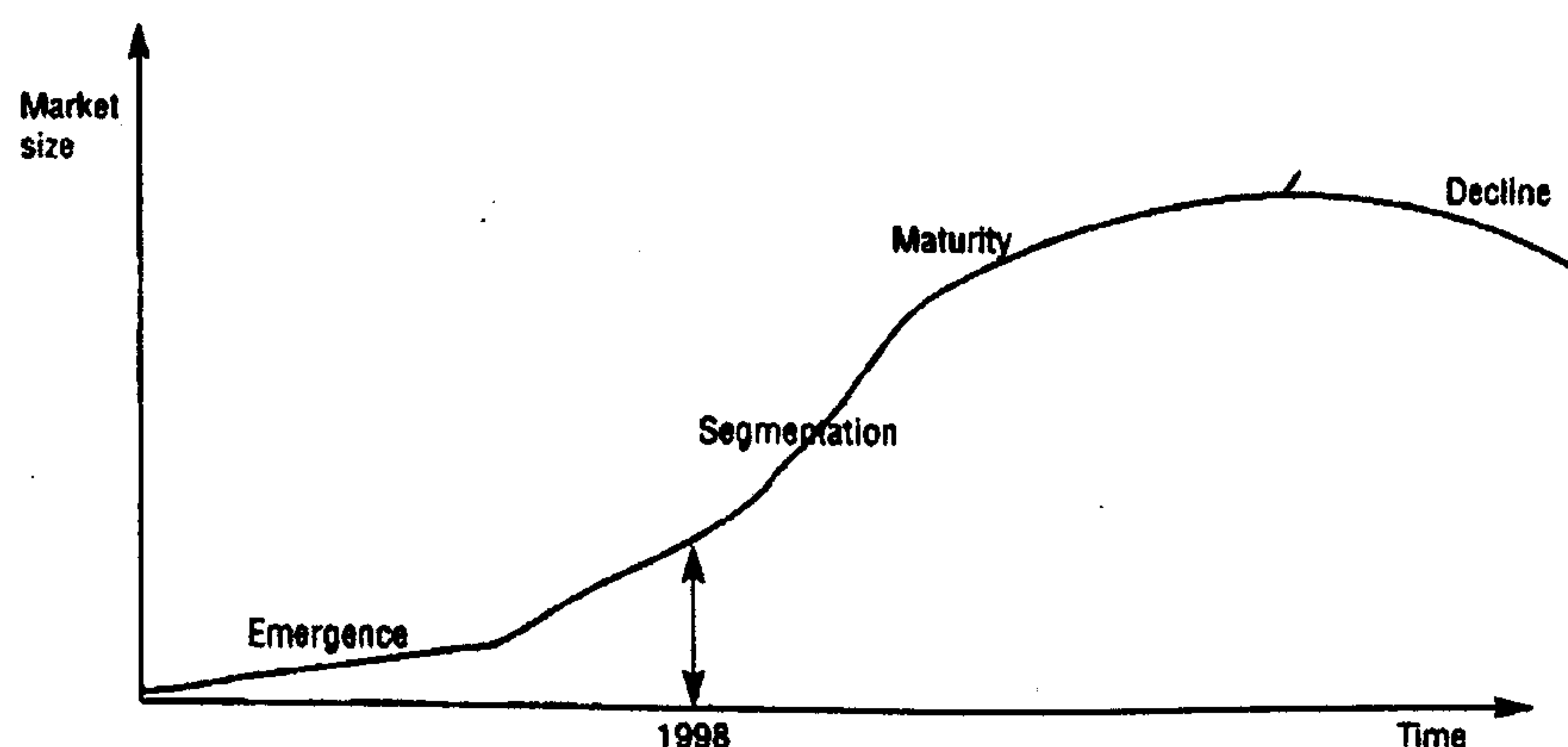


Figure 3.4 Growth Curve of LSPs Sector

Source: Berglund *et al.* (1999, p. 68)

Other authors, e.g. Langley *et al.* (2005) report that the LSP sector is enjoying annual growth rates greater than 10% from 1996 to 2005 in terms of the survey results, despite a significant number of mergers and acquisitions. Dornier *et al.* (1998) also note that the US and Europe have experienced rapid growth. All these discussions indicate the expansion of LSPs should not be ignored.

3.6.4 Segmentation of LSPs

Berglund *et al.* (1999) argue that the segmentation of LSPs was emerging in terms of strategic differentiation in the late 1990s, but it had not reached a mature stage, as shown by S-curve in Figure 3.4. Based on an extensive survey of Dutch, British, German and Swedish LSPs, Berglund *et al.* (1999) found that this segmentation was composed of two dimensions including four segments built on the mission statement of companies (see Figure 3.5).

Examples of Mission Statements of Companies in Each of the Four Segments and Other Characteristics of the Segments.			
	Service	Solution	Examples
Value-added logistics	Value leader in global integrated logistics services for durable consumer goods	Provide consultative logistics solutions	Order processing, kitting, repair/recycle, network design, inventory management
Basic logistics	Supporting companies in being more competitive by using our service	Provide complex third party logistics solutions	Transport, warehousing, (de)consolidation, labeling
Customer value proposition	Specific competitive service at low cost	Customized comprehensive offering at competitive cost	
Customers	<ul style="list-style-type: none"> - Many - Logistics is core - Standard concepts - Multiple sources 	<ul style="list-style-type: none"> - Few, large - Logistics is non-core - Complex situations - Single sourcing 	
Advantages	Focus, sharing, scale	Complexity management subcontracting skills	
Examples	LTL, express package/freight, spare parts	Ambient food distribution EDCs	

Figure 3.5 Segmentation of LSPs

Source: Berglund *et al.* (1999, p. 63)

One dimension is LSPs providing a specific service versus covering a complete range of services and offering customer logistics solutions. This includes service and solution segments. The other dimension is LSPs providing only traditional transportation and warehousing activities versus offering additional activities. Value-added services and basic services segments represent this dimension. Berglund *et al.* (1999) further observed that almost all companies surveyed operated their activities in the four segments. Nevertheless, they were prone to concentrate their activities on one of the four segments.

Based on three theoretical models, i.e. Porter's positioning model, the RBV and interorganizational perspectives⁵, Persson and Virum (2001) classify LSPs into four groups differentiating their strategic positions in the logistics service market. The four groups are: (a) logistics operators with variety-based and physical-asset-based operators; (b) third-party logistics operators with physical-based assets and solely operating on the third-part market; (c) logistics agents with no physical assets or very small investments in physical assets and a variety-based strategic position; (d) logistics integrators with having small or non-physical assets and strong customer orientation. Figure 3.6 shows the four groups.

⁵ The three models refer to Porter's (1980) "Competitive Strategy"; Penrose's (1959) "The Theory of the Growth of the Firm"; and Kay's (1993) "Foundation of Corporate Success", as noted by Persson and Virum (2001).

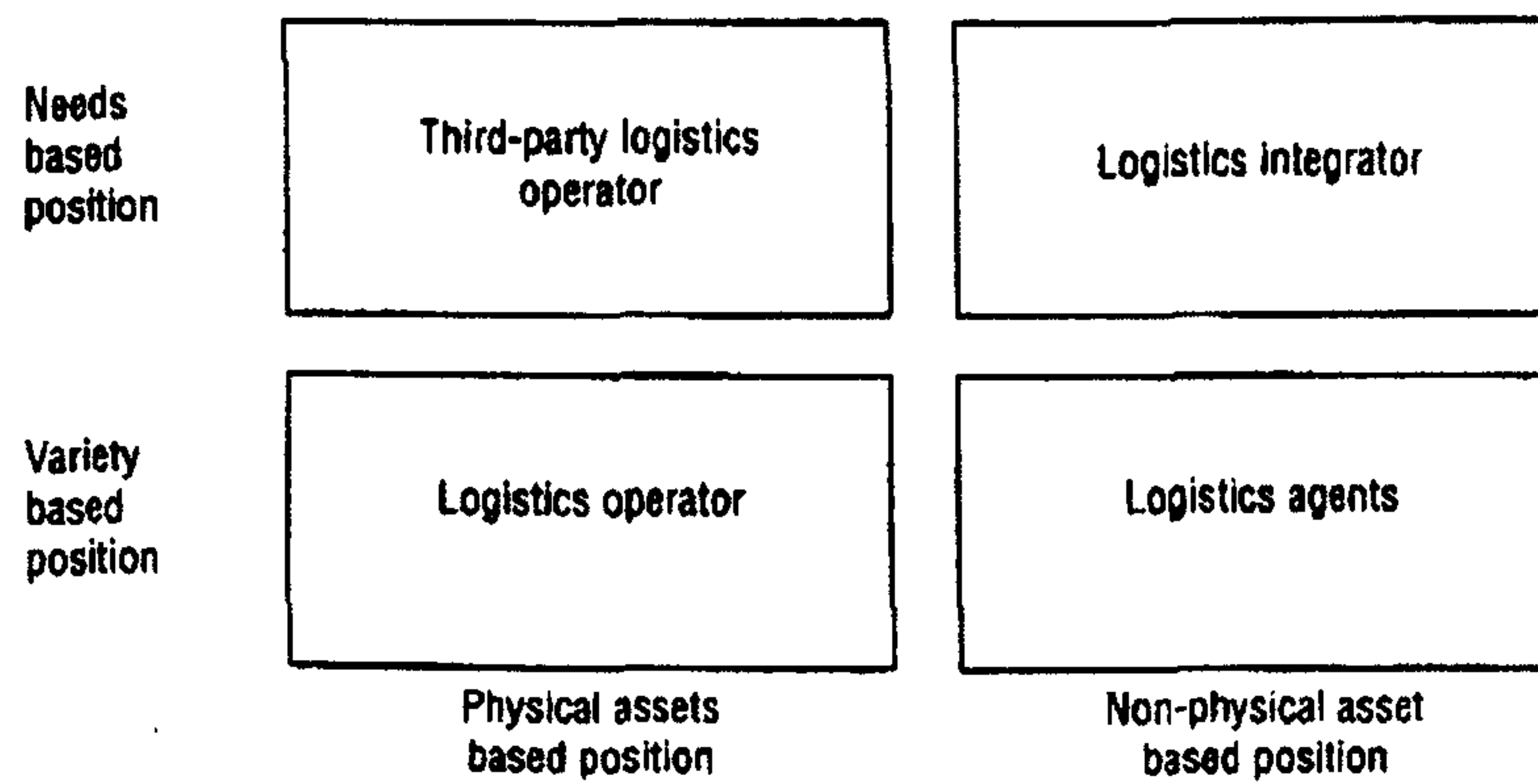


Figure 3.6 Logistics Service Providers and Their Strategic Position

Source: Persson and Virum (2001, p. 61)

This classification indicates that each LSP may have its strategic positions and can find a niche matching its particular resource base in a heterogeneous logistics service market, in which it can be competitive (Persson and Virum, 2001). Unlike the strategic segmentation of Berglund *et al.* (1999) based on the mission statement of companies, the segments developed by Persson and Virum (2001) are built on the strategic positions made by service varieties and customer needs.

Applying a network approach and the model of general ability of problem solving and customer adaptation, Hertz and Alfredsson (2003) divide LSPs into four categories: (1) standard TPL (third party logistics) provider supplying standardized services such as warehousing, distribution, pick and pack, etc; (2) service developer offering advanced value-added services; (3) customer adapter taking over customers' activities and improving the efficiency in handling but not making much development of services; (4) customer developer integrating with the customer often in the case of taking over all its whole logistics services. This division is based on two dimensions: coordination and adaptation abilities, illustrating a possible differentiation of LSPs between their strategic developments which are built on the customer development.

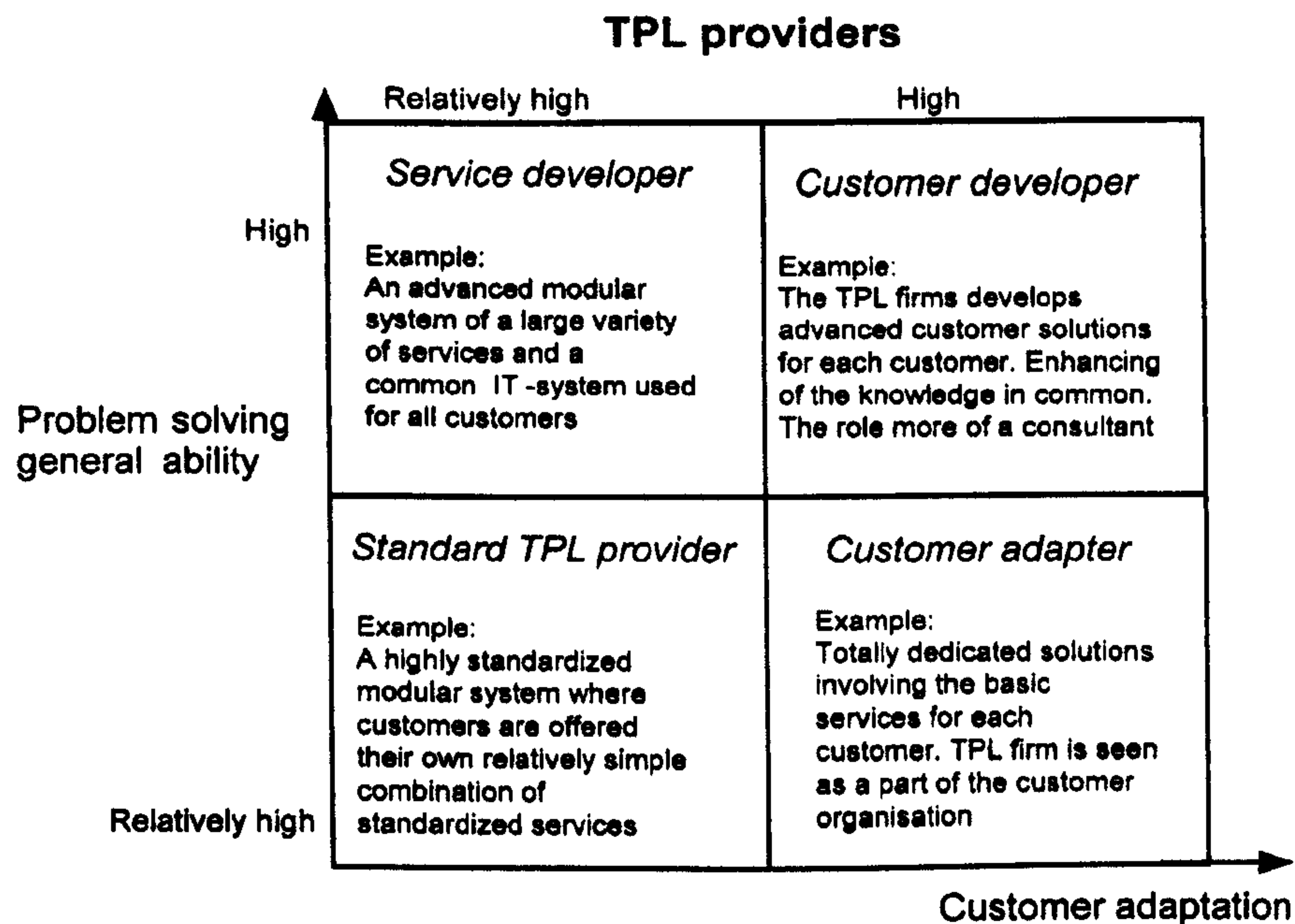


Figure 3.7 LSPs Classified according to Abilities in General Problem Solving and Customer Adaptation

Source: Hertz and Alfredsson (2003, p. 141)

Hertz and Alfredsson (2003) explain that their work supports earlier classification defined by Berglund *et al.* (1999). However, they argue that the classification of Berglund *et al.* (1999) was more static and impossible to describe the different degrees of general abilities or of customer adaptation. From their perspective, abilities are the important criteria in segmenting LSPs.

The above three works point to the fact that LSPs have been segmented, although the grounds on which these segments are based, i.e. corporate mission, strategic position and the abilities of coordination and adaptation, are different. Each LSP may create its competitive advantage within a particular matched segment on the basis of its resources and capabilities.

3.6.5 Diversified growth strategies of LSPs

In recent years, there have been various examples of mergers, acquisitions and strategic alliances among LSPs. The overall aim for most LSPs to take these strategies is to increase their strengths and gain competitive advantage in the logistics service market. Four growth strategies often employed by LSPs are discussed below.

(1) Mergers and Acquisitions (M&A)

Mergers and acquisitions (M&A) are used to achieve external growth and lead to horizontal integration and business diversification. This can yield two major advantages: (a) the merged company can rationalise its assets and operations, thereafter reducing replicated activities; and (b) the joint company can reduce competition (O’Laughlin *et al.*, 1993).

Typical drivers for M&A among LSPs include regional expansions, service diversification and industry specialization (Langley *et al.*, 2006). M&A activity continuously changes companies’ competitive advantage, facilitates towards globalisation and broader service offerings as well, such as expanding the global reach of companies, service-line enhancements, expansion of service capabilities in specific industries, the acquisition of 4PL capabilities and the desire to acquire geography-specific knowledge (Lieb and Kendrick, 2003). Prominent examples of large-scale LSPs mergers include DHL and Exel, Kuehne & Nagel and USCO, UPS and Fritz and Menio Forwarding, PWC Logistics and Geo-Logistics (Langely *et al.*, 2006). The period 2005-2006 had high merger activity in the LSP market, as seen in the UK logistics market. This will be discussed in Chapter 4.

(2) Joint venture

The joint venture is an important alternative to M&A. By jointly creating a third corporate entity, called joint venture, two companies can contribute their experience and skills in this new entity, whereas the new entity may enjoy a degree of independence from the two parent companies. Moreover, the two companies are the shareholders of the new entity (O’Laughlin *et al.*, 1993). For example, Hi-Tech Logistics Ltd. is the joint venture created by IBM and UK-based international LSP Tibbet & Britten, where IBM holds 40 percent equity. Hi-Tech Logistics was integrated into Tibbett & Britten and provided distribution services for IBM in the UK (Hutchison Tibbett&Britten, 2007). However, in some countries, a foreign company, such as a major airline company, is not allowed to take majority ownership in some operations (O’Laughlin *et al.*, 1993).

Joint venture is a popular way for an LSP to secure broader geographical coverage. A good example of joint venture is UPS and Federal Express. Both companies have developed joint ventures in other regions.

(3) Strategic alliances

Strategic alliances for LSPs are considered originating from outsourcing (Grant *et al.*, 2006; Stock and Lambert, 2001). During the 1980s, a number of companies outsourced diversified logistics activities to third parties and examined the viable development of partnerships with them. From an historical point of view, traditional relationship between LSPs' and shippers are arm's length transactions, where each side has made an effort to maximize its own benefits with little respect to the other side's interests. However, in the last few decades, both sides have come to recognize the benefits arising from outsourcing and developing strategic partnerships (Stock and Lambert, 2001). Many LSPs have thus tried to move the traditional and conventional customer-supplier relationship to a true partnership (Langley *et al.*, 2006).

Avoiding financial risks is the major advantage of taking strategic alliances. In contrast to M&A and joint venture, strategic alliances can "provide a degree of market access and operational integration desired by a company without the capital investment or legal framework required in a merger, acquisition or joint venture" (O'Laughlin *et al.*, 1993, p. 78). Other advantages include clarifying the roles of each partner and increasing the likelihood of success.

Different driving forces have been described for strategic alliances taken by LSPs. Broadening geographical coverage and expanding service offerings are the two major drivers, as identified by some studies (see Table 3.10).

Table 3.10 Driving Forces for Strategic Alliances

Researchers	Driving forces
Lieb and Randall (1999)	To broaden service offerings To broaden geographical coverage
Carbone and Stone (2005)	To enlarge and strengthen the geographical network To penetrate new market in terms of services To penetrate new geographical markets

Source: adapted from Lieb and Randall (1999) and Carbone and Stone (2005)

Strategic alliances normally involve two types: vertical and horizontal alliances. Vertical alliances take place between LSPs and their customers, focusing on a comprehensive partnership on a long-term basis; e.g. in 1999 Danzas agreed to provide Kellogg's with world warehousing, distribution for plants in Michigan, USA, Mexico and the UK (Carbone and Stone, 2005). Horizontal alliances are developed between

LSPs. For example, in 1999 Gefco, Kuehne and Nagel set up a European alliance for freight road transport under the brand name, Gefco-KN. The horizontal alliance is perceived as one way to spread costs/risks and increase the scope of services (Carbone and Stone, 2005).

(4) Organic growth

In contrast to acquisitions and joint ventures, organic growth has fewer risks for companies' expansion despite relatively slower growth rate (Stone, 2001, 2002). Because of this attribute, organic growth is normally considered as a support to the other modes for expansion and not encouraged for the newcomer entrants to adopt. For example, some UK LSPs, such as NFC, Christian Salvesen, T&B and TDG, made acquisitions when entering the European market, followed by organic growth for subsequent expansion (Stone, 2001, 2002). This organic growth helped these companies to move into the mature phase in the whole strategic expansion and has been extremely important. Another example is DHL, which also took this route when it successfully entered many markets in the world. In 2004 its business grew by 13% organically (Foster and Armstrong, 2005).

All the above strategic approaches adopted by LSPs illustrate that LSPs put emphasis on their strategic developments. These growth strategies lead to the service diversification of LSPs and the improvement of their capabilities since resources may have been able to be shared and capabilities are embedded in activities.

3.7 Summary

This chapter has reviewed logistics service providers (LSPs), whose competitiveness is the subject of this research.

LSPs are the firms that provide multiple logistics services for use by customers. These services comprise mainly transportation, warehousing, cross-docking, inventory management, packaging and freight forwarding.

LSPs emerged in the early 1980s. Their development has been influenced by many factors stemming from both demand and supply sides. On the demand side, globalization of business, increased competition, the need to focus on core business, the expectation for improving service and reducing cost are the main reasons for companies

to outsource their logistics activities which previously had been performed in-house. On the supply side, worldwide deregulation, the advancement of IT, declining profit margins in traditional services and low returns on capital are the strong drivers for LSPs to provide a more comprehensive set of logistics offerings for users.

LSPs can be classified in various ways; for example, by geographical coverage, business origin, asset, service offerings and business model. Each LSP attempts to provide unusual services for customers on the basis of its resource bases and capabilities, hence the diversification of logistics service provision.

Currently, there are five common trends that LSPs are exhibiting: (1) adjusting to changes in the external environment; (2) meeting more sophisticated customer needs; (3) continuously expanding; (4) segmentation; and (5) developing different strategic strategies for growth.

In general, LSPs differ from other service firms because of their unique final output. Diversified service offerings and logistics activities are required to support the process of value creation. Competition between LSPs is manifest in these final service offerings. The development of LSPs, to a large extent, hinges on customers and the external environment. There is no doubt that more and more sophisticated customer needs and the ever-changing external environment will continue to shape the development of LSPs. Under these pressures, in order to differentiate themselves from the competition, LSPs are expanding their range of services and geographical coverage, thereby exploiting resources and capabilities.

The next chapter examines the specific development of LSPs in China and the UK.

CHAPTER 4 THE DEVELOPMENT OF CHINESE AND UK LSPS

4.1 Introduction

This chapter will examine the development of Chinese and UK LSPs. The UK is one of the most advanced countries in the world, while China is a developing country with a high rate of economic growth. Given these basic national characteristics, an attempt will be made to assess the extent to which the development of LSPs in the two countries is influenced by factors such as history, economy, politics and culture.

4.2 Chinese LSPs

Partly as a result of its entry into the WTO, China's economy has been booming with an annual GDP growth rate of nearly 10% (i.e. 10.7% in 2006) and the country is becoming a global manufacturing centre. Driven by the immense potential of the Chinese market, more and more foreign investment and various foreign companies have entered China.

The provision of logistics services in China is an emerging market. However, influenced by the whole macro-economy progress, the logistics service market is enjoying rapid growth. In 2005, logistics expenditure was 33,860 billion yuan (\$4573.5 billion), an increase of 12.9% from 2004, about 18.6% of GDP. In the same year, the total turnover of logistics was 48.1 billion thousand yuan (\$6.5 billion), having an increase of 25.2% from 2004 (CFLP, 2006). In this market, Chinese LSPs have been growing fast. As far as is known, there have been more than 18,000 registered for logistics services. Moreover, the logistics industry reported annual growth rates of 31% for 1999, 35% for 2000, 55% for 2001, and is expected to grow continuously in future (Boltion and Wei, 2003). In 2005, the revenue created by LSPs was 18,791 billion yuan (\$2538.1 billion), an increase of 12.7% from 2004 (CFLP, 2006). Although the generation of these figures is in doubt, since it is difficult to conduct logistics statistics under the current statistical system in China, i.e. without governmental statistics of logistics and because the businesses of LSPs are administrated by different ministries, a rapid growth market for logistics has been the current trend in China.

4.2.1 Evolution of logistical management in China

In line with the development of the Chinese economy, the evolution of logistical management in China has three distinct stages: materials management under a centrally planned economy from the early 1950s to the early 1980s; materials and logistical management under a planned market-oriented economy from reform and opening up to the mid 1990s; nascent and accelerative development of logistics under a socialist market economy⁶ from its inception in the mid 1990s to the present (CCTA, 2001, 2003).

Stage 1: early 1950s – early 1980s

China established a centrally planned economy with the foundation of the People's Republic of China in 1949. It lasted until the early 1980s when the economy was reformed and opened up. During this period, the Chinese economy operated under a planned management system. The government implemented plan-commanded production, allocation and provision on various commodities, especially on raw and processed materials, and main consumption goods. The main function of transportation and distribution organizations was to guarantee the fulfilment of plan-commanded distribution. In order to save expenditure in the transport and distribution system, the government introduced a series of policies, such as comprehensive development of different transport modes, rational planning of the layout of all kinds of nodes for stock and transportation, rationalisation of inventory, design of efficient freight networks, and development of multi-model transport. These policies were designed mainly to improve materials management whereby production, storage and transport were organized in line with a national plan.

During this period, the allocation of resources and the supply for commodities were processed in terms of administration and regionalism. The economic efficiency of materials management was correspondingly put in second place. Logistics activities were limited to warehousing and transportation. Individual parts of the logistics system were not interconnected; the system was shown poor and overall yielded low levels of benefit.

⁶ Socialist market economy, as a conventional term, has been often used in the *Financial Time, China Daily* and other documents.

Stage 2: early 1980s – mid 1990s

The Third Plenary Session of the Eleventh Central Committee held in 1978 was a critical event for accelerating Chinese reform and opening up in China. This provided the opportunity for China to proceed from a planned economy to a market-oriented economy.⁷ Several key changes then occurred:

- Market liberalisation was gradually enhanced.
- Economic orientation began to shift from production economy to commodity economy.
- The volume of domestic and international trade increased steadily.

In addition, the concept of logistics was introduced in China in the early 1980s. Logistics activities consequently received attention and developed in place of traditional materials management. Affected by changes in the economic and social environment, not only commercial organizations but also manufacturing organizations began to attach importance to logistical management, as an alternative to traditional materials management. Moreover, not only was the development of state-owned logistics companies heavily emphasized, but private logistics companies also emerged. Logistics changed from being confined to particular sectors and local areas into being an activity which was more widely available and diversified.

As economic activities were given a market orientation, logistics companies began to be concerned with economic benefit. Logistical management was no longer limited to warehousing and transportation in isolation; instead, more attention was paid to the coordination of a range of logistics activities, including packaging, goods handling and related information processing. According to system thinking, there has been greater integration of warehousing, automated storage and retrieval systems (ASRS) and various transport modes. The aim of all these practices was to optimise the whole logistics process in accordance with the system thinking, and reduce the logistics expenditure to the lowest possible level. In this period, the economic and social benefits of logistics were increased. Nevertheless, since the market-oriented economic system had not yet been completely established, the mindset of “large and all-inclusive” and

⁷ This transition was completed in two phases. The first phase was from a planned economy to a planned market - oriented economy, or rather, a planned economy as the priority and a market - oriented economy as the complement. The second phase was the system of a combination of planned economy and market-oriented economy.

“small and all-inclusive” was still entrenched in many traditional commercial and manufacturing organizations. That is to say, companies, regardless of their size scale, owned vehicles, warehouses and purchasing departments and undertook everything. This not only weakened the core business of companies, but also brought companies much extra cost and lowered efficiency of operations. The process of the logistical management had therefore not been fully implemented as it had been in the west.

Stage 3: mid 1990s – present

In 1993, the Third Plenary Session of the Fourteenth Central Committee initially decided to establish a socialist market economy. Since then, China has sped up the pace of economic reform. The business environment has undergone a major transformation. The rapid development of technology and extensive application of information technology, strong customer focus, establishment of a competitive system, ending economic shortages that used to exist in the planned economy system, plus rapid economic growth have all given the management of logistics much greater opportunities. Meanwhile, the Chinese government reformed, restructured and reorganized traditional warehousing and transportation companies, prompting them continuously to offer a new service portfolio. In addition, many new logistics companies have emerged in response to the needs of the new economy system.

During this period, apart from state-owned logistics companies, the number of non state-owned logistics companies such as private companies and Sino-foreign joint ventures has increased rapidly. It can be seen from the report of China Top 100 LSPs survey in 2004 that 70% of Top 100 companies were established after 1995 (CCTA, 2005). These companies included state-owned enterprises, private companies, and Sino-foreign joint ventures in which the Chinese side holds a dominate share. Additionally, wholly foreign-owned logistics companies have started to enter China.

During the transition of the Chinese economy to a socialist market economy system, logistics activities gradually grew out of the supporting role, and logistics services are now performed according to the requirements of the market forces. Logistics companies could have adopted objectives similar to those of their western counterparts: achieving the lowest cost to fulfil the best quality of service. Moreover, given the exploitation and application of information technology, the efficiency of logistical management has accordingly improved.

4.2.2 Role of Chinese government in logistical development

The Chinese government initiated the new wave of rapid development in Chinese logistics. In November 1999, the State Economic and Trade Committee (CETC)⁸ and The World Bank jointly launched “The International Symposium of Modern Logistics Development”. Mr. Wu Bangguo, one of the vice premiers in the Chinese central government stated at this symposium that Chinese logistics should have a great leap forward development.

The Chinese central government plays a very important role in the development of logistics. In recent years, the Chinese central government has recognized the importance of logistics to industries and national competitiveness, and has in turn adopted many approaches to prompt logistical development. Table 4.1 displays some of the central government initiatives which have been announced since 1999. These initiatives have taken effect and directed the development of logistics.

⁸In 2002, the State Economy and Trade Commission was amalgamated into the Stated Development and Reform Committee in a re-structured ministry.

Table 4.1 Initiatives Announced by Chinese Central Government

Administrative Ministry	Time	Initiative
SETC	Nov. 1999	Initiated "The International Symposium of Modern Logistics Development". It is the highest level conference regarding the logistics issue to have been held by the Chinese government and international organizations. Mr. Wu Bangguo gave an important written report.
MOC (communications)	Feb. 2001	The document regarding "Some Opinions of Prompting Transportation Enterprises to Develop Comprehensive Logistics Services" was released.
SETC, MOR, MOC (communications), MII, MOFTEC, CAAC	Mar. 2001	The document regarding "Some Opinions on Accelerating Chinese Modern Logistics Development" was released.
SETC, MOR, MOC (communications), MII, MOFTEC, CAAC and one associate CCTA	Jun. 2001	Work Colloquia of Modern Logistics was held in Shanghai.
SDPC	Jul. 2001	The long-term strategy of logistics development in <i>The Tenth Five Plan of Transportation Development Planning</i> was put forward; meanwhile, two research projects: "Development Strategy of Chinese Logistics from 2001 to 2020" and "Development Strategy of Chinese Transportation from 2001 to 2020" were launched.
SETC	Jul.-Dec. 2001	In July, 2001, a coordination system concerning logistics companies was set up in order to strengthen the communication between the government and enterprises, and 34 companies were identified as the first group involved in this coordination system. In December, 2001, the first meeting involving the 34 companies was held.
MFTEC	Jun. 2002	Three provinces including Jiangsu, Zhejiang, Guangdong and four municipalities cities including Beijing, Tianjin, Shanghai, Chongqing, and Shenzhen Economic Zone were issued as the experimental units for foreign investment logistics companies.
NDRC and MOF	2003	Funds containing 1.3 billion yuan were allocated to be used in developing logistics infrastructure and logistics information.
NDRC, MOC, MPC, MOR, MOC, CGAC, SAT, CAAC, SAIC	Aug. 2004	The document containing "Opinions on Prompting Modern Logistics Industry in China" was released.
NDRC and NBSC	Oct. 2004	The document "The Notice of Organizing and Implementing Statistical Accounting and Report System on Social Logistics (Trial Implementation)" was released.
NDRC	Feb. 2005	The document "The Notice of Setting up Contact Meeting System of National

Logistics” was released. The meeting was composed of 13 ministries (NDRC, MOC (commerce), MOR, MOC (communications), MOIL, CAAC, MPS, MOF, CGAC, SAIC, SAT, AOSIQ, SAC) and two associations (CCTA and CFLP). The meeting was entitled “Ministry-Level Coordination Meeting of Logistics”.

SAT and NDRC	Dec. 2005-Mar. 2006	The document “The Notice of Tax Policies on Trial Logistics Enterprises” was released. In January, 2006, 37 trial logistics enterprises were levied tax according to variable levies in turnover tax. In March, 2006, SAT and NDRC released the document again to identify the procedure and method of income tax return so as to resolve the issue of how logistics enterprises should pay tax.
NDRC, MOR, MOC (communications)	Mar. 2006	The document regarding “The Notice of Strengthening Administration for Transportation Enterprises Engaging in Two or More Transportation Modes” was released.
NDRC, NBSC, CFLP	Apr. 2006	The document “The Notice of Organizing and Implementing Statistical Accounting and Report System on Social Logistics” was released.

Notes:

SDPC: The State Development and Planning Commission. In March 2003, it was renamed the National Development and Reform Commission (NDRC) and meanwhile absorbed some of the administrations of SETC.

NDRC: National Development and Reform Commission

SETC: The State Economic and Trade Commission. In March 2003, it was cancelled. Some administrations were absorbed into NDRC, and the rest were restructured together with MOFTEC (Ministry of Foreign Trade and Economic Cooperation) to form a new ministry, the Ministry of Commerce.

MOFTEC: Ministry of Foreign Trade and Economic Cooperation. In March 2003, it was cancelled. It absorbed some administrations to form a new ministry, the Ministry of Commerce.

MOC (commerce): Ministry of Commerce; MOC (communications): Ministry of Communications

MOR: Ministry of Railway; CAAC: General Administration of Civil Aviation of China

MI: Ministry of Information Industry; MPS: Ministry of Public Security

CGAC: Customs General Administration of China; SAT: State Administration of Taxation

SAIC: State Administration for Industry and Commerce; MOF: Ministry of Finance

AOSIQ: General Administration of Quality Supervision, Inspection and Quarantine of China

SAC: Standardization Administration of China; NBSC: National Bureau of Statistics of China

CCTA: China Communications and Transportation Association (association belonging to SDRRC before March 2003, now belonging to NDRC)

CFLP: China Federation of Logistics and Purchasing (association belonging to SETC before March 2003, now belonging to NDRC)

Driven by the necessity of logistical development in China, local governments also put the development of logistics on the agenda in local economic development. They have attempted, proactively, to create and improve the local business environment for logistical development. For example, in order to cater for the increasing logistics demand arising from manufacturers, in 1998 the Shandong government initiated the project concerning optimizing enterprise logistics, and promulgated the document entitled "Opinions on Optimizing Enterprise Logistics Management". Logistics businesses such as Haier Logistics and Tingdao Beer Logistics have emerged as examples of what has been called the "Shandong Model". Guangdong Province proposed a policy of helping five important large LSPs. According to this policy, the five LSPs can receive an annual subsidy of three million yuan (\$407 thousand).

Apart from the government, many associations under the government's administration have also positively contributed to the development of logistics. Of these associations, the China Communication and Transportation Association (CCTA) is the most influential. CCTA is a social and economic organization approved by SDPC and was jointly established in 1982 by the various departments from the ministries of railway, transportation, posts and telecommunications, civil aviation, petroleum pipeline and others. Major activities of CCTA include conducting research committed by the government in developing strategies, policies, regulations, standardizations, layouts, and information systems for logistics and transportation in China; providing consultations for logistics and transportation enterprises; and offering professional logistics training and education. Each year since 2004, CCTA has run a survey of the Top 100 Chinese LSPs. This survey has received much more attention in the Chinese logistics community.

4.2.3 Impact of China's accession to the WTO on Chinese LSPs

China's accession to the WTO in 2001 has had a dramatic effect on its economic development, since it can now be integrated into the global economy as a WTO member. With its admission to the WTO, China has gradually loosened the regulations on foreign ownership and assets within the country that might have prevented foreigners from entering the Chinese market. The opening of a distribution entrance is considered to be most remarkable because China's transportation and logistics market is perceived as rudimentary but still having commercial reality (Shaw and Wang, 2002). This opening may provide opportunities for foreigners and companies interested in this market,

especially for those pursuing this area as a major source of competitive advantage (Perkins and Shaw, 2000).

The opening schedule for distribution and transportation is set in six years from 2001 to 2007 (see Table 4.2). The big changes happen mainly on the ownership, service and geographical coverage. In addition, among the opening of different transport modes, rail transport is the last one to open up fully.

Table 4.2 China's WTO Distribution and Transportation Service Commitments

Sector	Upon Entry: December 11, 2001	Year One: by December 11, 2002	Year Two: by December 11, 2003	Year Three: by December 11, 2004	Year Four: by December 11, 2005	Year Five: by December 11, 2006	Year Six: by December 11, 2007
Distribution (Wholesale and Commission Agents Service, excluding salt and tobacco)	<p>FIEs can distribute all of their products made in China.</p> <p>Foreign service suppliers can provide a full range of related services for products they distribute.</p>	<p>Minority foreign equity permitted except for books, magazines, and newspapers (BMN), pharmaceutical products, pesticides, mulching films, chemical fertilizers and processed and crude oil.</p>	<p>Majority foreign equity permitted.</p> <p>No geographic or quantitative restrictions.</p>	<p>100% foreign equity permitted except for chemical fertilizers, processed oil, and crude oil.</p> <p>May distribute BMN, pharmaceutical products, pesticides, mulching films.</p> <p>No geographic, quantitative or equity restrictions.</p>		<p>100% foreign equity permitted for all products. No limits of foreign participation after 2006.</p> <p>May distribute chemical fertilizers and crude and processed oil.</p>	
Rail Transportation	Up to 49% foreign equity permitted.			Majority foreign equity permitted.			100% foreign equity permitted.
Road Transportation	Up to 49% foreign equity permitted.	Majority foreign equity permitted.		100% foreign equity permitted.			
Warehousing and storage	Up to 49% foreign equity permitted.	Majority foreign equity permitted.		100% foreign equity permitted.			
Freight Forwarding	Up to 50% foreign equity permitted, with certain conditions. 5 year waiting period for second JV.	Majority foreign equity permitted. With certain conditions	Waiting period for second JV reduced to 2 years. National treatment for registered capital requirements for branches.		100% foreign equity permitted. National treatment for capital requirements for subsidiaries.		

Notes: FIE=Foreign-invested enterprise, JV=Joint Venture; BMN=books, magazines, and newspapers.

Source: Adapted from Bolton and Wei (2003, pp. 14-15)

As a result of this change, Chinese LSPs have been facing competition from more and more wholly-owned foreign counterparts. The structuring and consolidating of the entire logistics market has been inevitable, as has happened in the US and Europe following deregulation (Easton, 2003). Furthermore, the demand for logistics from foreign multinationals has forced Chinese LSPs to improve their operational capabilities. Chinese LSPs thus face many new opportunities and challenges.

4.2.4 Growing demand for logistics services

On the basis of an overall analysis of many factors: GDP, total value of imports and exports, freight traffic, freight ton-kilometers, and volume of freight handled in ports, CCTA (2003) forecast that there would be a large demand market for logistics services in the first twenty years of this century. The sources for this large increase in the demand for logistics services will stem primarily from four streams: manufacturing and commercial organizations, rural markets, urban inhabitants and multinationals (CCTA, 2003).

(1) Increasing outsourcing from Chinese manufacturing and commercial organizations

Challenged by the transition of economic system and fierce global competition, more and more companies, especially traditional manufacturers and retailers, have come to realize the pressure of cutting costs and expanding services. Moreover, they have also found that the traditional business models, i.e. “large and all-inclusive” and “small and all-inclusive”, have substantially hindered companies from operating efficiently and effectively. For this reason, they set about restructuring logistics activities in-house and positively outsourced these activities to logistics companies so as to concentrate on core business to improve their competitiveness. The reforms occurring in commercial business modes and channels which cater for the diversification of consumer demand, have given rise to various logistics needs.

(2) Huge potential of rural logistics demands

China is a large agricultural country, with a large proportion of its population living in rural areas. Materials for agricultural production and consumption are delivered within rural areas. Agricultural products and processed products also need to be transported to urban areas. All these require the support of a strong system of logistics service provision. In the Sixteenth National Congress of the CPC, the Chinese government

highlighted the rural issue entitled the “Shan Nong” policy, which relates to developing agriculture and rural economy, improving the living standard of peasants, and speeding up to the exploitation of the rural market. Rural logistics has consequently become an indispensable part of Chinese logistics.

(3) Growing logistics demands of urban inhabitants

In contrast to the rural areas, in Chinese cities, the living standard of residents has been improving fast. With the consumption structure shifting from “Wengbao”⁹, based on farm product consumption, to “Xiaokang”¹⁰ on industrial product consumption, and, at a higher level, “Fuyu”¹¹, relying heavily on services consumption, the logistics service market in cities is more mature than in rural areas.

(4) Expanding logistics demand from multinationals

Many multinationals have been investing in China to take advantage of the low production costs and a high rate of market growth. Foreign multinationals invariably outsource their logistics, many of them performing to use joint venture LSPs combining Chinese and foreign operators. Correspondingly, the increasing demand from these multinationals is also an important driver of logistics market growth.

This forecast has now been demonstrated by an ever-increasing pressure on Chinese LSPs as they face greater demands from different market segments (CCTA, 2005). Also this trend will continue for the foreseeable future.

4.2.5 Categories of LSPs in China

It is possible to classify Chinese LSPs into six categories (CCTA, 2001, 2003):

(1) LSPs growing out of traditional transportation, warehousing and freight forwarding companies

A group of large national transportation, warehousing and freight forwarding companies was established in China during the period of centrally planned economy; these include the COSCO group, Sinotrans group, CMST and China Post, etc. Under the socialist market economy, some of them have embraced the opportunity to develop into logistics businesses. For instance, the COSCO group formulated a new strategy for logistics

⁹ Wengbao means life being adequately fed and clad.

¹⁰ Xiaokang means life being well-off.

¹¹ Fuyu means life being prosperous.

development in 2000 whereby the group would shift from being a global carrier to becoming a global logistics business. "COSCO Logistics" has since emerged. Sinotrans made an effort to convert itself from a traditional transportation company into a modern, international logistics company consisting of many components, including marketing, operation, logistics and warehouse information systems, all designed to deliver unified service quality, procedures and standard operations. As the biggest warehousing company in China, CMST has changed its traditional business model after experiencing the transition from a planned economy to a market-oriented economy. CMST built the brand of "quality, efficiency, convenience, and consideration", providing a series of logistics services to different customer groups. China Post established China Post Logistics Co., Ltd (CNPL) in 2003. Under the "China Post Logistics" banner, CNPL has taken advantage of the "three nets", i.e. physical net, financial net and information net, to develop Pan-China and the Pan-net postal logistics business.

These large state-owned companies are the major forces in the development of logistics services in China. By contrast, there are numerous relatively small state-owned transportation, warehousing and freight forwarding companies in China. They cover the whole country and also provide an array of services for their customers.

(2) New generation of LSPs

In contrast to companies with a long history of traditional transportation, warehousing and freight forwarding, a new generation of LSPs, which established in the 1990s or 2000s, has several characteristics distinct from those of their predecessors. These companies set themselves up from the outset as integrated logistics service providers. Furthermore, some of them operate asset-light businesses, implementing services by renting public facilities. In addition, these companies involve different ownerships, with the number of non state-owned companies apparently increasing. Baogong Logistics is a good example of the new generation of private logistics companies in China. since it was founded in 1994, Baogong Logistics has dedicated its business to providing one-stop integrated distribution for manufacturers. In 1997, Baogong was the first private LSP to employ the Internet and IT to monitor the whole process of logistics management. By interfacing with customers' electronic data, Baogong could effectively and efficiently serve its customers.

(3) LSPs spun off by their parent companies

In China, some manufacturers and retailers have spun off their in-house warehouse and transport departments, making them into separate logistics companies. The separated entity not only serves their parent company but can also provide services to other companies. Manufacturers such as Haier, Changhong, Tingdao Beer, and retailers such as Lianhua and Guomei, etc, have all taken this path. For example, in 1998, Haier restructured enterprise engineering, centralized management and put purchasing, warehousing, distribution and transportation together into a logistics department which was consisted of three divisions: purchasing, distribution and warehousing. Haier not only optimized and restructured its logistics business and resources, but also adopted a “Synchronizing Logistics” model and targeted zero stock. As a result, Haier could cut its logistics costs; idle materials have decreased by 90%; warehouse area has reduced by 88%; working capital invested in inventory has reduced by 60%.

(4) Wholly foreign-owned companies

Since 1997, the Chinese government has permitted some foreign shipping companies, i.e. Maersk, APL, to set up sole (individual proprietorship) container transportation enterprises on a logistics trial basis. Now more and more foreign companies are permitted to perform their logistics operations in China thanks to China’s accession to the WTO. For instance, in 2007, leading US trucking company Schneider National became the first non-Chinese company to win a road freight operator’s licence in China (Transport Intelligence, 2007). Among these companies, some are global mega carriers, i.e. APL and Maersk on shipping service; FedEx, UPS, and DHL on air transportation and express services; others like Exel and TNT. These companies have strong service capabilities, overseas networks and international customer relationships. Moreover, their clients are mainly multinationals. Some of them take the piggybacking’ way, following their clients to enter the Chinese logistics market, hence expanding their service and geographical coverage. For example, KWE, a Japanese forwarder, chosen by many Japanese manufacturers as their service supplier, undertakes 20% of the airfreight moving between China and Japan (Foster and Armstrong, 2005). Others like APL and Maersk in an effort to meet their customers’ global needs and have entered China (Huang and Kadar, 2003).

(5) Joint venture logistics companies

The rise in the number of joint ventures is also a major trend in the Chinese logistics market. Normally, there are two patterns for the joint ventures: between LSPs or between LSPs and other industrial companies. DHL-Sinotrans, offering an overnight delivery service, was the first pioneer in logistical joint ventures in China. It was established by DHL and Sinotrans in 1986. With reference to the other pattern, for example, in June 2002, Legend Group Ltd. and APL Logistics created a joint venture to provide specialized logistics services in the IT industry. Similarly, the TNT group and Shanghai Auto Industry took the same way in 2001. Some possible benefits could be leveraged by both cooperative sides; mainly, on the foreign side, setting up a joint venture may help these companies to enter the Chinese market legally. Moreover, they may rapidly expand their business by means of their partners' strong local service networks. On the Chinese side, mostly, the aim for LSPs is targeted at learning expertise and skills from their counterparts, while some of them, such as the Legend Group Ltd., a leading personal computer vendor, and the Shanghai Auto Industry Group being an auto producer, desire specialized services for their specific industries.

(6) IT companies involved in logistics

In China, some IT companies have turned their attention to logistics services. Compared with transportation, warehousing and logistics companies, IT companies are not very strong on their capabilities in offering logistics services. But by leveraging strong advantages on IT, these companies are adopting several methods of conducting their business: (a) cooperating with logistics companies to implement logistics services; (b) building their own service network and then forming a strategic alliance with other companies to set up logistics services; (c) designing logistics solutions and innovating logistics management software/logistics information system on the basis of information technology services. For example, by integrating traditional commercial and E-commerce, Shanghai Maling Aquarius Co., Ltd. has fulfilled its home delivery objective by creating the "85818 logistics delivery system".

4.2.6 Service offerings and capabilities

Chinese LSPs have been able to offer many services for their customers. This has been demonstrated in some surveys. Table 4.3 displays the services surveyed (CCTA and TLI-AP, 2002, 2003). The results reflect the service diversification in the Chinese logistics service market.

Table 4.3 Service Offerings by Both Providers and Users

2002 Provider Survey		2003 User Survey	
Service	Offering Rate (Percent)	Outsourced logistics service	Usage Rate (Percent)
Warehousing	93.1	Outbound transportation	86
Distributing	89.7	Inbound Transportation	63
Transportation	86.2	Warehousing	46
Total logistics solution	86.2	Freight forwarding	38
Insurance agent	79.3	Cross-docking	36
Consolidation	75.9	Customs clearance	29
Custom clearance	75.9	Inventory management	27
Freight forwarding	75.9	Carrier selection	21
IT-Support	75.9	Product marketing/labelling, packaging	21
Inventory management	75.9	Customer service	18
Order management	72.4	Order fulfilment	14
Packaging and repackaging	69.0	Distribution control	13
Import/Export	65.5	Shipment consolidation/distribution	13
Express shipping	62.1	Information Technology	11
Assembly and installation	55.2	Product Assembly/installation	9
Financial services	31.0	Order entry/processing	7
		Supply chain manager	7
		Freight Bill auditing/payment	7
		Rate negotiation	7
		Consulting services	7
		Factoring (Trade Financing)	5
		Products returns and repair	5

Source: adapted from CCTA and TLI - AP (2002, 2003)

Basic services, i.e. warehousing and transportation, dominate in both supply and demand, while high-value services such as consulting services are less needed. Moreover, according to the report by China Warehousing Association (CWA, 2005), the service offerings of LSPs in 2006-2008 are still focused on traditional warehousing and transportation (see Figure 4.1). In addition, Huang and Kadar (2003) reported that transportation and warehouse management accounted for the majority of outsourced logistics services, whereas value-added services and integrated supply chain management were lacking in demand. In fact, these results are in line with the overall trend of outsourcing in other countries, as discussed previously.

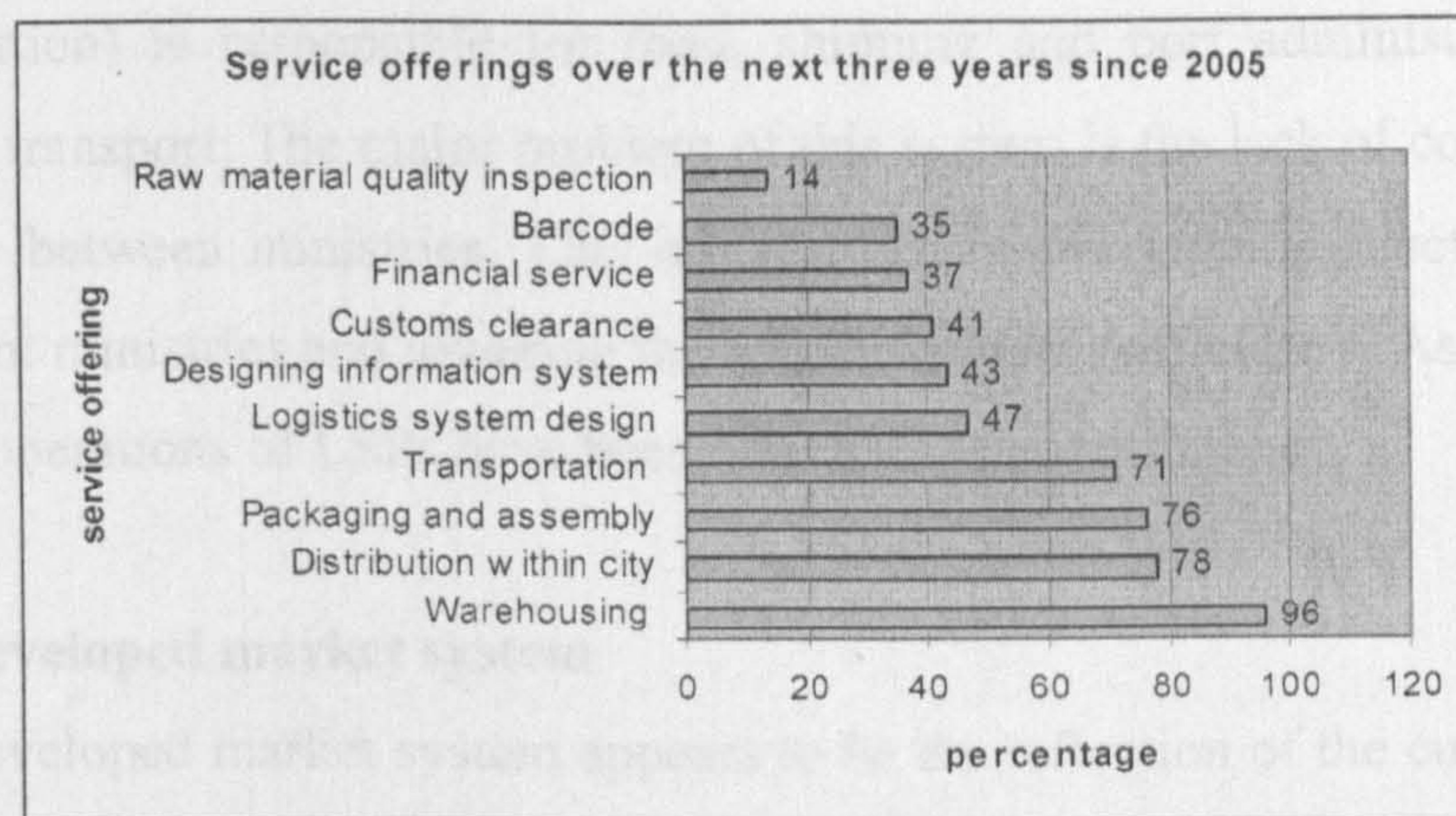


Figure 4.1 Service Offerings over the Next Three Years Since 2005

Source: based on data from China Warehousing Association (2005, p. 41)

Despite the diversification of service provision and the improvement of service capabilities, LSPs have not fully met the needs of their customers. The possible reasons are reported by CCTA (2001, 2003, 2005 and 2006) as follows.

- ❑ There are few strong LSPs in China who can compete against world-class LSPs.
- ❑ Overall operational level is not high.
- ❑ IT standard is not high.
- ❑ Hard infrastructure and software need to be improved further.
- ❑ Sub-tier suppliers have not yet met the requirement of LSPs.

4.2.7 Constraints

The Chinese market economy is in a period of transition. Some constraints stemming from this transition are still in effect and thus prevent LSPs from performing well. Generally speaking, there are two main constraints relating to the administrative system and underdeveloped market mechanism (CCTA, 2001, 2002 and 2003; Hong and Liu, 2007)

(1) Administrative system

Currently, the administrative system in charge of LSPs is derived from the former planned economy system. Although this system has been substantially restructured a few times in recent years, each function pertaining to logistics is still under the control of different ministries. For example, NDRC enacts the strategies and policies of logistical development; MOR takes the functions of the railway; MOC

(Communication) is responsible for road, shipping and port administration; CAAC monitors air transport. The major problem of this system is the lack of coordination and transparency between ministries. This has resulted in overlapping functions emerging from different ministries and lowering the administration's efficiency. As a result of this system, the operations of LSPs have been affected by low efficiency.

(2) Underdeveloped market system

The underdeveloped market system appears to be the reflection of the current transition economy. The direct effect of this system for LSPs is that their businesses, operations and competition are not able to be legally protected in some situations. For instance, under this system, some LSPs perhaps involve the illegal operations, e.g. carrying loads beyond the legal limits of vehicles in order to gain benefit. In addition, some sectors, such as rail transport, in which regulations will be loosened last in the commitments to the WTO, are tightly controlled by the state-owned economy. As a consequence, the operation involving rail transport is accordingly monopolized by state-owned LSPs.

4.3 UK LSPs

The European logistics service market is considered to be more mature than US by some studies (e.g. Bardi and Tracey, 1991; Lieb *et al.*, 1993; O' Laughlin *et al.*, 1993; Randall, 1991). Within Europe, the UK is regarded as more mature than its other European counterparts (Peter *et al.*, 1998a, b). UK LSPs are among the world leaders in global logistics and many are rapidly expanding. The development of UK LSPs, from an historical point of view, has been influenced by the transport deregulation on the freight haulage sector which took place in the late 1960s.

4.3.1 Impact of transport deregulation

The 1968 Transport Act is regarded as the milestone of transport deregulation on road haulage in the UK. Road transport is the dominant mode of goods transport in the UK; as demonstrated by governmental statistics (shown in Table 4.4), around 60% goods moved and 80% goods lifted were derived from the road transport in 2003 and 2004. The implementation of this Act has been considered profound in the development of road transport and logistics services (Cooper, 1988; IGD, 1996; Fernie, 1994; McKinnon, 1994, 1998; Peters *et al.*, 1998b).

Table 4.4 Freight Transport by Mode: 2003-2005

Year	Goods moved (billion tonne kilometres)					Goods lifted (million tonnes)				
	Road	Rail	Water	Pipeline	All modes	Road	Rail	Water	Pipeline	All modes
2003	162	19	61	11	252	1753	89	133	141	2116
2004	163	21	59	11	253	1863	102	127	158	2250
2005	163	22	--	11	----	1868	104	--	168	-----

Source: The Department for Transport (2006)

Before 1968, road transport provision in the UK was administered using the ABC system of quantitative licensing. “C” licences were issued to companies to transport their own goods, whereas “A” and “B” issued were given for hire-and-reward business. The number of “A” and “B” licences was controlled by the government, while there was no restriction on the number of “C” licences. In nature, the adoption of this system is to restrict the number of vehicles that road hauliers could operate (Cooper, 1988; IGD, 1996; Fernie, 1994; McKinnon, 1994; 1998). Under this system, the efficiency of the operations undertaken by hauliers was weakened directly and indirectly by various regulations. In addition, the competition was suppressed to some extent since some hauliers with an adequate supply of operating licences and route permits could escape from intense competition and consequently enjoy higher profits and greater security (McKinnon, 1998).

The significance of the 1968 Transport Act lies in replacing this quantitative licensing system with a qualitative one. Under this new system, as long as companies met minimum standards such as safety and maintenance of vehicles, professional competence, knowledge of vehicle regulations, good reputation and professional practice, they could become hauliers (Cooper, 1988, 1991; IGD, 1996, McKinnon, 1994, 1998). This new system loosened regulatory controls and made entry to the sector easier. As a result, the ease of entry led to many new haulage companies entering the freight sector, which thus became very competitive (IGD, 1996; McKinnon, 1994, 1998).

The deregulation in freight haulage has been phased out since 1968. Four decades later, this deregulation has had a significant impact on freight haulage, by, for example, enhancing the quality of haulage services and improving efficiency of freight transport operations. The development of logistics services was also promoted by the deregulation. Before the deregulation, one fact is that operator’s licences were tightly controlled and own-account operations were over-dependent on the freight haulage market (McKinnon, 1994, 1998). In the early 1980s, there was a trend emerging

towards greater use of professional haulage along with the removal of this regulatory control. This made the externalisation of non-core functions available. Furthermore, the new competitive conditions caused by the deregulation conducted to the growth of distribution operators providing road haulage as part of their logistical service package (McKinnon, 1998). In addition, many hauliers might have gone beyond transport operations to become logistics and supply chain operators, as they were forced to differentiate themselves from their competitors (Cooper, 1988). As a result, LSPs have developed and expanded.

4.3.2 Continuous changing demand

As in many countries, the demand for logistics services in the UK is rapidly changing. The development and expansion of this demand trend are prompted by many factors.

As discussed above, deregulation of the road freight haulage is one important driver. In addition, the realignment of capital allowance in the 1984 Budget also had an impact on the externalization of logistics services (McKinnon, 1994, Peters *et al.*, 1998b). Under the 1984 Budget, the corporate taxation was changed since capital allowances had been phased out and corporation tax was reduced. This circumstance reinforced companies away from in-house operations by redirecting tax incentives away from their own assets to the maximization of their profits (McKinnon, 1994). It discouraged companies from “making further investment in in-house distribution facilities and strengthened the relative economic advantage of contract services” (McKinnon, 1994, p. 251). By nature, this policy was concerned with the importance of capital investment to core businesses rather than ancillary activities such as logistics within a company (McKinnon, 1994). Apart from the two drivers, new demand for logistics services is arising in the UK with the advent of globalization, E-business and pan-European production (Logistics Manager, September, 2006; Waller, 2001).

The reasons in prompting logistics service demand have been revealed by some survey studies, as shown in Table 4.5, reported by PE Consulting (1996) and Jaafar and Rafiq (2005).

Table 4.5 Some Reasons of Demand for Logistics Services

PE Consulting (1996)	% of companies	Jaafar and Rafiq (2005)	% of companies
Improve service	87	To reduce the logistics costs	56.3
Reduce cost	85	To avoid investments in a non-core activity	54.6
Increase flexibility	79	To get a more flexible logistics service	43.2
Avoid investment	61	To improve services to our customer	41.5
Non-core activity	59	To obtain service from a logistics expert	36.1
Obtain specialist management	50	To improve the logistics service	34.4
Improve control	50		

Sources: PE Consulting (1996); Jaafar and Rafiq (2005)

There have been some changes in customer demand for logistics services over recent years. One phenomenon is, as indicated by Jaafar and Rafiq (2005), that “improve logistics services” ranked the first place in PE Consulting (1996); however, it was the last one in the survey of Jaafar and Rafiq (2005). “Reduce logistics costs” ranked second and first in the surveys of PE Consulting (1996) and Jaafar and Rafiq (2005), respectively. This suggests that financial factors are becoming more important than service-related factors under the consideration of customer needs for logistics services. In addition, the demand for logistics services may vary by sector. In a survey of UK retailers, representing 60% of UK grocery retail sales, Fernie (1999) found that a number of UK retailers tended to keep logistics services in-house. In some cases, the saturation of outsourcing among retailers had been reached. Results from Jaafar and Rafiq (2005) further supported the findings of Fernie; i.e. there were 36.8% retailers spending less than 20% logistics expenditure on service providers, while the majority of manufacturers, wholesalers/distributors and others spent 21% and 50% on service providers.

However, citing Datamonitor (2000), Waller (2001) considers that there is considerable potential for growth in demand, since more than 50% logistics activities remained in-house. Moreover, most UK manufacturers, in particular, the automotive (57%), textile (53%) and hi-tech/electronic (50%) sectors, are seeking “a single pan-European logistics service provider”.

4.3.3 Diversification of players

There is a diverse range of LSPs in the UK logistics service market. They can be categorized as follows.

(1) By turnover/revenue

The Institute of Grocery Distribution (IGD) in 1996 described the distribution service sector in the UK as being polarized, which is manifested by large operators and many small companies in terms of their turnover. Small companies are “often ‘owner-drivers’ operating on short-term rates for basic transport services”. In contrast, big companies “offer a wide range of distribution and logistics services across many product sectors”; these include NFC plc, P&O Industrial Services, Ocean Group plc, Tibbert & Britten plc. In the middle of the spectrum, there are some medium sized operators, “often regionally or product sector focused operators who offer specialized knowledge or experience to potential customers” (IGD, p. 4). In the 2000s, the market has changed considerably for some players, with much merger activity and many companies going out of business. However, the overall variation by turnover has not changed too much because different sized operators compete in the logistics service market, as revealed by some surveys, e.g. “Logistics Manager’s Survey of Top Logistics Service providers” (Logistics Manager, June, 2006); “2006 Logistics Manager Contracts Analysis” (Logistics Manager, September, 2006).

Transport Intelligence exhibited top 10 world operators by size of contract logistics revenues in 2003. Exel, TBG, Hay Logistics and Salvesen ranked first, third, eighth and ninth, respectively. In the same year, *Analytiqa* displayed 26 companies by UK contract logistics revenue. Exel, Wincanton, Tibbett & Britten ranked the first three, respectively. It should be noted here that Exel had acquired Tibbett & Britten successfully. In 2005, *Analytiqa* published the Top 28 European logistics service providers in terms of total logistics revenues in 2004, where Exel was Europe’s number one logistics provider, NYK, Kuehne + Nagel, Ryder, Wincanton, ACR Logistics, Christian Salvesen, TDG and Gist ranked third, fourth, ninth, twelfth, twenty first, twenty second, twenty fourth and twenty fifth respectively (*Analytiqa*, 2005). The 2005 *Transport Intelligence* listed 50 logistics service providers in the world: Royal Mail and Exel ranked tenth and eighteenth respectively. This also indicates that there are world class LSPs in the UK. These rankings show that many of the world’s largest LSPs were UK-owned. In 2005, the largest of these companies, Exel, was acquired by the German operator Deutsche Post World Net (DPWN), formerly Deutsche Post. Other large UK logistics providers have also been taken over by foreign companies such as Hays/ACR Logistics by Kuehne + Nagel. Table 4.6 shows the 35 leading logistics service providers in the UK by turnover in 2005.

Table 4.6 35 Leading Logistics Providers in the UK by Turnover

Tier One	Company	Turnover-total (£m)	Tier Two	Company	Turnover-total (£m)	Tier Three	Company	Turnover-total (£m)
1	Healthcare Logistics	20.5bn	8	Christian Salvesen	805.5	16	Lloyd Fraser Group	84.0
2	DHL Logistics	19.5bn	9	TDG	510.5	17	Innovate Logistics	83.0
3	NYK Logistics (UK)	16.4bn	10	Gist	315.9	18	ABP Connect	76.0
4	Kuehne + Nagel	14.0bn	11	Jigsaw Solutions	170.0	19	Palletways	72.0
5	Ryder Europe	5.2bn	12	Bibby Distribution	127.0	20	Baylis Logistics	41.0
6	TNT Logistics UK	3.6bn	13	Davies Turner	125.0	21	Lane Group	40.0
7	Wincanton	1.7bn	14	Clipper Logistics	124.0	22	PROLOG	37.0
			15	Culina Logistics	120.0	23	Cert Group	36.0
						24	C Butt	30.0
						25	RHYS Davies Freight Logistics	30.0
						26	TM Logistics	30.0
						27	Bougey Distribution	27.0
						28	Interoute Transport Services	26.7
						29	J W Suckling Transport	20.5
						30	21 st Century Logistics	20.0
						31	Potter Group	17.0
						32	Pall-Ex	13.0
						33	RH Freight Services	10.0
						34	Framptons Transport Services	9.5
						35	Palletforce	5.0

Note: There are 35 companies in total, owing to the turnover of Meachers Group Holdings being unavailable.

Source: based on data from Logistics Manager (June, 2006, pp. 36-45)

(2) By business origin

Many LSPs in the UK grew out of traditional transportation, warehousing and freight forwarding companies. For example, TDG formed in 1927, is derived from a transportation company and is now a major provider of logistics services. The medium sized Gregory Distribution was established in 1919 as A J Gregory & Son Transport. The origins of Hays Distribution can be traced to the 17th century when the lease of a warehouse was first taken over. It then developed to become a specialist in logistics services (IGD, 1996). Various players are now offering many services which are not limited, as they were in their original service.

(3) By type of contract

According to service exclusivity (McKinnon, 2004; Rushton *et al.*, 2000), there are two typical types of contracts: dedicated and shared-user contracts.

A dedicated contract is awarded where the work is done for a particular client (Cooper *et al.*, 1991; Cooper and Johnstone, 1990; Fernie, 1999; IGD, 1996; McKinnon, 2004; PE, 1996; Rushton *et al.*, 2000). The service in this contract is exclusive because it “closely resembles in-house operations and denies LSPs the opportunity to improve asset utilization by combining different companies’ logistical demand... it is a ‘quasi-own account’” (McKinnon, 2004, p. 170). For example, ACS&T provides dedicated temperature controlled transport service for McCains (IGD, 1996). The early presence of dedicated contracts was in response to the demand of the leading retail groups (Peters *et al.*, 1998b). A dedicated contract includes dedicated contract distribution and transport. Dedicated distribution is regarded as “very much a British phenomenon in that a single warehouse development is dedicated to one client” (Fernie, 1999, p. 84). In contrast to dedicated contracts, shared-user contracts are awarded where clients are willing to share user facilities (Cooper *et al.*, 1991; IGD, 1996). There are several providers of logistics services specialising in this kind of contract. For example, Lane Group, acquired by Wincanton, specialized in dedicated and semi-dedicated contracts in retail and manufacturing along with home delivery services, and will continue doing so (Logistics Manager, June, 2006). Based on shared user principles, Christian Salvesen offers services for manufacturers (ambient and frozen food). However, many players, such as Wincanton, provide both dedicated and shared services to customers. In the list of 36 companies displayed in Table 4.6, there are 28 companies which provide both dedicated and shared user services. What is noticeable in recent years is that the

proportion of dedicated and shared services users in the UK logistics service market has gradually been changing. As shown in the latest survey from “2006 Logistics Manager Contracts Analysis” covering more than 150 major logistics contracts, the shift is moving from dedicated contracts to shared users (Logistics Manager, September, 2006). In 2001, the first survey showed that 60% of contracts were dedicated contracts to a specific customer, while in 2006, 58% of contracts were shared users.

(4) By role in the supply chain

Abrahamsson and Wandel (1998) propose a five-layer model, including users and four tiers of LSPs, where the four tiers refer to: (1) third party logistics provider; (2) traditional supplier, such as express, warehousing and truckload; (3) sub supplier (specialist), such as air, local carrier and rail; (4) infrastructure, such as airport, road and rail. The ground for Abrahamsson and Wandel (1998) to build the four tiers is based on few companies performing all logistics activities themselves owing to the lack of geographical coverage, mix of services, and/or the capacity users need. As a result, services may be outsourced to sub-tier suppliers. Laarhoven *et al.* (2000) argue that an LSP may outsource non-core activities to second-tier providers in order to concentrate on its core skills. On the basis of the same view as above, McKinnon (2004) divides the grocery supply chain into three levels and shows how LSPs are used at each level. At the primary level for distribution, close to production, LSPs can fulfil trunk haulage, primary consolidation, and pallet-load service activities. At the second level for distribution, LSPs can handle integrated contract distribution, separate transport and warehousing services, and reverse logistics activities. At the tertiary level, LSPs provide local food deliveries to small independent retailers and catering outlets (McKinnon, 2004).

(5) By the sectors served

A number of LSPs offer logistics services for many sectors, as presented in Table 4.7.

Table 4.7 Sectoral Analysis of Total LSP Revenue by Industry Sector

Industry Sector	2006(%)	2005(%)	2004(%)	2003(%)	2002(%)	2001(%)
Food, drink & tobacco	21	19	24	17	19	26
Electrical and electronics	17	11	13	10	5	9
Motor vehicles & parts	16	9	13	10	11	10
Household goods & hardware	8	4	5	6	10	6
Mixed retail business	6	2	8	0	10	4
Paper, printing & publishing	5	2	1	1	1	2
Chemical industry	4	4	3	4	2	4
Metal manufacturing	4	4	2	0	1	1
Other transport equipment	3	2	1	0	1	2
Books & stationery	3	1	3	2	4	3
Timber & furniture	2	1	1	2	1	1
Clothing footwear & leather	2	4	5	6	7	6
Pharmaceuticals	2	4	2	2	5	5
Fuel & oil	1	2	3	2	2	2
Mechanical engineering	1	0	2	1	0	1
Furnishings & fabrics	0	0	2	2	0	1
Office machinery	0	4	1	0	2	1
Others	6	22	12	15	13	9

Source: Logistics Manager (September, 2006, p. 64)

Table 4.7 shows that the food, drink and tobacco sectors have been the largest users of LSPs in the UK since 2001. The grocery sector was the first to recognize the benefit of outsourcing logistics activities (IGD, 1996; Waller, 2001; Bedeman and Gattorna, 2003). Many studies have discussed the logistics activities in this area (e.g. Browne, 2003; Fernie, 1994, 1999, 2003; Fernie *et al.*, 2000; McKinnon, 1996, 2004; Stephens and Wright, 2002). In addition to the above sectors, home delivery has also been observed as a growth sector (Logistics Manager, September, 2006; Waller, 2001).

4.3.4 Current developments of UK LSPs

The current developments of UK LSPs can be viewed from the expanded service offerings they are providing and the expansion of their growth.

(1) Widely expanded service offerings

Many UK LSPs have been able to provide a range of logistics services in response to the ever-changing requirements of users and fierce competition among themselves. Some regular surveys monitor these various logistics services from provider or user perspectives.

The *Logistics Manager*'s survey of top logistics service providers, classifies the services into ten categories, i.e. shared user, dedicated, chilled/frozen, inventory management, IT systems, air freight, sea freight, reverse logistics, 4PL/lead logistics provider, and value-added services (Logistics Manager, June, 2006). Figure 4.2 shows the extent to which the 36 LSPs provided these services.

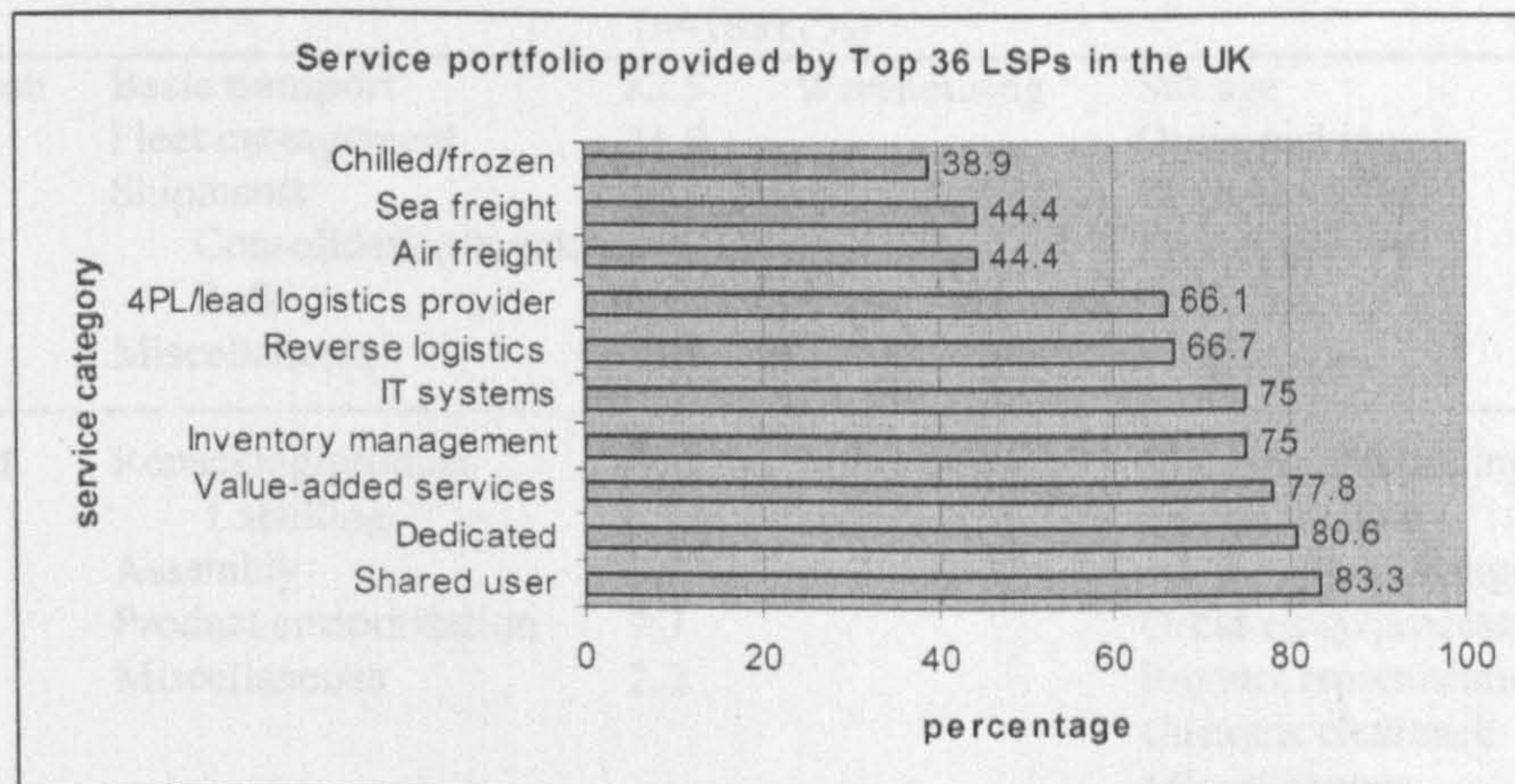


Figure 4.2 Service Portfolio Provided by Top 36 LSPs in the UK

Source: based on data from Logistics Manager (June, 2006)

Shared user service ranked the first place as shown, followed by dedicated service. This result is consistent with the later survey of more than 150 major contracts, where the results reveal that shared user service increased (Logistics Manager, September, 2006). Value-added services, inventory management, IT systems, reverse logistics and 4PL were all the preferred services offered by most of the top 36 LSPs. Generally speaking, the results reveal that these top LSPs are concerned with more advanced and complex service provisions. For example, inventory management is regarded as a supplementary or value-added service for LSPs (van Hoek, 2000a, 2001) since they normally do not hold inventories (Coyle *et al.*, 1996). 4PL service, treated as the evolution of 3PL, also addresses the complexity of offerings more than basic services such as transportation, warehousing, etc. The reverse logistics service reflects an increasing demand of environmental concern since the disposal of old products and packaging is facing many companies. These results, in some sense, reflect that these top LSPs are proactive when offering services in response to the needs of their customers.

Based on the responses from various industries, i.e. manufacturers, wholesales/distributors, retailers and others, Jaafar and Rafiq (2005) report the services outsourced by these customers, as shown in Table 4.8.

Table 4.8 Type of Services Used by the Customers of LSPs

Type of services		Average (n=183) (%)			Average (n=183) (%)
Transportation	Basic transport	82.5	Warehousing	Storage	53.0
	Fleet management	21.9		Order picking	43.7
	Shipments	40.4		Cross-docking	33.3
	Consolidation/break Bulk			Miscellaneous	3.3
	Miscellaneous	15.8			
Value-added services	Repacking/product Labelling	25.7	Information services	Tracking and tracing	27.9
	Assembly	5.5		Electronic data	22.4
	Product customization	7.7		Interchange/internet	
	Miscellaneous	2.2		Order entry/processing	12.0
				Product replenishment	8.2
				Customs clearance	19.7
				Miscellaneous	4.9

Source: Jaafar and Rafiq (2005, p. 307)

There are four categories of services used by customers in the survey of Jaafar and Rafiq (2005): transportation, warehousing, value-added services and information services. The former two are basic services which many companies often like to outsource. Jaafar and Rafiq (2005) confirmed this fact but they also found that the demands for logistics services from customers were diversified. Both basic services and value-added and information services were all required. Although basic services are still the biggest proportion used, users have expanded their needs in many areas, which has increased their dependence on LSPs.

(2) Growth strategies for the development of LSPs

As described by *Logistics Manager* in the survey of top logistics service providers, there have been many changes among LSPs in a single year (2005); for example, Exel has been acquired by DPWN, TNT was put up for sale, the ACR name disappeared after the takeover by Kuehne + Nagel, while both Christian Salvesen and Wincanton had new chief executives. In addition, many smaller operators such as Jigsaw, in which ten partners work together to provide large scale national logistics services, have begun to work together to improve their competitiveness (*Logistics Manager*, June, 2006).

To respond to the rapidly changing requirements of their customers, UK LSPs are making an attempt to develop an array of logistics services and geographical coverage. Towards this end, they are adopting different strategies to expansion. Among these are M&A, strategic alliances, organic growth and joint ventures. Table 4.9 exhibits some of the growth experience and strategies of UK-based LSPs which took place in 2005-2006.

Table 4.9 Growth Strategies Adopted by UK-Based LSPs

Year	Strategy	Approach
2005	M&A	The takeover of Hammond Logistics has cemented Bibby Distribution.
2005	M&A	Clipper Logistics acquired Northern Commercials (the Iveco and Fiat dealer)
2005	M&A	Exel was acquired by Deutsche Post World Net, parent company of DHL.
2005	M&A	Gist acquired the Van Dongen network in Holland.
2005	M&A	Pharmaceutical distribution company Celesio AG acquired Healthcare Logistics as part of its European Services business, which was branded in 2006 as the Movianto Group.
2005	M&A	Innovate Logistics acquired 100 percent shares of Phil Hanley Ltd.
2005	M&A	TNT Logistics UK acquired home delivery arm of HANSON Logistics-establishing TNT Home.
2005	M&A	Wincanton expanded its French operations last autumn with the takeover of Premium Logistics.
2006	M&A	Innovate Logistics acquired Grampian Country Transport Ltd.
2006	M&A	Kuehne + Nagel acquired ACR Logistics.
2005	Strategic alliance	Jigsaw Solutions has now ten partner companies: F.Swain, C.M.Downton, Currie European, Widdowson Group, Elddis Transport, Pollock Scotrans, Macfarlane Transport, Bartrums Transport, S&R Smith, Sparks Transport.
2006	Strategic alliance	Meachers Group Holdings plans continuing expansion into its core activity markets especially through its strong partnership with LinQ Alliance.
2006	Strategic alliance	Rhys Davies Freight Logistics is looking to develop alliances with major companies within the market sector in which it operates with logistics companies where they find 1-5 pallet consignments fall outside their working parameters.
2005	Joint venture	Innovate HQ has formed a joint venture with Eimskip which will take a 50 percent stake in Innovate.
2006	Joint venture	Kuehne + Nagel has formed a joint venture with Scottish & Newcastle UK, creating a national drinks distribution company KN Drinks Logistics.
2006	Organic growth	Gulina Logistics is continuing to support the organic growth of its chilled food and drink customers by offering a wider range of value added services, including a new dedicated co-packing at its Prime Point facility.
2006	Organic growth	Exel intends to grow organically and to achieve this, it is concentrating its efforts in three areas: integration of a number of acquired businesses which are at various stages of the process; performance - it intends to use its scale, size and global footprint to its advantage; and growth.
2006	Organic growth	Jigsaw is achieving further organic growth with existing customers and development of new business.

Source: based on Logistics Manger (June, 2006, pp. 36-45)

Different growth strategies have been implemented by UK LSPs. Companies may take single or integrated strategies in terms of corporate development. For example, TM Logistics forecasts its next five plan development from 2006, which involves a combination of organic growth, strategic alliances and M&A, as TM Logistics diversifies and offers new value-added services in the supply chain (Logistics Manger, June, 2006). The implementation of these growth strategies, on the one hand, helps some operators to be stronger than before; on the other hand, it forces some operators to go out of business ultimately. In addition, these growth strategies have not only been adopted by UK-based LSPs within the UK, but also employed by them in their expansion to become European and global operators, particularly, pan-European LSPs.

On the basis of a postal questionnaire survey, Stone (2001, 2002) empirically examined the expansion strategies of UK-based LSPs in Europe. The drivers for UK-based LSPs to implement their European expansion were caused by many factors. Generally, they are encouraged by: (1) the establishment of Single European Market (SEM) in 1993, making logistics operations in Europe easier to conduct since the protection of local hauliers and restrictions on foreign operators have been abolished; (2) the increased deregulation of the European road transport industry in the early 1990s, harmonising SEM; (3) the promotion arising from the government for SEM benefits; and (4) increasing competition and the limited growth potential of the maturity of the UK logistics market (Stone, 2001, 2002). These opportunities and pressures force UK-based LSPs to exploit their growth potential beyond the UK, especially for those leading operators. In addition, Stone (2001, 2002) also found that UK-based LSPs have combined different approaches, i.e. acquisition, 'piggybacking' and some joint ventures to access their European entry and expand their geographical coverage. Organic growth has been used normally following the achievement of the initial entry. By taking these growth strategies, UK-based LSPs have built their presence in many European countries, as seen in Table 4.10.

Table 4.10 European Geographical Coverage of UK-based LSPs (1998)

Country/Region	Benelux	France	Germany/ Austria/ Switzerland	Iberia	Italy	Greece	Poland	Czech Repub./ Slovenia	Hungary
BOC (BOCDS)	*	*			^		*	*	
Hays (HDS)	*	*	*	*	*		*	*	*
NFC (Exel Logistics)	*	*	*	*	*			^	
Ryder (UK)	*		*						
Ryder Inc (USA)							*		
Salvesen Logistics	*	*	*	*	*				
T&B	*	*	*	*	*	*			*
TNT Logistics	*	*	*	*	*	*	*	*	*
TDG	*	*	*/#	*	#				

Key:*, own offices; #, partners; ^, agents.

Source: Stone (2002, p. 103)

The European expansion has brought different effects to companies. Some companies have gained benefits, while some have not. However, the demand for European logistics, particularly from those core industrial European countries, is increasing. Although UK-based LSPs have not been able to reach the pan-European coverage fully, such demand may encourage UK-based LSPs to have more cross-border European coverage and achieve their profit in increasing competition. Stone (2001, 2002) asserts that European expansion of UK-based LSPs is likely to go on although it is being challenged. The expansion and development of UK-based LSPs are therefore continuing.

4.4 Summary

This chapter has reviewed Chinese and UK LSPs. Chinese and UK LSPs have emerged and grown in two completely different contexts. This has led them to take different paths.

The Chinese logistics service market is at a much earlier stage in its development. As a result of the economic transition - from a centrally planned economy towards the socialist market economy - the government is still playing an important role in promoting the development of Chinese LSPs. To encourage the development of LSPs, the Chinese government has in recent years launched a variety of initiatives beneficial for LSP businesses and operations.

China's accession to the WTO in 2001 has had a pronounced effect on Chinese LSPs since the regulations on foreign operators and the protection that this offered has been removed. Influenced by this change, Chinese LSPs are embracing new opportunities and challenges for their businesses.

Chinese LSPs are experiencing an increasing demand for logistics services, which stems primarily from four main streams: manufacturing and commercial organizations, rural markets, urban inhabitants and multinationals. To meet these customer needs, both state-owned and privately owned LSPs are striving to offer more diversified service portfolios. However, the current service capabilities of Chinese LSPs are not fully meeting the large demand.

The development of Chinese LSPs is currently constrained mainly by two factors: the administrative system and an underdeveloped market system. In the former case, the major problem is the lack of coordination and transparency between ministries. In the latter case, market failures can distort competition in some situations.

In contrast to China, the UK logistics service market is much more mature and many UK LSPs are among the world leaders.

From an historical view, the deregulation in the freight haulage sector which took place in the late 1960s in the UK has had a significant impact on the development of British LSPs. In the UK, road transport is the dominant mode of goods transport. The deregulation of road haulage made the entry to logistics operations easier, and hauliers could go beyond traditional transport operations to become logistics and supply chain operators. LSPs could thus develop and expand.

Given the well-developed market economy, UK LSPs are more customer-focused. UK LSPs not only offer basic services such as transportation and warehousing for users, but are also concerned with more advanced and complex service provisions, such as dedicated service, 4PL, reverse logistics and other value-added services.

UK LSPs are attempting to develop their strategic expansion in becoming European and global operators. Towards this end, UK LSPs are developing different strategies

towards expansion, such as mergers and acquisitions (M&A), strategic alliances, joint venture and organic growth.

In general, the evolution and growth of LSPs in the two countries are at different phases. Given the two contrasting settings, it would be interesting to know to what extent the LSPs of both countries have different understandings of competitiveness. This will be examined in later chapters.

CHAPTER 5 CONCEPTUAL MODEL AND RESEARCH PROPOSITIONS

5.1 Introduction

This chapter will develop a conceptual model of LSPs' competitiveness and discuss the constructs central to the model. Drawing on the RBV and Porter's theory of strategic management, many other studies on firm-level competitiveness and previous studies of LSPs' success in the LSP literature, the research model for this study is first proposed. A detailed discussion of the constructs underlying the model is subsequently presented. Building on this discussion, seven research propositions are consequently postulated; these focus on the primary sources of an LSP's competitiveness, the contributing factors, measures and the practices of achieving competitiveness.

5.2 Previous Studies of LSPs' Success

As discussed in Chapter 2, competitiveness is not a new topic. However, in logistics and supply chain management, competitiveness of LSPs still remains largely unresolved. This may be partly seen from the results found by Maloni and Carter (2006) and Selviaridis and Spring (2007). In their studies, journal papers regarding LSPs published in the period 1989-2004 and 1990-2005 were examined. Despite a wide range of issues being discussed in these papers (see section 1.1 in Chapter 1), no topic relating to LSPs' competitiveness is clearly addressed. In fact, logistics is not the only service actuality the competitiveness of which has attracted limited research interest. As illustrated by OECD (1992), the relationship between service and competitiveness has not been given sufficient attention by economics researchers. The difficulty lies in the inherent attributes of service provision. The service sector used to be considered as a residual sector, much less important than agricultural and manufacturing industries. Thus, this sector is composed of heterogeneous activities lumped together for statistical convenience, resulting in unsatisfactory indicators for measuring competitiveness related to services (OECD, 1992). With respect to LSPs, it is likely to be more difficult than the other types of services, owing to their relatively recent development and the lack of governmental statistics and diversity, as discussed in Chapter 3.

In the LSP literature, many authors discuss the success of LSPs. Two aspects are linked to this issue: financial performance of LSPs in the logistics service market, and identification of success factors for LSPs.

5.2.1 Financial performance of LSPs in the logistics service market

As discussed in Chapter 3, many organizations judge LSPs according to their financial performance, such as revenue/turnover and growth rate. For example, in 2005, Armstrong & Associates published the Top 25 LSPs in the world in terms of their logistics revenues in 2004; Exel was the number one logistics provider with revenue of \$11,6bn, followed by Kuehne + Nagel International AG and Schenker with \$9,316bn and \$8,9bn. DHL Danzas Air & Ocean ranked fourth. This assessment manifests the profitability of LSPs and to some extent it is possibly linked to the success of individual LSPs by financial strength (Foster and Armstrong, 2005).

5.2.2 Factors contributing to the success of LSPs

Many authors have discussed factors for the success of LSPs using different research methods such as case study, interviews, mail surveys and other approaches. These discussions fall into two main categories: the identification of success factors of LSPs and the confirmation of practices involving these factors.

(1) Identification of success factors

Success factors have been discussed individually or jointly in the LSP literature. In the former case, for example, according to Porter's competitive theory, Sum and Teo (1999) identify the importance of strategy and then empirically examine the impact of different strategic positioning, i.e. pure cost leadership, pure differentiation, and cost and differentiation, on the success of an LSP. Harding (1998) examines the quality of LSPs. He claims that "customer service has become a crucial measure of competitiveness in logistics markets throughout the world. As competition has become more intense, service quality has become the primary determinant for creating overall customer satisfaction" (p. 103). Given the influence of a relationship orientation in the supply chain management, Pannayides and So (2005) investigate the effect of this orientation in LSP and client interactions, indicating that customer relationship may directly or indirectly impact on an LSP's effectiveness and supply chain performance through developing key organizational competencies that lead to sustainable competitive advantage.

Some authors discuss the combined effect of several success factors. Yeung *et al.* (2006) link the financial performance of LSPs to corporate strategic orientation and operational priorities. In addition to strategy factors, the significance of operations in logistics

activities has also been identified. Gunasekaran and Ngai (2003) delineate the success of a small logistics company. This success for the company was attributed to the impact of strategy and technology, which were pointed to strategic alliances and IT systems specifically. On the basis of case analysis, Gunasekaran and Ngai (2004) further investigate the combined effect of several critical factors on an LSP's success. These factors include: (1) strategic alliances; (2) IT; (3) networking and relationship management; (4) KPIs for management control; (5) customer relationship management (CRM); (6) Joint ventures (JV); and (7) innovation and benchmarking. Following the adaptation of technology and total quality management (TQM) to the sustained competitiveness, Brah and Lim (2006) empirically examine the effects of technology and TQM on the performance of LSPs. They found that firms with high technology and high TQM perform significantly better than their low technology peers. Based on the survey results, Lieb and Kendrick (2003) conclude that the effective blending of corporate cultures, goals, strategies, services offerings, IT and operations will have a major impact on LSPs' profitability.

(2) Confirmation of practices relative to success factors

The underlying principle of some authors in discussing practices relative to success factors is that the significance of these factors has been assumed. Under this prerequisite, Wisner and Lewis (1997), for example, assert that efforts to improve performance and competitiveness have impelled transportation companies to implement formal quality improvement programmes. They then empirically examine the quality improvement practices in the transportation industry and their relationship to company success. In their examination, customer feedback information, top management commitment, tracking quality problems, and the measurement of quality attributes were the most important components of these formal quality improvement programmes. The improvements in customer service, on-time deliveries and the increased competitiveness were highlighted as the quality improvement efforts.

In response to a need for qualified managerial talent in the growing LSPs, Gibson and Cook (2001) present empirical evidence of the practices for hiring entry-level managers based on a survey of 41 US LSPs. These practices included recruitment, selection and compensation methods. Van Hoek and Chong (2001) illustrate the experiences of UPS in developing a 4PL business model, reflecting the practice that UPS used information and communication technology (ICT) to progress their client's supply chain towards

greater added value and the creation of an e-supply chain. In this practice, ICT was highlighted for its support to the competitiveness of the supply chain. Moreover, the implementation of this practice conducted to the transition of UPS from the heritage in express and physical logistics services towards the creation of an integrated supply chain for the strategic and operational application of information.

Table 5.1 displays some studies concerning the factors contributing to the success of LSPs.

Table 5.1 Some Studies Concerning the Factors Contributing to the Success of LSPs

Researcher	Year	Theoretical foundation	Research method	Research setting	Feature
Brooks	1993	Porter's theory	conceptual study		international competitiveness: assessing and exploring competitive advantage by ocean container carriers
Bowersox and Daugherty	1995		conceptual study		the impact of IT
Murphy and Daley	1996		mail survey	the US	the impact of EDI and information management on international freight forwarders
Closs <i>et al.</i>	1997		mail survey and interviews	North America, Europe and Pacific Basin	the influence of IT on world class logistics capability
Wisner and Lewis	1997		mail survey	the US	quality improvement practices
Harding	1998		survey	the US	the measurement, evaluation and improvement of logistics service provider quality
Sum and Teo	1999	Porter's theory	mail survey	Singapore	strategic posture
Lewis and Talalayevsky	2000		conceptual study		leveraging IT
Gibson and Cook	2001		mail survey	the US	hiring practices
Van Hoek and Chong	2001		case study	the US	UPS logistics: practical approaches to the e-supply chain innovation
Chapman <i>et al.</i>	2003		conceptual study		critical success factors
Gunasekaran and Ngai	2003		case study	Hong Kong China	globalisation strategies and network
Lemoine and Dagnæs	2003		case study	Europe	the impact of effective blending of success factors
Lieb and Kendrick	2003		survey	the US	the relationship between technology and LSPs
Sauvage	2003	behavioural model	mail survey	France	critical success factors
Gunasekaran and Ngai	2004		case study	Hong Kong China	marketing strategies and company performance
Panayides	2004a, b	RBV	mail survey	Asia-Pacific	the utilization of IT
Piplani <i>et al.</i>	2004		mail survey	Singapore	the impact of WMS on organizational performance
Auaty <i>et al.</i>	2005	RBV	mail survey	the US	logistics innovation
Flint <i>et al.</i>	2005		in-depth interviews	the US, Sweden and the UK	the positive influence of the relationship orientation on key organizational capabilities
Pannayides and So	2005	relationship orientation	mail survey	Hong Kong China	the effects of technology and TQM on the performance of LSPs
Brah and Lim	2006	total quality management	mail survey	Singapore	the impact of IT on the competitive advantage of logistics firms
Lai <i>et al.</i>	2006		mail survey	Mainland China	strategic posture
Wang <i>et al.</i>	2006	Porter's theory	mail survey	Mainland China	assessing technological innovation in patenting for LSPs
Wu	2006		patent statistics		the impact of strategic orientation and operational priorities on financial performance
Yeung <i>et al.</i>	2006	Porter's theory	mail survey	Hong Kong China	

In the above studies, the contribution of IT to an LSP's success is often seen, followed by strategy and operation. Other factors such as service quality, network, CRM, innovation, marketing, inventory management, human resource management (HRM) and corporate culture have also been discussed. Table 5.2 displays the frequencies of these success factors, but is only an approximate classification as some factors were aggregated into only one success factor in some cases. For example, Brah and Lim (2006) discuss the effect of IT and TQM on the performance of LSPs. In their study, TQM was defined with seven aspects: (1) top management leadership; (2) strategic planning; (3) process management; (4) information system and analysis; (5) HRM; (6) quality focus concerning the effectiveness of quality department, the amount of quality efforts and the improvement of services; and (7) customer focus. In fact, strategy, business process management (BPM), IT, HRM and service quality have all been involved.

Table 5.2 Success Factors for LSPs

Researcher	Strategy	Operation	Service quality	IT	Network	CRM	Innovation	Marketing	Inventory management	HRM	Corporate culture	TQM
Brooks (1993)	✓											
Bowersox and Daugherty (1995)				✓								
Murphy and Daley (1996)				✓								
Closs <i>et al.</i> (1997)				✓								
Wisner and Lewis (1997)			✓									
Harding (1998)			✓									
Sum and Teo (1999)	✓	✓										
Lewis and Talalayevsky (2000)				✓								
Gibson and Cook (2001)				✓						✓		
Van Hoek and Chong (2001)												
Chapman <i>et al.</i> (2003)							✓					
Gunasekaran and Ngai (2003)	✓	✓		✓					✓			
Lemoine and Dagnæs (2003)	✓				✓							
Lieb and Kendrick (2003)	✓	✓		✓							✓	
Sauvage (2003)				✓								
Gunasekaran and Ngai (2004)	✓	✓		✓	✓	✓	✓					
Panayides (2004a, b)								✓				
Piplani <i>et al.</i> (2004)				✓								
Autry <i>et al.</i> (2005)												
Flint <i>et al.</i> (2005)							✓					
Pannayides and So (2005)						✓						
Brah and Lim (2006)				✓								✓
Lai <i>et al.</i> (2006)				✓								
Wang <i>et al.</i> (2006)	✓	✓										
Wu (2006)							✓					
Yeung <i>et al.</i> (2006)	✓	✓										
Frequency	8	6	2	12	2	2	4	1	1	1	1	1

All these success factors are consistent with the summary in OECD (1992) of contributing factors to firm-level competitiveness. It implies that success factors reside inside rather than outside an LSP.

5.3 Developing a Conceptual Model of an LSP's Competitiveness

On the basis of previous studies of LSPs and the RBV and Porter's theory of strategic management, and many other studies on firm-level competitiveness, a conceptual model of LSPs' competitiveness is presented in Figure 5.1. A detailed discussion of the constructs central to the model and the related links are discussed below, along with the research propositions. This involves four elements: primary sources of an LSP, the contributing factors, measures and the practices of achieving competitiveness.

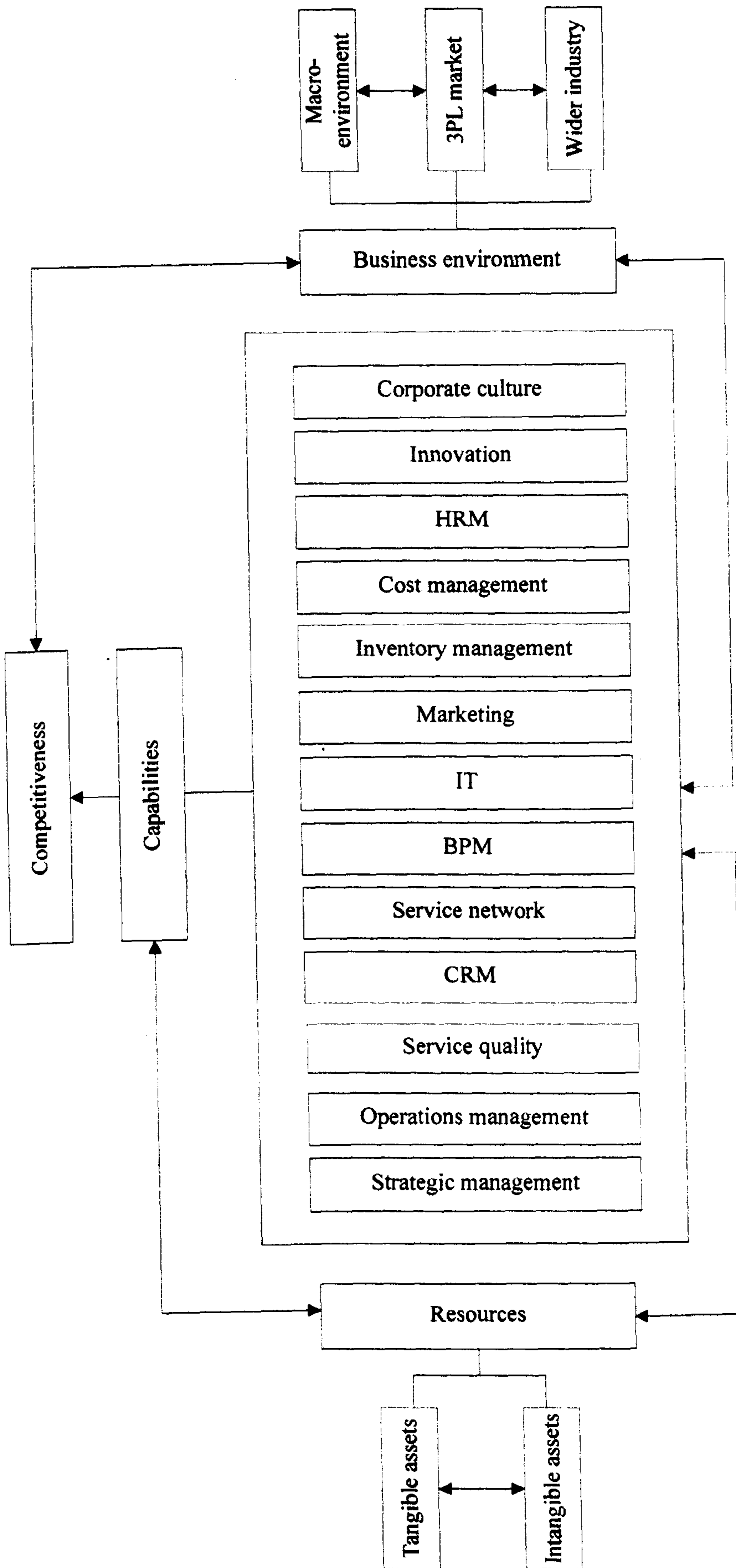


Figure 5.1 The Conceptual Model of LSPs' Competitiveness

5.3.1 Sources of an LSP's competitiveness

There have been two competing perspectives on the sources of a firm's competitiveness: the RBV and Porter's theory, as discussed in Chapter 2. The RBV approach suggests that resources - including tangible and intangible assets and capabilities inside a company - are the primary sources of competitive advantage, i.e. the internal, firm-specific side is the most important. Porter claims that, in contrast to the RBV, the environment is the original source when he adopts industry as the unit of analysis. In this case, the external dimension is very important. However, Porter has also agreed with the importance of firm-specific factors in his work (Foss, 1996). An integration of two perspectives for understanding a firm's competitiveness has emerged. The rational explanation for this integration is linked to the SWOT framework (see Figure 2.4). Through this link, the RBV approach is considered to complement Porter's framework in improving understanding of the conditions of a company's sustained competitive advantage, especially in the longer term. Porter's work, on the other hand, adds an understanding of the external environment in terms of short term and business strategies to the RBV (Foss, 1996). In addition, the OECD study addressed the concept of "structural competitiveness", meaning that the competitiveness of companies stems partly from external factors, such as "country-specific long-term trends in the strength and efficiency of a national economy's productive structure, its technical infrastructure and other externalities on which firms build" (OECD, 1992, p. 242). This suggestion is consistent with the view of integrating the RBV and Porter's theory.

The integration of these two perspectives highlights the importance of capabilities, resources and environment, and treats them as possible sources of competitive advantage. The main issue becomes which of the three factors is most important. Numerous empirical studies built on Porter's theory and the RBV demonstrate that any rational explanation of the sources of a company's competitiveness should be firm-specific. They also agree that, in particular, capabilities play the most important role in determining competitiveness.

The significance of capabilities has also been highlighted by some studies on logistics and supply chain management. Morash *et al.* (1996b) empirically examine the impact of strategic logistics capabilities on competitive advantage and firm success. In this study, strategic logistics capabilities were defined with two dimensions: demand-oriented capabilities (i.e. pre-sale and post-sale customer services, delivery speed, delivery

reliability and responsiveness to target markets) and supply-oriented capabilities (i.e. widespread distribution coverage, selective distribution coverage and low total cost distribution). The study reveals that demand-oriented capabilities were more related to firm performance than supply-oriented capabilities; in particular, customer responsiveness and competing on time were recognized as being the major pillars of a firm's success. Zhao *et al.* (2001) also investigate the effect of logistics capabilities on firm performance. Likewise, logistics capabilities were categorized into two types: customer-focused and information-focused capabilities. The results indicate that customer-focused capabilities were significantly related to firm performance, whereas information-focused capabilities influenced customer-focused capabilities and in turn improved firm performance. The Michigan State University Global Logistics Research Team (1995) identified 17 universal capabilities of world class logistics, as shown in Table 5.3.

Table 5.3 Seventeen Universal Capabilities of World Class Logistics

Dimension		World Class Logistics Capability
Positioning	4 capabilities	Strategy, supply chain, network and organization
Integration	7 capabilities	Supply chain unification, information technology, information sharing, connectivity, standardization, simplification and discipline
Agility	3 capabilities	Relevancy, accommodation and flexibility
Measurement	3 capabilities	Functional assessment, process assessment and benchmarking

Adapted from The Michigan State University Global Logistics Research Team (1995, p. 28)

The MSU researchers conclude that individual companies may put different emphases on specific capabilities given their different economic, social and competitive situations, but some of the 17 capabilities are present in all situations. Moreover, they found that “world class logistics firms have a higher total level of capability achievement than their less accomplished competitors” (The Michigan State University Global Logistics Research Team, p. 24). However, despite the impact of these capabilities on firm success, the focus of these studies was targeted mainly at industrial firms as opposed to LSPs. Therefore, according to the above discussion, the first two research propositions in relation to the primary sources of an LSP's competitiveness are postulated as follows.

P1: Resources, capabilities and business environment are the primary sources of an LSP's competitiveness.

P2: Capabilities are the most important source of an LSP's competitiveness.

5.3.2 Factors contributing to an LSP's competitiveness

The contributing factors for an LSP's success identified in Table 5.1 and 5.2 are mainly recognized as diversified capabilities that an LSP would like to obtain, improve and sustain with the aim of achieving success in accordance with the RBV. Therefore, in terms of the RBV, OECD (1992) and these earlier studies of LSPs' success, thirteen contributing factors will be discussed. They are strategic management, operations management, service quality, CRM, IT, service network, BPM, marketing, inventory management, innovation, HRM, corporate culture and cost management. The thirteen contributing factors comprise the underlying dimensions of one source of competitiveness: i.e. "capabilities", as shown in Figure 5.1. Each contributing factor is an individual capability according to the RBV. Thirteen contributing factors refer to thirteen individual capabilities. To facilitate discussion, "contributing factors" employed by OECD (1992) and "individual capabilities" are used interchangeably in the discussion. In particular, "individual capabilities" are used in some specific contexts, such as in the propositions postulated and in the discussion of empirical results, for noting the contribution of different capabilities.

(1) Strategic management

The role of strategic management within a company has been discussed in numerous studies. Many strategists (e.g. Porter, 1980, 1985; Thompson, 2001; Barney, 1991, 1996, 2002; Johnson and Scholes, 2002) emphasize the impact of strategic management in improving a company's competitive advantage. Strategic management refers to "an inherently integrative activity in a firm - forcing managers to bring the skills and expertise of different business functions together to conceive of and implement a strategy" (Barney, 2002, p. xiii). Strategic management involves three aspects: (1) understanding the strategic position of an organization; (2) strategic choices for the future; and (3) turning strategy into action (Johnson and Scholes, 2002). Strategic management has been evolving for a long time and its core theme has changed through time, as viewed in Table 5.4. The theme in this century is innovation and creativity. This is reflected in the current importance of knowledge bases and network management in response to contemporary IT economy and networked society. However, the essence of strategic management is strategic thinking, meaning how to manage resources effectively inside companies and quickly adapt changing circumstances to obtain opportunities and face challenges.

Table 5.4 The Evolution of Strategic Management

	1950s	1960s	1970s	1970s-1980s	1980s-1990s	2000s
Dominant theme	Budgets used for planning and control	Corporate planning	Corporate strategy	Industry analysis	Competitive advantage	Innovation and creativity
Main issues	Financial control through budgeting	Planning for growth	Portfolio planning	Segments, choice, positioning	Sources of competitive advantage	Flexibility and responsiveness
Concepts and techniques	Budgets at all levels for directing and planning	Forecasting and modelling	Synergy, Strategic Business Units (SBUs), matrices and experience curves	Structure and competitor analysis	Resources, core competencies	Rapid diversification, knowledge and learning
Implications	Strength of financial management is crucial	Planning Departments and the five year plan	Diversification, multidivisional, globalisation	Selectivity, restructuring, asset management	Business Process Re-engineering (BPR), outsourcing, restructuring and refocusing	Virtuality, knowledge bases, network management

Source: Lawson (2002, p. 45)

In the logistics and supply chain community, strategic management is also recognized as a very important determinant of an LSP's success. It has been discussed in some studies, as shown in Tables 5.1 and 5.2. For example, based on Porter's three generic strategies, Sum and Teo (1999) and Wang *et al.* (2006) discuss the strategic posture of Singapore and Chinese LSPs respectively. Two studies reported the same finding that differentiation strategy outperformed cost leadership strategy. Likewise, Yeung *et al.* (2006) empirically investigate the financial performance resulting from different strategic choices on the basis of data source from LSPs in Hong Kong, China. The study found that LSPs adopting the combined strategy of cost and differentiation perform best in their financial performance, followed by companies pursuing pure differentiation strategy and then those cost - or commodity - driven companies. These results indicate that different strategic choices may improve the competitiveness and performance of an LSP. Moreover, in intense competition, adopting pure cost strategy only, to some extent, cannot guarantee that LSPs will be more advantageous.

(2) Operations management

In contrast to strategic management, operations management focuses on routinised, operation-specific activities (Johnson and Scholes, 2002). It refers to the "activities, decisions and responsibilities of operations managers who manage the arrangement of resources which are devoted to the production of goods and services within an organization" (Slack *et al.*, 1998, p. 39). Similarly, Wright and Race (2004) define operations management as "the ongoing activities of designing, reviewing and using the operating system, or systems, to achieve outputs as determined by the organization" (p. 8). Operations management has a long history and is derived from factory or production management, as shown in Table 5.5.

Table 5.5 The History of Operations Management

Period	Milestone	Originator or representatives or influence
Industrial Revolution during late eighteenth and early nineteenth centuries	Factory management and the change from craft working to centralized, mechanically powered factory system e.g. Steam engine in 1769, division of labour in 1776 Interchangeable parts in 1790s	Developed during the onset of the Industrial Revolution in the period when factories were created James Watt, Adam Smith (Wealth of Nations) Eli Whitney
Scientific management 1920s-1920s	Principles of scientific management	Frederick W. Taylor, Frank and Lillian Gilbreth; Henry Gantt, Henry Ford
Quality controls 1930s	Sampling and inspection. Statistical control methods	Walter Shewart
Human relations movement 1930s-1960s	Importance of worker motivation	Elton Mayo, Abraham Maslow, Frederick Herzberg, Douglas McGregor
Management science 1940s-1960s	Early computerization and cybernetics, e.g. MRP in 1960s	Norbert Wiener, John von Neumann, Gregory Dantzig, George Dantzig, Remington Rand, Joseph Orlicky, IBM
Quality revolution 1970s-1990s	Service quality and production quality in a total quality management ethos e.g. mass production in the service sector in 1970s Total Quality Management (TQM) and Total Quality Control (TQC) in 1980s-1990s	McDonald's Restaurants, W. Edwards Deming, Joseph Juran
Manufacturing strategy paradigm 1970s-1990s	Manufacturing as a competitive weapon e.g. the influence of Just In Time (JIT) and other Japanese manufacturing methods: Kanban, Poka-yokes, empowerment, flexible manufacturing systems, etc. Operational contribution to competitive strategy in 1990s Supply chain management, business process re-engineering	Taiichi Ohno and the Toyota Production System, Wichham Skinner, Hayes and Wheelwright, Various consultants and companies, Hammer and Channey
Information revolution 1980s-2000s	Electronic Data Interchange (EDI), Electronic Point of Sale (EPOS) in 1970s, Internet, WWW, electronic enterprise	Numerous individuals and companies
Globalisation		

1990s-2000s

Worldwide markets and operations
Electronic commerce and electronic enterprises

Information and
consumer revolution
2000s-

Agility, flexibility and responsiveness, time as a competitive weapon
Supplier network management
Mass customisation
E-commerce and V-business, E-tailing and E-operations,
Customizing operations strategies by demand behaviour

The next era

?????

Source: adapted from Lawson (2002, pp. 7-9)

Operations management evolves through time. The importance of operations management to the service sector was recognized in the 1970s and it is now regarded in this sector as being a competitive weapon for both manufacturing and service organizations (Johnson, 1994). Thus, operations management has widened from its manufacturing origins to cover services and the role of customers in the use of these services (Armistead *et al.*, 1995; Heskett, 1986; Sasser *et al.*, 1978).

Operations management is associated with logistics and supply chain management. This may be partly seen from the three concepts, logistics, supply chain management and operations management, often being treated as synonyms (Lambert *et al.*, 2005). Operations management in a logistics company is often seen from many day-to-day activities such as transportation and warehousing which effectively convert input into output, but it is crucial to the implementation of corporate strategy. For example, while the focus of Sum and Teo (1999) and Wang *et al.* (2006) is targeted at strategic postures, operations for different strategic types are also discussed. Yeung *et al.* (2006) particularly emphasize the importance of operations underlying the adopted strategy and resultant financial performance, indicating that it is important to improve customer service in terms of shorter delivery lead time, meeting promised due dates and customers' special requests and offering reliable services across all strategic choices.

(3) Service quality

In today's highly competitive environment, the pursuit of service quality has been an essential strategy. Service quality yields economic benefit in two ways (Buzzell and Gale, 1987, p. 7).

In the short run, superior quality yields increased profits via premium prices. ...PIMS businesses that ranked in the top third on relative quality sold their products or services, on average, at prices 5-6% higher (relative to competition) than those in the bottom third.

In the long term, superior and/or improving relative quality is the more effective way for a business to grow. Quality leads to both market expansion and gains in market share. The resulting growth in volume means that a superior-quality competitor gains scale advantages over rivals. As a result, even when there are short-run costs connected with improving quality, over a period of time these costs are usually offset by scale economies. Evidence of this is the fact that, on average, businesses with superior quality products have costs about equal to those of their leading competitors. As long as their selling prices are not out of line, they continue to grow while still earning superior profit margins.

The significance of service quality for LSPs has also been evidenced by some studies. For instance, given the extreme importance of service quality in customer service, Harding (1998) discusses the approach to the measurement, evaluation and improvement of LSPs quality. Three criteria are discussed in this approach: the importance of a service to customers, the performance of the service and the cost and time required by this improvement. The objective is to give priority to the improvement of those most important services to customers but involving least expense and time. Wisner and Lewis (1997) identify the benefits from quality improvement practices in the transportation industry, suggesting that transportation firms should give higher priority to quality improvement for future economic success. In examining the effect of TQM to LSPs, Brah and Lim (2006) found that quality management practices were positively related to the performance of LSPs in Singapore. All the studies have highlighted that service quality is paramount to LSPs.

(4) Customer relationship management (CRM)

Given the prominence of LSPs in supply chain management, the relationship between LSPs and their clients is critical. Indeed, it has been suggested that today it is supply chains that compete rather than individual companies (Christopher, 1992). As LSPs provide intercompany linkages, they play a key role in determining supply chain competitiveness.

CRM is defined by Accenture as the “holistic and methodical approach to identifying, attracting and retaining a company’s most valuable customers through a set of capabilities which in turn must also be integrated into supply chain processes in order to achieve their objectives” (Dull *et al.*, 2003, p. 51). A survey conducted by Accenture of 21 CRM capabilities in 250 companies across six industries revealed that a company could add more than US\$1 million per year to its pre-tax profits as a result of the improvement of its CRM capabilities (Dull *et al.*, 2003). This shows the impact of CRM capability on companies’ financial performance.

Using a case study, Gunasekaran and Ngai (2004) indicate the impact of CRM on corporate performance in a Chinese logistics company. CRM has enabled the company to know customer expectations better in terms of logistics service and long-term business relationships, and in turn to be one of critical success factors for the company.

Panayides and So (2005) also suggest the necessity for LSPs to cultivate and improve relationships.

(5) Information technology (IT)

IT refers to “the hardware, databases, software, and other devices that support an information system” (Lewis and Talalayevsky, 2000, p. 174). Kent Jr. (1996) takes a similar view when he states that the IT function is comprised of the management of computer software, EDI, telecommunications and data-handling hardware. IT is considered one of the few productivity tools that may both increase in capabilities and decrease in cost simultaneously (Closs *et al.*, 1997). IT can be a significant source of competitive advantage to a company in its marketplace (Porter and Millar, 1985).

The pronounced influence of IT on LSPs has been widely discussed by numerous studies. For instance, through examining the relationship between IT and the competitive advantage of Chinese LSPs, Lai *et al.* (2006) found a significant impact of IT on companies in obtaining competitive advantage. This reflected on the following five aspects: (1) there was no change in the improvement of service variety advantages when IT was at a low level; (2) higher IT might help improve delivery speed and reliability, customer relations, and order accuracy; (3) higher IT might lead to a higher cost advantage; (4) integrating the IT system, aligning IT strategy and business strategy, and obtaining superior IT management skills were essential for companies to achieve competitive advantages efficiently; (5) managers may expect competitive advantages to be derived from investment on IT applications. Not limited to the Chinese setting, in many surveys, IT has also been identified as a key differentiating factor for LSPs, such as the survey regarding US logistics companies conducted by Lieb and Randall (1996).

In addition, the application of IT in a supply chain setting can help LSPs deal with increased complexity. Based on the survey results on the use of IT in the LSP operations in Singapore, Piplani *et al.* (2004) found that LSPs benefited from the adoption of IT in their operations, particularly in integrating supply chain activities among the various business partners such as when implementing vendor-managed-inventory (VMI) with suppliers. By leveraging IT, LSPs were able not only to monitor the level of inventory at the clients' premises, but also to help customers reduce the quantity of stock which eventually led to cost reduction.

(6) Service network

With the advent of globalisation businesses, markets are no longer confined to geographical boundaries but are instead linked to a complex worldwide network. The networked organization has become an integral component of globalisation and one of the critical success factors for companies to survive in the new economy (Lemoine and Dagnæs, 2003).

A network refers to “the fundamental stuff of which new organizations are and will be made” (Castells, 2000, p. 180). The network performs with a different mode of organizing economic activities distinct from the traditional organizational model and then brings many benefits for companies, such as taking advantage and opportunities for growth; finding new markets, segments and niches across geographical borders and responding to markets rapidly at a low cost (Lemoine and Dagnæs, 2003).

The role of networking has been recognized in logistics and supply chain management. Chandrashekar and Schary (1999) argue that there are two complementary networks in virtual supply chain management, one dealing with information, the so-called “the marketpace”, also called information network, and the other with physical flow, “the marketplace”, called a physical network. Fusco *et al.* (2005) propose the concept of concurrent networks with three dimensions, e.g. physical network, value network and business network, for supply chain competitiveness. Bernal *et al.* (2002) examine the role of the network of small-medium-sized freight forwarders. This network can be a source for these forwarders to gain international competitiveness. Lemoine and Dagnæs (2003) illustrate the dynamics of internationalisation and globalisation of freight-forwarding and LSPs in investigating the networking of these organizations in a case study.

Improved networking has been fundamental to the development of LSPs in the new economy. Several types of network are relevant to the development of LSPs, as addressed in the literature.

(a) Establishment of own subsidiaries and representative offices (i.e. Gunasekaran and Ngai, 2003, 2004; Lemoine and Dagnæs, 2003). An LSP may set up a service network to access regions and countries.

- (b) *Networking by developing a horizontal alliance between LSPs* (Lemoine and Dagnæs, 2003). Within this network one LSP may act as a strategic centre and be surrounded by some partners, adopting decentralised, autonomic, participating and coordinative governance.
- (c) *Networking by developing a vertical alliance between one LSP and its suppliers* (Abrahamsson and Wandel, 1998). Within this network one LSP may be a general supplier/contractor for its clients. The LSP has its sub-tier suppliers responsible for the logistics activities contracted by the LSP.
- (d) *Networking by developing a strategic alliance between an LSP and its clients; for example, some LSPs have integrated their manufacturing customers by providing postponed final manufacturing and relevant services* (van Hoek, 1998a).

All the above networks can combine to form a bigger network for an LSP. This can enable it to provide a wide range of services for its clients and over a wide area.

(7) Business process management (BPM)

BPM is not simply business process re-engineering (BPR), a term proposed by Hammer and Champy (1993). The concern of BPR is the redesign of business processes with the aim of producing radical improvement in performance (Hammer and Champy, 1993). BPR is widely embraced by many companies but it has been queried for its failure to deliver the expected results in some cases (Lee and Dale, 1998). Unlike BPR, BPM is “a structured approach to analyse and continually improve fundamental activities such as manufacturing, marketing, communications and other major elements of a company’s operation”(Zairi, 1997, p. 64). The focus of BPM is on how to manage and control processes within the aim of improving the quality of products and services (Elzinga *et al.*, 1995). The drivers for the adoption of BPM are generally considered to have arisen from: (a) globalisation; (b) changing technology; (c) regulation; (d) the action of stakeholders; and (e) the eroding of business boundaries (Armistead *et al.*, 1997).

BPM is suggested by Zairi (1997) as a boundary-less approach to modern competitiveness in which traditional functional boundaries are cut across by processes. In this case, activities could be managed and improved continuously to deliver high quality standards of products and services consistently without functional barriers.

The thinking of BPM is well adapted to logistics and supply chain management because of its emphasis on processes. It may be seen in the definition of logistics and supply chain management, where the two concepts are related to the management and implementation of processes. Logistics is “the process of planning, implementing and controlling procedures for the efficient and effective transportation and storage of goods including services, and related information from the point of origin to the point of consumption for the purpose of conforming to customer requirement”, while supply chain management is “an integrating function with primary responsibility for linking major business function and business processes with and across companies into a cohesive and high-performing business model” (CSCMP, 2006). The thinking of BPM has also been noted by some studies concerning LSPs. For example, Brah and Lim (2006) consider process management to be one aspect of TQM when examining the effect of TQM on the performance of LSPs, showing the association between business management and the improvement of LSPs’ performance.

(8) Marketing

Marketing refers to “an organizational function and a set of processes for creating, communicating and delivering value to customers and managing customer relationships in ways that benefit the organization and its stakeholders” (American Marketing Association, as reported by Keefe, 2004, p. 17). Marketing may provide a mechanism for companies to improve their competitive ability and in turn achieve superior performance (Panayides, 2004a; Speed and Smith, 1993). For example, Li (2000) has empirically examined the extent to which marketing as a capability is one of the sources of the competitiveness among Chinese manufacturers.

Marketing is particularly important as it interacts with other functions such as logistics, operations and production (Morash *et al.*, 1996a; Stank *et al.*, 1999; Stock, 2002). The integration of marketing and logistics may lead to better performance (Stank *et al.*, 1999). Panayides (2004a, b) investigates the impact of marketing practices and marketing strategy on business performance. The results reveal that service differentiation, market segmentation, cross functional customer focus and inter-functional co-ordination have all exerted a positive impact on the performance of LSPs. The result is also consistent with Porter’s generic theory of competitive advantage based on differentiation.

(9) Inventory management

Inventory management is considered by many LSPs to be an exceptional service because they do not normally hold inventory for the clients (Coyle *et al.*, 1996).

However, some LSPs have willingly provided inventory management as a value-added service in pursuit of increased revenue and as part of the customisation of product/service offerings to customers. Through offering this service, the value added for LSPs to acquire may be higher than that of traditional transportation and warehousing services under the chain context of supplementary logistics service transactions (van Hoek, 2000a, 2001). In fact, this phenomenon, on the one hand, indicates that inventory management is quite important in logistics activities because the decisions about transport, warehouse and stock are essentially inventory decisions subject to transportation and storage costs. This has been evidenced by A.T. Kearney's research that successful LSPs have recognized logistics issues as being relevant to the management of inventory across the demand chain (Africk and Markeset, 1996). On the other hand, it also reflects that such a shift has happened at LSPs in their service orientation from the asset-based approach, i.e. freight bill payments and warehouse management concerning administrative functions, towards a problem-solving approach such as providing inventory management (Africk and Markeset, 1996).

Gunasekaran and Ngai (2003) examined the success of logistics management in a small logistics company. At the core of the logistics management was inventory management. All the other functions surrounded managing the inventory with the objective of making the right products available, at the right time, in the right quantity, and in a cost-competitive manner.

(10) Innovation

Innovation refers to "the adoption of an idea or behaviour - whether pertaining to a device, system, process, policy, programme, product or service - that is new to the adopting organization" (Zaltman *et al.*, 1973, p. 10). Rogers (1995) simply describes innovation as "an idea, practice, or object that is perceived as new by an individual or other unit of adoption" (p. 11). Within the logistics and supply chain context, the extent of innovation ranges from the basic to the complex, such as "developing new software, designing new packaging, creating new delivery processes, building new and innovative facilities, and developing new services" (Flint *et al.*, 2005, p. 136).

Innovation is a critical factor to the success of many companies, including that of LSPs (Flint *et al.*, 2005). Drawing on important innovation knowledge from other disciplines, such as new product development, market orientation, customer value, organizational learning and process, Flint *et al.* (2005) construct a grounded theory of the customer value-oriented innovation process related to LSPs. The aim of this grounded theory is to discover how LSPs try to be innovative. In addition, the importance of service innovation to LSPs was highlighted as being distinct from the normal focus on technological and managerial innovations in many companies. Chapman *et al.* (2003) also take a similar view on the importance of innovation, in particular, service innovation in logistics services. Having reviewed the extensive literature, Chapman *et al.* (2003) conclude that service innovation is conceived as being non-technical by nature in contrast to technological innovation. There are three factors underpinning service innovation: technology, knowledge and relationship networks. Within the new economy, it is necessary for logistics companies to be innovative in each of these ways.

(11) Human resource management (HRM)

HRM is key to competitiveness (Terpstra, 1994). Numerous studies have conceptualised or empirically examined the relationship between HRM and the performance of companies. Human resource is the only capability that competitors cannot replicate exactly (Evans and Lindsay, 1996). Fawcett *et al.* (2004) also stress the significance of people as being the most important competitive resource. According to Porter (1990), companies develop their competitive advantage through the development of their human resources.

In logistics and supply chain management, Gowen III and Tallon (2003) examine the relationship between some HRM factors and SCM practice success. Their study suggests that HRM factors can give companies a competitive edge even if rivals have conducted SCM practices effectively. Specifically, they emphasize the critical impact of employee training, implementation barriers, and management and employee support on competitiveness. Qualified logistics managerial talent is imperative to LSPs with the growing logistics services.

(12) Cost management

Cost management is a set of techniques and methods used to control and improve companies' activities and processes, their products and services (Brinker, 1996, cited in

Agrawal and Mehra, 1998). The purpose of cost management for companies is to maximize their current and future profits of companies (Agrawal and Mehra, 1998).

In logistics management, there are two fundamental drivers for companies to perform logistics services: better provision of logistics services and lower costs. Thus the accounting and control of logistics costs is vital to companies seeking and improving competitive advantages. To ensure profitability, companies need more accurate and focused costing of logistics functions (Pohlen and La Londe, 1994), either using traditional cost-accounting systems applied in logistics operations for many years or ABC (activities-based costing) which become prevalent in the 1990s (Foster, 1999; Gooley, 1995; Goldsby and Closs, 2000; Liberatore and Miller, 1998; Lin *et al.*, 2001; Pohlen and La Londe, 1994; Stapleton *et al.*, 2004).

(13) Corporate culture

Corporate culture is one of several attributes that a company can use to differentiate itself from others (Alchian, 1950; Alchian & Demsetz, 1972; Barney, 1986a). However, it is elusive and hard to describe (Barney, 1986a; Sherwood, 1990).

Corporate culture refers to “a complex set of values, beliefs, assumptions, and symbols that define the way in which a firm conducts its business. In this sense, culture has pervasive effects on a firm because a firm’s culture not only defines who its relevant employees, customers, suppliers, and competitors are, but it also defines how a firm will interact with these key actors” (Barney, 1986a, p. 657). Corporate culture can have significant economic value for companies (Barney, 1986a). Some cultures can become an enabler to companies because they create a positive framework within which employees, customers, suppliers, and others can operate effectively (Barney, 1986a; Deal & Kennedy, 1982). As discussed previously, corporate culture has been identified by Lieb and Kendrick (2003) as one factor that impacts on LSPs’ profitability.

Thus, on the basis of an extensive discussion of thirteen contributing factors (thirteen individual capabilities) possibly residing in LSPs, two propositions relating to the contribution of individual capabilities are postulated as follows:

P3: An LSP’s competitiveness is the combined result of a series of individual capabilities.

P4: Some individual capabilities are more important than others in contributing to an LSP's competitiveness.

In addition, some attributes of resources/capabilities are extremely important in leading to the sustainability of competitive advantage, as discussed in Chapter 2. For example, Mata *et al.* (1995) analyzed five attributes involved in IT; these include customer switching costs, capital, proprietary technology, technical IT skills and managerial IT skills. They argue that IT managerial skills are the only attribute to provide sustainability. Their argument is that IT managerial skills (a) are often heterogeneously distributed across firms; (b) reflect the unique histories of individual firms; (c) are routines in a firm; and (d) are based on socially complex relations within the IT function, between the IT function and other business functions, and between the IT function and a firm's suppliers or customers. It is hard for other firms to imitate these skills, making them a source of sustained competitive advantage. Accordingly, the following proposition is made:

P5: Each capability has several attributes which vary in their relative importance.

5.3.3 Measures of an LSP's competitiveness

Various measures, such as quantitative or qualitative, and financial or non-financial, as discussed in Chapter 2, have all been proposed to evaluate a company's competitiveness. In a logistics and supply chain context, while there are many studies about performance measurement, "to date, literature on specific measures, frameworks, and models does not appear to adequately guide individual firms in logistics measure selection" (Giffis *et al.*, 2004, p. 100).

Chow *et al.* (1994) comprehensively renew logistics performance measurement. In their study, they suggest that logistics performance be viewed "as a subset of the larger notion of firm or organizational performance" (p. 23) and should be defined to incorporate multiple goals pursued by companies, such as sales growth, profitability and customer satisfaction. They note that measuring logistics performance is a difficult and complex endeavour and no one-best-way paradigm can be used. Mentzer and Konrad (1991) review logistics performance practices and suggest methods for improvement from an efficiency/effectiveness perspective. The focus of this approach is on the extent to which goals are achieved (effectiveness) and resources utilized (efficiency). Caplice

and Sheffi (1994, 1995) treat logistics performance measurement as a system. This system could be measured at either individual metric or system-wide levels. At the individual level, they suggest three generic metrics for capturing the overall performance: utilization, productivity and effectiveness. The system-wide measurement consists of three components: inputs (resources utilized), demand information (service requirements requested by customers) and outputs (completed deliveries of services to customers). All the above discussions indicate, as recommended by Chow *et al.* (1994), that both quantitative and qualitative techniques, and multiple measures rather than one measure should be considered in logistics performance measurement. Moreover, the implication of supply chain management for logistics performance, i.e. the particular role of an organization in a supply chain and the assessment given the performance of the supply chain rather than individual participants, should be recognized and considered.

Compared with logistics performance, supply chain performance involves more elements. It is a chain-wide measurement covering several companies (van Hoek, 1998b). Cavinato (1992) presents a total cost/value model to assess supply chain competitiveness. This model focuses on the inter-firm cost analysis that can provide cost and value advantage to the whole supply chain. Van Hoek (1998b) proposes a framework for selecting measures based on strategic context and the contribution of organizations in supply chain competitiveness. It is suggested that customer service, market creation and the other measures should be used. On the basis of the literature survey, Gunasekaran *et al.* (2001) put forward a conceptual model for the supply chain performance at three levels (strategic, tactical and operational) of management. Both financial (e.g. net profit vs. productivity ratio) and non-financial (e.g. improved quality) measures were used to evaluate the performance at the three levels. Generally speaking, these above discussions suggest that the measurement of supply chain performance should utilize integrated measures to stimulate firms to consider a chain-wide performance as opposed to their own individual performance measures (Lai *et al.*, 2002).

However, both logistics measurement and supply chain measurement are associated with measuring the performance of LSPs. For example, Lai *et al.* (2002) develop a measurement model to evaluate supply chain performance in transport logistics. This model includes three dimensions: service effectiveness for shippers, operations efficiency for transport LSPs and service effectiveness for consignees. The performance

of these LSPs was focused on how they use resources efficiently to perform service activities. Griffis *et al.* (2004) also place emphasis on the importance of measuring individual logistics organizations. They argue that firms differentiate themselves in the competition through their goals; these goals may determine the nature of firm operations and will in turn influence the type of measures firms should select for their logistics systems. They further suggest that “performance measures should be chosen for their ability to detect performance consistent with the logistics organization’s specific mission, goals, and environment” (p. 95). Therefore, the main features of performance measurement for logistics, LSPs and supply chain are summarized in Table 5.6.

Table 5.6 Comparison of Measurement among Logistics, LSPs and Supply Chain

Measurement	Logistics	LSPs	Supply chain
Focus	Subset of a firm performance	Individual firm performance, and also as the component of supply chain performance, corporate mission and goal need to be considered	Chain -wide performance
Attributes of measures	Hard and soft; quantitative and qualitative; financial and non-financial		
Dimensions	Multi-dimensional		
Assessment	Objective and subjective measures		

Based on the various discussions above, the measures for assessing an LSP’s competitiveness may take into account four aspects. First, the measurement of an LSP’s competitiveness may consider two facets, i.e. current competitiveness and its longer term sustainability. Current competitiveness is connected to the accomplishment of a specific goal, while sustainability is related to the potential to maintain competitiveness. The two facets have been suggested by many studies in Chapter 2. Secondly, given the service attribute of LSPs, the measures should include service attributes. Thirdly, multiple measures may be used to capture the competitiveness. Finally, there is a need to adapt a supply chain perspective on performance measurement taking account of the interaction between companies at different levels.

Given these considerations, a set of six measures of LSPs’ competitiveness can be proposed: market share, growth in market share/market share growth, profitability, productivity, service quality and innovation. Of these six measures, market share,

growth in market share/market share growth, profitability and productivity are quantitative measures, while service quality and innovation are qualitative measures. Profitability is a financial measure, while the other five measures are normally treated as non-financial measures (Bharadwaj *et al.*, 1993; Capon *et al.*, 1990; Defee and Stank, 2005; Fahy, 2000; Feurer and Chaharbaghi, 1994; Kaplan and Norton, 1992). The specific meaning of each measure is discussed as follows.

(1) Market share

Market share is “a sufficient indicator of competitiveness if the firm is maximizing profits (i.e. not sacrificing profits in the pursuit of market share for its own sake)” (McFetridge, 1995, p. 4). It is the measure which reflects the relationship between input cost and (or) productivity advantages. In most cases, companies having a high share of the markets that they serve are much more profitable than those smaller-share companies. The connection between market share and profitability has been demonstrated by the PIMS (Profit Impact of Market Strategies) project undertaken by the Marketing Science Institute. The PIMS project reports that market share is one of the most important key profit influences of 37 factors examined (Buzzell *et al.*, 1975). When market share increases, a business is likely to have “a higher profit margin, a declining purchases-to-sales ratio, a decline in marketing costs as a percentage of sales, higher quality, and higher priced products” (Buzzell *et al.*, 1975, p. 97). Market share is also positively related to other measures of financial performance (Capon *et al.*, 1990).

The market share of a company expresses its sales as a percent of total market sales. In reality, it is difficult to measure the market shares of LSPs. The difficulty lies in a lack of statistical information for the whole LSP sector, as discussed in Chapter 2. For this reason, some researchers manage to get around the problem by adopting other means. For example, Stank *et al.* (2003) examine the influence of logistics service performance on market share. The test was run in the context of the logistics services provided by North American LSPs. Two ways were adopted to measure the LSPs’ market share. In the first case, the market share measurement of LSPs was a relative measure which reflected managers’ assessments of their share on a 7-point scale with 1 = worst in industry, 4 = average, 7 = best in industry. The second way was a good-faith estimate of the firm’s actual share (percent of total North American LSPs market). The “good-faith estimate” was a statement of the actual percent share accounted for by the firm.

(2) Growth in market share/market share growth

Market share is a static measure of a firm's position in the marketplace. Nevertheless, growth in market share/market share growth can indicate how relative strength changes through time. In the logistics and supply chain research, this measure has been used by some studies to assess company performance. For instance, Sum and Teo (1999) and Wang *et al.* (2006) adopted average growth in market share over the past two years to view the competitive performance of companies when investigating the strategic posture of LSPs in Singapore and forwarder-based LSPs in China respectively, as discussed previously.

(3) Profitability

Put simply, profitability refers to revenues minus costs. Profitability is the financial bottom line (Sink *et al.*, 1984). According to Buckley *et al.* (1988), profitability, in particular long run profitability, is the single most important measure of competitive success. It is an indicator of current competitiveness although profitability is best measured over a period (McFetridge, 1995). Profitability has been used in the research regarding LSPs. Given the difficulty in acquiring financial data, profitability is often used as a subjective measure. For example, Lieb and Bentz (2005) used profitability indicating companies' financial performance when they surveyed the North American third party logistics industry. Panayides (2004a, b) uses this measure to reflect company performance in investigating the marketing strategies adopted by LSPs. In the above two cases, profitability was used as a subjective assessment of the overall performance of LSPs.

(4) Productivity

Productivity is understood to be "the ratio of quantities of output (goods and services from an organizational system over a period of time to quantities of input resources consumed by that organizational system for that period of time; or, the ratio of quantity at the desired quality level to resources actually consumed" (Sink *et al.*, 1984, p. 267). Simply put, productivity is the ratio between output and input (Anderson *et al.*, 1997; Caplice and Sheffi, 1994; Johnston and Jones, 2004; Stainer, 1997). The more the input is reduced to for a given output, the better is the productivity (Gummesson, 1998). In logistics research, Clarke (1991) for instance reports how productivity was measured in physical distribution by South Carolina distribution managers.

(5) Service quality

Quality means conformance to specifications, fitness for use (Sink *et al.*, 1984). It is “a measure of performance on the input side, with respect to the transformations of input, and also on the output side” (Sink *et al.*, 1984, p. 267). Quality has been an important indicator of both market share and profitability in many markets (Capon *et al.*, 1990; Hays and Hill, 2001).

Evaluating service quality is difficult because it involves not only the outcome of a service but also the process of service delivery (Parasuraman *et al.*, 1985). In logistics, service quality refers to meeting agreed customer requirements and expectations, which includes many dimensions such as order transmission and delivery, accurate paper work, post-sales support, accurate and timely generation and transmission of information (Coyle *et al.*, 1996). Lai *et al.* (2006) investigate the impact of IT on the competitive advantage of LSPs in China, where service quality was selected as one measure representing this competitive advantage.

(6) Innovation

In an ever-changing market, the effective performance of an organization depends more and more on the successful management of innovation (Tushman and Nadler, 1986). With the continuous improvement and creation driven by internal and external pressures, demands, changes and needs in many companies, it has been suggested by many authors, e.g. Kaplan and Norton (1992) and Sink *et al.* (1984), that innovation is one measure for the performance measurement of companies. Innovation has also been used in the measurement of logistics and supply chain performance. Brewer and Speh (2000) used a modified balanced scorecard to measure supply chain performance, where innovation and learning was one of selected four measures. The emphasis of this measure here, as noted by authors, was placed on the future as opposed to current capabilities of the whole supply chain. On the basis of analysing patenting achievement, Wu (2006) evaluates technological innovations in the logistics sector. He argues that technological innovation should be considered as a measure reflecting an LSP's success, like many other quantifiable measures (e.g. order cycle length reduction, service improvement), while patents are innovation performance indicators representing this success. Based on the above views, it is reasonable to postulate the sixth proposition as follows.

P6: The measurement of an LSP's competitiveness is multidimensional.

The six foregoing measures are interrelated. Some measures may be the cause or consequence of other measures. Profitability is viewed, in some cases, as an outcome of the other measures. The PIMS analysis, for example, shows that market share is a key to profitability (Buzzell *et al.*, 1975; Buzzell and Gale, 1987). Gummesson (1998) conceptualizes the relationship between productivity, quality and profitability in service firms. In addition, it is worth noting that cost has not been included as a measure of competitiveness. In theory the lower the costs the company incurs, the more competitive it will be. However, cost in itself is not a competitive variable any more than revenue would be. It is productivity, reflecting the conversion of costs into output, which impacts on competitiveness. Griffis *et al.* (2004) argue that logistics cost might be an important measure for the firm, but should not be the key performance indicator. They particularly note that cost minimization as the driving force has been changed when the firm has differentiated itself by providing unique services to different clients. In an examination of the relationship between marketing strategies of LSPs and their performance in some countries, Panayides (2004a, b) found that cost advantage is not related to measures (i.e. profitability, sales volume, market share and overall performance) of LSPs performance when examining marketing strategy.

5.3.4 Achievement of LSPs' competitiveness

As commented by Krugman (1996), "of course competitiveness was the key; the only question was how to achieve it" (p. 17). The achievement of competitiveness is a basic and simple question. It is the result of successful management practices by entrepreneurs or corporate executives, as concluded by OECD (1992).

Practices are "characteristics which describe business behaviours which tend to cause the creation of a performance gap" and that they could be related to many aspects, such as (a) processes; (b) organization structures; (c) management system; (d) human factors; (e) strategic approaches (Zairi, 1994, p. 16). The MSU researchers claim that "a practice consists of a way to perform essential work. Practices are the most visible aspects of discipline because they involve what people do and where they spend most of their time" (The Michigan State University Global Logistics Research Team, 1995, p. 20).

The linkage between practices and competitiveness has been demonstrated by some authors (e.g. Meyer *et al.*, 1999; Voss and Johnston, 1995; Voss *et al.*, 1997). In their studies, the central hypothesis is that the adoption of best practices, for a service

company, is linked to the attainment of high service standard directly and this will in turn lead to superior business performance and competitiveness. The strong relationship between practices and business performance has been examined by Voss and Johnston (1995) and Voss *et al.* (1997) in their investigation of the competitiveness of service companies. It has also been found by Voss *et al.* (1995) in studying the competitiveness of European manufacturers in four countries.

Practices have been given very high emphasis in recent years. The concern for firms' success has shifted from comparing performance measures into determining best practices and what can be achieved (Andersen and Camp, 1995; Rogers *et al.*, 1995; Smith, 2000; Woodburn, 1999). As claimed by the MSU researchers, "understanding what it takes to be world class starts with identifying the practices that are likely to result in superior performance across a wide range of business situations" (The Michigan State University Global Logistics Research Team, 1995, p. 20). In addition, the capabilities of a firm can be measured by its management practices (Voss *et al.*, 1997). Grounded in these discussions, the proposition relative to practices of achieving LSPs' competitiveness is postulated as follows.

P7: An LSP's competitiveness is associated with a series of specific management practices.

5.4 Summary

After discussing the theories of firm-level competitiveness and clarifying the subject of competitiveness discussed in prior chapters, this chapter has developed a conceptual model of LSPs' competitiveness.

This chapter starts with a review of previous studies of LSPs' success. This includes discussions of the financial performance of LSPs in the logistics service market and success factors for LSPs. Based on these earlier studies and grounded in two theories of strategic management - the resource-based view (RBV) and Porter's theory, and also other research on firm-level competitiveness - a conceptual model of LSPs' competitiveness is therefore proposed. Constructs underlying the conceptual model are then discussed extensively; these include three sources, thirteen contributing factors, six measures and management practices. Building on this discussion, seven propositions are postulated, which are linked to the research questions posed in Chapter 1.

(1) What are the primary sources of an LSP's competitiveness? To what extent does an LSP's competitiveness depend on the exogenous and endogenous factors?

P1: Resources, capabilities and business environment are the primary sources of an LSP's competitiveness.

P2: Capabilities are the most important source of an LSP's competitiveness.

(2) What specific factors can contribute to an LSP's competitiveness? What is the relative contribution of these identified determinants to an LSP's competitiveness?

P3: An LSP's competitiveness is the combined result of a series of individual capabilities.

P4: Some individual capabilities are more important than others in contributing to an LSP's competitiveness.

P5: Each capability has several attributes which vary in their relative importance.

(3) What are the possible measures that LSPs can use to assess their competitiveness? To what extent can they be quantified?

P6: The measurement of an LSP's competitiveness is multi-dimensional.

(4) What are the management practices that LSPs should be adopting to enhance their competitiveness? What procedure should they adopt to measure and improve competitiveness?

P7: An LSP's competitiveness is associated with a series of specific management practices.

The proposed conceptual model of LSPs' competitiveness will be used in a subsequent analysis. All propositions will be validated empirically in chapters 7-9.

CHAPTER 6 RESEARCH METHODOLOGY

6.1 Introduction

This chapter will present the methodology used in this study. The aim is to provide a process of the research conducted. Key elements of this methodology are:

- (a) Combination of qualitative and quantitative approaches;
- (b) Three-phase study involving piloting, validation and main survey;
- (c) Comparative surveys in two countries, China and the UK;
- (d) Use of multiple research methods: comprising telephone interviews, e-mail survey, semi-structured face-to-face interviews and large-scale postal questionnaire.

Figure 6.1 displays the methodological framework.

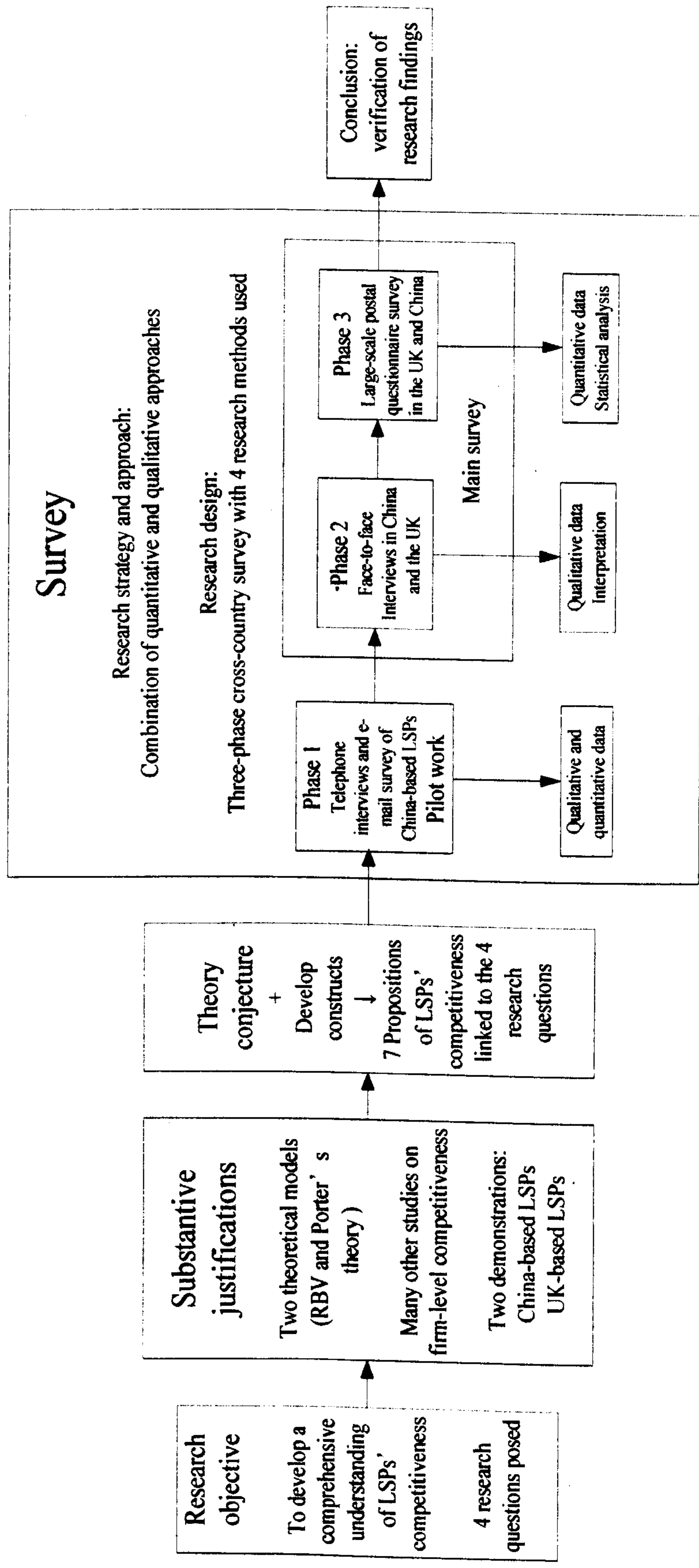


Figure 6.1 Methodological Framework

6.2 Combination of Qualitative and Quantitative Approaches

6.2.1 Philosophical stance

In social sciences, many paradigms such as positivism, postpositivism, interpretivism, critical theory, constructivism, structuralism and humanism have been named by social scientists (see Burrell and Morgan, 1979 and Denzin and Lincoln, 1994). However, in business and management research, two paradigms, entitled positivism and phenomenology, tend to dominate (Collis and Hussey, 2003; Gummesson, 2000, Easterby-Smith, 1991; Hussey and Hussey, 1997; Mangan *et al.*, 2004; Remenyi *et al.*, 1998).

A paradigm is defined as “a basic set of beliefs that guide actions” (Denzin and Lincoln, 1994, p. 99). Put simply, a paradigm may be treated as a world-view to guide the researcher (Denzin and Lincoln, 1994). A paradigm includes three elements: ontology, epistemology and methodology, which concern the nature of reality, knowledge of the world and how to obtain knowledge about the world respectively. Under the positivist paradigm, reality is considered to be external and objective. The world can be explained and predicted. The researcher is independent; research findings are considered value-free, time-free and context-independent (Guba and Lincoln, 1994). There is a long tradition of positivist position in social science that is derived from natural science (Denzin and Lincoln, 1994; Easterby-Smith, 1991; Remenyi *et al.*, 1998). It is now widely manifest in many disciplines, such as business and management. Under the phenomenological paradigm, reality and researcher are not separate. Reality is considered subjective and can be understood rather than explained and predicted. The researcher is involved and cannot be detached from the phenomenon being studied. Research findings under the phenomenological paradigm are considered time-specific, contextual and idiographic (Collis and Hussey, 2003; Gummesson, 2000, Easterby-Smith, 1991; Hussey and Hussey, 1997; Mangan *et al.*, 2004; Remenyi *et al.*, 1998). Table 6.1 lists some features of the two paradigms.

Table 6.1 Features of the Two Main Paradigms

Positivistic paradigm	Phenomenological paradigm
Tends to produce quantitative data	Tends to produce qualitative data
Uses large samples	Uses small samples
Concerned with hypothesis testing	Concerned with generating theories
Data is highly specific and precise	Data is rich and subjective
The location is artificial	The location is natural
Reliability is high	Reliability is low
Validity is low	Validity is high
Generalizes from sample to population	Generalizes from one setting to another

Source: Collis and Hussey (2003, p. 55)

Basically, positivist and phenomenological paradigms are two extreme philosophical stances with different world-views and concerns, as shown in Table 6.1. Some authors regard them as being incompatible (e.g. Collis and Hussey, 2003; Easterby-Smith, 1991). Morgan and Smircich (1980) and Collis and Hussey (2003) present a continuum of core ontological assumptions with the positivist and phenomenologist at either end, as shown in Figure 6.2.

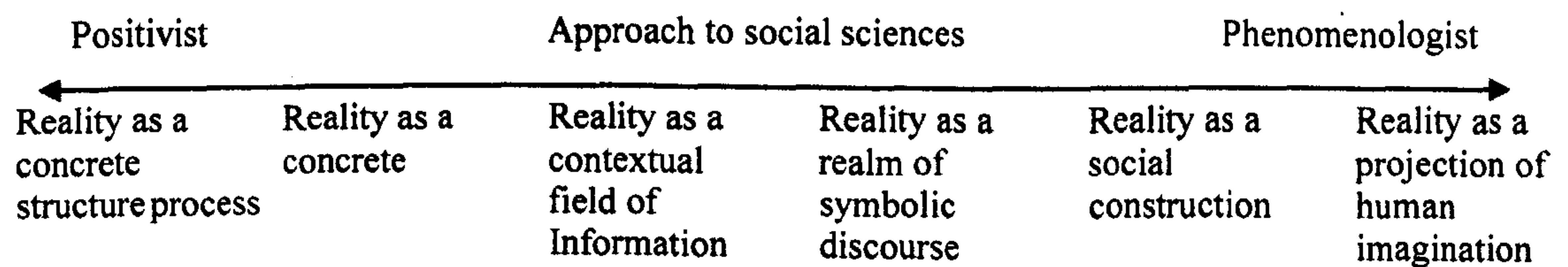


Figure 6.2 Continuum of Core Ontological Assumptions

Source: Collis and Hussey (2003, p. 51)

The positivist approach tends to be associated with the collection and analysis of quantitative data, while the phenomenological approach generally involves the use of qualitative data. Building on the two philosophical stances, quantitative and qualitative research has accordingly different attributes. Table 6.3 presents ontological, epistemological and methodological perspectives in the use of these two types of approaches.

Table 6.2 Comparison of Qualitative and Quantitative Research

Assumption	Question	Quantitative	Qualitative
Ontological	What is the nature of reality?	Reality is objective and singular, apart from the researcher	Reality is subjective and multiple as seen by participants in a study
Epistemological	What is the relationship of the researcher to that researched?	Researcher is independent from that being researched	Researcher interacts with that being researched
Methodological	What is the process of research?	Deductive process Cause and effect Static design-categories isolated before study Context-free Generalizations leading to prediction, explanation, and understanding Accurate and reliable through validity and reliability	Inductive process Mutual simultaneous shaping of factors Emerging design-categories identified during research process Context-bound Patterns, theories developed for understanding Accurate and reliable through verification
Axiological	What is the role of values?	Value-free and unbiased	Value-laden and biased

Source: Adapted from Creswell (1994, p. 5)

Because of the incompatibility of the underlying research paradigms, quantitative and qualitative approaches appear not to be combined. However, many studies (e.g. Creswell, 2003; Tashakkori and Teddlie, 1998) have shown that the two approaches and their underlying paradigms can ‘coexist’ since both paradigms have shortcomings and neither provides a complete understanding. Also, according to House (1994), the fact that these two very different approaches exist suggests a “misunderstanding of science” (p. 20). Datta (1994) proposes more practical reasons for this ‘coexistence’, such as both paradigms having long history and also having influenced policy. Reichardt and Rallis (1994) argue that there are many similarities at a fundamental level between quantitative and qualitative approaches and that they should “form an enduring partnership” (p. 85). There is a move towards developing a ‘middle ground’ between quantitative and qualitative approaches, bridging the gap between positivist and phenomenological paradigms (Easterby-Smith, 1991). This involves the development of mixed methodology/mixed methods/methodological mixes, which includes the essence of both quantitative and qualitative approaches (Creswell, 2003; Tashakkori and Teddlie, 1998).

The paradigm underpinning this 'middle ground' is named 'pragmatism' by some researchers (e.g. Creswell, 2003, Tashakkori and Teddlie, 1998). In fact, other researchers (e.g. Guba and Lincoln, 1994) have proposed another form of positivism, which they call postpositivism, which allows for the interpretation of qualitative data and so helps to narrow the gap with phenomenology. Nevertheless, the name of paradigm is not the concern of the study. The essential thing is that both quantitative and qualitative approaches can be used in the same research to cope with different research questions (Creswell, 2003; Tashakkori and Teddlie, 1998). As commented by Collis and Hussey (2003):

It is perfectly possible, and even advantageous, to use both qualitative and quantitative methods for collecting data. For example, a questionnaire survey providing quantitative data could be accompanied by a few in-depth interviews to provide qualitative insights and illuminations (Collis and Hussey, 2003, p. 77).

6.2.2 Combining qualitative and quantitative approaches in logistics research

In logistics research, quantitative research grounded in the positivist paradigm holds a predominant position, while qualitative research underpinned by phenomenological paradigm is less often applied (Ellram, 1996; Gammelgaard, 2004; Golicic *et al.*, 2005; Halldórsson and Aastrup, 2002; Mangan *et al.*, 2004; Mentzer and Kahn, 1995; Näslund, 2002). In recognition of general trends in business and management research, many logistics researchers (e.g. Ellram, 1996; Golicic *et al.*, 2005; Mangan *et al.*, 2004; Näslund, 2002), have called for more qualitative studies, especially using both qualitative and quantitative approaches to overcome the weakness of the pure quantitative approach in logistics research. This is considered conducive to the development and advancement of logistics research, as judged by Näslund (2002):

It will be hard to develop any research field if all researchers belong to the same paradigm and culture, and do the same kind of research with the same kind of research methods. Someone has to break the barrier and try new methods and new perspectives (p. 325) ...

If everyone conducts similar types of research, guided by the leading academics' choice of paradigm, and guided by academic history and an "established path", then will the discipline really evolve and develop academically and theoretically? (Näslund, 2002, p. 335)

Näslund (2002) delineates the benefits of simultaneously adopting qualitative and quantitative approaches in logistics research, and argues that not all research problems can be resolved with the same approach. Some research problems may be better coped

with by use of a quantitative approach, while some by qualitative, or even some, possibly, by a combination of both. Further, he advocates that it is necessary to use both quantitative and qualitative methodologies for the development and advancement of logistics research.

Many logistics researchers have combined different research approaches in their studies. For example, in keeping with the 'middle ground' in management research and Näslund (2002), Mangan *et al.* (2004) highlight the resultant benefits of combining qualitative and quantitative approaches in investigating seaport/ferry choice in Ireland. This study investigated issues using both positivist and phenomenological paradigms. A three-phase research design was adapted with alternative inductive reasoning (qualitative analysis), deductive reasoning (quantitative analysis), and then inductive reasoning (qualitative analysis) to obtain more meaningful research findings. Golicic *et al.* (2005) propose the concept of a balanced approach, meaning research using both inductive (typically qualitative), and deductive (typically quantitative) approaches within a research project. Wilding and Juriado (2004) adopt a mixed approach of combining a written questionnaire with telephone and face-to-face interviews to investigate customer perceptions of the logistics outsourcing decision. They note that this mixed approach provides a comprehensive set of data for their research.

6.2.3 Qualitative and quantitative approaches employed in this study

As discussed in preceding chapters, this study aims to develop a comprehensive understanding of LSPs' competitiveness from the LSP's perspective. It will examine LSPs' assessment of primary sources of competitiveness, contributing factors, measures and practices for achieving it. To answer the research questions posed in Chapter 1, seven propositions are postulated in Chapter 5, building on an extensive literature review. Table 6.3 shows the linkage between these research questions and propositions.

Table 6.3 Research Questions and Propositions

Research Questions posed in Chapter 1	Propositions postulated in Chapter 5
RQ1: What are the primary sources of an LSP's competitiveness? To what extent does an LSP's competitiveness depend on the exogenous and endogenous factors?	P1: Resources, capabilities and business environment are the primary sources of an LSP's competitiveness.
	P2: Capabilities are the most important source of an LSP's competitiveness.
RQ2: What specific factors can contribute to an LSP's competitiveness? What is the relative contribution of these identified determinants to an LSP's competitiveness?	P3: An LSP's competitiveness is the combined result of a series of individual capabilities.
	P4: Some individual capabilities are more important than others in contributing to an LSP's competitiveness.
	P5: Each capability has several attributes which vary in their relative importance.
RQ3: What are the possible measures that LSPs can use to assess their competitiveness? To what extent can they be quantified?	P6: The measurement of an LSP's competitiveness is multidimensional.
RQ4: What are the management practices that LSPs should be adopting to enhance their competitiveness? What procedure should they adopt to measure and improve competitiveness?	P7: An LSP's competitiveness is associated with a series of specific management practices.

The seven propositions will be validated through empirical examination by survey. The results of validating these propositions will address research questions such as 'what, which, how and why'. Answering these questions will require a mix of quantitative and qualitative data, particularly as no comprehensive theory of LSPs' competitiveness has yet been developed. The combination of different types of data from different sources is important for achieving rigour and credibility.

The combination of qualitative and quantitative approaches is mainly an example of triangulation in business research. Triangulation is known as using different research approaches, methods and techniques in the same study. It may overcome the potential bias and sterility of a single-method approach (Collis and Hussey, 2003; Denzin, 1970; Easterby-Smith *et al.*, 1991; Saunders *et al.*, 2003; Tashakkori and Teddlie, 1998). Denzin (1970) defines triangulation as "the combination of methodologies in the study

of the same phenomenon” (p. 297). Easterby-Smith *et al.* (1991) identify four types of triangulation:

- (1) *Data triangulation*: the data is collected over different times or from different sources.
- (2) *Methodological triangulation*: both quantitative and qualitative methods of data collection are involved.
- (3) *Triangulation of theories*: theory from different disciplines may be borrowed.
- (4) *Investigator triangulation*: different investigators collect data for the same study and compare the results.

The present study uses three types of triangulation, as shown in Table 6.4.

Table 6.4 Adoption of Triangulation in the Study

Triangulation type	Manifestation
Triangulation of theories	Borrowing the knowledge of multi-disciplines related to management and economy, particularly strategic management into the study regarding LSPs' competitiveness.
Methodological triangulation	Combining qualitative and quantitative approaches with different research methods to investigate LSPs' competitiveness. Four research methods including telephone interviews, e-mail survey, semi-structured face-to-face interviews and large-scale postal questionnaire were used.
Data triangulation	Time of data collection: 2005-2006 Sources: China and the UK

In addition, as “the quantitative-qualitative distinction is applied at various levels: data, design and analysis, interpretation of results, and epistemological paradigm” (Howe, 1988, p. 15), the essence of the combination approach in this study is manifest in the following four respects: logical reasoning, methods of data collection, analytical techniques of research findings, and relationship between researcher and the study. These are defined below.

- (1) **Logical reasoning.** Overall this study applies the knowledge of competitiveness at the firm level and other disciplines to develop a conceptual model of LSPs' competitiveness. The applicability of a general theory on competitiveness used by LSPs from China and the UK will be examined empirically. This is the process of deductive reasoning that works from the more general to the more specific (Babbie,

2001). However, inductive reasoning which works from specific observations to broader generalizations (Babbie, 2001), is also used in the study. For instance, the process of how to obtain conclusions from face-to-face interviews is the best demonstration of this inductive reasoning. The two methods of reasoning - deduction and induction - are therefore interacted in the study.

- (2) **Methods of data collection.** Four methods in qualitative and quantitative attributes will be used in data collection, as presented in Table 6.4. Each method has its strengths and weaknesses in collecting data, as will be discussed later. The combination approach may overcome this disadvantage.
- (3) **Analytical techniques of research findings.** Different analytical techniques will be used for qualitative and quantitative research findings. Subjective judgment will be required in the interpretation of qualitative data, while statistical techniques will be used to analyse quantitative data.
- (4) **Relationship between researcher and the study.** In a 'middle ground', pragmatist study such as this, the researcher can assume different roles in addressing research problems. When using qualitative approach, he/she will interact with the respondents, while the researcher is more detached and independent using quantitative approach.

6.3 Multiple Research Methods

As mentioned in Table 6.4, four research methods were used in this survey. This approach is consistent with an increasing trend in logistics research that the application of a multi-method (i.e. triangulation) is employed more and more (Frankel *et al.*, 2005). Table 6.5 exhibits the four survey methods used and their phase in the research, each to be discussed next.

Table 6.5 Research Methods in Different Phases

Research method	Attribute	Phase	Purpose
Telephone interviews and E-mail survey	Qualitative Quantitative	Phase-1 Pilot work Phase-1 Pilot work	Exploratory
Semi-structured face-to-face interviews	Qualitative	Phase-2 Interviews	Exploratory Explanatory
Large-scale postal questionnaire	Quantitative	Phase-3 Questionnaire	Explanatory

6.3.1 Face-to-face and telephone interviews

The interview is the most fundamental of all qualitative methods (Easterby-Smith *et al.*, 1991). There are different types of interviews. According to the level of formality and structure, interviews are classified as structured interviews, semi-structured interviews and unstructured interviews (Saunders *et al.*, 2003). In-depth interviews are normally referred to in the literature as unstructured interviews (Easterby-Smith *et al.*, 1991; Saunders *et al.*, 2003). Depending on ease of access to the interviewee, interviews can be either face-to-face or by telephone (Saunders *et al.*, 2003).

Interviews are often used in logistics research. Frankel *et al.* (2005) measured the frequency with which interviews were used by examining a total of 108 articles published in the *Journal of Business Logistics* in the period of 1999-2004. Among the seven research methods examined (i.e. surveys, interviews, observation, focus groups, case studies, experiments, literature reviews and content analysis), the utilization of interviews with 26.8% was merely second to surveys (51%). In addition, they found that authors tended to use interviews as the secondary support method to assist surveys (i.e. the primary method) in data collection. In the present study, telephone interviews and semi-structured face-to-face interviews were used.

(1) Telephone interviews

Telephone interviews were utilized in Phase 1: pilot work. Telephone interviews have several advantages, such as good geographical coverage, timeliness and speed, relatively lower cost compared with mail survey and face-to-face survey (Calvert and Pope, 2005; Evans and Mathur, 2005; Walton, 1997). Nevertheless, there are also some disadvantages, such as interviewer bias, limited time causing less in-depth questioning and respondent distraction (Calvert and Pope, 2005; Evans and Mathur, 2005).

The application of telephone interviews in logistics research is relatively recent (Griffis *et al.*, 2003; Walton; 1997). Nevertheless, the use of this survey technique has expanded in recent years and is now considered one of most common methods of data collection (Walton, 1997). By examining articles published in the *Journal of Business Logistics* and *Transportation Journal* in the period of 1984-94, Walton (1997) found that telephone interviews are the most appropriate way to meet the challenge of the Seven Rs of logistics research, in contrast to mail surveys and face-to-face interviews. The Seven Rs refers to “the challenge of contacting the *right* person with the *right*

information at the *right* time in order to ask the right questions using the *right* instrument for the collection of the *right* data at the *right* cost” (p. 221, italics in the original). Seven Rs describes the inherent challenges to conducting empirical logistics research. Van Hoek (2000b, 2001) justifies the use of telephone interviews in exploring supplementary third-part logistics services in the supply chain, since telephone interviews better serve Seven Rs.

In this study, telephone interviews were particularly appropriate for the pilot work where it was desirable to collect company data quickly and efficiently.

(2) Semi-structured face-to-face interviews

Semi-structured face-to-face interviews were adopted in Phase 2: the first stage of the main survey. Differing from the informality of unstructured interviews and predetermined questionnaire used in structured interviews, semi-structured interviews use “a list of themes and questions to be covered, although these may vary from interview to interview” (Saunders *et al.*, 2003, p. 246). Semi-structured interviews can not only help researchers reveal and understand the “what” and the “how” but also usefully explore the “why” (Saunders *et al.*, 2003). As Frankel *et al.* (2005) found, semi-structured interviews can be used to supplement other research methods. Wass and Wells (1994) argue that this mode can explore and explain themes addressed in postal questionnaires and also be a means to validate research findings arising from the questionnaire being used. In addition, semi-structured interviews may play a useful role, especially when the issue involved is “highly confidential and commercially sensitive” and the “interviewee may be reluctant to be truthful about this issue other than confidentially in a one-to-one situation” (Easterby-Smith *et al.*, 1991, p. 76). Nevertheless, the cost spent on semi-structured interviews is relatively higher. Furthermore, there are higher requirements for researchers to have interviewing skills (Easterby-Smith *et al.*, 1991; Saunders *et al.*, 2003).

In logistics research, there has been widespread use of semi-structured interviews coupled with other methods to obtain empirical evidence. For example, Wilding and Juriado (2004) adopt the postal questionnaire and semi-structured interviews together to conduct an empirical study of customer perceptions on logistics outsourcing in the European consumer goods industry. Stefansson (2006) utilizes a multiple-case study to obtain empirical evidence when investigating collaborative logistics management and

the role of LSPs. These case studies were conducted using semi-structured interviews, addressing open-ended questions to one or more interviewees.

6.3.2 E-mail survey

E-mail questionnaires were used in the pilot work. When compared with traditional survey modes such as postal questionnaire and interviews, the e-mail survey is a relatively new means for data collection permitted by advances in information technology and wide application of computer technology. The e-mail survey has been highly appraised by some authors. Schuldt and Totten (1994) see the e-mail survey as the standard data collection method in the 21st century; Schaefer and Dillman (1998) view the e-mail survey as a promising means to conduct surveys.

Numerous studies have discussed the strengths of the e-mail survey. The most significant advantage of the e-mail survey is low cost, wide distribution and rapid response (Couper *et al.*, 1999, Evans and Mathur, 2005, Grant *et al.*, 2005; Oppermann, 1995; Ranchhod and Zhou, 2001, Schuldt and Totten, 1994, Sheehan and McMillan, 1999, Wilson and Laskey, 2003).

In logistics research, using the Internet for collecting data is an increasing trend (Frankel *et al.*, 2005). Griffis *et al.* (2003) compare the e-mail survey and postal questionnaire for their response rate, response speed, nature of data collected and relative cost. Their study reveals that on all of these criteria the e-mail survey was superior to the postal questionnaire. Moreover, there is no difference in the data collected by e-mail survey and postal questionnaire. In addition, Griffis *et al.* (2003) further argue that e-mail surveys operate data in electronic form which facilitates subsequent analysis. Nevertheless, the implementation of the e-mail survey requires web access to be available to respondents.

6.3.3 Large-scale postal questionnaire

A large-scale postal questionnaire survey was conducted in Phase 3, the second stage of the main survey and also the final stage of the whole survey. The questionnaire is one of the most widely used ways and an efficient means in obtaining quantitative data (Easterby-Smith *et al.*, 1991; Remenyi *et al.*, 1998; Saunders *et al.*, 2003). The main aim of a questionnaire survey is to gain evidence that “cannot be observed or that is not already available in written or computerized form” (Remenyi *et al.*, 1998, p. 150). The

results from a questionnaire survey are mainly used for description, explanation or hypothesis testing (Remenyi *et al.*, 1998; Saunders *et al.*, 2003).

The postal or mail questionnaire is the most frequently used type. The merits of this method, i.e. wide coverage at a relatively low cost, avoidance of interviewer bias, generating a large sample and the like, have been widely discussed by many authors (e.g. Cavusgil and Elvey-Kirk, 1998; Gendall and Menelaou, 1996; Greer *et al.*, 2000; Griffis *et al.*, 2003; Evans and Mathur, 2005; Oppenheim, 1992; Remenyi *et al.*, 1998). However, these authors also point out the weaknesses of this method in collecting data, such as high non-response rate, inability to clarify the questions, respondents returning incomplete questionnaires, impersonal and noncommittal approach.

Questionnaires have been extensively used in logistics research. Griffis *et al.* (2003) noted their prevalence in the *Journal of Business Logistics*. They found that 39.6 % of articles and 81.6% of surveys used postal questionnaires. Likewise, by examining the articles appearing in the same journal during 1999-2004, Frankel *et al.* (2005) found that the questionnaire survey was the most frequently adopted method. Another author, Larson (2005), investigates the articles published in the *International Journal of Physical Distribution and Logistics Management* in the period of 1989-2003, and reports an attractive figure: there have been 166,351 questionnaires mailed to logistics professionals for supporting research. He asserts that the mail survey has become extremely popular as a means of data collection.

Based on the Seven Rs of logistics research of Walton (1997), four methods used in the present study are compared in Table 6.6. The e-mail survey has been added. Each “high”, “medium”, “low” rating is awarded three points, two points and one point respectively.

Table 6.6 Comparison of Four Methods Used in the Logistics Research

Characteristics	Postal questionnaire	Telephone interviews	Face-to-face interviews	E-mail survey
Contact the RIGHT person	Medium	High	High	Medium
Reach person with RIGHT information	Medium	High	High	Medium
Reach person at the RIGHT time	Low	High	Medium	High
Ask the RIGHT questions	Medium	High	High	Medium
Use the RIGHT instrument	Low	Medium	High	Low
Collect the RIGHT data	Low	High	High	Low
RIGHT cost	Medium	High	Low	High
Likelihood that unknown bias from refusal will be avoided	Low	High	High	Low
Obtaining a statistically Significant	High	High	Low	High
Success in avoiding item non-response	Low	High	Low	Low
Total Points	16	29	23	19

Source: Adapted from Walton (1997, p. 223)

According to the total point of each method, telephone interviews appear to be better, followed by face-to-face interviews, e-mail survey and postal questionnaire. Nevertheless, four methods all manifest their strengths and weaknesses. This suggests the necessity of combining them in the data collection for this study.

6.4 Three-Phase Cross-Country Survey

Creswell (2003) suggests that four concerns need to be addressed when choosing the combination of quantitative and qualitative approaches to conduct research. The four concerns involve how to implement the process, which approach is a priority, how to integrate data, and whether a larger theoretical perspective should guide the research (e.g. issues regarding gender, race/ethnicity, lifestyle and class). In line with Creswell (2003), the identification of the four concerns in the study is as follows.

(1) Implementation. Both qualitative and quantitative data were collected in three phases sequentially. Specifically, qualitative data collection came first, and quantitative data collection came later, as will be seen in Figure 6.3.

- (2) **Priority.** Priority was given to the quantitative approach which includes the use of quantitative data and analysis.
- (3) **Integration.** Integration involved combining qualitative data from interviews and quantitative data from the questionnaire survey following the sequence outlined in Figure 6.3.
- (4) **Theoretical perspective.** No larger theoretical perspectives relating to gender, race/ethnicity and lifestyle were explicitly adopted in the study.

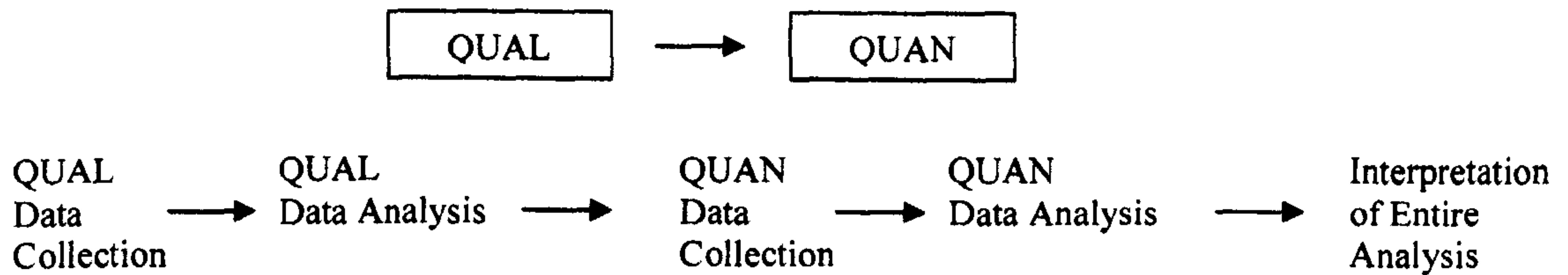


Figure 6.3 Sequential Design

Source: Creswell (2003, p. 213)

Table 6.7 outlines the three-phase cross-country survey. The pilot work in Phase 1 involved an initial survey with telephone interviews and email survey, while Phase 2 and Phase 3, comprising interviews and postal questionnaire, represented the main survey. Accordingly, data collection from Phase 2 and Phase 3 will underlie the analytical core of the whole study. Details of each phase are given below.

Table 6.7 Three-Phase Cross-Country Survey

Phase	Survey technique	Logic reasoning	Purpose
1	Telephone interviews and e-mail survey with 9 China-based LSPs	Inductive	establish a picture of important issues for the next two phases, i.e. main survey
2	Semi-structured face-to-face interviews with 21 China-based LSPs and 2 UK-based LSPs	Inductive	corroborate and verify the evidence arising from Phase 1, pilot work, and explain some contextual phenomena
3	Large-scale postal questionnaire with the UK-based LSPs and China-based LSPs, useable responses with 35 UK companies and 114 Chinese companies	Deductive	Further verify and validate the evidence from Phase 1 and Phase 2

6.4.1 Phase 1: Pilot work with initial survey

Oppenheim (1992) suggests that it is necessary in social surveys to do pilot work to try out the survey instrument. Pilot work is usually referred to a “process of designing and trying out questions and procedures” (Oppenheim, 1992, p. 47). The pilot work for the study took one month during which nine Chinese LSPs were surveyed by telephone interviews and e-mail survey. The purpose, implementation and results of the pilot work are presented as follows.

(1) Purposes of pilot work

The general purpose of pilot work was:

- To investigate and clarify some concepts, dimensions and variables proposed by practitioners but not necessarily discussed in the literature.
- To provide factual evidence for improving, revising and refining the pilot questionnaire.
- To strengthen the research validity and ensure study rigour.

(2) Implementation of pilot work

The implementation of the pilot work involved two survey techniques: telephone interviews and e-mail survey. Exploiting the researcher’s past working experience in China, four senior managers of Chinese LSPs were chosen as interviewees for telephone interviews and the other five companies readily participated in the e-mail survey. Table 6.8 displays relevant information about the companies surveyed.

Table 6.8 Companies in Telephone Interviews and E-mail Survey

Company	Position	Ownership	Type of company	Location of company
A (telephone)	Vice president	SOE	LSP focusing on shipping	Shanghai
B (telephone)	CEO	SOE	spun up by parent manufacturer	Shandong
C (telephone)	Senior manager	JV	Integrated LSP	Hebei
D (telephone)	Senior manager	SOE	LSP focusing on warehousing	Zhejiang
E (e-mail)	Department	SOE	LSP focusing on shipping	Shanghai
F (e-mail)	Vice president	Private	LSP focusing on road transport	Shanghai
G (e-mail)	Vice president	Private	LSP focusing on railway transport	Beijing
H (e-mail)	Operations manager	SOE	LSP focusing on carrier service	Guangzhou
I (e-mail)	Vice president	SOE	LSP focusing on road transport	Hebei

With regard to telephone interviews, semi-structured interviews were employed. A list of themes (as shown in Appendix 1) to be discussed was sent to interviewees by e-mail in advance. The duration of each interview was between 1 and 2 hours. Inquiries with open-ended and closed questions were adopted in interviews. By contrast, the e-mail survey utilized a structured questionnaire, which is contained in Appendix 2. The structured questionnaire used for the e-mail survey was developed based on a cross-disciplinary review of the literature. Attitude measurement using the Likert 5-point scale was adopted for some questions (Likert, 1932).

(3) Results of pilot work

The pilot work revealed a large measure of agreement between the Chinese respondents on key research questions, such as whether capabilities, resources and the business environment all impact on an LSP's competitiveness. This supports the evidence in the literature review. It nevertheless indicates that these companies have differing perceptions on LSPs' competitiveness. Interviewees also expressed enthusiasm for the study. The following excerpts from telephone interviews and messages attached in the e-mail survey illustrates this.

- (a) Competitiveness, oh, it is a very hot topic. Many industries, many companies are investigating and discussing this issue. But I have not heard any studies on our LSPs.
- (b) Competitiveness, it is the thing that our company is thinking everyday.
- (c) Capabilities should be most important. Without people, we have nothing.
- (d) We are sharing the same business environment; the key thing is how to best use our own resources.
- (e) As a state-owned LSP focusing on shipping, we want to know where our competitiveness is distinct from other LSPs? We should have our own characteristics stemming from our state-owned background, our container shipping strength in operating logistics services. Not all LSPs can have these resources.

However, it is a small sample and based on a single country. It was not possible to generalize these initial research findings.

6.4.2 Phase 2: Main survey with interviewing

Semi-structured face-to-face interviews with senior or middle managers were subsequently held in the main survey. The interviewing was divided into two stages: first with 21 interviews in China, then with 2 interviews in the UK. The purposes for

conducting these on-site interviews, the sampling and data collection are discussed below.

(1) Purposes

Phase 2 is essentially pilot work for Phase 3, the main postal questionnaire survey. There were several purposes for undertaking the semi-structured face-to-face interviews.

- First, to corroborate and verify important issues further, some not discussed in the literature or pilot work.
- Second, to explore and explain some contextual phenomena via on-site personal interviews, in particular, issues underlying these phenomena relating to “how” and “why”.
- Third, to provide more substantial evidence for further improving and refining the pilot questionnaire for the main survey.
- Finally, to strengthen the validity of research findings and ensure the study was rigorous.

(2) Interviewing in China

(a) Sampling and data collection

It took three months to undertake all interviews in China and the UK. Convenience sampling was employed as the sampling technique in both China and the UK. A convenience sample is defined by Vogt (1999) as “a sample of subjects selected for a study not because they are representative but because it is convenient to use them” (p. 57). The popularity of the convenience sample is growing since it can provide significant insight and a good source of data for exploratory purposes, for example, “to get different views on the dimensions of a problem, to probe for possible explanations or hypotheses, and to explore constructs for dealing with particular problems and issues” (Ferber, 1977, p. 58). Although this technique is widely used, it is prone to bias since the cases appear in the sample only because of the convenience of acquiring them. Moreover, the subsequent generalizations are likely to be flawed owing to the possible bias involved in the choice of sample. In addition, the sample cannot use statistical testing for the data because it is not random (Saunders *et al.*, 2003).

In China, after liaising with companies by telephone in advance via an intermediary and the researcher, twenty-one companies readily agreed to participate in interviews. These companies were located in Beijing, Tianjin, Shanghai, Jiangsu province, Guangdong

province and Shengzhen. Of these, ten were state-owned enterprises (SOEs); seven were private companies and the remaining four were joint ventures (JVs). Categorized by their business origin, there were eight transportation-based LSPs, four warehouse-based LSPs and nine integrated LSP. In addition, thirteen companies ranked among the Top 100 LSPs in China in 2005 (CCTA, 2005). A total of thirty managers, holding various positions in their individual company, i.e. general president, vice president, assistant general, operation manager, project manager, marketing and client manager respectively, were interviewed. The twenty-one companies interviewed were separate from those surveyed in Phase 1, the pilot work. Table 6.9 and Figure 6.4 display the location of the twenty-one companies and other relevant information.

Table 6.9 Profile of the Interviewed Companies and Interviewees

No.	Type	Location	Ownership	Interviewee(s)	Remark
1	Warehouse-based LSP	Beijing	Private	Vice General President; Manager of Pawn Department	
2	Transportation-based LSP	Beijing	SOE	Secretary of the Part Chairman	Listed in Top 100 in China
3	Warehouse-based LSP	Beijing	SOE	Vice general president; Manager of Market Department	Listed in Top 100 in China
4	Transportation-based LSP	Beijing	JV	Deputy General President of Product Logistics Division; General Manager of Project Logistics Division	Listed in Top 100 in China
5	Integrated LSP	Beijing	Private	General Operation Director	Listed in Top 100 in China
6	Transportation-based LSP	Beijing	SOE	Vice General President; Manager of Operation Department	Listed in Top 100 in China
7	Warehouse-based LSP	Beijing	SOE	Vice General President	Listed in Top 100 in China
8	Integrated LSP	Tianjin	JV	Comprehensive Manager	
9	Transportation-based LSP	Shanghai	SOE	General President; Operational Manager	Listed in Top 100 in China
10	Warehouse-based LSP	Shanghai	SOE	General President; Vice General President	
11	Integrated LSP	Jiangsu	JV	General President	
12	Transportation-based LSP	Shanghai	Private	Operation Manager	Listed in Top 100 in China
13	Integrated LSP	Jiangsu	SOE	Vice General President	
14	Integrated LSP	Guangzhou	Private	Vice General President	Listed in Top 100 in China
15	Transportation-based LSP	Guangzhou	SOE	Assistant General	
16	Transportation-based LSP	Guangzhou	SOE	General President Assistant	Listed in Top 100 in China
17	Integrated LSP	Guangzhou	Private	General President; Manager of Support Department	Listed in Top 100 in China
18	Integrated LSP	Guangzhou	Private	General Market Director	Listed in Top 100 in China
19	Transportation-based LSP	Guangzhou	SOE	General President	Listed in Top 100 in China
20	Integrated LSP	Shengzheng	JV	General President Assistant; Project Manger; Manager of Transportation Department; Manager of Equipment Department	
21	Integrated LSP	Shengzheng	Private	General President	

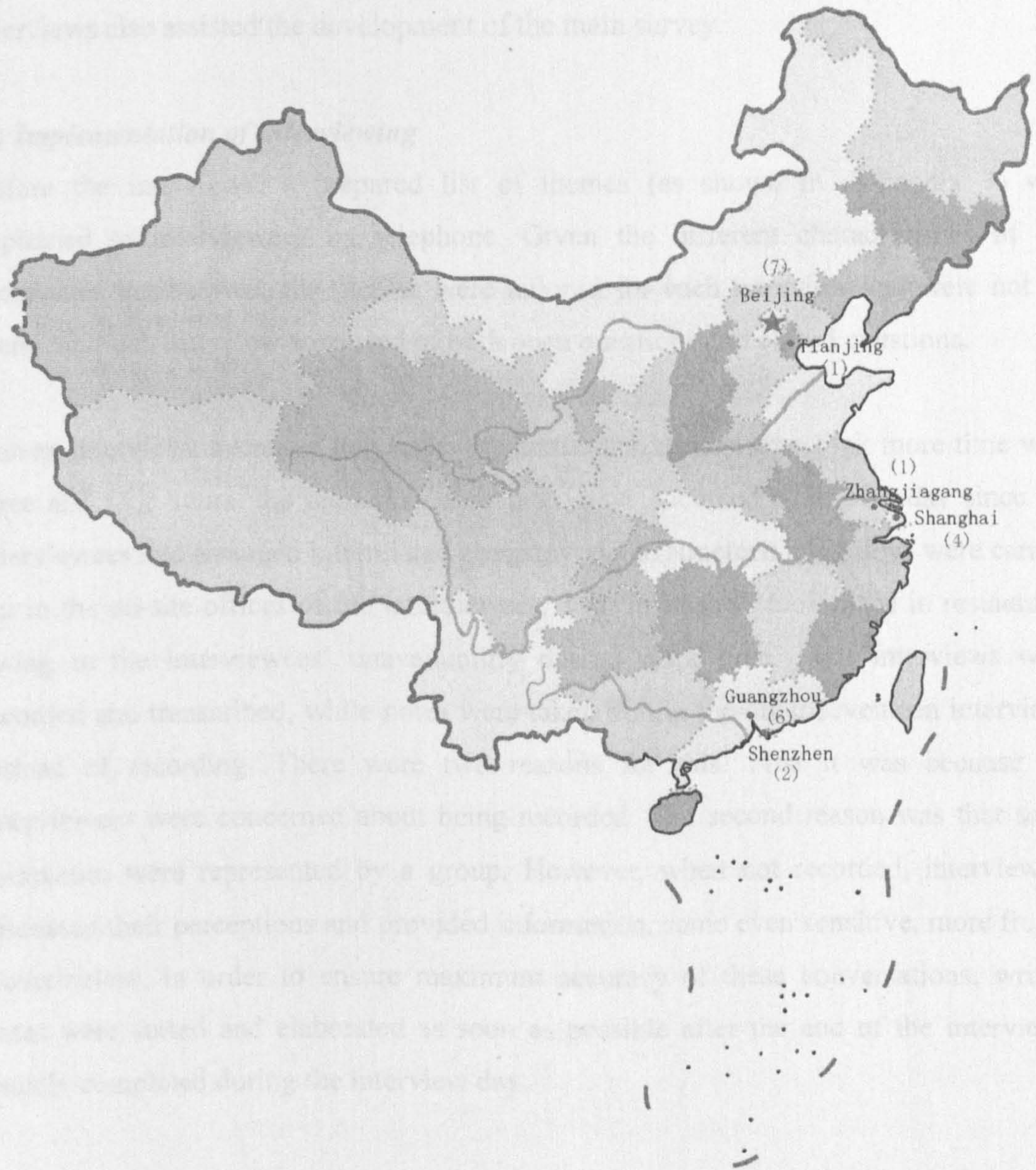


Figure 6.4 Geographical Coverage of 21 Interviewed Companies in China

The current structure of Chinese LSPs has been discussed in Chapter 4. The sample of 21 LSPs can be representative of this structure. Therefore, despite its being a convenience sample, the findings from these interviewed companies could be generalised as a manifestation of the China-based LSPs perspective.

In addition to conducting interviews in the LSPs, the researcher also had the opportunity to interview twelve professionals serving in the logistics departments of companies, the government and consultancies. They were interested in the research and readily

provided useful information to the investigation. These insights gained from these interviews also assisted the development of the main survey.

(b) Implementation of interviewing

Before the interviews, a prepared list of themes (as shown in Appendix 3) was explained to interviewees by telephone. Given the different characteristics of the companies interviewed, the themes were tailored for each interview and were not all identical. Each interview consisted of both open questions and closed questions.

Eleven interviews averaged two hours in duration; six interviews took more time with three and four hours, the remaining four interviews occupied most of a day since the interviewees had arranged interrelated company visits. Nineteen interviews were carried out in the on-site offices of the interviewees. Two interviews took place in restaurants owing to the interviewees' unavailability during work time. Four interviews were recorded and transcribed, while notes were taken during the other seventeen interviews instead of recording. There were two reasons for this. First it was because the interviewees were concerned about being recorded. The second reason was that some companies were represented by a group. However, when not recorded, interviewees discussed their perceptions and provided information, some even sensitive, more freely. Nevertheless, in order to ensure maximum accuracy of these conversations, written notes were sorted and elaborated as soon as possible after the end of the interviews, usually completed during the interview day.

(3) Interviewing in the UK

The convenience sample was also employed in the UK. The number of samples for interviews in the UK is very small, only two. The reason was that it was difficult for the researcher to find participants in the UK. The two companies agreed to participate were contacted by the researcher's supervisor. One was a warehousing-based LSP, while the other one was a transportation-based LSP. The two interviewees were a middle manager and former senior manager of their companies.

Two interviews were conducted at the University. Each interview took about one hour. Similarly, a list of themes (as shown in Appendix 4) was used in interviews. The two interviews were recorded and transcribed.

6.4.3 Phase 3: Main survey with postal questionnaire

A large-scale postal questionnaire survey was carried out in China and the UK in the final phase of the study.

(1) Purposes of the survey

The purposes were:

- ❑ To corroborate research findings and results arising from Phase 1 and Phase 2
- ❑ To survey a much larger sample of companies and thus create a stronger empirical base for generalization
- ❑ To strengthen the overall reliability of research findings

(2) Survey instrument

The pilot questionnaire used in the e-mail survey was considerably modified and refined. All items in the revised and refined questionnaire were grounded in an extensive literature review and survey in Phase 1 and Phase 2. The questionnaire was composed of four sections entitled (1) general issues; (2) strategic planning and objectives; (3) assessing performance and competitiveness; and (4) background information. Questions within the questionnaire were mainly closed questions. An attitude measurement of the Likert 5-point scale was adopted for some questions. The survey instrument was originally designed in English and later translated into Chinese by the researcher (see Appendices 5 and 6). Given the different contexts, there were some small differences between the two versions of questionnaire. For instance, with regard to service quality standards, except for the international ISO 9000/9001 standard, British standards were used for UK-based LSPs, while Chinese standards were used for China-based LSPs. The status of state-owned enterprise in relation to the ownership structure of the company was seen in the Chinese version only. In addition, there were two enquiries (i.e. measures of competitiveness and the impact of marketing on competitiveness) used by different ways in the two versions for tentative discussions given the different cultural contexts. Two versions of the questionnaire were pre-tested within four UK-based LSPs and three China-based LSPs respectively. The aim of the pre-test was to detect possible shortcomings, such as ambiguous wording, inapplicable questions, and also to assess its appropriateness for companies. After pre-testing and further minimal revisions, the final version of the questionnaire was prepared and distributed.

(3) Postal questionnaire in the UK

(a) Sampling and data collection

Three main sources were used to construct the sampling frame in the UK survey.

- *Trade publications.* *Supply Chain Business* and *Logistics Manager* listed leading Logistics Operators. *Supply Chain Business* (June 2004 and June 2005) and *Logistics Manager* (February 2006) contained directories.
- *Referral.* The website <http://www.logisticsnews.com> displaying the list of top 25 UK logistics companies and The Motor Transport U.K. Top 100 logistics companies was used.
- *Internet.* Some websites were consulted for more information to generate samples. The lists exhibited in http://www.transportintelligence.com/assets/files/UK_Logistics_Buyers_Guide_brochure.pdf for UK Logistics Buyers Guide, http://www.triangle.eu.com/conferences/UK_Express/default.asp for UK Express Delivery and <http://www.rfg.org.uk/useful/service/> for rail freight operating companies in the UK were chosen as a sampling frame more.

In total, a list of 150 companies from England, Scotland, Wales, and Northern Ireland was compiled for the UK postal survey.

(b) Survey administration

A self-administered questionnaire was used in the UK postal survey. The questionnaire was mailed to senior and middle managers of the 150 companies. It included the enclosure of a stamped addressed envelope with the questionnaire, a cover letter with assurances of confidentiality and anonymity, and a promise that a report of survey results would be sent to the respondents after completion of the study. Respondents were given three weeks to return the questionnaire.

(c) Response rate

Of the 150 questionnaires sent out, five questionnaires were returned as undeliverable owing to the change of address and the respondents targeted no longer being in business. Thus, the effective sample size was 145. 38 responses in total were received, giving a valid response rate of 26% (38/145). Of the 38 responses, two explained that they were not LSPs; one attached a letter stating they lacked time to fill in the questionnaire. Thus the number of usable responses received from the survey in the UK was 35, which

comprised sixteen transportation-based LSPs, two warehouse-based LSPs and seventeen integrated LSPs. Thus, the effective response rate was 24% (35/145). Figure 6.5 shows the geographical coverage of 35 respondents, where 80% of respondents were in England, 14% in Scotland and the rest in Wales; there was no respondent from Northern Ireland.

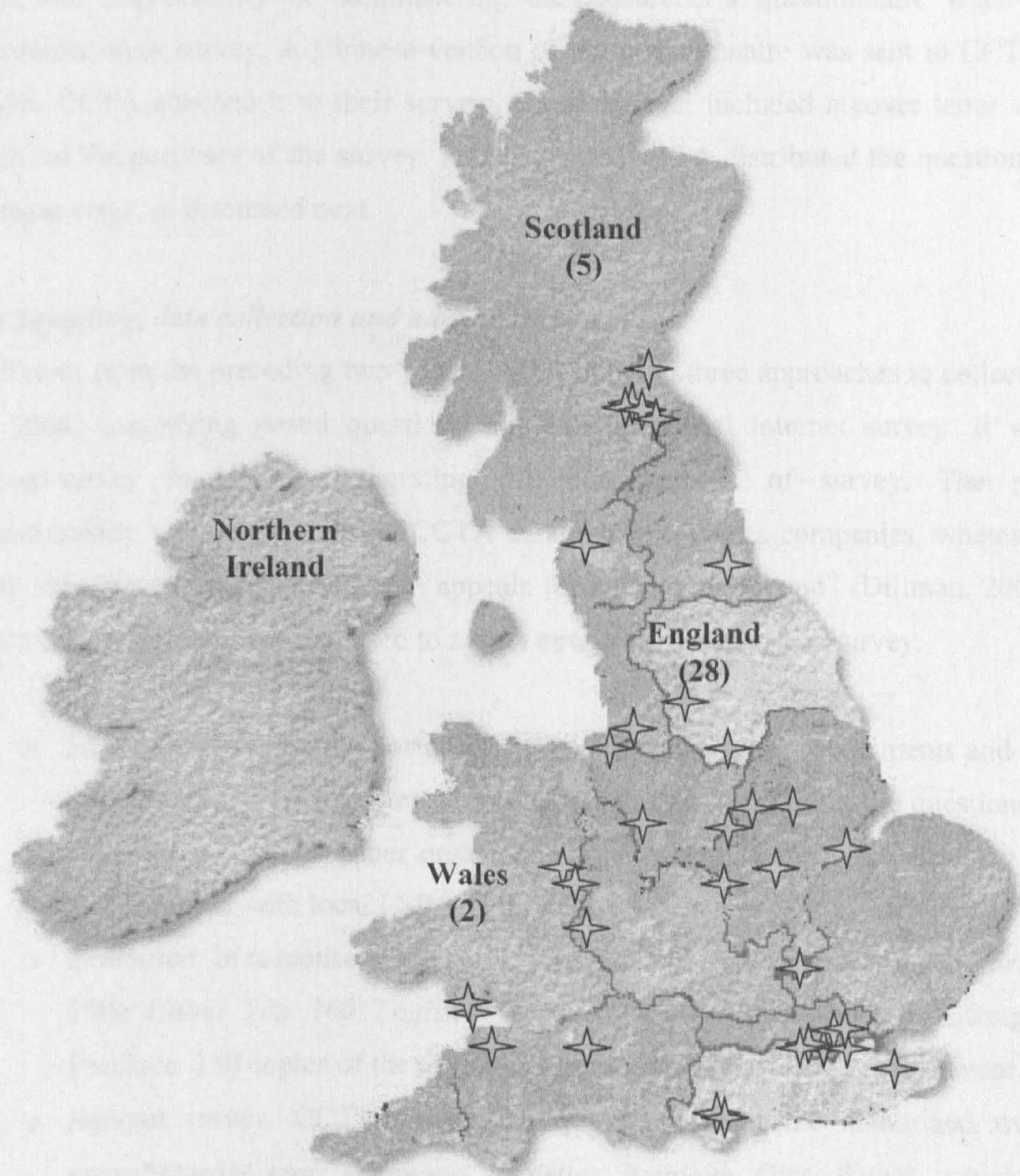


Figure 6.5 Geographical Coverage of 35 Respondents in the UK

(4) Postal questionnaire in China

(a) Background to the postal questionnaire in China

The administration of questionnaire was entrusted to China Communication and Transportation Association (CCTA), the former employer of the researcher.

CCTA is the most authoritative and influential organization in the Chinese logistics and transportation community, which was introduced in Chapter 4. Since 2004, jointly with eight influential associations¹² in China, CCTA has run a survey of the Top 100 China-based LSPs. This survey is held in high regard by Chinese logistics companies. It was the third year for CCTA to run the survey of Top 100 LSPs in 2006. CCTA willingly took the responsibility of administering the researcher's questionnaire when they conducted their survey. A Chinese version of the questionnaire was sent to CCTA by email. CCTA attached it to their survey. The document included a cover letter which outlined the purposes of the survey. Subsequently, CCTA distributed the questionnaire in three ways, as discussed next.

(b) Sampling, data collection and administration

Different from the preceding two years, CCTA adopted three approaches to collect data in 2006, comprising postal questionnaire, exhibition and Internet survey. It was a mixed-survey mode, i.e. integrating different methods of survey. The postal questionnaire was sent out to the CCTA database of logistics companies, whereas the web survey was "being set up with appeals for anyone to respond" (Dillman, 2000, p. 355). The exhibition was also used to attract new participants to the survey.

- *Mail by express.* In the postal questionnaire, some local governments and some branches of CCTA together with CCTA, centrally mailed out the questionnaire. The reason for these other organizations becoming senders was that they were more familiar with local LSPs.
- *Exhibition.* In response to the survey, a press conference named *Senior Forum of 2006 China Top 100 Logistics Service Providers* was held in Guangdong Province. 150 copies of the questionnaire were made available at this event.
- *Internet survey.* CCTA posted the questionnaire at the authorized website www.56top100.com (*Zhonguo Logistics Baiqiang Qiye Wang*), which was exclusively to provide and report information from the survey of Top 100 LSPs.

¹² The eight associations are China International Freight Forwarders Association (CIFA), China Railway Society (CRS), China Association of Shipping Agency (CASA), China Shipowners' Association (CSA), China Ports & Harbors Association (CPHA), China Association of Port-of-Entry (CAOP), China Customs Brokers Association (CCBA), and China Air Transport Association (CATA).

730 questionnaires in total were distributed. Table 6.10 displays the approaches and copies distributed. The survey in China took three and half months to complete owing to the broad coverage and complex procedures used in implementing the survey.

Table 6.10 Approaches and Copies Distributed

Sender for postal questionnaire	Copy	Approach
Organizations entrusted by CCTA	380	Mail by express
CCTA	200	Mail by express
Senior Forum of 2006 China Top 100 LSPs	150	Exhibition
In total	730	

(c) Response rate

114 completed questionnaires were returned, including 111 from express/exhibition and 3 were returned from the Internet. All 114 responses are usable. However, it is difficult to calculate an effective response rate under three completely different survey modes, i.e. postal questionnaire, exhibition and Internet survey. It is also impossible to calculate a meaningful response rate for the online version of the survey. The response rate for mail and exhibition modes may be calculated as 15.2% (111/730). Nevertheless, the most important thing is to consider whether the 114 responses are representative. Discussions with CCTA suggest that this sample is representative. Figure 6.6 shows the geographical coverage of the 114 respondents.



Figure 6.6 Geographical Coverage of 114 Respondents in China

6.5 Preliminary Evaluation for Quantitative Data

As discussed earlier, the quantitative approach including the use of quantitative data and analysis was given priority in this study. The quantitative data obtaining from Phase 3, large-scale questionnaire will be performed by statistical analysis. Prior to the analysis, quantitative data were evaluated preliminarily. These mainly involved two aspects: testing non-response bias and choosing suitable statistical techniques in terms of data attributes and sample sizes.

6.5.1 Test for non-response bias

Babbie (2001) emphasizes that “a demonstrated lack of response bias is far more important than a high response rate” in assuring the accuracy of research results (p. 256). Non-response bias is simply a description of the difference between the answers from respondents and non-respondents (Lambert and Harrington, 1990). Several methods are recommended by Armstrong and Overton (1977) to estimate the non-response bias. This includes comparison with known values for the population, subjective estimates and extrapolation methods. In the study, non-response bias was assessed based on the extrapolation method. This method assumes that respondents who answer later are more like non-respondents. The responses of the early respondents are then compared with the late respondents in terms of surveyed variables. A test of non-response bias was therefore conducted to examine the extent of the potential bias in the results.

In the UK sample, the non-response bias was examined by averagely dividing the 35 responses into two groups, namely early ($n_1 = 18, 51.4\%$) and late ($n_2 = 17, 48.6\%$) respondents. In the Chinese sample, two groups were composed of early ($n_1 = 77, 67.5\%$) and late ($n_2 = 37, 32.5\%$) respondents for 114 responses. The researcher received total return from CCTA twice. The first time was in two months with 77 responses, while the second time was in three and half months with 37 responses. 16 variables were used in assessing the non-response bias for the UK and Chinese samples respectively, as shown in Tables 6.11 and 6.12. Given the non-parametric attribute of the 16 variables, the Mann-Whitney test was used to assess the difference between two groups in both samples. The Mann-Whitney test is the non-parametric equivalent of the independent t -test, which will be further discussed in Chapter 8.

Table 6.11 Non-Response Bias Test for the UK Sample

Variable	Early responses (18) Mean scores	SD	Late responses (17) Mean scores	SD	Mann-Whitney test	
					z	Sig (2-tail)
Resources	3.83	.786	3.94	.659	-.502	.616
Capabilities	4.33	.594	4.35	.931	-.619	.536
Business environment	3.61	.979	3.71	1.213	-.466	.641
Strategic management	3.65	.862	4.12	.781	-1.586	.113
Operations management	4.61	.502	4.41	.795	-.533	.594
Service quality	4.50	.618	4.53	.717	-.342	.732
CRM	4.29	.849	4.00	.707	-1.196	.232
IT	3.94	.873	4.00	1.061	-.347	.728
Service network	3.72	.752	3.65	.786	-.553	.580
BPM	3.41	.712	3.53	.514	-.640	.522
Marketing	2.94	1.056	2.71	.849	-.872	.383
Inventory management	3.22	1.114	3.19	.834	-.350	.726
Innovation	3.78	.943	3.94	.748	-.388	.698
HRM	3.67	.485	3.53	.874	-.554	.580
Cost management	4.33	.686	4.29	.686	-.182	.856
Corporate culture	3.50	.857	4.00	.935	-1.464	.143

Table 6.12 Non-Response Bias Test for the Chinese Sample

Variable	Early responses (77) Mean scores	SD	Late responses (37) Mean scores	SD	Mann-Whitney test	
					z	Sig (2-tail)
Resources	4.49	.774	4.57	.778	-.747	.456
Capabilities	4.66	.684	4.83	.453	-1.204	.229
Business environment	4.10	.912	4.18	.834	-.280	.780
Strategic management	4.56	.734	4.65	.597	-.303	.762
Operations management	4.52	.644	4.71	.519	-1.584	.113
Service quality	4.79	.522	4.89	.315	-.886	.375
CRM	4.47	.739	4.67	.535	-1.277	.202
IT	4.44	.819	4.56	.558	-.216	.829
Service network	4.37	.830	4.47	.609	-.244	.807
BPM	4.29	.749	4.44	.735	-1.093	.274
Marketing	4.25	.768	4.31	.856	-.560	.575
Inventory management	4.01	.841	4.17	.878	-1.095	.274
Innovation	4.44	.698	4.62	.594	-1.300	.194
HRM	4.38	.795	4.67	.535	-1.721	.085
Cost management	4.51	.792	4.58	.806	-.439	.661
Corporate culture	4.14	.884	4.42	.732	-1.488	.137

The test results show that, at the 0.05 level, there were no significant differences between the mean scores of the early and late responses in both samples. This suggests that non-response bias is not a problem in this study.

6.5.2 Statistical techniques

Various statistical techniques were used to analyze these quantitative data. All data analysis was processed by the statistical software package SPSS 14.0 for windows. SPSS means *Statistical Package for the Social Sciences*. It is appropriate for social science research.

In implementing data analysis, two important issues should be addressed. First, the two national samples had different sample sizes. The number of the UK sample was 35, while the Chinese sample was 114. In this case, different statistical techniques had to be adopted. For example, normally, factor analysis requires the sample size of over 100 (Hatcher, 1994; Field, 2005). In terms of this rule, the UK sample with 35 was unsuitable for conducting factor analysis. Secondly, given three kinds of variables, nominal (categorical), ordinal and interval in the survey instrument, multiple and integrated statistical techniques had to be applied. In general, nominal (categorical) data were analyzed using frequency counts and percentages, cross tabulation, Chi-square (χ^2) for independence, Wilcoxon Signed-Rank test, Friedman test, Mann-Whitney test and Spearman correlation analysis. Ordinal and interval data were analyzed using means, standard deviation (SD), *t*-test, and Pearson correlation analysis.

The rationale of statistical techniques used in the study is outlined below. More details will be presented in chapters 8 and 9.

- **Descriptive statistics.** The aim of using descriptive statistics is to summarize and describe samples; e.g. mean, SD and variance are used to summarize the key features of data.
- **Correlation analysis.** This is used to explore the relationship between two or more variables. Owing to the different attributes of variables, different techniques were used, e.g. Pearson correlation analysis for parametric approach and Spearman correlation analysis for nonparametric approach.
- **Regression analysis.** The nature of regression analysis is to predict some variables on the basis of others (Field, 2005; Nunnally and Bernstein, 1994;

Stevens, 2002; Vogt, 1999). Regression analysis is used in the study to explain the variability of dependent variables.

- ***Exploratory factor analysis (EFA)***. EFA may discover what factors lie behind a set of variables through reducing a large number of variables to a small number of factors (Field, 2005; Nunnally and Bernstein, 1994; Stevens, 2002; Vogt, 1999). EFA in this study attempted to identify how many factors are present and the underlying structure of those examined variables.
- ***Factor analysis regression (FAR)***. In order to overcome the problem of high multicollinearity in the Chinese sample, factor analysis regression (Basilevsky, 1981; Scott Jr., 1966) was adopted to further explain a dependent variable, e.g. the capabilities of an LSP, using the selected factors as independent variables by EFA.

6.6 The Credibility of Research Findings

The effect of using multi-methods on a combination of qualitative and quantitative data will ultimately improve the credibility of research findings (Saunders *et al.*, 2003).

Different criteria are employed to judge qualitative or quantitative research, since the two approaches are underpinned by different philosophical stances. From an historical viewpoint, the judgment of a study is originally conducted from quantitative research with a positivist paradigm. The criteria used in the judgment include internal validity, external validity, reliability, generalizability and objectivity (Creswell, 2003; Easterby-Smith, 1991; Denzin and Lincoln, 1994; Tashakkori and Teddlie, 1998). In contrast, qualitative research tends to use trustworthiness, authenticity, misapprehensions, credibility, transferability, dependability and confirmability to assess the study (Denzin and Lincoln, 1994; Lincoln and Guba, 1985). Table 6.13 shows some studies of research methodology, and summarizes their perspectives on these criteria.

Table 6.13 Selected Studies, Perspectives and Terms about Criteria

Study	Perspective	Terms
LeCompte & Goetz (1982)	Parallel qualitative equivalents: compare issues of validity to counterparts in experimental and survey research	Internal validity External validity Reliability Objectivity
Lincoln & Guba (1985)	Alternative terms: pose alternative terms that apply more to naturalistic axioms	Credibility Transferability Dependability Confirmability
Eisner (1991)	Alternative terms: reasonable standards for judging the credibility of qualitative research	Structural corroboration Consensual validation Referential adequacy

Source: adapted from Creswell (1998, p. 200)

Despite a variety of different terminology used in judging either qualitative or quantitative research, it is suggested by some authors that there are equivalents between quantitative and qualitative criteria. According to the criteria proposed by Guba and Lincoln (1989) and Erlandson *et al.* (1993), Halldórsson and Aastrup (2002) describe how qualitative and quantitative criteria parallel each other, for example, credibility parallels to internal validity, transferability parallels to external validity and dependability parallels to reliability. Creswell (1998) also argues that qualitative criteria parallel traditional quantitative approaches to validity. Based on the 'middle ground' stance, Tashakkori and Teddlie (1998) explain that there should be commonalities and similarities in the measurement between qualitative and quantitative research.

The basic principles and objectives of QUAN and QUAL approaches to measurement are quite similar. Perhaps the major difference is the fact that QUAN measurement is usually based on classification of events/attributes into previously established categories, while QUAL measurement is more frequently based on classification into emerging categories or explanations (p. 78, Capitals in the original).

...the two approaches to defining the "quality of inferences" as a result of observations /data are highly similar. As such, a merged framework that includes elements of both approaches is very feasible and within reach (Tashakkori and Teddlie, 1998, p. 93).

Among various criteria, validity and reliability appear to be used in assessing both quantitative and qualitative research. Validity is the extent to which research findings accurately affect what has happened in the real world, while reliability is the extent of the recurrence of research findings, if results could be consistently and repeatedly obtained (Churchill 1979; Collis and Hussey; 2003; Denzin and Lincoln, 1994;

Easterby-Smith *et al.*, 1991; Nunnally and Bernstein, 1994; Tashakkori and Teddlie, 1998). As discussed earlier, the language of validity and reliability is originally from use in quantitative research (Easterby-Smith *et al.*, 1991; Kirk and Miller, 1986). For this reason, there has been some reluctance to use them in qualitative research “because they might imply acceptance of one absolute (positivist) reality” (Easterby-Smith *et al.*, 1991, p. 41). Creswell (1998) suggests using term verification instead of validity, for “verification underscores qualitative research as a distinct approach” (p. 201). But he also proposes employing different frames of “verification (validity)” in qualitative approach. As Easterby-Smith *et al.* (1991, p. 41) explain:

Provided the research is committed to providing a faithful description of others’ understanding and perceptions, then ideas such as validity and reliability can provide a very useful discipline.

Therefore, it should be no surprise that there have been different meanings of the terms ‘validity’ and ‘reliability’ in qualitative and quantitative viewpoints when illustrating the credibility of research (Easterby-Smith *et al.*, 1991), as shown in Table 6.14.

**Table 6.14 Concerns of Validity and Reliability
in Quantitative and Qualitative Approaches**

	Quantitative viewpoint	Qualitative viewpoint
Validity	Does an instrument measure what it is supposed to measure?	Has the researcher gained full access to the knowledge and meanings of respondents?
Reliability	Will the measure yield the same Results on different occasions (assuming no real changing in what is to be measured)?	Will similar observations be made by different researchers on different occasions?

Source: adapted from Easterby-Smith *et al.* (1991)

Validity and reliability are the traditional ways to judge logistics research (Halldórsson and Aastrup, 2002). Dunn *et al.* (1994) claim that a more scientific approach, which includes examining various types of validity and reliability, is needed in empirical research in business logistics, in particular, when latent variables are constituted in building theory. Mentzer and Kahn (1995) point to the necessity of examining and discussing the issues of validity and reliability in order to assure the acceptability of researching findings. Mentzer and Flint (1997) emphasize that “regardless of the particular methodology selected, much of the achievement of rigor is embodied in the concepts addressing the many dimensions of validity” (p. 201). The two studies classify validity as four types: (a) statistical conclusion validity (i.e. whether there is a statistical

relationship between two phenomena); (b) internal validity (i.e. provides evidence of whether the relationship is causal); (c) construct validity (i.e. whether the measures assess what they purport to assess); and (d) external validity (i.e. the degree to which the research findings can be generalized to the broader population) on the basis of a positivist paradigm focusing on quantitative research. Ellram (1996) places emphasis on the quality of research design, and stresses “whether quantitative and qualitative, good research design requires external validity, reliability, construct validity and internal validity” (p. 104). She further discusses the four criteria in the context of case study, a typical qualitative approach. Garver and Mentzer (2000) insist that “testing for validity and reliability is important in any research study” (p. 116). In their qualitative study of exploring buyer-salesperson relationships from the customer’s perspective, they use the framework, which was proposed by Lincoln and Guba (1985) and later extended by Wallendorf and Belk (1989) through testing trustworthiness, to provide validity and reliability of the study. Similarly, Flint and Mentzer (2000) discuss the trustworthiness of the research process and the findings when they explore changes in customers’ desired value and the implications for logisticians. Halldórsson and Aastrup (2002) suggest that logistics research may consider alternative criteria for traditional validity and reliability, such as “truth-value”, “transferability and contextualism”, and “trackability and explicitness”. These could supplement rather than replace traditional criteria. In general, these studies attempt to indicate the importance of validity and reliability to a credible study.

The present study aims to achieve credibility through proving validity and reliability. This can be evidenced by adopting a mixture of quantitative and qualitative approaches, and using multiple methods to investigate an LSP’s competitiveness, as suggested by Saunders *et al.* (2003).

6.7 Summary

This chapter has described the methodology used in the study. The characteristics of this methodology have been detailed.

The core of the methodology used in this study is the combination of quantitative and qualitative approaches, which are grounded in two different philosophical stances: positivist and phenomenological paradigms. It is the approach that many logistics researchers have recently been calling for. The employment of this approach is based on

the characteristics of the study and research problems to be resolved. In general, the present study examines the applicability of general theories on competitiveness used by LSPs from China and the UK. This is the process of deductive reasoning that works from the more general to the more specific. In this case, the quantitative approach is used where appropriate to test the reliability of the results. However, to make the study valid, some specific observations arising from two cultural contexts are used to broaden generalizations. This needs a qualitative approach employing inductive reasoning.

Guided by this methodology, four research methods are used to collect both quantitative and qualitative data. The four methods are used in the different stages of a three-phase survey: telephone interviews and email survey in the piloting work, while semi-structured face-to-face interviews and a large scale questionnaire survey are used in the second and the third phases, which comprise the main survey. Qualitative data are analysed using the method of interpretation, while quantitative data are examined using statistical techniques.

The main survey was conducted in two countries: China and the UK. Given the different cultural settings, sample sizes were achieved differently. In the UK, 2 face-to-face interviews and 35 responses in questionnaire survey were achieved, while in China 21 interviews and 114 responses were achieved. The analysis based on two settings provides a firmer basis for generalizing the findings internationally.

In general, the credibility of the study is achieved by using different methodological approaches which can improve validity and reliability in various ways.

Chapters 7-9 will present the empirical results, starting with the qualitative analysis of the semi-structured face-to-face interviews in the following chapter.

CHAPTER 7 QUALITATIVE ANALYSIS OF FACE-TO-FACE INTERVIEW DATA

7.1 Introduction

This chapter will present the results of face-to-face interviews conducted in China and the UK. While China is currently undergoing the transition to a market economy as well as political reforms, the UK has had a well-established market economy for a long time. In China, the logistics service market is known as an emerging market and LSPs are developing rapidly, whereas the UK's logistics service market is much more mature and its LSPs are among the world leaders. Given the two different settings, this analysis will focus on the impact of the given contexts on the understanding of LSPs' competitiveness.

The interview survey was heavily skewed towards the Chinese market. Managers in a total of twenty-one Chinese LSPs agreed to be interviewed, while only two interviews were achieved in the UK. The results of the interviews will be analyzed with reference to the research propositions outlined in Chapter 5. The propositions relate to primary sources, contributing factors, measures and achievements of LSPs' competitiveness. The intention was to use the interviews to assess the validity of the propositions.

7.2 Perspective of Chinese LSPs

As the world's largest transitional economy, China has been experiencing enormous changes to its economic system, such as governmental administration and enterprise ownership structures, since the current economic reform began in 1978. Nevertheless, this transition is still on-going and has not yet been completed, as addressed by the Fifteenth Central Committee of the Communist Party of China in November 2002 and the 5th Plenary Session of the 10th National People's Congress in March 2007. This incomplete transition may be seen from two sides. On the one hand, the former centrally planned economy representing the old economic system has been weakened and dismantled through removing many barriers which constrain business operations. More and more foreign investments and companies have now entered China to seize opportunities in a rapidly growing market. Market orientation and competition orientation are increasing with the influx of foreign entrants. Moreover, China's accession to the WTO further speeds up this change. On the other hand, parts of the old

economic system remain in place and impede the operations of industries and companies.

Against this background, the current state of the logistics service market has exhibited some new trends, which have been described in Chapter 4. Generally, on the user side, as a result of intensified competition after China's entry into the WTO, more and more companies are focusing on their core resources and capabilities, and are outsourcing their logistics functions previously performed in-house. On the LSPs side, different types of LSPs are emerging which are interdependent, mutually promotive and competitive. Some LSPs want to build a strategic partner relationship with foreign LSPs in order to exploit their native advantages in China, such as network, equipment and low labour cost. Some small and middle sized LSPs are being absorbed by those large LSPs. In addition, many LSPs are restructuring their organizations and businesses, expanding their service portfolio and geographical coverage (CCTA, 2003). The interviews reveal the understanding of twenty-one interviewed companies regarding LSPs' competitiveness within this turbulent business environment in which they are operating.

7.2.1 Profile of interviewed companies

The general information of the twenty-one interviewed companies, such as business origin and location, has been presented in Chapter 6 (see Table 6.8). Table 7.1 presents more details of these companies, i.e. age of business and sectors served.

Table 7.1 Relative Information of 21 Interviewed Companies

Company No.	Type ^a	Year established	Ownership	Main served sectors
A	T	1998	SOE	chemical, paper and paper products, automotive parts, industrial machinery and equipment, household appliances
B	W	1998	SOE	logistics services pertaining to warehousing and distribution of containers
C	T	2002	JV	logistics services pertaining to transportation, warehousing, distribution of containers
D	T	1995	Private	clothing, FMCG, industrial machinery and equipment, electronic products, household appliances, retail
E	I	2003	SOE	integrated logistics service in free tax zone
F	W	2001	Private	warehousing and distribution, long-distance transportation, warehouse receipts pledging
G	I	1992	Private	household appliances, industrial machinery, electronic products, computer/telecoms, FMCG, chemical
H	T	1997	SOE	logistics services penitent to transportation, warehousing, distribution of containers
I	T	1993	SOE	parcels, home delivery by railway network
J	I	2000	Private	household appliances, construction materials, FMCG
K	T	1999	SOE	express services pertaining to parcels, home delivery by postal network
L	I	1997	Private	FMCG
M	I	2000	JV	integrated logistics services from ports to plants
N	I	1999	Private	wood, paper, stone
O	T	2001	SOE	door-to-door service by international containers and railway containers, supply chain service, product service
P	I	1999	JV	integrated logistics service in free tax zone
Q	W	1999	SOE	foodstuff, household appliances, FMCG
R	I	2002	JV	industrial machinery and equipment, automotive parts, electronic products, computers and telecommunications
S	I	2000	Private	supply chain service, pharmaceutical, FMCG, warehouse receipts pledging
T	T	1993	SOE	parcels, home delivery by railway network
U	W	1962	SOE	warehousing, warehouse receipts pledging

Note: a: T: transportation –based LSPs; W: warehousing-based LSPs; I: integrated LSPs

On the basis of Table 6.8 and Table 7.1, the profile of the twenty-one companies interviewed is displayed in Table 7.2.

Table 7.2 Profile of 21 Interviewed Companies

Profile	No.	Percentage (%)
<i>Ownership</i>		
SOE	10	47.6
Private company	7	33.3
JV	4	19.1
<i>Types by business origin</i>		
Transportation-based LSPs	8	38.1
Warehouse-based LSPs	4	19.0
Integrated LSPs	9	42.9
<i>Types by established mode</i>		
Traditionally transformed	8	8.1
New generation	12	57.1
Spun off	1	4.8
<i>Ages of business</i>		
0-5	5	23.8
5-10	11	52.4
10-20	4	19.1
Above 20	1	4.7
<i>Sectors served</i>	Various customers from industries and the end consumers	
<i>Whether ranked among the Top 100 in 2005</i>		
Ranked among the Top 100	13	61.9
Not ranked among the Top 100	8	38.1

Table 7.2 shows the diversity of interviewed companies reflected by ownership, types either by business origin or by established mode, age of business, various customers and whether ranked among the Top 100 LSPs in China. As discussed in Chapter 6, despite being a convenience sample, the sample of these twenty-one companies is representative of the current structure of Chinese LSPs. Therefore, the results can be generalized.

7.2.2 Primary sources of an LSP's competitiveness

Previous chapters have explained that there have been two competing perspectives in strategic management on the primary sources of a company's competitiveness. The RBV proposes that resources/capabilities are primary sources, while Porter's theory considers that activities/environment, especially environment, is the primary source.

Of the twenty-one companies interviewed, eighteen companies emphasized the significance of capabilities to an LSP's competitiveness; two companies selected resources, while the remaining company stressed the business environment. These results are presented in Table 7.3.

Table 7.3 Primary Sources Viewed by 21 Interviewed Companies

	Capabilities	Resources	Business environment
SOEs	9	1	0
Private companies	6	1	0
JV	3	0	1
Total	18	2	1
Percentage	85.7%	9.6%	4.8%

The two companies saw resources as the primary source; however, they also emphasized the necessity of capabilities. The two companies, i.e. one an SOE and the other a private company, have been in the business for less than five years. That SOE still relies on help from its local government to perform its business. The problem this company faced was the lack of a customer base. Another private company explained that the company has had enough capabilities to serve customers, but inadequate assets, in particular, intangible assets. The intangible assets were referred to as being mainly the relationship between the company and the authorities administering its business. The JV, which noted the business environment as the primary source, was established by a Chinese company and a Japanese company in the late 1990s. This company was more concerned with the changes of the policies for the JVs' businesses and operations.

(1) Business environment

The business environment in which Chinese LSPs operate is continuously shaped by many factors. The companies interviewed perceived the key factors facing them as being derived mostly from the impact of the government, China's accession to the WTO and the uncertainty of customer demand.

(a) Impact of government

During the interviews, almost all the companies referred to the role of the government in promoting logistical development and creating a more liberalized, market-oriented and open-competition business environment for LSPs. This role, as viewed by them, has brought substantial benefits to their business operations. Primarily, the benefits they

have enjoyed include infrastructural investment, the financial aid and other governmental policies.

Infrastructural investment

The interviews confirm CCTA's (2002) view that the Chinese government has invested increasingly in the public infrastructure which LSPs employ. These infrastructures included transportation, communication networks and storage facilities. Table 7.4 displays the amount of these infrastructural investments from 2003 to 2005, published by the National Bureau of Statistics of China.

Table 7.4 Investment in Fixed Assets by Industry from 2003-2005

	Unit: 100 million yuan		
Transport, Storage and Post	2003	2004	2005
Rail Transport		846.3	1267.7
Road transport		4665.5	5581.4
Urban Public Transport		391.3	531.1
Water Transport		534.6	779.3
Air Transport		272.4	302.4
Transport via Pipelines		107.0	79.6
Loading, unloading and other transport services		58.6	43.5
Storage		186.9	258.5
Post		28.8	16.9
In total	5669.0 ^a	7091.5	8860.4

Notes: a: Some items have been adjusted since 2005 in China Statistical Yearbook. 5669.0 used is the figure presented after adjustment. For this reason, figures of sub-items do not display because of adjustment.

Source: China Statistical Yearbook (2004, 2005, 2006)

The Chinese government has continuously expanded its investment in the fixed assets involving transport, storage and postal sectors; the increase is about 20% annually from 2003 to 2005. Many of the companies interviewed emphasized that the capacity of the public infrastructure they used has been dramatically increased. Moreover, the quality of the public infrastructure, as they perceived, is improving.

Financial aid

The interviews reveal that companies can obtain subsidies or financial aid from the government to develop their businesses. Not only SOEs but also private companies and JVs can all gain subsidies as long as their projects are approved. Apparently, it is different from the former centrally planned economy in which financial aid was given to SOEs only for promoting the development of the state-owned economy. Table 7.5 gives an example of governmental subsidies provided for the projects. It relates to the amount of governmental subsidies for the construction of road transport junctions and logistics

centres in a province in north China in 2006. Owing to the confidentiality required by the informant, the name of the province and its city cannot be revealed.

Table 7.5 Subsidies Provided on the Projects in One Province in 2006

Supervisor	Operator and ownership	Characteristics	Governmental Investment on total amount(%)	Construction periods
City A transportation bureau	transportation-based LSPs SOE	road transport junction	19.7	2005-2006
City B transportation bureau	transportation-based LSPs SOE	logistics centres	32.8	2005-2007
City C transportation bureau	Integrated LSPs, private company	logistics centres	17.2	2005-2006
City D transportation bureau	transportation-based LSPs private company	logistics centres	46.9	2005-2007
City E transportation bureau	transportation-based LSPs SOE	logistics centres	10.2	2005-2007

This information has been confirmed by some interviewed companies who have enjoyed state subsidies. Of these companies, private companies and JVs were satisfied with this reform, since they could enjoy the same privileges as SOEs. SOEs acknowledged that this was one of the substantial changes made under the socialist market economy although they were not now being given priority. However, they believed that they retained advantages in obtaining subsidies on the basis of their long-term well-established reputation. For instance, all companies in China today are encouraged by the government to borrow money from banks for developing their business. In some cases, SOEs can borrow money more easily as a result of their established reputation.

Other government policies

The interviews reveal that the policies promulgated by the government over the past few years involved many areas, such as administration, customs and taxation in relation to LSPs' business operations. For example, the document entitled "Opinions on Prompting Modern Logistics Industry in China", announced by nine ministries in August 2004 (see Table 4.1 in Chapter 4), was regarded as one of the most important initiatives. This document was composed of four parts. The first part, concerned with creating a business environment in favour of LSPs, included the adjustment of administration for registration, the improvement of tax management for LSPs and the rectification of

market economic order. The second part highlighted the effective means of facilitating the operations of LSPs. These means comprised: (1) encouraging and supporting manufacturing and commercial organizations to outsource their logistics activities in-house; (2) expanding financial channels; (3) accelerating the consolidation of logistics assets and the construction of logistics centres; (4) simplifying customs procedures; and (5) optimizing the vehicle management in urban delivery. The third part emphasized the fundamental need to support and sustain the development of LSPs. This involved: the standardization of logistical technology; disseminating advanced vehicles and equipment dedicated to logistics; enhancing IT and improving the skills of logistics professionals. The final part was concerned with the establishment of a coordinated system linking the thirteen ministries supervising LSPs and two associations (i.e. CCTA and CFLP).

These policies were regarded by the companies interviewed as having a profound influence on their business operations. For example, the document entitled “The Taxation Policy on Trial Logistics Enterprises” announced by SAT and NDRC in January 2006, was seen as addressing a major problem facing LSPs. This problem was caused by the imposition of a levy on LSPs. In China, the imposition of a levy is provided in terms of industrial categories. However, in the case of no category being set for LSPs, it is hard for the taxation sector to impose a tax upon LSPs (CCTA, 2002). According to this document, thirty seven logistics companies have become members of the first group to enjoy the new taxation policy and thus avoid this problem. In addition, interviewed SOEs and private companies also noted unfairness in the taxation of Chinese companies and their foreign counterparts. This has resulted from the current dual income-tax structures. Under the structures, Chinese companies pay income tax at a nominal rate of 33 percent, while their foreign counterparts, which benefit from tax waivers and incentives, pay an average of 15 percent only. Apparently, this tax policy offers advantages to foreign-invested enterprises (FIEs) and is considered unfair to domestic businesses. It has been openly criticized as it has in fact handicapped Chinese companies who have been facing tougher competition, in particular, when China joined the WTO in 2001 (CCTA, 2002). As with many other Chinese companies, these interviewed SOEs and private companies called for the removal of these tax privileges for foreign businesses and expected to compete with their foreign counterparts on an equal footing. This discrimination will be phased out and replaced with a new tax system in January 2008. According to the new tax system, FIEs will be levied with a 25

percent income tax rate similar to that of Chinese companies. In addition, other preferential terms on tax enjoyed by FIEs will be eliminated.

Although the interviews confirm the contribution of the Chinese government in supporting LSPs, some policies have had a negative effect on LSPs' business operations. For instance, an LSP undertaking a diverse range of activities may need authorization from several government ministries. The LSP must obtain permission from various ministries by applying for certificates for its business qualification in these functions. This finding is consistent with the investigation conducted by CCTA (2001, 2002) which found various certificates are required in business which involve different ministries and have in fact hindered LSPs' business operations. The additional bureaucracy is an impediment.

In addition, local protectionism was considered by many of the companies interviewed to be an important issue. Under local protectionism, as these companies claimed, an LSP may seek protection from the local government for its business; however, it cannot be protected in other regions. This causes geographical distortion of the market for LSP services. This finding confirms the conclusion of CCTA (2001, 2002) regarding the harmfulness of local protectionism to logistics activities. Of these companies, some transportation-based LSPs and newly established companies felt it worse. Transportation-based LSPs needed to trade on a fair basis across regions, while newcomers attempted to increase their presence and were keen to build and expand their service network geographically. In contrast, some other traditional companies interviewed perceived this issue slightly better since they have built their network over a long period under the former centrally planned economy. The purpose of their networks, however, was to support the central plan rather than provide customer-oriented services. Nevertheless, these assets have become a competitive advantage for them in implementing logistics activities.

Generally, the results indicate that the influence of the Chinese government has permeated into LSPs' businesses and in turn shaped their operations. This finding corroborates Porter's (1991) view that government may play an important part in shaping the pressures, incentives and capabilities of companies. To a large extent, this not only mirrors the incomplete development in China's market economy, but also reflects the nascent development of Chinese logistics.

(b) China's accession to the WTO

The interviews reveal that managers were proud of China's entry into the WTO inasmuch as the Chinese economy will become an important part of the global economy. Many business rules which have been previously applied in international business in other parts of the world will now be applied in China. To some extent, this can drive the marketization progress in China since many restrictions on Chinese and foreign enterprises have been gradually removed.

Generally speaking, the interviews show the impact of China's WTO entry as having two principal effects: pressures and opportunities. The pressures were perceived to derive from the change of competitive conditions. With the relaxation of regulations on foreign enterprises entering China's market and the reduction of protection for Chinese companies, the logistics service market will become more liberalized. By 2007, foreign operators will have their presence in a variety of areas where only Chinese companies used to be before (see Table 4.2 in Chapter 4). While Chinese LSPs have advantages in their service networks and degree of cultural adaptation, foreign operators may outperform them by means of their advanced management, operation and services, as perceived by the interviewed companies (Table 7.6).

Table 7.6 Comparison of Advantages between Chinese and Foreign LSPs by Interviews

Items	Chinese LSPs	Comparison of advantage	Foreign players
Management		<	
Service		<	
Operation		<	
Service network		>	
Technology		<	
Cultural adaptation to local customers		>	
Cultural adaptation to foreign customers		<	
The amount of customers		>	
Price		>	

TNT's recent acquisition of a Chinese LSP illustrates the foreign penetration of the Chinese logistics market. The acquired company was a private LSP, and was one of the companies interviewed. With regard to this acquisition, as commented by CEO of TNT, Peter Bakker stated:

It is a milestone to TNT. This acquisition will give us a huge road network and help us to forge a world-class delivery network in China (Heilongjiang Daily, 15-03-2007).

Correspondingly, the CEO of the acquired LSP explained:

Over the past ten years, the company has made great progress. However, there has been a big gap on capital, technology, business philosophy, equipment and international network between the company and its foreign rivals. This is exactly the advantage of TNT. Mergers/acquisitions activities launched by foreign-invested transportation and logistics companies will soon enter the stage of a high speed development in China. The question is whether we can employ the acquisitions and its effects to enhance the management and service capabilities of native transportation and logistics companies. It is the choice that we must face. The company expected to improve its space through this acquisition (Heilongjiang Daily, 15-03-2007).

The Chinese LSPs interviewed also identified three opportunities arising from the WTO's entry. First, membership of the WTO promotes the adoption of international standards. As these are generally higher than those currently achieved in the Chinese LSP market, it will represent an upgrading of service quality. Second, by cooperating with foreign LSPs in joint ventures, good business practice will be transferred. Third, some Chinese LSPs have the ambition to expand their operations internationally either through joint ventures or organically.

(c) Uncertain customer need

The interviews reveal that companies are facing uncertain consumer demand for logistics. The high level of demand uncertainty in China is largely owing to the economy being in a transitional stage and in a dynamic environment (Gao *et al.*, 2007; Zhou *et al.*, 2002). Demand uncertainty refers to the instability of customer preferences and expectations and can be attributed to limited consumption experience and knowledge and external factors, such as governmental regulations to protect consumer interests (Chan and Cui, 2004; Zhou *et al.*, 2002). In China, companies also have limited experience in purchasing logistics services. In some regions, logistics is still new to people. In addition, because of the ingrained habits of the former centrally planned economy, the ideology of service and consumption has not yet been well formed.

Chinese logistics companies indicated that customer demand for their services was changing in many ways:

- (1) The cycle time over which customers changed their needs was shortening.
- (2) The range of customer needs was becoming more extensive, e.g. retailers changing their product assortments.

- (3) Customer requirements were becoming more sophisticated, e.g. irregular cargoes loaded and more delicate items with high value added.
- (4) Customer expectations were rising for lower price and higher quality services.
- (5) Some customers had no clear preferences of services; e.g. some customers requested LSPs to advise them on service options.
- (6) Customers coming from different regions had different preferences and expectations, e.g. variations between urban and rural inhabitants, or the east coastal provinces and the west areas.
- (7) Customers coming from different industries often had different expectations and levels of professional knowledge, e.g. customers from automotive and household appliances were more demanding.

Overall, these changes in the nature of demand for logistics services were increasing complexity. There was also evidence of a widening gap between the service capabilities of LSPs and customer needs in China.

(2) Resources

Resources were recognized by the companies interviewed as tangible and intangible assets. Tangible assets included vehicles, warehouses, facilities, service network and the like. In contrast, intangible assets were patents, brand names, reputation and business relationships. Relationships with external organizations were regarded by companies as an important resource. These organizations included governmental ministries which supervised LSPs' business, and industrial associations set up to represent and support them, such as CCTA. The interviews indicated that the tangible assets of companies came from different sources. Table 7.7 displays the sources of tangible assets by ownership and established mode.

Table 7.7 Sources of Tangible Assets of 21 Interviewed Companies

Company	Tangible assets
<i>Ownership</i>	
SOEs	buy, rent or inherit from the government, parent companies
Private companies	buy, rent or inherit from parent companies
JVs	buy, rent
<i>Type by established mode</i>	
Traditional companies	good inheritance from the government
Successors	normally there is no inheritance
Spun off	relative inheritance from parent companies

The tangible assets came from three sources: buying new assets, renting public assets and inheriting former assets. The former two sources were quite common, while the latter one applied to those LSPs growing out of traditional transportation/warehousing companies or spun off from parent manufacturers. Largely, these traditional companies were SOEs. They were formerly owned by the government under the former centrally planned economy. Inherited assets have become the 'backbone' of these companies. In the case of one LSP spun off by its parent manufacturer, the CEO explained that it was allowed to use its parent manufacturer's product and marketing networks to develop its logistics service network. The CEO noted that these product and marketing networks had quite a long history and covered a wide geographical area in China. Leveraging this strength, the company had managed to expand its service network rapidly.

Given the long history of the state-owned economy in China, SOEs have had influential brands and reputation and enjoyed good relationship with external organizations. However, this situation has been changing. In the newly growing logistics service market, the dominance of SOEs has gradually decreased, while those other types of ownership, private companies, JVs and wholly owned foreign players have become accepted by customers as a result of their growing presence and strength in China. This change also reflects the fact that Chinese businesses are changing their traditional attitudes to former SOEs under the new economic system. During the interviews, according to the observation of the influence by brand, patents and relationship with external organizations, it appears that there is not much difference in these intangible assets between different ownerships of LSPs. For example, three types of ownerships, i.e. SOEs, private companies and JVs, showed their influential brands in China and owned different patents also.

(3) Capabilities

All the companies interviewed attached great importance to their capabilities. Capabilities were simply described by companies as skills outperforming competitors. The interviews indicate that capabilities were involved in a range of areas, such as management, service, operation, strategy, innovation and adaptability to the business environment. Moreover, companies stressed that resources, including tangible and intangible assets, could not create competitiveness by themselves. They had to be accompanied by capabilities. In addition, companies indicated that there was a gap in capabilities between Chinese LSPs and their foreign counterparts. The gap was possibly

the result of: (a) underdeveloped market system; (b) poor knowledge of logistics; (c) inadequate IT; and (d) lack of qualified professionals.

7.2.3 Contributing factors

The interviews contained questions about the most important factors contributing to an LSP's competitiveness. The interviews reveal that the factors identified by companies are related to diversified capabilities rather than resources. Each factor is pointed to one individual capability. Among the factors awarded by managers, six individual capabilities received relatively more attention. They were IT (42.9%), human resources (38.0%), service network (33.3%), service quality (28.6%), innovation (28.6%) and strategic management (19.0%) (see Appendix 8). Others, such as operations management, CRM, cost management, marketing, inventory management, culture and others, were also put forward.

The findings not only corroborate the RBV and OECD (1992), but also substantiate many of the other studies concerning LSPs' success (e.g. Harding, 1998; Sum and Teo, 1999; Lewis and Talalayevsky, 2000; Gibson and Cook, 2001; Gunasekaran and Ngai, 2003; Pannayides and So, 2005). In addition, many interviewees emphasized that different contributing factors, acting together, impacted on the success of LSPs. This confirms the views of Leahy *et al.* (1995), Leib and Kendrick (2003) and Gunasekaran and Ngai (2004), that an LSP's success is the combined result of a series of factors rather than a single one. Some factors were also considered to be more important than others in influencing a company's competitiveness. The following section will highlight these factors.

(1) Strategic management

In general, the companies interviewed differed in their strategic focus. Many had targeted specific niches as their core business to maximize their profits. Of them, one SOE had specialized railway container transportation. Two companies provided services from ports to plants. One company inherited the former postal network from the government and could offer home delivery by means of this postal channel. One company distributed appliances to the customers whose revenues exceeded 500 million yuan (around \$68 million). One leading player was proud of its service portfolio on the engineering sector. These diversified strategic positions suggest that there is already a significant degree of segmentation in the Chinese logistics service market despite it

being an emerging market. This finding supports the conclusion of Berglund *et al.* (1999) concerning the strategic segmentation of the LSP industry.

Apart from strategic positioning, many companies also described their strategic visions. Regional operators wanted to extend their geographical coverage, while some national operators expected to expand their service coverage further into other countries. The principle underlying this strategic expansion outside China, as interpreted by the CEO of one leading operator, was “Change Market by Market, Change Cooperation by Market”, meaning that Chinese LSPs should adopt a similar strategy of market penetration as foreign players entering China.

The results suggest that strategic management has received much attention from the companies interviewed, even among SOEs who were behaving as business entities independent of the government. As one CEO of an SOE explained:

Strategic management is the necessity of company business in market economy. Short-termism had a negative effect in the former centrally planned economy and discouraged strategic management in companies. Indeed, companies themselves did not need strategic management since the government determined their behaviour.

(2) Operations management

Operations were considered important by the companies interviewed in implementing strategic planning and converting inputs to outputs for value creation. This finding is consistent with the view of Yeung *et al.* (2006) concerning the importance of operational priorities in LSPs’ strategic positioning and financial performance. The interviewees also claimed to be improving their operations in the face of foreign competition. Improvements in operations management were focused on speed, inflexibility, standardization, efficiency and effectiveness in response to the needs of customers and their cooperative partners. Moreover, some companies noted that operations had to be more specified and specialized. In addition, to obtain maximized output from operations, many companies were doing more to control the quality of operations. A few companies also employed benchmarking to upgrade their operational procedures.

However, some companies reported that it was difficult to maintain operational standards when working with partner companies. This was because of the variability of

standards within the Chinese logistics market, as noted in previous surveys (CCTA, 2001, 2002 and 2005). As remarked by one interviewee, companies could do their best within their internal operations management, but could not control the operations of their external partners. As a result, choosing qualified partners has become a key issue in companies' operations management, particularly when LSPs are operating in complex supply chains.

(3) Service quality

Service quality was considered to be the main contributor to companies' success by all the companies interviewed. This is in line with much of the literature (e.g. Harding, 1998; Mentzer *et al.*, 1999). Different approaches have been adopted by companies to achieve service quality assurance. Accreditation with ISO9000/9001, the international quality certificate, was preferred by most companies. Some interviewed companies also obtained national accreditation, e.g. GB. Some companies applied standards specific to particular sectors, such as container shipping. A few companies developed their own service quality system. For instance, in order to satisfy customers, one leading Chinese operator interviewed developed a service quality system named *Testing Customer Satisfaction System (TCSS)*. The system has been implemented within the company and its subsidiaries as well. According to a company manager, developing *TCSS* was not the ultimate aim. Instead, building service brand and enhancing service quality will be its perpetual pursuit.

(4) Customer relationship management (CRM)

CRM appears to have become an indispensable part of the business of many LSPs. To cultivate good relationships with customers, companies adopted many CRM approaches, such as frequent reviews, and formal or informal meetings with customers. Many companies interviewed classified customers into different categories, each with a different service package. For instance, one private LSP classified its customers into two categories: ordinary customers with generic logistics demands and VIP customers with high-quality logistics expectations. Ordinary customers accounted for 80 percent of the company's business and were charged normal rates. The other 20 percent of VIP customers paid premium rates. The business philosophy of the company was that ordinary customers have a "business contract", whereas VIP customers were regarded as strategic partners within the supply chain. As a professional LSP, it should be able to provide VIP services for VIP demands. The company provided a client manager for

each VIP customer who inspected and evaluated its operations. When problems arose, the client manager helped the VIP customer resolve them in time.

(5) Information technology (IT)

The interviews reveal that IT has played a key role in the development of LSPs. This confirms the finding of Lai *et al.* (2006) that IT could significantly influence Chinese LSPs' competitive advantage. In order to monitor and meet the requirements of customers, many interviewed companies have built IT systems which interface with those of their customers. The methods of building IT systems were varied. Most companies employed outside IT professionals to design them. Several jointly developed their IT systems, while a few companies had sufficient competence to internalize their IT development. Overall, Chinese LSPs were willing to invest heavily in IT.

(6) Service network

Great emphasis was placed on the extent of an LSP's network. In a country as large and varied as China, geographical coverage was a key competitive differentiator. The results reveal that service network was often defined broadly to include the systems of subsidiaries and affiliated companies. It is consistent with the description by Gunasekaran and Ngai (2003, 2004) of service network in China. The service network was referred to not only as a resource but also as a capability. According to the companies interviewed, tangible assets, such as vehicles, warehouses and equipments, were only one component of a service network. In particular, with the emergence of more and more LSPs adapting an asset-light business model, tangible assets were becoming a less appropriate way of defining a service network. By contrast, the capacity to build, manage and expand the service network was considered as more important. To some extent, this finding supports the argument of Pandza *et al.* (2003) that network can be viewed as either resources or capabilities from different perspectives. There were three ways to build and expand a service network for the companies interviewed.

(1) *Inheritance.* This applied to nine companies (42.9%); they inherited from: (a) the former network built in the centrally planned economy for implementing the government's plan, and (b) parent companies.

(2) *New development.* Ten newly established companies (47.6%) have built their service networks from scratch.

(3) *Mergers&Acquisitions*. Two company's networks (9.5%) were obtained by means of the merger and acquisition process.

Three levels of management control of service networks were observed.

(1) *Having control*, meaning the company holds more than 50 percent shares in its subsidiaries and affiliated companies.

(2) *Significant influence*, meaning the company holds 20 - 50 percent shares in its subsidiaries and affiliated companies.

(3) *No significant influence*, the company holds less than 20 percent shares in its subsidiaries and affiliated companies.

The results reveal that, with few exceptions, most companies used more than one level to manage their service networks.

(7) Business process management (BPM)

The adoption of business process management (BPM) in Chinese LSPs is greatest in those logistics companies spun off by their parent manufacturers. Haier Logistics is the frontrunner among these companies. It has applied a "Synchronized Logistics" model, with the aim of keeping supply-chain management closely aligned with the manufacturing strategy. Coupled with this, Haier logistics adopted a process-based organizational structure. BPM is now adopted by many logistics companies in China, as demonstrated by the interviews. In most LSPs a process-based structure exists alongside a traditionally function-based structure. The function-based structure was used to perform routines, while the process-based structure dealt with customer-driven business processes.

(8) Marketing

All the companies interviewed, regardless of their business type, expressed great enthusiasm for marketing their services and implementing the process in practice. They employed different approaches to market their services and capabilities. Normally, personal promotion, referral, advertisement, website and exhibition were all used. One interviewed company offering courier services had introduced a '*Three Level Marketing System*'. This system was composed of three components: corporate marketing, subsidiary marketing and business department marketing. Of the three levels, the business department was the basic marketing unit. Four marketing approaches,

including the use of a sales department, channel management, teams, and telephone and website sales, were employed in the system. The four approaches targeted different customer groups. Team marketing focused on customers with long-term relationships, while the other three were applied to transaction-based customers.

The application of marketing in logistics is relatively new in China. Within the previous centrally planned economy, there was no place for marketing. The results indicate that the marketing concept is now diffusing through logistics companies.

(9) Inventory management

The results reveal that over half of the companies interviewed provided inventory management for their customers. They did not own the inventory but controlled it for their clients. As one leading operator in China explained:

If a company wishes to obtain its customers' business, the company should provide all services that the customers have considered. Since some customers wish to save money but in reality they do not know how to do so, logistics companies should help them reach this aim. Implementing inventory management is one of many ways.

This leading operator treated inventory management as a core service offering. This finding is in line with the conclusion reached by Gunasekaran and Ngai (2003). Other companies interviewed also emphasized the significance of implementing inventory management. There was strong demand for this stock control service, especially from manufacturers and retailers. They continued to invest the working capital, assume the associated risk and forecast demand. They felt, however, that LSPs could effectively manage the replenishment process and inventory levels.

(10) Innovation

Four interviewed companies put innovation, especially sustained innovation capabilities, in the first place among the important factors contributing to company's competitiveness. Other companies interviewed also stressed the necessity of innovation within the changeable and turbulent business environment. The aim of innovation was to hold the current competitive position or pursue a higher level of competitive position, as explained by companies.

The results found that there were three innovations described by the companies interviewed: technological, managerial and service innovation. Several examples of the three innovations were quoted. One private company invented a type of pallet which was specially designed for handling delicate medical equipment. This was an example of technological innovation. Managerial innovation focuses on organizational structure. Two of the private companies interviewed had abolished internal hierarchical relationships and had replaced with a new service relationship between different functions. With respect to the service innovation, three companies highlighted the business model of warehouse receipts. One of them was the initiator of this service in China. This business model ranked the first in the *Ten Logistics Innovation Models in China* in 2004.

Put simply, the business model of warehouse receipts refers to customers putting goods into warehouses owned by warehousemen, and borrowing money from banks in terms of warehouse receipts documented by warehousemen (Varangis and Larson, 1996; Lacroix and Varangis, 1996). Banks lent money to customers according to the price of stored goods shown in the warehouse receipts. Meanwhile, banks also require warehousemen to monitor and manage the stored goods. Warehouse receipts, backed by underlying commodities, have been employed in most industrial countries as an integral part of the financial sector (Lacroix and Varangis, 1996). However, Lacroix and Varangis (1996) note that warehouse receipts are especially useful in developing and transition economies, where there are institutional and structural shortcomings and new market instruments need to be created. The implementation of the warehouse receipts is perceived to “broaden the market for warehouse services and increases competition in the storage industry” (Lacroix and Varangis, 1996, p. 38). The reason for this is that warehousemen play a key role in bridging between customers and banks.

With regard to the impact of this service innovation, it will be further introduced later using a case of the initiator in China. Nevertheless, this finding of adopting service innovation in Chinese LSPs supports the views expressed by Chapman *et al.* (2003) and Flint *et al.* (2005) on the importance of service innovation to service companies.

(11) Human resource management (HRM)

Many of the companies interviewed viewed the talents of their employees as an important contributing factor. The importance of this factor has increased in recent

years because of a shortage of qualified logistics staff in China. For this reason, human resource management (HRM) has a necessary role in cultivating these talents. In general, all interviewed companies were willing to invest in HRM in order to recruit and retain more skilled staff. The investment was required in three principal HRM practices.

(a) *Recruitment.* Drawing candidates mainly from universities and other professions.

(b) *Staff training.* This was often organized in association with universities. For example, one company spun off from its parent manufacturer, initially launched a joint training programme with a university in 2001. This was the earliest MSC course established jointly by a company and a university in the Chinese logistics community. More than thirty employees have since joined the course.

(c) *Performance measurement.* This included appraising, rewarding and compensating staff according to their progress, but also using disciplinary procedures, where necessary, to correct poor performance.

(12) Cost management

The interviews explored two methods that Chinese LSPs were using to control costs: the traditional accounting system and activity-based costing (ABC). In the former case, companies allocated cost according to departments, while in the latter case, cost was allocated to particular activities and then the performance of these activities was measured. All the interviewed companies used the traditional accounting system, while some adopted ABC as well. The purpose for those companies using ABC, as explained by one manager of a SOE, was to identify more accurate and focused costing within activities while achieving a desired customer service level. The implementation of ABC helped them to establish which activity could generate profit and loss. This consequently drove them to reduce and eliminate those non-profitable activities and seek new resource deployment and management efforts in profitable activities. Most important, through ABC, managers learned how to plan and manage complex operations while reducing cost and enhancing service, as noted by this manager. The growth in the use of ABC observed in the survey is consistent with the claim of Goldsby and Closs (2000) and Pohlen and La Londe (1994) for the application of ABC in logistics.

(13) Corporate culture

Many companies regarded corporate culture as being essential to the success of LSPs. It accords with the conclusion reached by Peters and Waterman (1982) and is further emphasized by Sherwood (1990).

Companies associated their 'culture' with many different things, such as brand, logos, business model, characteristics of companies, teamwork and leadership styles and relationships with external organizations. Some distinguished their culture from that of other companies, especially foreign entrants, in terms of history and ownership. Some interviewed companies noted that corporate culture is recognized and accepted by customers and partners, and hence can be a source of longer term loyalty. Accordingly, building and publicizing this culture can enhance competitiveness.

7.2.4 Measures of an LSP's competitiveness

(1) Measures adopted by CCTA

Thirteen of the companies interviewed, who participated in the survey of the Top 100 LSPs in China, discussed the measures of LSP performance adopted in the CCTA survey. As discussed in Chapter 6, CCTA launched the survey of the Top 100 LSPs in China in 2004. On the basis of this survey, and drawing on foreign experience, CCTA proposed a set of standards which should be used to select the Top 100 LSPs. These standards have been approved by Chinese logistical experts, both academics and practitioners. The standards not only reflect companies' strength in terms of actual and potential performance, but were chosen because they could be operationalized and quantified. The standards are as follows:

Standard 1: Gross revenue and net income from the logistics business

Standard 2: Extent of service network. This can include the networks of subsidiaries and affiliated companies.

Standard 3: Status of the service quality control and management system. This standard concerns: (a) whether companies have been accredited with ISO 9000/9001 quality assurance; (b) whether they have built a service quality control and management system; (c) there are measures of service quality including customer satisfaction rate, on-time delivery rate, customer complaint rate, damage rate and average order lead time.

Standard 4: Customer evaluation. All the participants are required to provide a list of 10-20 major customers they are serving. CCTA conducts a further survey of these customers to obtain the feedback on the standard of service provided.

Standard 5: Status and application of the information system. This standard has three components: (a) external IT links to subsidiaries and affiliated companies, customers, customs, financial and other relevant organizations; (b) internal IT links, e.g. between the finance and HRM department; and (c) whether companies have built a Decision Support System (DSS).

Standard 6: Human resource structure. This standard is assessed by criteria such as the educated levels of employees and the amount of expenditure spent on training employees.

The final score is the weighted sum of the six standards, with 50 percent for standard 1 and 10 percent for each of the other five standards. It is calculated in two steps. In the first step, a primary score is given for each standard. In the second step, the primary score is multiplied by the associated weighting factor to give the final score (CCTA, 2004, 2005 and 2006).

This set of standards is being used to assess the strength of LSPs in China. It has become widely recognized and accepted by Chinese LSPs since it objectively evaluates an LSP's strength from expert and customer perspectives.

(2) Performance measures as perceived by interviewed companies

The companies interviewed also gave their views on the measurement of an LSP's competitiveness. The results reveal that market performance, financial performance and managerial capabilities are considered to be key criteria.

Those LSPs originating from transportation and warehousing companies emphasized market performance, e.g. market share and sales growth. In China, transportation and storage are mature industries. Statistical information on the two industries is released annually by the National Bureau of Statistics of China (NBSC). Each transportation company or warehousing company can then evaluate its market share by gross industrial revenue. The executive vice president of a warehousing-based LSP, established 40 years ago and the biggest landowner in the storage industry, commented that:

We are satisfied with our current competitive position. The reason is our market share has always been the biggest one in the industry (i.e. storage industry) since our company was established in the 1960s. Among the Top 100 LSPs, the rank of our company is not at the top. However, it does not affect our reputation in the industry.

Another private company located in Shenzheng was also proud of its market performance, although it did not participate in the survey of the Top 100 LSPs over the past two years. The CEO expressed satisfaction with the competitive position of his company in the niche market of providing logistics services between ports and plants.

Financial performance was measured by the standard indicators, including revenue, revenue growth, profitability and operating cost. Many interviewees noted that, of these measures, cost measure is important but not the key factor under the service competition. This finding is consistent with that of Griffis *et al.* (2004), who argue that logistics cost might be an important measure for a logistics organization, but should not be the key performance indicator. Capabilities to manage and exploit potential were related mainly to service quality and innovation. In addition, service network and human resource were also suggested. Interviewees noted that the criterion for measuring managerial capabilities was relatively difficult to quantify.

Overall multiple measures are used in China to assess an LSP's competitiveness. Those developed by the CCTA are now well-established, but companies can also use their own, sometimes employing national government statistics to estimate their relative position in the market. This is in line with the recommendation of many authors (e.g. Gorynia, 2001; Feurer and Chaharbaghi, 1994; Zairi, 1994) that diversified measures are used in assessing a company's competitiveness.

7.2.5 Good practices in achieving competitiveness

The companies interviewed employed a variety of ways of gaining competitiveness. This generally involved exploiting their capabilities in a way that deployed resources and adapted to the business environment. This is illustrated by the following case studies.

Case 1: Use of strategic management

This is a leading logistics operator in China, which was established in January 2002 on the basis of merging two companies for their businesses with an ocean shipping carrier

and international freight forwarder, respectively. Its head office is in Beijing. The LSP has over 470 subsidiaries in China and 11 overseas offices in some countries. It employs over 12,000 people. In 2005, its revenue totalled 36.5 billion yuan (\$4.9 billion).

Many factors may explain the success of the LSP. However, strategic management is one of the most important factors. The strategic positioning of the LSP has been key to its competitive success. The LSP identified six sectors (household appliances, automotive industry, chemical, electric utility industry, exhibition and retail) in which it would specialise. The company also target large national manufacturers. It built strategic alliances with these manufacturers on a win-win basis. There were two reasons for these strategic alliances. In the first place, the needs of manufacturers have shifted from traditional transportation and warehousing to value-added services. These value-added services required more than the normal transaction relationship, particularly in the supply chain setting. LSPs can become an important component of their customers' supply chain to help them to design, coordinate and provide value-added services as strategic partners. In the second place, these strategic alliances also benefited the LSP by forcing it to improve its service capability, hence achieving greater competitiveness. The LSP also desired to go into the overseas market with these large manufacturers as they extended their export businesses.

The LSP employed three business models in cooperating with these manufacturers: strategic cooperation, property cooperation and business cooperation. Strategic cooperation focused on building long-term relationships with strategic partners. This involved the delivery of general services and designing tailored logistics solutions for customers. More specifically, the LSP provided a package of solutions for these customers from off-line at producer to customers or consumers at different places, in which it included the management and planning of the whole logistics project, storage management at the factory, transportation in trunk line, management of warehouses at different areas, and regional coordinating transportation. Under this cooperation, the LSP has established strategic partners with many household appliance manufacturers, such as TCL, Changhong and Hisense. The second cooperation was property cooperation. The aim of this cooperation was to make joint investment in property with manufacturers through establishing JVs. The JVs provided professional services for the served manufacturers. For example, the LSP built up JVs with many automotive manufacturers, such as Beijing Hyundai, Beijing Benz-Daimlerchrysler. The established

JVs offered a supply chain model of automotive logistics, which included services such as distribution centre management, just in time, milk runs and consolidation. Business cooperation focused on specific projects. The LSP provided all or part of logistics services for these projects. For example, it offered international chemical manufacturers, such as CNOOC-Shell and Secco, transportation delivery for their core equipment.

The implementation of a series of strategic management initiatives has helped the LSP reach their targets. The LSP has covered almost all the domestic renowned household appliance and automotive manufacturers, and built up its prestige in the electronic and automotive logistics sector, enjoying a stable customer base through its superior, tailored and efficient services. On the other hand, it has followed its customers into overseas markets. Currently, the LSP has a presence in: (a) the American, European and Australian household appliance markets following its household appliance customers, such as TCL, Kelon; (b) the electric utility market of America, middle Asia and southeast Asia, following its electric utility customers.

Case 2: Role of service network

Two state-owned LSPs simultaneously developed courier services on the basis of their country-wide networks which they inherited from their parent organizations. One of these two networks is a rail-based network. The LSP using the rail network had 645 subsidiaries and employed over 22,000 people. In 2005, its revenue was 6.5 billion yuan (\$884 million). The other LSP is based in the postal network covering the whole country. It has seven regional distribution centres in China. Sixty people are employed in its headquarters in Beijing. The revenue of the LSP in 2005 was 1.95 billion yuan (\$264.1 million).

In 2003, the LSP with the rail network had an opportunity to be the service provider for Motorola, the mobile phone company. The operation was to distribute the finished products of Motorola to customers, especially the end consumers. These products included handset and other spare parts. The contract was ended within three months, however. Although the LSP could provide perfect services “from station/depot to station/depot” using its strong rail network, it was unable to provide good services from “door to door”, especially on the “last mile delivery” to the end consumers. The main reason for the unsuccessful cooperation was that the company was still developing its service network from station/depot to consumers.

The other LSP, employing the postal network, took over the contract. It had a strong physical network built for mailing letters for over a hundred years. The network could serve remote parts of China and provide a “last mile delivery” service. The cooperation between this company and Motorola was successful. Motorola was so satisfied with the performance of the LSP that it has renewed the contract. The company therefore gained huge benefits from this contract. The revenue of the first year was 8 million yuan (\$1.1 million), and in the second year this increased rapidly to 20 million yuan (\$2.7 million). The LSP is still running this contract today.

Case 3: IT system

A private LSP was established in the early 2000s. In 2005, it had 19 subsidiaries in China and employed 1192 people. Its revenue was 620 million yuan (\$83.9 million). When required by customers to upgrade its IT system, the LSP decided to invite a professional IT company to be a shareholder. The strategy was distinct from that of many other LSPs which design IT system themselves or invite IT companies to do so. However, this LSP has had its own philosophy in building its IT system. It believed that if the interests of the IT company and the LSP were the same, the resulting IT system would be better suited to the latter’s operations.

As expected, after investigating the market for two months, the IT company designed an IT system that was well suited to its operations. As a result, the two companies have enjoyed the benefits since then. The professional IT company has since expanded its business into the logistics sector developing similar relationships with other LSPs.

Case 4: Logistics innovation: the new business model for warehouse receipts

The LSP, which is the biggest landowner in Chinese storage industry, was established in the early 1960s and is regarded as the initiator of the warehouse receipt business in China. It had 220 subsidiaries across the whole of China and employed over 8000 people. In 2005 its revenue totalled 7.4 billion yuan (\$1.0 billion).

The LSP initiated this business model, essentially a value-adding service for warehouse operators, in 1992. By 1999, the model had become the main source of the company’s revenue. Since 1999, the growth rate of this business has been up to 120 percent each year. The LSP has offered this service to over 500 customers. Collateral securities have consisted of products such as ferrous metal, nonferrous metals, building materials, cars,

paper, coal and chemicals. Four national banks and many financial agencies have cooperated with the LSP in this venture. By the end of 2005, as a result of this business, the company's revenue exceeded 60 billion yuan (\$8.1 billion). This move into the ownership of companies inventory causes additional risks, but this has not yet proved a problem.

The demand for this service has resulted from the difficulty that some manufacturing and commercial enterprises, especially small and middle enterprises (SMEs), have in obtaining loans from banks. They are able, however, to borrow against the value of inventory held in the LSPs warehouses. When the system of warehouse receipts was permitted in China, the company became the first cooperative partner able to work with banks to provide this service. Its comparative advantage lay in: (1) its large scale assets; (2) a network covering the whole country; (3) the breadth of its customer base; and (4) its good reputation in the storage industry.

- (1) Large scale assets.** With respect to warehouse receipts, the warehousemen should play a role in rebuilding credit before banks and customers. The warehousemen not only obtain banks' accreditation, but also help SMEs to build up credit guarantees using their own reputations and financial positions. Consequently, there should be a high level requirement of the asset scale for the warehousemen. The asset scale of the LSP had above 50 billion yuan (US\$6.8 billion) and was capable of guaranteeing this business.
- (2) A network covering the whole country.** The company owned the largest warehouse network in China, which covered over 90 percent central cities and communications hubs; over 140 warehouses owned and allied, over 100 access railroads and over 2000 vehicles. This network was conducive to the customers for storing goods in different sites, and hence reducing transportation cost.
- (3) The breadth of its customer base.** The business of warehouse receipts is frequently related to warehousing and selling. The LSP have had over 7800 customers. Many customer resources were the basis for implementing this business. In addition, the trade volume of the company in 23 spot markets reached 700 million yuan (\$94.8 million). These manufacturing and commercial customers became potential customers.

(4) Good reputation in the storage industry. The warehousemen, acting as middlemen between banks and customers in this business, should take responsibility for monitoring and managing stored goods. Under these circumstances, the warehousemen must be able to cope with the business with honesty. The warehousemen should not cheat banks allying customers by showing false inventory documents and allowing customers to take out stored goods. Likewise, they should not unite banks to damage customers' benefits. In some cases, the warehousemen must compensate for the losses of stored goods. The LSP was established in the 1960s and has a long-term quality service and reputation in the industry. It was the first partner to have been chosen by both banks and customers.

This service has brought the LSP much more added value. On the one hand, the LSP has increased its capabilities in the field of value-added services; on the other hand, as the third party trusted by both banks and customers, the LSP has successfully permeated their customers' supply chain and strengthened the relationship with banks. In addition, compared with other logistics services, this business has generated a relatively high profit margin as a result of the relatively high risk undertaken. Thus, provided risk is controlled, this business could bring better benefits for the warehousemen, as remarked by the LSP.

7.3 Views of Two UK Companies

At a later stage, interviews were held with two UK companies, one a large integrated LSP with clients in many different sectors, the other providing wholesale services in a particular sector. The managers provided insights based on their understanding regarding the business environment, measures and the relationship with customers. It is interesting to note that these two companies shared many common perceptions with those of the managers interviewed in China.

7.3.1 Business environment

The UK logistics service market was seen as a mature market with many demanding clients and to be highly competitive. In this market, LSPs not only compete continuously for an ever-decreasing profit margin, but always face increasingly demanding customers. As commented by one of the interviewees (Company T):

One problem for LSPs in the UK is that the margin had gone down and down. Early in 1999, we had contracts producing a margin greater than 10 percent, some even 40 percent profit margin. Now if you get 3 percent, you are lucky. This could be a measure of competitiveness.

The other interviewee expressed a similar view (Company W):

Everyone has to meet the performance of customers. But more important, because the margin is going down, we have to do things at less cost, which means we have to be more efficient and more productive.

7.3.2 Performance measures

The manager from Company T noted that “it is easy to measure your own performance, but this is different for measuring competitiveness”. The two companies measured the LSPs’ competitiveness using different criteria.

Company W focused on customer service, cost and operation. From the point of view of this company, cost was a basic thing since costing had the greatest impact on profit. Customer service was measured against quality standards. Operational performance was judged relative to KPIs, such as on time delivery, pick up accuracy and on time processing. Company T used measures such as financial position, the number of contracts won and the range of service offerings. Both managers highlighted the danger of LSPs being assessed with cost. Customer service was also strongly emphasized, particularly by company W:

The priority has shifted from cost to service. Our customers are contract-based; they are not interested in the cost-based arrangement. They want to see service work out hundred percent of the time. So, service, over the past five years, has become a big dimension. Everything happens in service.

Both companies were interested in benchmarking their efficiency and service performance with comparable businesses.

Overall the managers perceived that the competitiveness of LSPs reflected market performance (i.e. performance and position), financial performance (i.e. profit and cost), and managerial capabilities (i.e. operation and customer service). This was in line with results from the Chinese interviews.

7.3.3 Strength relationships with customers

Building mutual loyalty with customers was considered as a fundamental means of gaining competitive advantage. Some methods, such as customer reviews and client visit, were adopted by the two companies to build and cultivate relationships. Companies can also present their development planning and shared ideas with customers. The aim is to build credibility with customers. A few instances of poor performance can underline these relationships, although, as commented by Company W:

Clients focus on the one thing you did wrong, and forget about the thousands of things you did right. So you are only as good as the weakest link.

To meet this strict requirement, the two companies were trying to (a) reduce variance in performance; (b) increase the investment on IT; (c) increase the transparency of operations; and (d) expand the service network.

7.4 Summary

This chapter has analysed twenty-three interviews conducted in both China and the UK.

First of all, the results of twenty-one Chinese interviews are analyzed. The analysis tests the seven research propositions postulated in Chapter 5. In general, Chinese LSPs are operating in a business environment more favourable to competition than before. This is revealed by the interviews from three aspects. First, the Chinese government is making an attempt to create a more liberalized, market-oriented and open-competition business environment for Chinese LSPs, as opposed to exerting direct control and manipulation on companies' businesses and operations as happened in the past. Second, China's accession to the WTO provides more opportunities for Chinese LSPs to compete with their counterparts on an equal footing. Third, there are more differentiated services that LSPs can compete for now. These differentiated services, to some extent, are caused by the uncertainty, diversification and complexity of customer needs in an emerging logistics service market. By competing on capabilities LSPs can distinguish themselves. Various means are employed by Chinese LSPs to improve competitiveness. The assessment of competitiveness is made by using different measures such as market performance and financial performance. Overall, the results from the Chinese interviews confirmed the research propositions postulated in Chapter 5.

Two interviews conducted in the UK were analysed next. Despite the very small sample size, the two interviews broadly confirmed the Chinese interviews.

The results also reveal that both Chinese and UK managers share some common perceptions of an LSP's competitiveness, although they operate within different cultural and market contexts. For example, both Chinese and UK managers would use multiple measures rather than a single measure to assess LSPs' competitiveness and all recognize the disadvantage of over-emphasizing cost as a measure. Additionally, many ways have been employed by companies to achieve their competitiveness.

Nevertheless, there are also significant differences in the understanding of competitiveness, probably stemming from the given contexts. In the Chinese context, although capabilities are identified as the most important primary source, the government still exerts a strong influence on the ability of companies to compete, since China has not yet fully become a market economy. In addition, the practices used to achieve competitiveness reflect the characteristics of a transitional economy, e.g. the development by a major warehouse-based LSP of the 'warehouse receipt' business model. By contrast, from the perceptions of the two UK companies, the interpretation of an LSP's competitiveness in the UK tends to be "business as usual" within a mature market economy.

While the combined sample of face-to-face interviews in the two countries has been adequate to confirm the propositions and helped to answer the research questions, validating them required much larger, postal questionnaire surveys. The results of these surveys are discussed in the next two chapters.

CHAPTER 8 DESCRIPTIVE AND COMPARATIVE ANALYSIS OF THE QUESTIONNAIRE DATA

8.1 Introduction

This chapter and the next chapter will further assess the validity of the seven research propositions postulated in Chapter 5, by statistically analyzing the postal questionnaire survey. This chapter will generally describe the characteristics of the questionnaire data. The whole analysis will be done in five steps: (1) description of the profile of surveyed companies; (2) identification of primary sources; (3) assessment of contributing factors; (4) application of diversified measures; and (5) recognition of management practices.

Four research propositions will be discussed in this chapter; these include:

P1: Resources, capabilities and business environment are the primary sources of an LSP's competitiveness.

P2: Capabilities are the most important source of an LSP's competitiveness.

P6: The measurement of an LSP's competitiveness is multidimensional.

P7: An LSP's competitiveness is associated with a series of specific management practices.

To facilitate the analysis, descriptive statistics and inferential statistics will be used. Descriptive statistics include frequency, mean and standard deviation (SD), while inferential statistics involve mainly the calculation of confidence intervals, the Chi-square test, Friedman test, Wilcoxon signed-rank test, Mann-Whitney test, *t*-test and the calculation of Spearman's rank and Pearson correlation coefficients.

8.2 Data Structure

As nominal (categorical), ordinal, interval and ratio scales were used in the questionnaire survey, numerous statistical techniques, including descriptive statistics and inferential statistics, had to be employed in the data analysis.

As suggested by Stevens (1951), Cohen and Cohen (1975) and Miles and Shevlin (2001), three levels of measurement - ratio scale, interval scale and ordinal scale - may be used as quantitative scales, while the nominal scale is treated as a qualitative or categorical measurement. The Likert scale, widely used in social sciences, is essentially

an ordinal scale and can be subject to quantitative techniques in some necessary cases (Stevens, 1951; Cohen and Cohen, 1975; Miles and Shevlin, 2001). For example, regression analysis can be adapted for use with ordinal data conducted on a Likert scale (Miles and Shevlin, 2001). In logistics research, many studies have also been done by regression analysis using a five-point or seven-point Likert scale; these studies include those of Goldsby and Stank (2000) “World Class Logistics Performance and Environmentally Responsible Logistics Practices”, Morash *et al.* (1996b) “Strategic Logistics Capabilities for Competitive Advantage and Firm Success”, and Knemeyer and Murphy (2005) “Exploring the Potential Impact of Relationship Characteristics and Customer Attributes on the Outcomes of Third-party Logistics Arrangements”.

Given that the five-point Likert scale was used in the survey instrument, non-parametric approaches were appropriate. These involved the use of non-parametric tests of inference, such as the Chi-square test, Friedman Test, Wilcoxon signed-rank test, Mann-Whitney test and Spearman’s rank test. These techniques will be employed in this chapter. Pearson’s correlation test, regression analysis, exploratory factor analysis (EFA) and factor analysis regression (FAR) will be used in this and the next chapter. Because of the numerical scales required by these techniques, data will be treated as quantitative measurements, as suggested by Stevens (1951), Cohen and Cohen (1975) and Miles and Shevlin (2001).

8.3 Profile of Responding Companies

As discussed in Chapter 6, there were 35 and 114 useable responses in the UK and Chinese surveys respectively. The respondents were asked to provide background information which included types by business origin, age of business, number of employees, ownership and industry sectors served.

8.3.1 UK respondents

The background information of 35 UK respondents is presented in Table 8.1.

Table 8.1 Profile of 35 UK Respondents

Characteristics	Percent (%)	Number
<i>Type by business origin</i>		
Transportation-based LSPs	45.7	16
Warehouse-based LSPs	5.7	2
Integrated LSPs	48.6	17
Total	100	35
<i>Age of business</i>		
4 to 10	8.6	3
11 to 20	17.1	6
21 to 30	22.9	8
31 to 40	17.1	6
41 to 50	11.4	4
51 to 60	5.7	2
61 to 70	5.7	2
71 to 80	8.6	3
81 to 160	2.9	1
Total	100	35
<i>Type of ownership</i>		
Private company	85.7	29
Joint Venture (JV)	5.7	2
Private limited company	5.7	3
Public	2.9	1
Total	100	35
<i>Number of employees</i>		
0 to 200	17.1	6
201 to 400	25.7	9
401 to 600	17.1	6
601 to 800	8.6	3
801 to 1000	2.9	1
1001 to 2000	11.4	4
2001 to 4000	5.7	2
4001 to 10000	5.7	2
10001 to 40000	5.7	2
Total	100	35
<i>Industry sectors served¹</i>		
Industrial machinery and equipment	20.0	7
Textile & apparel	14.3	5
Electronic products, computer/telecoms	22.9	8
Automotive part	34.3	12
Furniture	17.1	6
Household appliance	14.3	5
Pharmaceutical	11.4	4
Chemical	34.3	12
Parcels	11.4	4
Home delivery	17.1	6
Construction materials	25.7	9
Raw materials	25.7	9
Retail	65.7	23
FMCG	48.6	17
Paper and paper product	37.1	13
Others ²	31.4	11

Notes: 1. Multiple choices.

2. In the category "others" were companies in the following sectors: packaging, all containerized imports and exports, personal care, gas, carpets, temperature controlled, and health care (not pharmaceutical).

Overall, the five major features of respondents are noted below. More details will be discussed later.

- Integrated LSPs and transportation-based LSPs dominate the respondents.
- The age of the businesses ranges from several years to over one hundred years.
- The vast majority are privately owned.
- The sample includes not only small and medium sized enterprises (SMEs) but also large companies, indicated by the number of employees.
- Respondents serve a wide range of customers. Retail and FMCG are the two biggest sectors, with 65.7 % and 48.6 % of the respondents respectively.

8.3.2 Chinese respondents

Table 8.2 displays the same information as that given in Table 8.1 but for the 114 Chinese responses.

Table 8.2 Profile of 114 Chinese Respondents

Characteristics	Percent (%)	Number
<i>Type by business origin</i>		
Transportation-based LSPs	19.3	22
Warehouse-based LSPs	10.5	12
Forwarder-based LSPs	4.4	5
Integrated LSPs	65.8	75
Total	100	114
<i>Age of business</i>		
2 to 10	58.8	67
11 to 20	27.2	31
21 to 30	7.0	8
41 to 50	1.8	2
51 to 60	5.2	6
Total	100	114
<i>Type of ownership</i>		
State-owned enterprise (SOE)	49.1	56
Private company	43.9	50
Joint Venture (JV)	3.5	4
Limited company	3.5	4
Total	100	114
<i>Number of employees</i>		
0 to 200	12.3	14
201 to 400	22.0	25
401 to 600	8.8	10
601 to 800	6.1	7
801 to 1000	6.1	7
1001 to 2000	19.3	22
2001 to 4000	14.9	17
4001 to 10000	7.0	8
10001 to 30000	3.5	4
Total	100	114
<i>Industry sectors served¹</i>		
Industrial machinery and equipment	64.3	72
Textile & apparel	46.4	52
Electronic products, computer/telecoms	55.4	62
Automotive part	53.6	60
Furniture	36.6	41
Household appliance	66.1	74
Pharmaceutical	40.2	45
Chemical	50.9	67
Parcels	22.3	25
Home delivery	15.2	17
Construction materials	43.8	49
Raw materials	57.1	64
Retail	47.3	53
FMCG	49.1	55
Paper and paper product	46.4	52
Others ²	28.6	32

Notes: 1. Multiple choices.

2. In the category "others" were companies in the following sectors: luxuries, dangerous cargo, art craft, coal and mineral, steel products, temperature controlled transportation, provisions and agriculture products, cosmetic, dieting industry and agriculture, petroleum drill movement.

Likewise, the five main features of Chinese respondents are listed below. These will be discussed in more detail later.

- Integrated LSPs represent almost two thirds of the respondents.
- Companies set up within 2-10 years account for over half of the respondents.
- There is a fairly even split between state-owned enterprises (SOEs) and private companies.
- Respondents include SMEs and large companies, indicated by the number of employees.
- Respondents serve a wide range of customers. Household appliances, and industrial machinery and equipment are the two biggest sectors, with 66.1% and 64.3 % of the respondents respectively.

8.3.3 Comparison of UK and Chinese respondents

The two sets of samples were compared. The results reveal some interesting findings from the survey, and indicate the diversity of the surveyed companies, as will be seen in Figures 8.1 - 8.8.

(1) Type by business origin

Four categories were set up to classify the surveyed companies, which include integrated LSPs, transportation-based LSPs, warehouse-based LSPs and forwarder-based LSPs. The classification regarding LSPs has been discussed in Chapter 3 (see Section 3.3 in Chapter 3 for more details about these definitions). The results are presented in Figure 8.1.

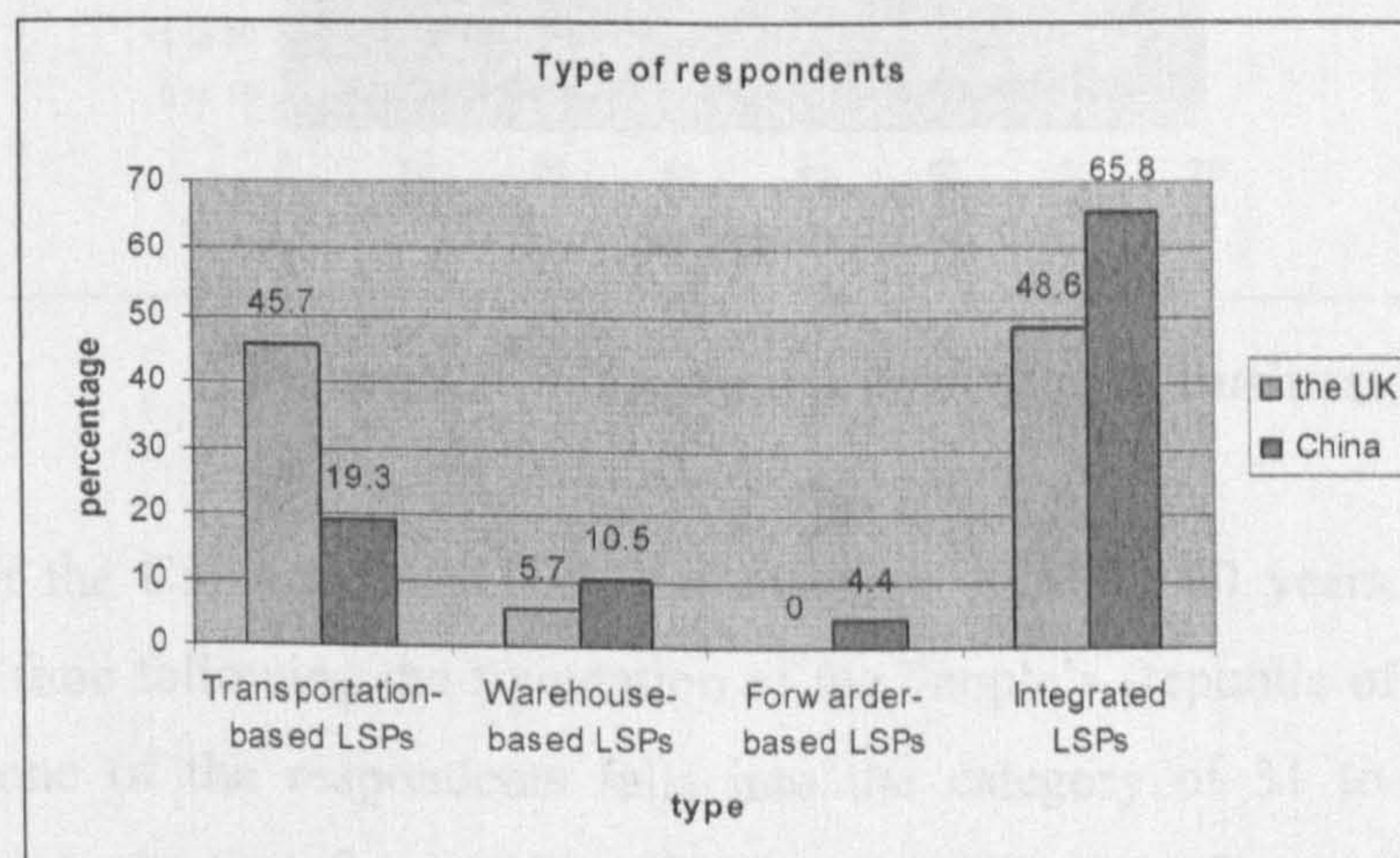


Figure 8.1 Comparison by Types of Respondents

Integrated LSPs is the biggest group in both the UK and Chinese samples, followed by transportation-based LSPs and then warehouse-based LSPs. Only five respondents from China have evolved from being freight forwarders. A Chi-square test was conducted, excluding the category of forwarder-based LSPs as there was no respondent from the UK. The results with $\chi^2 = 9.006$, $df = 2$, p -value 0.011 show that there is a statistical difference between the two samples on the three categories, where df stands for degree of freedom. This indicates that the structure of UK and Chinese respondents is likely to be different.

(2) Age of business

The ages of both UK and Chinese companies range from several years to several decades, as presented in Figure 8.2. Overall, Chinese businesses are much younger than UK respondents. In particular, almost 60% of Chinese LSPs surveyed were less than 10 years old, whereas in the UK the corresponding population is only 9%. This partly indicates a booming logistics service market in China in recent years. In contrast, UK respondents have developed over a longer time. This difference is indicated by the mean scores for UK and Chinese respondents, which are 40.5 (SD = 29.6) and 13.0 (SD = 13.2) respectively. A further t -test with $df = 38.262$ and p -value 0.000 shows that this difference is significant.

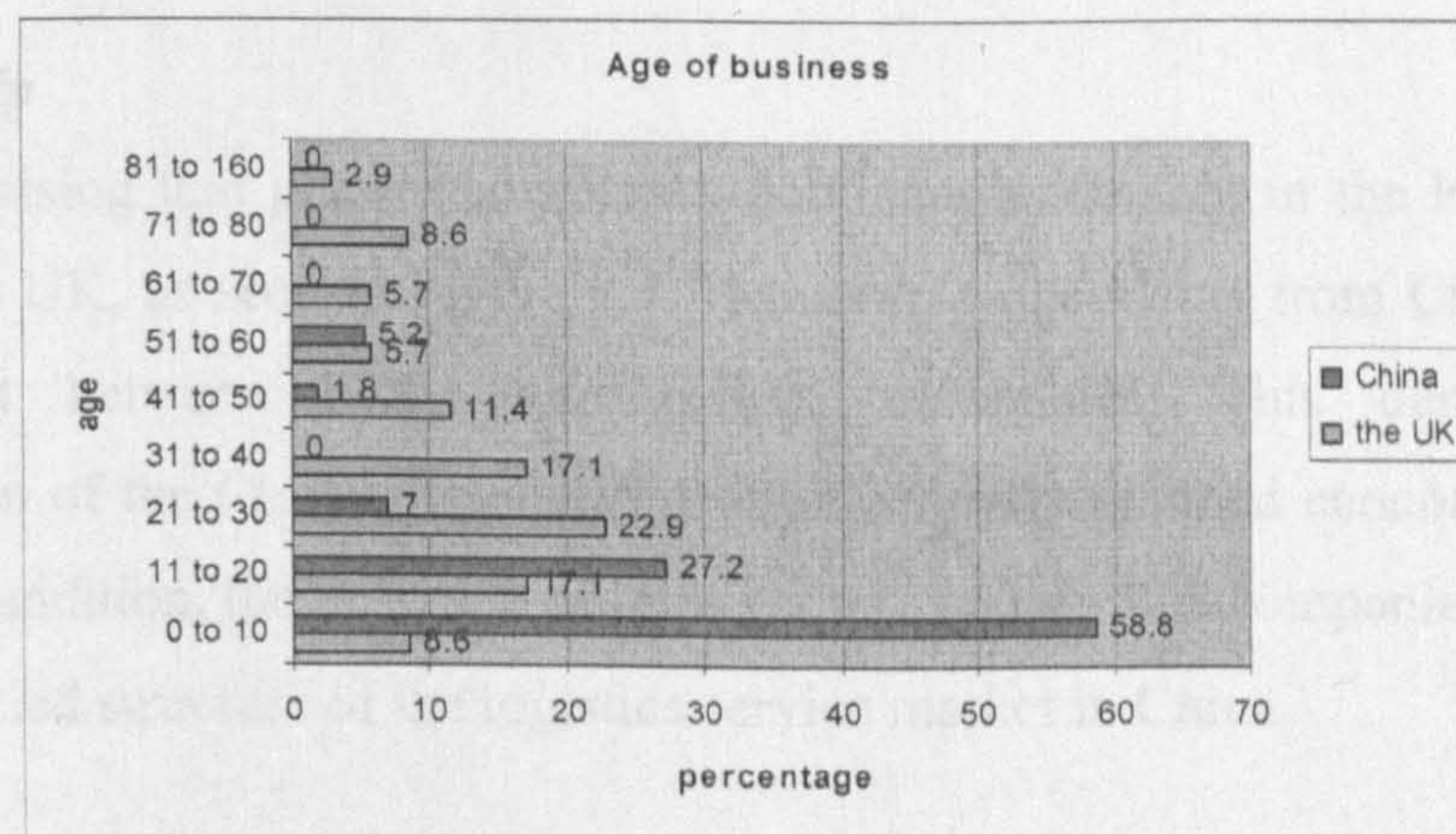


Figure 8.2 Comparison by Age of Business

The oldest of the Chinese LSPs is in the category of 51 to 60 years. This period is precisely the time following the foundation of the People's Republic of China in 1949. Moreover, none of the respondents falls into the category of 31 to 40 years. This category refers to the time from 1966 to 1976, when China was in a period of economic stagnation following the ten-year cultural revolution. In addition, the distribution curve

of the ages of Chinese respondents reveals that they are closely associated with the progress of the Chinese economy and economic reform. The progress of the Chinese economy and economic reform is marked by a series of milestones, some of which have been described in Chapter 4. Of these milestones, the opening-up policy of economic reform in 1978, Deng Xiaoping's remarks while touring in special economic zones (SEZs) of in South China in 1992 and China's accession to the WTO in 2001 have been considered the most important events for the rapid growth of Chinese economy and economic transition. The age distribution in Figure 8.3 shows the steep growth over the period.

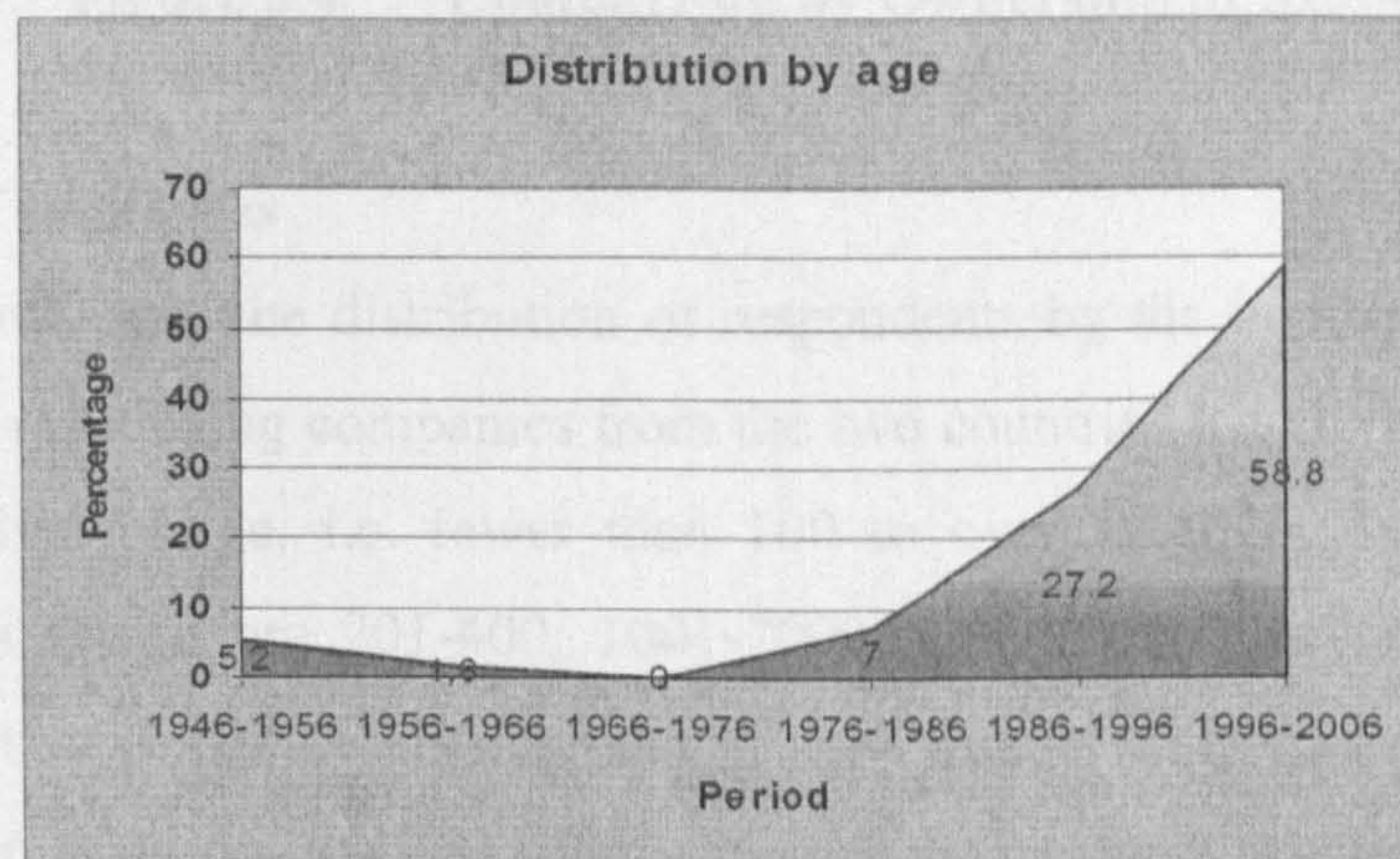


Figure 7.3 Age Profile of Chinese LSPs

(3) Ownership

It is not surprising that private companies dominate leadership in the logistics service market in the UK, as seen in Figure 8.4. However, respondents from China are almost equally split between SOEs and private companies. This demonstrates the transformation of the Chinese economy from a centrally planned economy to a market economy. In addition, the presence of joint venture and limited companies in the sample shows the varied structure of the logistics service market in China.

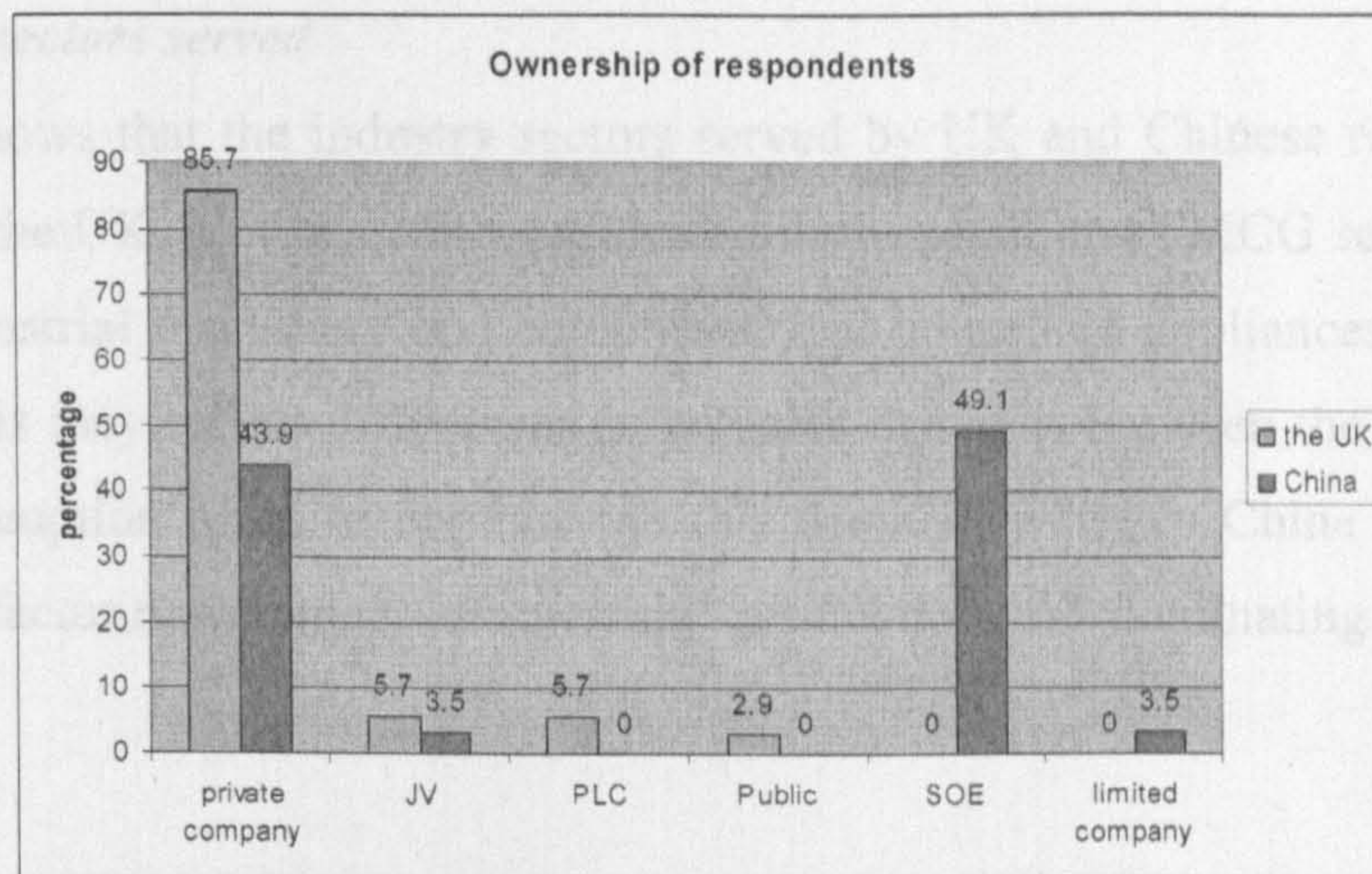


Figure 8.4 Comparison by Ownership of Respondents

(4) Number of employees

Figure 8.5 shows how the distribution of respondents by the number of employees is polarised. The responding companies from the two countries tend to be either relatively small or relatively large, i.e. fewer than 100 to over 10, 000. Two peaks for UK respondents as shown are 201-400, 1001-2000 with 25.7% and 11.4% respectively. However, the two peaks are also evident in the Chinese sample with 22% and 19.3% respectively. In addition, the 801-1000 category is a trough, where UK and Chinese respondents are 2.9% and 6.1% respectively. Moreover, the Chi-square test with $\chi^2 = 6.28$, $df = 8$, p -value 0.616 indicates that there is no statistical difference in terms of mean size between UK and Chinese respondents.

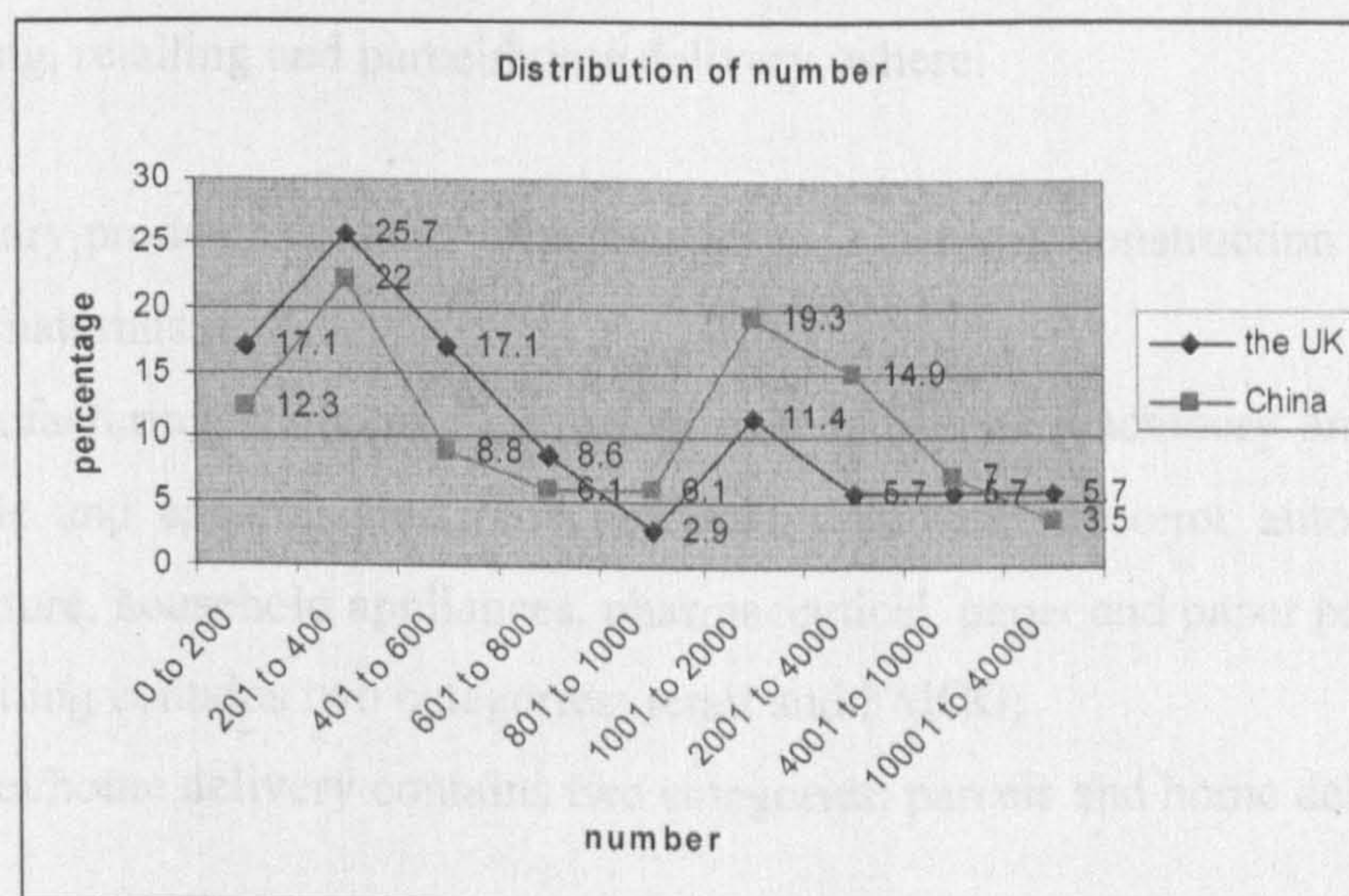


Figure 8.5 Comparison by the Number of Employees

(5) Industry sectors served

Figure 8.6 shows that the industry sectors served by UK and Chinese respondents are different. In the UK, services are concentrated in the retail and FMCG sectors, whereas in China industrial machinery and equipment, and household appliances receive more attention. This may reflect differences in logistics demands between the two countries. In UK consumption tends to dominate in this demand, while in China the demand is more manufacturing-oriented, suggesting production is dominating the national economy.

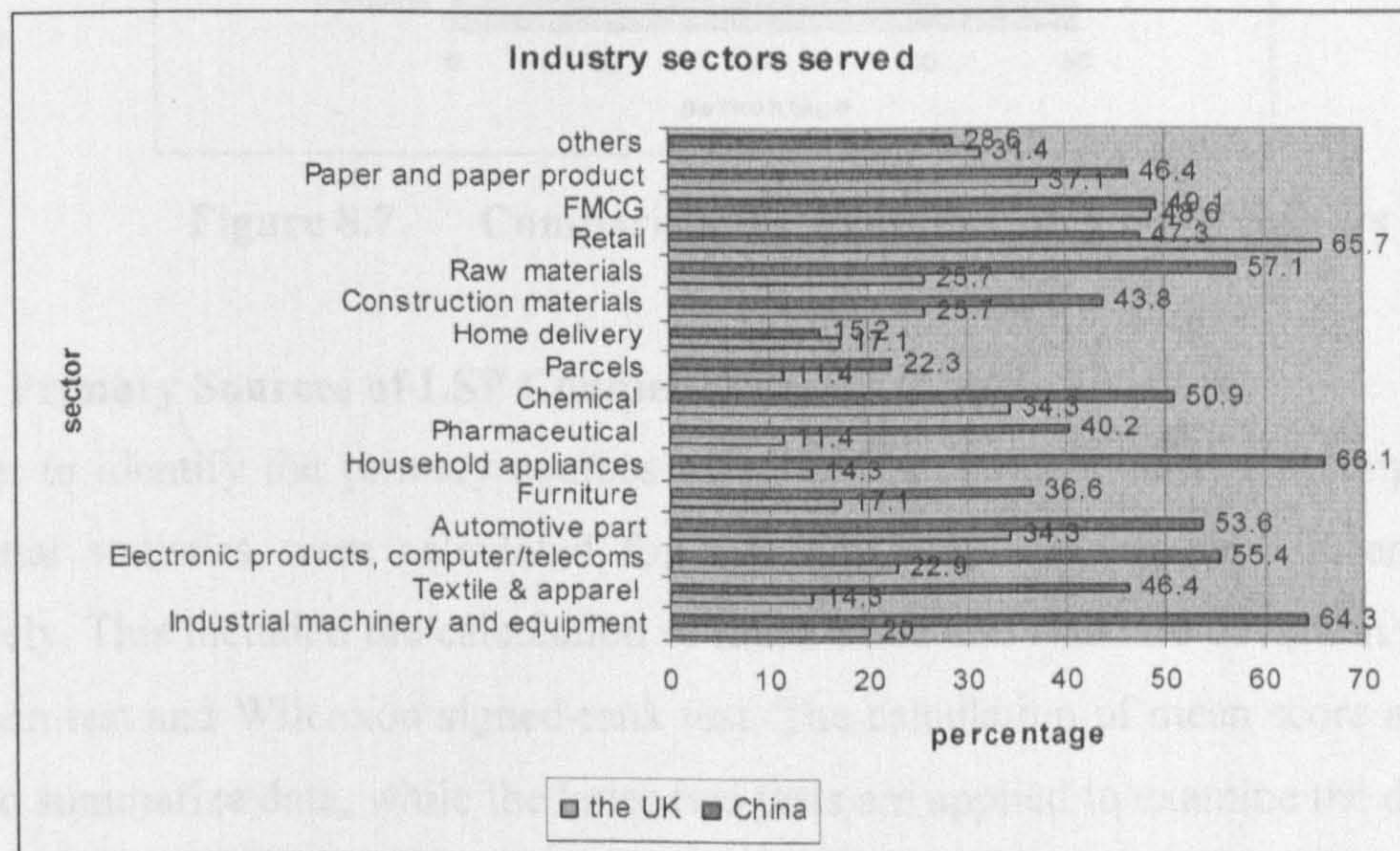


Figure 8.6 Comparison by Industry Sectors Served

However, the sectors can be consolidated into four categories: primary products, manufacturing, retailing and parcel/home delivery, where:

- Primary products contains three categories: chemical, construction materials and raw materials;
- Manufacturing contains eight categories: industrial machinery and equipment, textile and apparel, electronic products, computer/telecoms, automotive parts, furniture, household appliances, pharmaceutical, paper and paper products;
- Retailing contains two categories: retail and FMCG;
- Parcel/home delivery contains two categories: parcels and home delivery.

The results shown in Figure 8.7 reveal how the weighting of sectors served by respondents in the two countries, in a broad way, tends to be similar. Manufacturing is

the biggest client cluster for companies, whereas parcel/home delivery service is not dominant. However, as mentioned earlier, the relative balance of retailing and manufacturing differs between Chinese and UK LSPs.

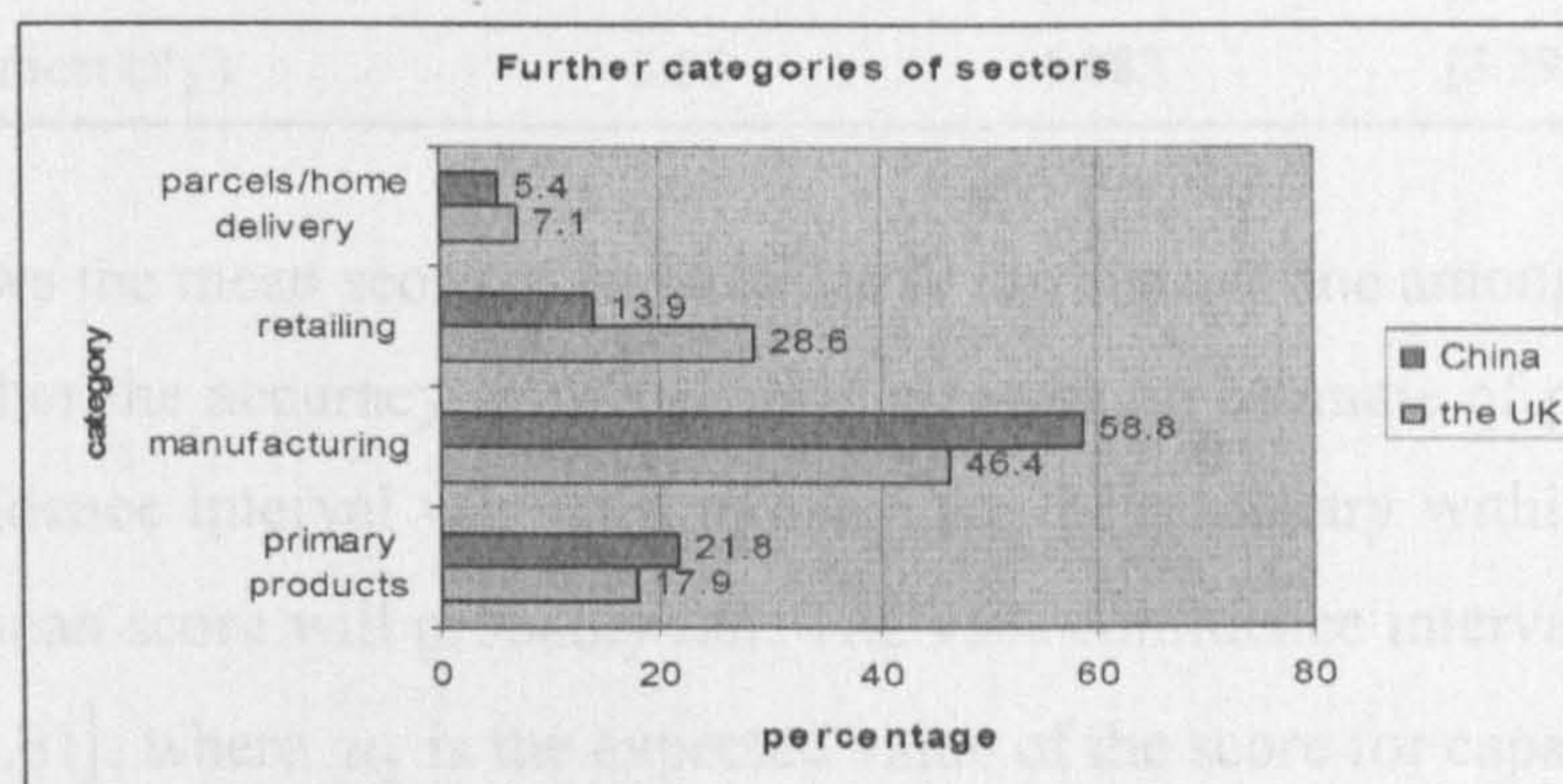


Figure 8.7 Comparison by Further Category of Sectors

8.4 Primary Sources of LSP Competitiveness

In order to identify the primary sources of an LSP's competitiveness, descriptive and inferential statistics were calculated for the two samples from the UK and China separately. This included the calculation of mean score and standard deviation (SD), the Friedman test and Wilcoxon signed-rank test. The calculation of mean score and SD is made to summarize data, while the latter two tests are applied to examine the difference between sources. In addition, Mann-Whitney test was used to assess the difference between the two samples on the same sources. The Friedman test, Wilcoxon signed-rank test and Mann-Whitney test are non-parametric tests. Non-parametric tests are often known as assumption-free tests as they make fewer restrictive assumptions about the data used, such as normal distribution.

8.4.1 The UK sample

In the UK, all respondents were asked to prioritize the impact of three sources of competitiveness - i.e. resources, capabilities and business environment - on the competitiveness of LSPs based on a five-point Likert scale, with a score of 1 indicating "no impact", 5 "high impact" and mid-point 3 "impact". The mean scores for the three sources are presented in Table 8.3, where x_j as variable stands for three sources, i.e., resources, capabilities and business environment, and μ_j is for the expected value of x_j ,

$$\mu_j = E(x_j), j = 1, 2, 3.$$

Table 8.3 Mean Score of Three Sources: UK Sample

Variable (x_j)	Mean Score	Std. Deviation	Confidence Interval
Capabilities (x_2)	4.34	0.765	[4.08, 4.61]
Resources (x_1)	3.89	0.718	[3.64, 4.13]
Business environment (x_3)	3.66	1.083	[3.29, 4.03]

Table 8.3 shows the mean score of capabilities is the highest one among three variables. To assess further the accuracy of this sample mean as an estimate of population mean, the 95% confidence interval was used to calculate the boundary within which the true value of the mean score will probably fall. The 95% confidence interval for capabilities is $\mu_2 \in [4.08, 4.61]$, where μ_2 is the expected value of the score for capabilities. It means that the true value of the lowest mean score of x_2 is likely to be above 4. This value is far above the mid-point 3. This indicates that the impact of capabilities on average is highly significant. Similarly, both the impact of resources and business environment are also significant, since their values fall into [3.64, 4.13] and [3.29, 4.03] respectively and then both exceed 3.

In order to explore the differences among the three sources, the Friedman Test was used. As mentioned earlier, the Friedman test is a non-parametric alternative to the one-way ANOVA which rests upon the parametric assumption. It is applied to test the difference among more than two independent variables within the same subject. Field (2005) describes this method as comparing several experimental conditions when the same participants have been used in each condition. In the current case, the three sources of competitiveness represent these 'conditions', while 35 respondents are the same participants taking part in the experiment. The aim is to test the difference between the three sources.

The null hypothesis is that the impact of three sources on competitiveness is the same, i.e. $\mu_1 = \mu_2 = \mu_3$. The test was conducted based on mean ranks.

$$\bar{R}_j = \frac{1}{35} \sum_{i=1}^{35} R(X_{ij}) \quad j = 1, 2, 3$$

where $R(X_{ij})$ is the rank for X_{ij} within the i -th subject.

The result of the Friedman test is displayed in Table 8.4.

Table 8.4 Friedman Test on Three Sources: UK Sample

Variable	Mean Rank
Capabilities	2.33 (\bar{R}_2)
Resources	1.91 (\bar{R}_1)
Business environment	1.76 (\bar{R}_3)

The results in Table 8.4 show that the mean ranks of the three variables are different in terms of the Friedman test. The mean rank of capabilities is the highest of the three variables. Moreover, the variation among the three variables is statistically significant at the 0.05 level with $\chi^2 = 8.54$, $df = 2$, p -value 0.014. This further confirms that the importance of the three variables is not the same and that one may be more important than the other two. As a result, the null hypothesis regarding the impact of three sources on competitiveness being the same is rejected.

The Friedman test assesses only the differences between several variables within subjects, while a pair-wise Wilcoxon signed-rank test gives more detailed comparative information. It is regarded as the non-parametric equivalent of the pairwise t -test and is used to test the difference between two variables within the same subject. The two variables are treated as a pair. In the current case, the Wilcoxon signed-rank test was conducted to explore the difference between any pairs of variables. There are three pair-wise comparisons, i.e. capabilities versus resources, capabilities versus business environment, and resources versus business environment. The results of the Wilcoxon signed-rank test are displayed in Table 8.5.

Table 8.5 Difference of the Alternative Sources: UK Sample

Pair-wise variables	p -value	Significance
Capabilities vs. resources	.008	significant at the level 0.01
Business environment vs. capabilities	.014	significant at the level 0.05
Business environment vs. resources	.453	not significant at the level 0.05

The results show that the difference between two pairs, i.e. capabilities and resources, and capabilities and business environment, are statistically significant at the 0.01 and 0.05 levels respectively. This indicates that the importance of any two variables is different in these two pairs. Given the mean scores of the three variables exhibited in Table 8.3, the results also indicate that capabilities have a much greater impact on

competitiveness than resources and business environment. In addition, the difference between resources and business environment is not statistically significant at the 0.05 level. This means that there is no significant difference in the relative importance of resources when compared with business environment on their individual impacts on competitiveness.

To sum up, in the UK sample, the results reveal that the three sources all impact on an LSP's competitiveness. In addition, the impact of capabilities is most important.

8.4.2 Chinese sample

Similar analyses were carried out on the larger sample of Chinese LSPs. Mean score, SD, confidence interval, Friedman test and Wilcoxon signed-rank test were all used. Table 8.6 displays mean scores, SDs and mean ranks of the three sources of competitiveness for the Chinese sample.

Table 8.6 Mean Score and Mean Rank of Three Sources: Chinese Sample

Variable	Mean Score	Std. Deviation	Confidence interval	Mean Rank
Capabilities	4.71	.624	[4.59, 4.83]	2.30
Resources	4.51	.773	[4.36, 4.66]	2.05
Business environment	4.13	.885	[3.95, 4.29]	1.65

The results show again that the mean score of capabilities is the highest of the three sources. The 95% confidence interval for capabilities shows the expected value ranging from 4.59 to 4.83. It means the lowest mean of capabilities is likely to be 4.5. This indicates that the impact of capabilities on average is highly significant. Likewise, both the impact of resources and business environment are also significant, since their values fall into the ranges [4.36, 4.66] and [3.95, 4.29] respectively and their mean scores are both above 4.

The SDs of capabilities and business environment are smaller than those of the UK sample, while the SD of resources is slightly higher. This result indicates that in the Chinese sample, the companies tend to show greater agreement than in the UK sample in their views of the first two sources, while in the case of resources there is little difference in the two countries.

The Friedman test reveals that the mean ranks of the three variables are different. The value of mean rank of capabilities is the highest of the three variables. Furthermore, the

difference among the three variables is statistically significant at the 0.01 level with $\chi^2 = 44.10$, $df = 2$, p -value 0.000. This result indicates that the importance of the three variables is not the same and that one may be more important than the other two. This result is in accordance with the finding from the UK survey.

The Wilcoxon signed-rank test further reveals differences between pairs of variables, as shown in Table 8.7.

Table 8.7 Difference of the Alternative Sources: Chinese Sample

Pair-wise variables	p -value	Significance
Capabilities vs. resources	.035	significant at the level 0.05
Business environment vs. capabilities	.000	significant at the level 0.01
Business environment vs. resources	.000	significant at the level 0.01

The differences between the three pairs are statistically significant at the 0.05 or 0.01 levels as shown. This indicates that the importance of any two variables is different in these three pairs. As such, given the mean scores of the three variables exhibited in Table 8.6, the results indicate that capabilities exert a greater influence on resources and business environment. In addition, the impact of business environment is significantly lower than that of resources with p -value = 0.000. The result shows that the degree of the importance of resources to competitiveness is higher than that of business environment. This is different from the finding from the UK sample.

All these results indicate that in the Chinese sample, resources, capabilities and business environment are all considered to impact upon an LSP's competitiveness. Among the three sources, the impact of capabilities is most important, followed by resources and then business environment. This shows that the Chinese sample produces the same results as the UK one.

8.4.3 Differences between the UK and Chinese samples

To ascertain whether there is a difference between the UK and Chinese samples, the Mann-Whitney test was employed. The Mann-Whitney test is the non-parametric equivalent of the independent t -test. It is identical to conducting an ordinary parametric two-sample t -test on the data after ranking across the combined samples. Put simply, it is used to compare two independent samples by using ranked data.

The Mann-Whitney test is often called the U test. It is assumed that there are two samples, sample 1 and sample 2. The null hypothesis is that the importance of the impacts of the three sources by the two samples is judged to be the same. The calculation of U is given by the following equation.

$$U = n_1 n_2 + \frac{n_1(n_1 + 1)}{2} - R_1$$

where n_1 is the sample size of sample 1, while n_2 is the sample size of sample 2, and R_1 is the sum of the ranks in sample 1.

The maximum value of U is the product of the two sample sizes. In addition, it can be calculated by hand in the case of small samples, when samples of fewer than 20 are involved. In the current case, n_1 and n_2 are replaced with the sample sizes of the UK and Chinese samples, i.e. 35 and 114. R_1 is the sum of the ranks in the UK sample.

The results show that the p -values of resources, capabilities and business environment are 0.000, 0.001 and 0.025 respectively. This indicates that the importance of each of the three sources as assessed by UK and Chinese respondents is different.

8.5 Contributing Factors to an LSP's Competitiveness

All respondents from the UK and China were asked to rate thirteen contributing factors to measure their importance using a five-point Likert Scale from 1 (unimportant) to 5 (very important) with mid-point 3 indicating important. The analysis was conducted in three steps.

- First, mean scores and their ranks were calculated for both the UK and Chinese samples.
- Secondly, the Mann-Whitney test was carried out to establish whether there was a significant difference between the two samples regarding each contributing factor.
- Thirdly, correlation analysis was done using the Spearman's rank and Pearson correlation tests to examine whether the rankings of importance of the thirteen contributing factors in two samples are related to each other significantly and how strongly they are related.

8.5.1 Summary of data

Table 8.8 displays some basic statistics of the thirteen contributing factors across the two country samples.

Table 8.8 Importance of Thirteen Contributing Factors by Mean Score, SD and Ranking

Variable	UK			China		
	Mean score	SD.	Rank	Mean score	SD.	Rank
Service quality	4.51	.658	1.5	4.82	.466	1
Operations management	4.51	.658	1.5	4.58	.612	3
Cost management	4.31	.676	3	4.54	.793	4.5
CRM	4.15	.784	4	4.54	.684	4.5
IT	3.97	.954	5	4.48	.745	7
Strategic management	3.88	.844	6	4.59	.694	2
Innovation	3.86	.845	7	4.50	.669	6
Corporate culture	3.74	.919	8	4.23	.845	12
Service network	3.69	.758	9	4.40	.765	9
HRM	3.60	.695	10	4.47	.733	8
BPM	3.47	.615	11	4.34	.745	10
Inventory management	3.21	.978	12	4.06	.852	13
Marketing	2.83	.954	13	4.27	.794	11

Note: 1= unimportant, 5= very important

In the UK sample, the results show that all the contributing factors but one, i.e. marketing, are judged to be important. Marketing is the least important by a significant margin. Service quality and operations management rank joint first. The 95% confidence interval for the two variables is the same, $\mu \in [4.29, 4.74]$, where μ is the expected value of the score for the variable. This means that the lowest mean of the two variables is likely to be above 4.20. As such, one can deduce that the true value of the two populations of service quality and operations management is contained within the range [4.29, 4.74].

With respect to the Chinese sample, the results show that all the thirteen contributing factors were considered important by Chinese respondents. Moreover, all these factors have substantial importance according to their mean scores which are far above midpoint 3. In particular, service quality is very close to the maximum mean value of 5. It may simply be a cultural characteristic to use the extremes in numerical scoring. In addition, in contrast to the results obtained from the UK sample, the perceptions of the Chinese respondents tended to exhibit greater agreement, especially regarding service quality, as seen by the lower SD values.

Service quality ranks first in both samples. Operations management, cost management and customer relationship all rank very highly. However, in the Chinese sample, strategic management ranks second, while it ranks sixth in the UK sample.

8.5.2 Difference between the two national samples

The Mann-Whitney test was used to examine the differences in judging the thirteen contributing factors between the UK and Chinese samples. The null hypothesis is that there is no significant difference between the two samples in judging the importance of each contributing factor. The results are displayed in Table 8.9.

Table 8.9 Mann-Whitney Test of Thirteen Contributing Factors

Variable	Sig (two-tailed) at 0.05 level	Variable	Sig (two-tailed) at 0.05 level
Strategic management	.000	Marketing	.000
Operations management	.611	Inventory management	.000
Service quality	.001	Innovation	.000
CRM	.005	HRM	.000
IT	.003	Cost management	.021
Service network	.000	Corporate culture	.005
BPM	.000		

The results show that all p -values except one, the value for operations management, are statistically significant at the 0.05 level. This indicates that there is no significant difference in the perceived importance of operations management by UK and Chinese respondents, while there are significant differences on the other twelve contributing factors. As discussed in Chapter 5, operations management is a basic and crucial function in logistics activities. This common perception shared by the managers in both countries indicates that the key role of operations management in logistics activities is generally accepted. The differences shown on the others reflect to some extent a general difference in business practice, culture, educational training, regulations and others between UK and Chinese LSPs.

8.5.3 Correlation analysis between the rankings in two samples

Pearson's test measures the strength of relationship between two variables on an interval or ratio scale, where the calculation is based on true values. Spearman's rank correlation test is a non-parametric approach, requiring ordinal data only. The calculation of this correlation is based on ranks of the data and applies the rationale of Pearson's correlation to those ranks.

These tests are used to assess the degree of correlation between the mean scores and rankings respectively of the thirteen contributing factors awarded by the UK and Chinese samples. Each sample has thirteen means, as shown in Table 8.8. Each group of thirteen means is essentially a variable. Hence there are two new variables from the two samples, called meanUK and meanChina. The two variables are considered as a pair for measurement. The strength of correlation between the two paired variables was examined using the Spearman's rank and Pearson correlation tests. The null hypothesis is that there is no significant correlation between the two variables.

The Spearman's rank and Pearson correlation coefficients are 0.857 and 0.807, and the p -value are 0.000 and 0.000 respectively, showing that the two variables are strongly correlated, as shown in Figure 8.8¹³. The null hypothesis can be rejected.

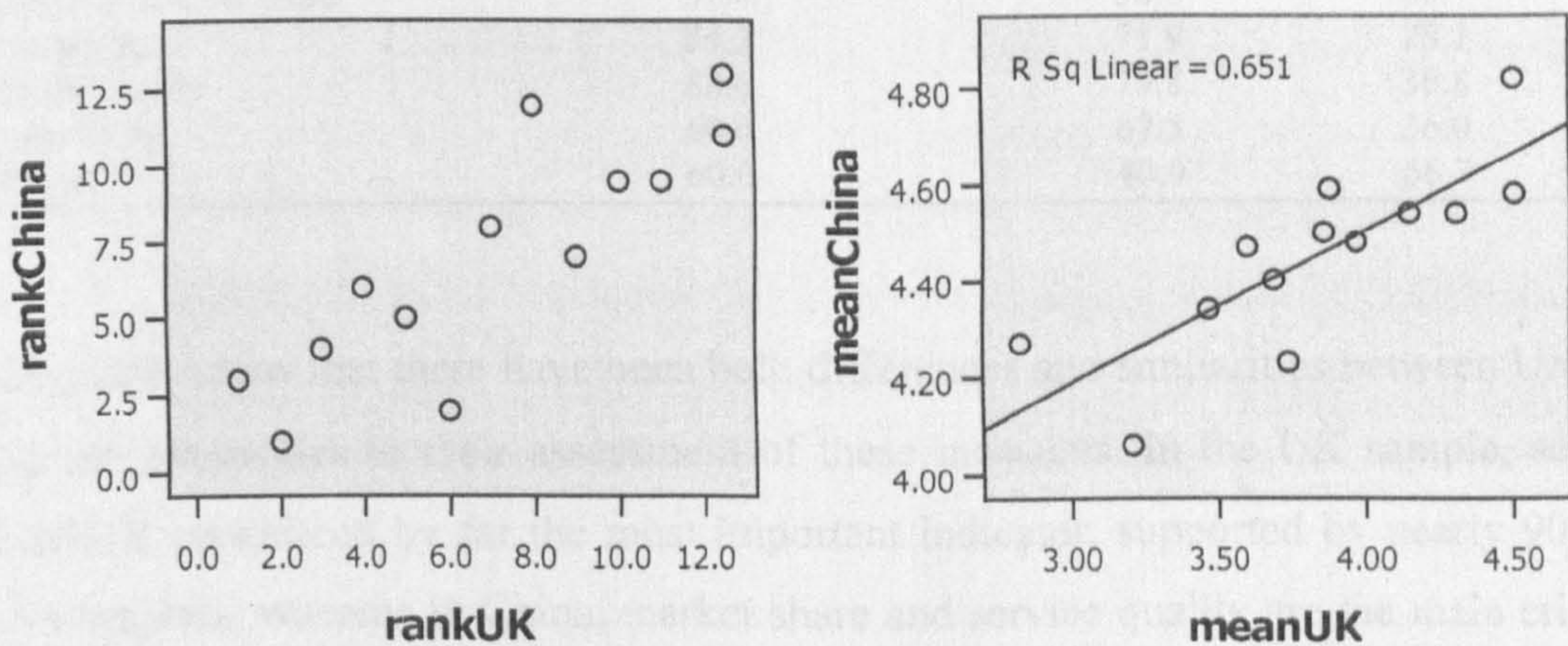


Figure 8.8 Correlation of Ranks and Means for Thirteen Contributing Factors

The result reveals that the evaluation of UK and Chinese managers on the rankings of the importance of the thirteen contributing factors to an LSP's competitiveness is quite similar.

To sum up, the importance of the thirteen contributing factors to an LSP's competitiveness has been examined by different statistical techniques. All of the thirteen contributing factors but one (i.e. marketing in the UK sample) are identified as being important by their mean scores in two countries. The managers in both countries view the importance of each contributing factor differently, except in the case of operations

¹³ To keep the two plots comparable, the ranks used in the plot on the left hand are sorted by the same order as the mean scores. The line in the plot on the right hand is the fitted regression line.

management. However, there is little difference in viewing the rankings of the importance of the thirteen contributing factors.

8.6 Measures of LSP Competitiveness

All the responding companies were asked which indicator they would use in assessing an LSP's competitiveness. In the Chinese sample, respondents were asked to distinguish the indicators used to assess actual and 'potential' competitiveness for a tentative discussion. The results can be seen in Table 8.10.

Table 8.10 Measures of Assessing Competitiveness

Measure	UK (N=35)	China (N=114)	
	Percent (%)	Actual Percent (%)	Potential Percent (%)
Market share	31.4	85.1	14.9
Growth in market share	31.4	36.8	66.7
Profitability	54.3	71.9	28.1
Service quality	88.6	79.8	36.8
Productivity	60.0	67.5	36.0
Innovation	60.0	40.0	66.7

The results show that there have been both differences and similarities between UK and Chinese companies in their assessment of these measures. In the UK sample, service quality is considered by far the most important indicator, supported by nearly 90% of the responses, whereas in China, market share and service quality are the main criteria, with about 85% and 80% respectively. Growth in market share and innovation are considered as the main indicators of 'potential' competitiveness, with around two thirds of responses in China.

In addition, innovation, productivity and profitability are adopted as key measures by over half of the respondents in the UK sample, while market share and its growth are identified by approximately one third of respondents. As discussed in Chapter 5, market share and growth in market share are considered as the indicators of market performance. This result reveals that market performance may be not the most important benchmark in assessing competitiveness to some UK companies. In the case of the Chinese sample, market share, service quality, profitability and productivity are also considered important indicators in measuring actual competitiveness. Likewise, as discussed in Chapter 5, profitability is a financial measure, while service quality and productivity are essentially non-financial measures. This result indicates that Chinese

companies would not use only market performance, but also use other performance measures to assess actual competitiveness. Regarding 'potential' competitiveness, growth in market share and innovation are distinguished from the other four measures. Innovation is a non-financial measure. This result reveals that market performance and non-financial performance are considered to assess competitive potential by Chinese companies. Apart from the above findings, the results also indicate that Chinese companies do not confine competitiveness to the actual performance. Instead, they would see the potential as an inherent characteristic of competitiveness.

Overall the results reveal that multiple measures rather than a single measure have been used by companies in assessing LSPs' competitiveness.

8.7 Achievement of Competitiveness

As discussed in Chapter 5, the most essential thing for an LSP is how to translate its vision of competitiveness into management practices. The survey placed heavy emphasis on these practices and focused on three issues in particular: (1) Which practices do LSPs apply? (2) Why do they implement these practices? (3) How do LSPs assess the impact of some practices on competitiveness? The remainder of this section will address these three questions.

8.7.1 Strategic management

Four issues of strategic management were considered. This includes strategic planning, competitive strategy, strategic objective of expanding geographically and plans to diversify the range of services.

To facilitate discussing the four issues, the profile of the service network of the companies surveyed was briefly described. The companies from two national samples had different geographical extents of their service network at global, European (i.e. only for the UK sample), national and regional levels, as shown in Figure 8.9. This result reveals that most respondents from the UK and China operate at a national level, although some have expanded to a global scale.

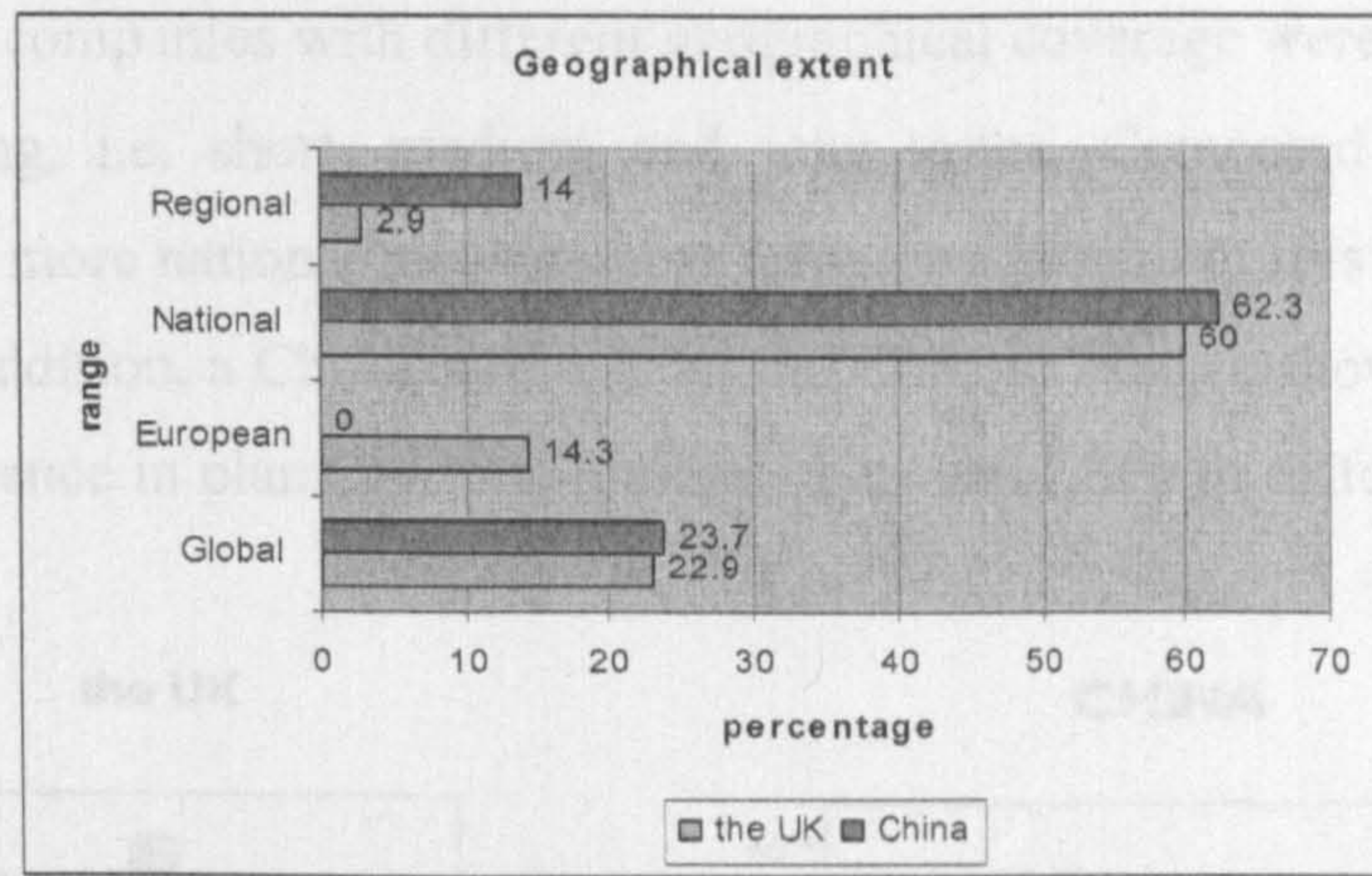


Figure 8.9 Comparison by Service Network

(1) Strategic planning

Across the UK and Chinese samples, all but two UK companies undertook strategic planning. The time horizon for this planning varies between the two countries. UK companies tended to engage in short (1-3 years) or medium (4-5 years) planning, while Chinese companies preferred to plan strategy on a medium and long term (> 5 years) basis, as shown in Figure 8.10. A Chi-square test¹⁴ indicates that there is significant difference between the two samples on the three time scales set by companies when undertaking strategic planning.

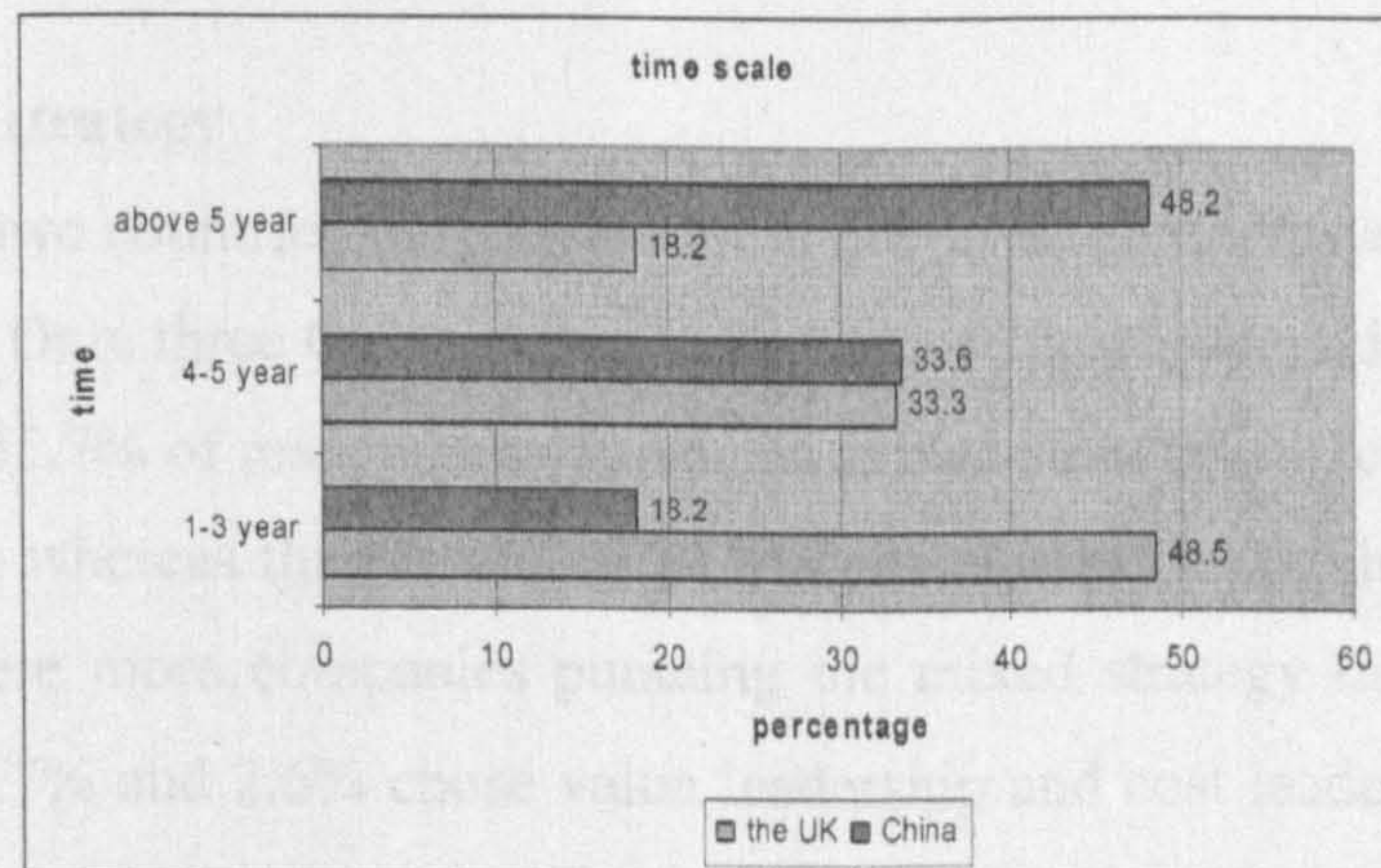


Figure 8.10 Comparison of Strategic Planning by Time Scale

Further, Figure 8.11 exhibits the time scales over which those LSPs whose operations extend over different areas plan their strategies. In the UK sample, only national players undertook long-term planning, i.e. over five years; the others chose short or medium planning. In addition, only one regional player undertook medium planning. In the

¹⁴ All the Chi-square test results in Section 8.7 are presented in Appendix 9.

Chinese sample, companies with different geographical coverage were involved in three types of planning, i.e. short, medium and long terms. Compared with global and regional players, more national players chose long-term planning. It is the same as in the UK sample. In addition, a Chi-square test for the Chinese sample shows that there is no significant difference in planning time horizons between LSPs of differing geographical extent.

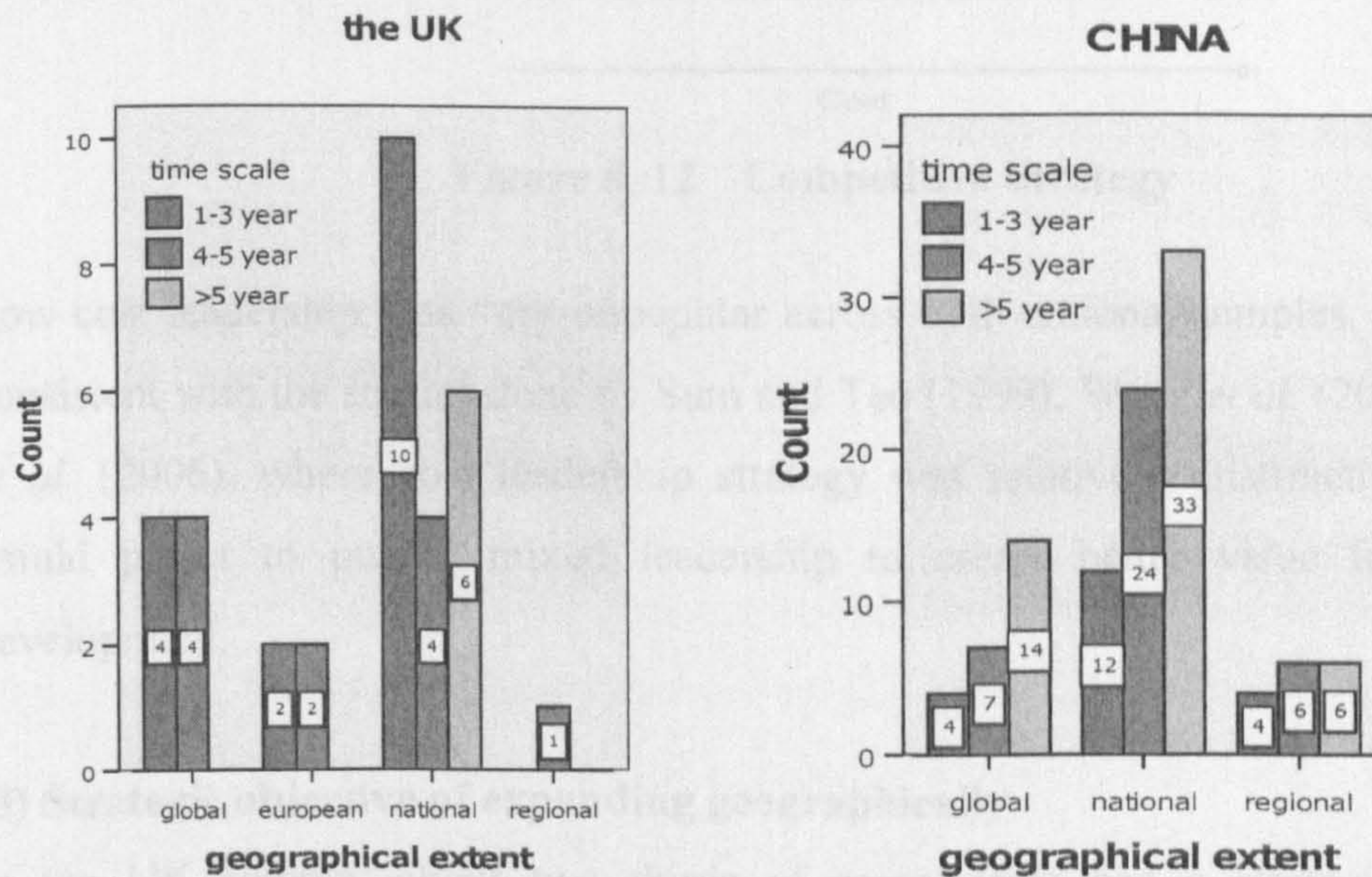


Figure 8.11 Time Scales for Strategic Planning by LSPs of Differing Geographical Extent

(2) Competitive strategy

Managers in the two countries were asked about the broad competitive strategy that they aimed to pursue. Only three Chinese respondents chose cost leadership. Additionally, in the UK sample, 65.7% of respondents pursued a mixed strategy, i.e. combining cost and value leadership, whereas the remaining 34.3% chose value leadership. In the Chinese sample, there were more companies pursuing the mixed strategy than in the UK, i.e. 80.7%, while 16.7% and 2.6% chose value leadership and cost leadership respectively, as shown in Figure 8.12.

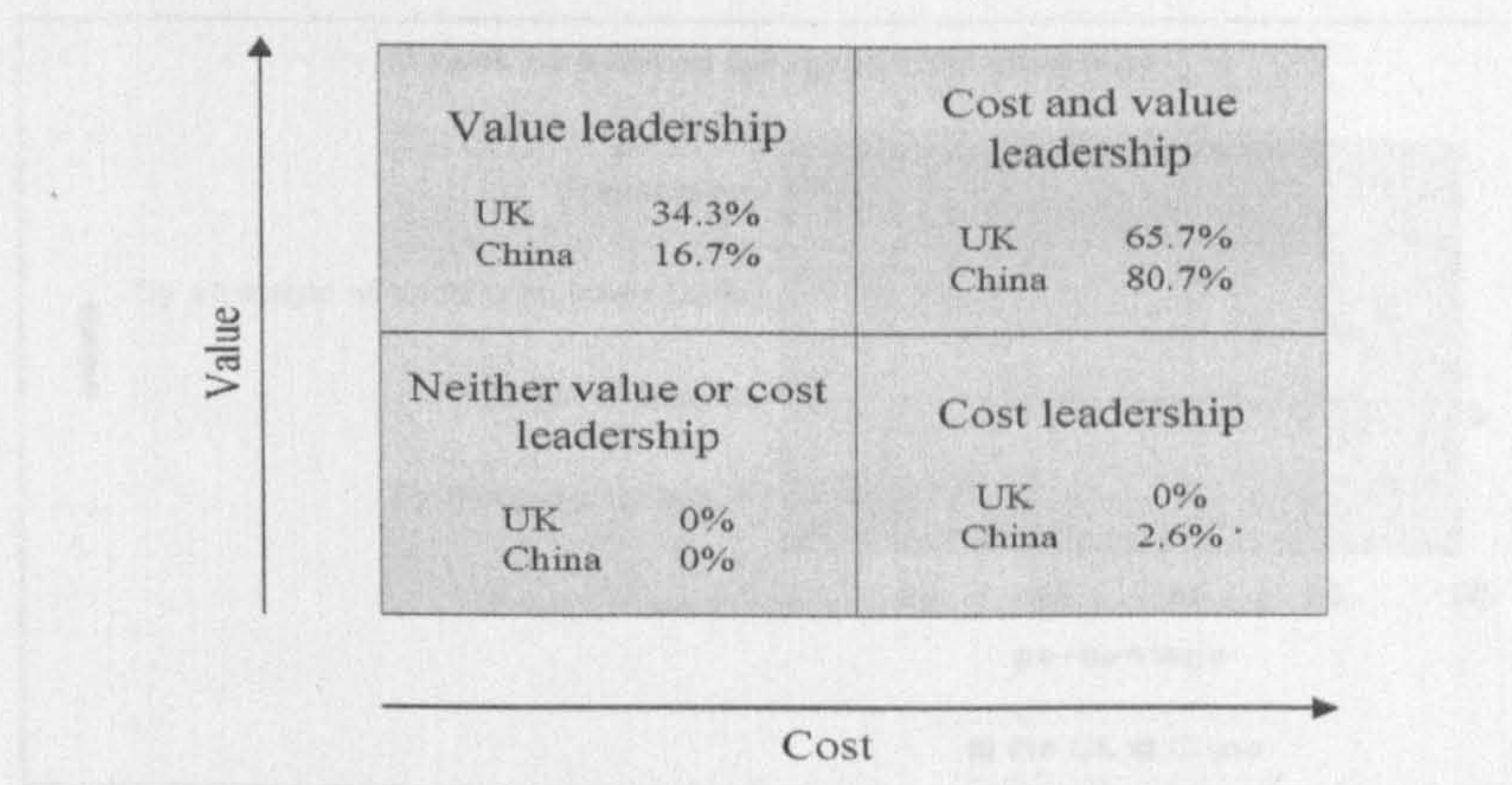


Figure 8.12 Competitive Strategy

Low cost leadership was very unpopular across both national samples. This finding is consistent with the studies done by Sum and Teo (1999), Wang *et al.* (2006) and Yeung *et al.* (2006), where cost leadership strategy was relatively unattractive. Companies would prefer to pursue mixed leadership to create better value for a sustained development.

(3) Strategic objective of expanding geographically

In the UK sample, about two thirds of respondents had a strategic objective of geographical expansion. In the Chinese sample, about 98% of respondents, i.e. almost all companies, wished to expand geographically. A Chi-square test indicates that there is significant difference on this issue between the two samples. Further, the two samples were asked to indicate how they plan to expand, as shown in Figure 8.13. The results show that merger/acquisition, strategic alliance, organic growth and franchising are used by companies. Furthermore, the Chi-square tests for the former three means¹⁵ also show the statistically significant difference between the two samples. This is likely to reflect difference in the age and the maturity of the Chinese and UK LSPs in their development.

¹⁵ The frequency of franchising is too small in the UK sample.

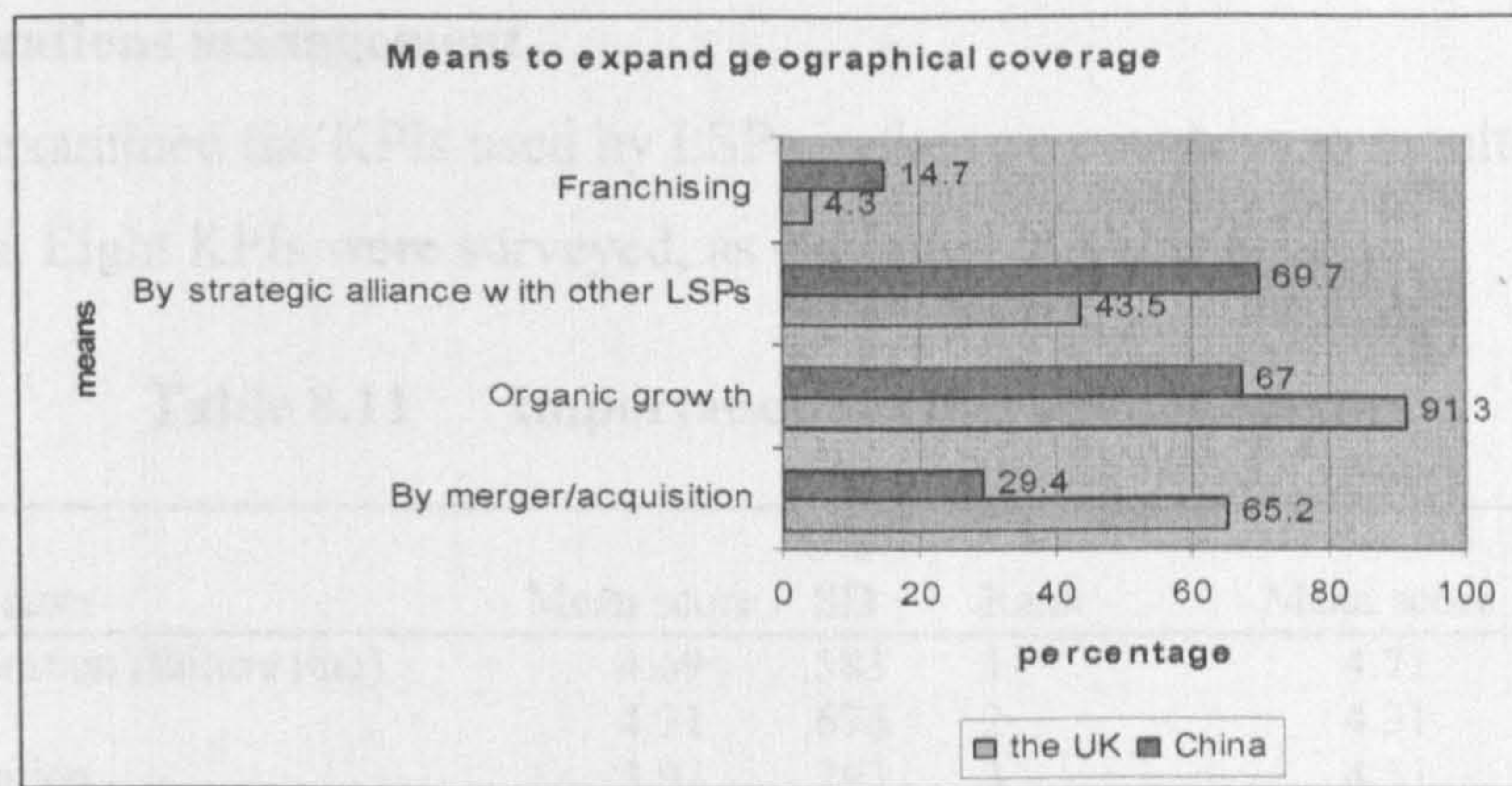


Figure 8.13 Means to Expand Geographical Expansion

(4) Plans to diversify the range of services

Around 57% of UK respondents and 97.4% of Chinese respondents planned to diversify their range of services. The results reveal that Chinese companies have much more ambitious plans for geographical expansion and service diversification than their UK counterparts. A Chi-square test indicates that there is a statistically significant difference between the two samples. In addition, companies diversified their service range by merger/reacquisition, organically and strategic alliance, as shown in Figure 8.14. The Chi-square tests for these three pairs of means were conducted. The test results are different. In the former case, there is no significant difference, while in the latter two cases, significant differences are shown between the two samples. The results seem to indicate that the role of merger/reacquisition in diversifying the range of services was generally perceived by the surveyed companies.

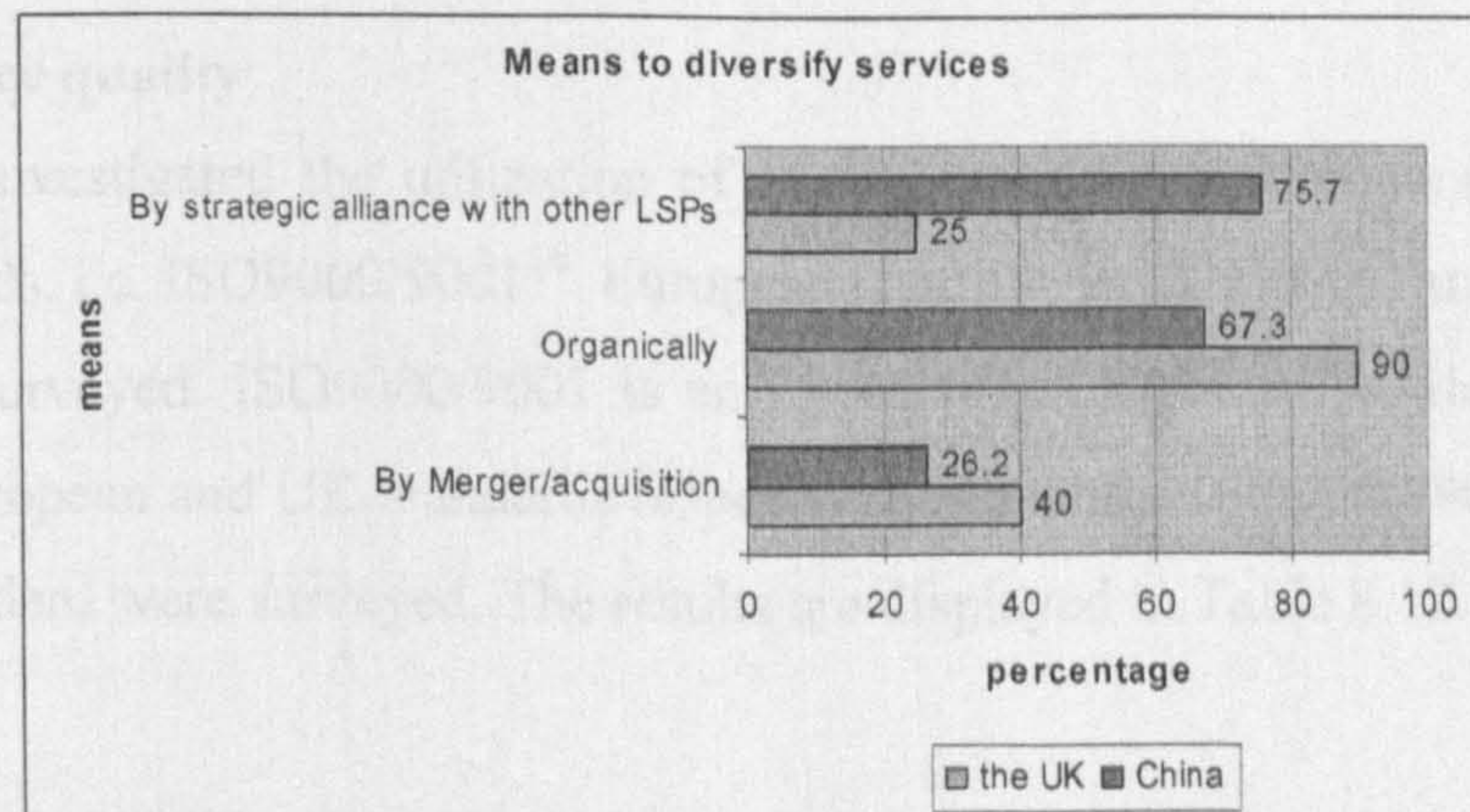


Figure 8.14 Means to diversify the range of services

8.7.2 Operations management

The survey examined the KPIs used by LSPs in the two countries to monitor operational performance. Eight KPIs were surveyed, as exhibited in Table 8.11.

Table 8.11 Importance of Operational Factors

Operational factors	UK			China		
	Mean score	SD	Rank	Mean score	SD	Rank
Quality of operation (failure rate)	4.69	.583	1	4.71	.510	1
Flexibility	4.31	.676	2	4.31	.751	7
Speed of operation	3.91	.793	3	4.51	.631	4.5
Capacity utilization	3.89	.832	4	4.25	.669	8
Innovation	3.77	.808	5	4.54	.631	3
Process integration	3.71	.860	6	4.51	.633	4.5
Degree of specialization	3.51	.887	7	4.59	.562	2
Standardization of operations	3.17	.954	8	4.38	.688	6

Note: 1= no importance, 5=high importance

The results show that all the eight KPIs were considered important by both UK and Chinese respondents. The quality of the operation (i.e. failure rate) ranks first in both countries. While there was general agreement between UK and Chinese companies that quality of operation was the most important operational criterion, opinions diverged on the relative importance of all the other criteria. For example, flexibility ranks second in the UK as opposed to only second bottom in China. On the contrary, degree of specialization ranks second in China as opposed to second bottom in the UK. The Spearman's rank and Pearson correlation tests for the eight KPIs show that there is no significant correlation between the rankings given to these operational KPIs by UK and Chinese LSPs.

8.7.3 Service quality

The survey investigated the utilization of quality standard by companies. In the UK, three standards, i.e. ISO9000/9001¹⁶, European Quality Award (EQA) and Charter Mark (UK) were surveyed. ISO9000/9001 is an international standard, while the latter two represent European and UK standards respectively. In China ISO9000/9001 and the GB national standard were surveyed. The results are displayed in Table 8.12.

¹⁶ In the UK, BS5750, the UK equivalent of the international quality standard ISO 9000, might have been an alternative UK standard.

Table 8.12 Adoption of Service Quality Standard

Service quality standard	UK (%)	China (%)
ISO9000/9001	65.7	76.3
European Quality Award (EQA)	2.9	—
GB (Chinese standard)	—	6.1

Others	25.7	7.9
International standard	e.g. ISO18001, 14000	e.g. ISO 14001, OHSAS 18000
Industry standard	e.g. SQAS, EFSIS	e.g. Quality system of China post logistics
Company established by itself	e.g. clients system or quality standards	e.g. KPI

In the UK nearly two thirds of respondents adopted ISO 9000/9001, only one company used EQA and no company used the Charter Mark (UK) standard. However, 25.7% of companies selected other standards. This includes international, industry and standards established by companies themselves. For example, SQAS, meaning *Safety and Quality Assessment Systems*, is used in the chemical industry in managing logistics operations. In the Chinese sample, about 76.3% of respondents adopted ISO9000/9001. 6.1% companies used GB. 7.9% companies chose diversified standards. For instance, the quality system of China post logistics is the criterion that has been widely employed in the postal sector in China. The results reveal widespread adoption of international standards by LSPs in both countries. Apart from this standard, various other standards are also adopted by companies.

In addition to service quality standard, respondents in both countries were also asked to prioritize the impact of customer service on LSPs' competitiveness. Nine criteria relevant to customer service were surveyed. A five-point Likert scale was used with a score of 1 indicating "no importance" and 5 "high importance". Table 8.13 exhibits the results.

Table 8.13 Importance of Nine Customer Service Criteria

Customer service criterion	UK			China		
	Mean score	SD	Rank	Mean score	SD	Rank
Reliability of delivery	4.66	.539	1	4.73	.484	1.5
Communication with clients	4.41	.609	2	4.73	.504	1.5
Staff conduct	4.32	.684	3	4.63	.631	4.5
Customer loyalty/retention	4.27	.719	4	4.63	.687	4.5
Response time	4.12	.686	5	4.53	.616	6
IT support	3.85	.892	6.5	4.41	.746	7
Value-added service	3.85	.972	6.5	4.34	.803	8
Billing accuracy	3.74	.898	8	4.66	.547	3
Complain/claims procedure	3.41	.925	9	4.27	.845	9

Note: 1=no importance, 5=high importance

All nine customer service criteria were considered important by both UK and Chinese respondents, with mean scores in excess of the mid-point 3. In China, reliability of delivery and communication with clients rank in joint first place, whereas the two criteria rank first and second in the UK respectively. In addition, the rankings of the two sets of criteria appear visually to be correlated. To examine further the correlation between the two samples, the Spearman's rank and Pearson correlation tests were used. The two correlation coefficients are 0.807 and 0.734, and the p -values are 0.009 and 0.024 respectively, indicating that the correlation between the two samples is significant, as shown in Figure 8.15¹⁷. These findings reveal that there is no clear difference between the managers in both countries in evaluating the rankings of the importance of the nine customer service measures to the competitiveness of an LSP.

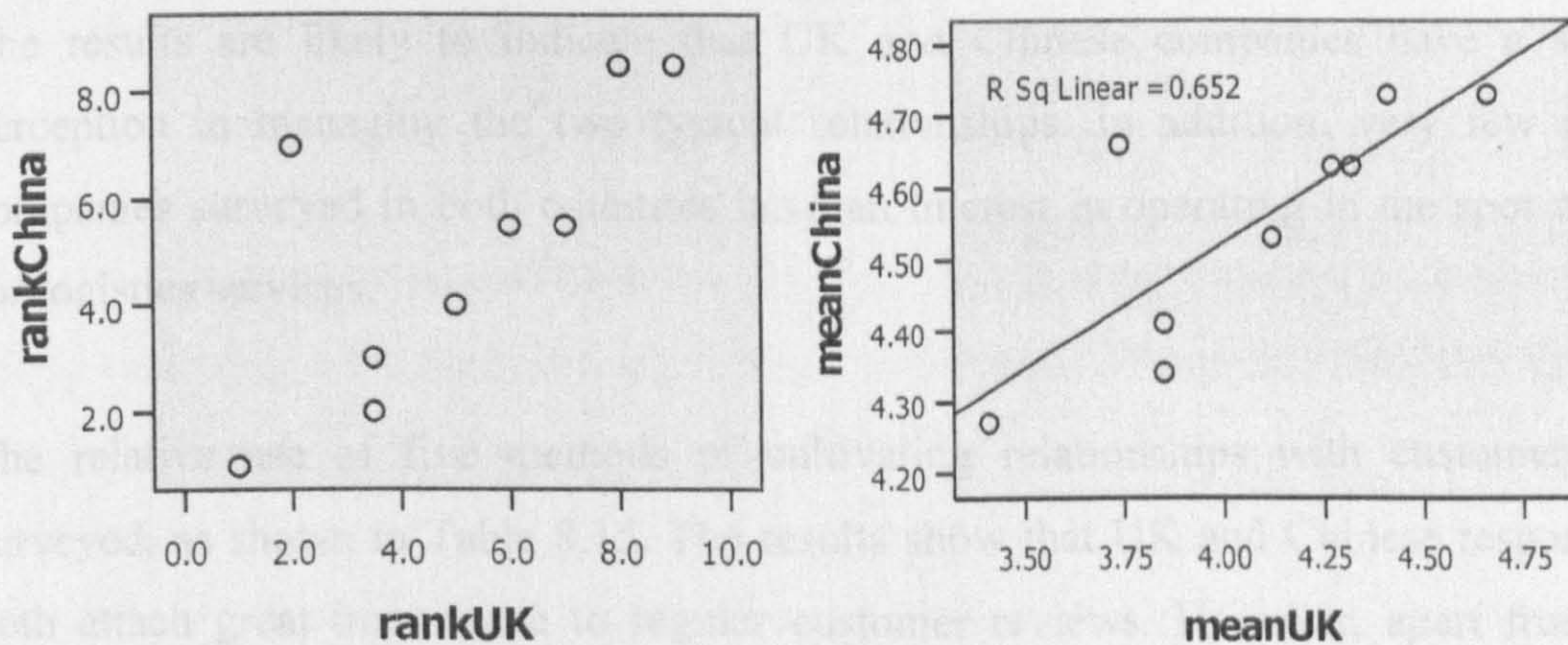


Figure 8.15 Correlation of Ranks and Means for Nine Customer Service Criteria

However, divergence still exists between the UK and Chinese samples. For example, billing accuracy ranks third in China as opposed to second last in the UK.

8.7.4 Customer relationship management (CRM)

With respect to CRM, the relative importance of two typical types of relationship, i.e. long-term contractual relationship and short-term transaction arrangement were surveyed. Table 8.14 displays the results.

¹⁷ The rationale of how the plots were drawn was similar to that shown in Figure 8.8.

Table 8.14 Nature of Customer Relationships

Customer relationship	UK	China	Weight by the number of customers						
	N=34 Percent (%)	N=114 Percent (%)	UK		China		t-test		
			Mean	SD	Mean	SD	t	df	p-value
Long-term	97.1	96.5	67.8	28.7	75.9	16.2	-0.569	147	.570
Short-term	71.9	89.4	32.9	30.1	21.2	14.4	1.189	147	.237
Others*	8.6	21.2	12.5	10.6	3.0	6.6			

*Notes: Others include spot market and temporary transaction etc.

Roughly 97% of both UK and Chinese companies sought long-term contractual relationships. 71.9% of UK respondents and 89.4% of Chinese respondents also intended to remain involved in short-term transactional arrangements. The *t*-tests as shown, indicate that there is no difference between the two samples in choosing relationships with their customers in terms of the weight by the number of customers. The results are likely to indicate that UK and Chinese companies have a similar perception in managing the two typical relationships. In addition, very few of the companies surveyed in both countries have an interest in operating in the spot market for logistics services.

The relative use of five methods of cultivating relationships with customers was surveyed, as shown in Table 8.15. The results show that UK and Chinese respondents both attach great importance to regular customer reviews. However, apart from this similarity, there is no agreement on the other methods. The results reveal that UK companies are more committed to mutually agreed performance measurement systems, joint initiatives and frequent meetings, while Chinese companies prioritize customized services and frequent meetings.

Table 8.15 Means Used in Cultivating Relationship

Means	UK Percent (%)	China Percent (%)
Regular customer reviews	97.1	87.6
Mutually agreed performance measurement system	88.6	38.1
Joint initiatives	71.4	38.9
Frequent meetings	57.1	67.3
Customized services	34.3	77.9

In addition, all respondents in both the UK and China were asked to what extent their attitude to their customers was proactive or reactive. This was scored with 1 indicating "highly reactive" and 5 "highly proactive". Figure 8.16 presents the diagram of scores across the two samples.

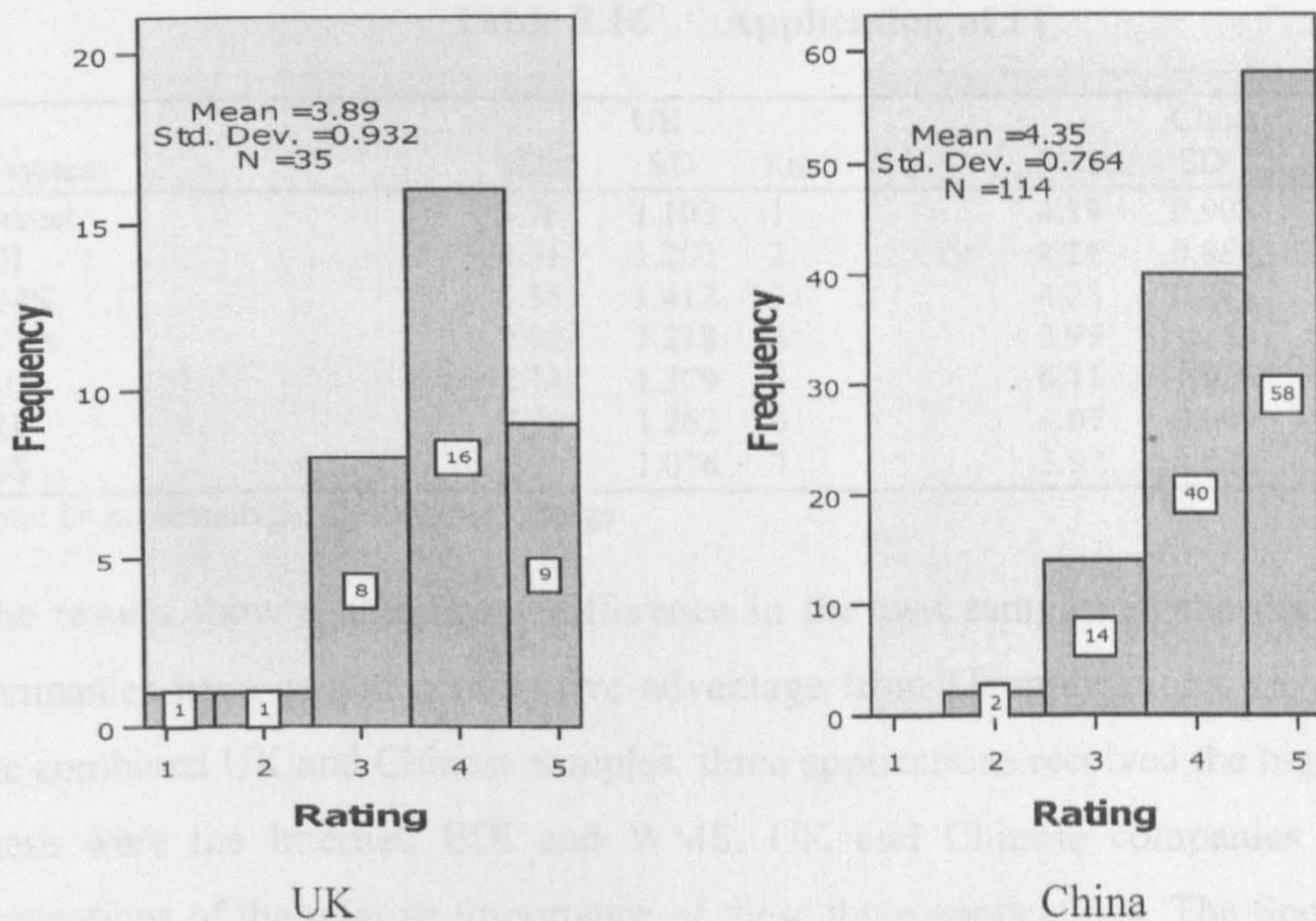


Figure 8.16 Distribution Curve of Reactive or Proactive

With mean values of 3.89 for UK respondents and 4.35 for Chinese respondents the scores were skewed to the 'proactive' end of the diagram. The Mann-Whitney test with p -value 0.005 indicates that there is a significant difference between the two samples on the rating of their attitude to their customers. The Chinese companies considered themselves to be more proactive than their UK counterparts, although it must be noted that differences in the scores may reflect cultural factors and managerial experience and do not translate into differences in the actual degree of proactivity.

8.7.5 Information technology (IT)

All UK and Chinese respondents were asked to rate the competitive advantage they gained from the application of IT. The survey enquired about a broad range of applications, including EDI, Warehousing Management System (WMS), Internet, Computerized Vehicle Routing and Scheduling (CVRS), Fleet Management System (FMS), ERP and Decision Support Systems (DSS). A five-point Likert scale with 1 indicating "no advantage" and 5 "large advantage" was used to assess the seven applications. Table 8.16 exhibits the results.

Table 8.16 Application of IT

IT system	UK			China		
	Mean	SD	Rank	Mean	SD	Rank
Internet	3.76	1.103	1	4.19	0.902	3
EDI	3.71	1.202	2	4.26	0.869	1
WMS	3.35	1.412	3	4.23	0.878	2
CVRS	2.82	1.218	4	3.99	1.153	6
FMS	2.74	1.379	5	4.11	1.025	4
ERP	2.30	1.262	6	4.07	0.949	5
DSS	1.90	1.076	7	3.92	1.025	7

Note: 1= no advantage; 5 = large advantage

The results show a significant difference in the two samples in the degree to which companies have gained competitive advantage from IT applications. However, across the combined UK and Chinese samples, three applications received the highest rankings; these were the Internet, EDI and WMS. UK and Chinese companies have similar perceptions of the relative importance of these three applications. The Spearman's rank and Pearson correlation tests were conducted to examine the relationship between the two samples. The two correlation coefficients are 0.786 and 0.878, and the *p*-values are 0.036 and 0.009, confirming that the correlation between the two samples is significant. This relationship is shown in Figure 8.17 for the ranks and means¹⁸. The results indicate that overall there is much similarity between the managers of both countries in gaining competitive advantage from the seven IT applications.

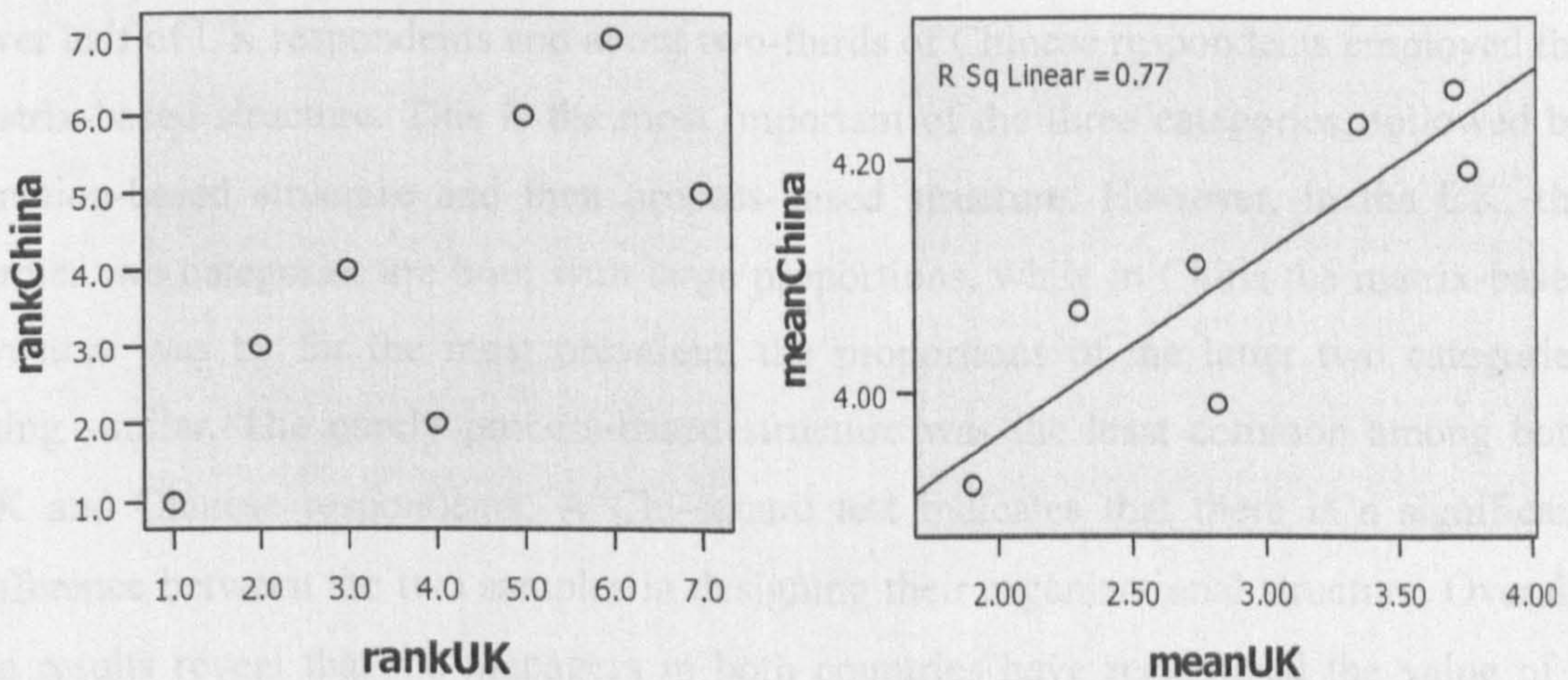


Figure 8.17 Correlation of Ranks and Means for Seven IT Applications

There are, nevertheless, notable differences between the rankings of some IT applications. For example, DSS was not considered advantageous by UK companies, as it has a relatively low mean value and ranking in the last place among the seven

¹⁸ Likewise, these plots have been constructed on the same basis as that in Figure 8.8.

applications. Nonetheless, this application also ranks seventh across the Chinese sample, although it obtained a mean ranking which was twice as high in absolute terms as that in the UK sample.

8.7.6 Business process management (BPM)

Enquires were made about organizational structures used by LSPs in the two countries. Three types of organizational structures were surveyed: function-based structure, process-based structure and matrix-based structure, i.e. combination of function and process-based structure. The results are displayed in Figure 8.18.

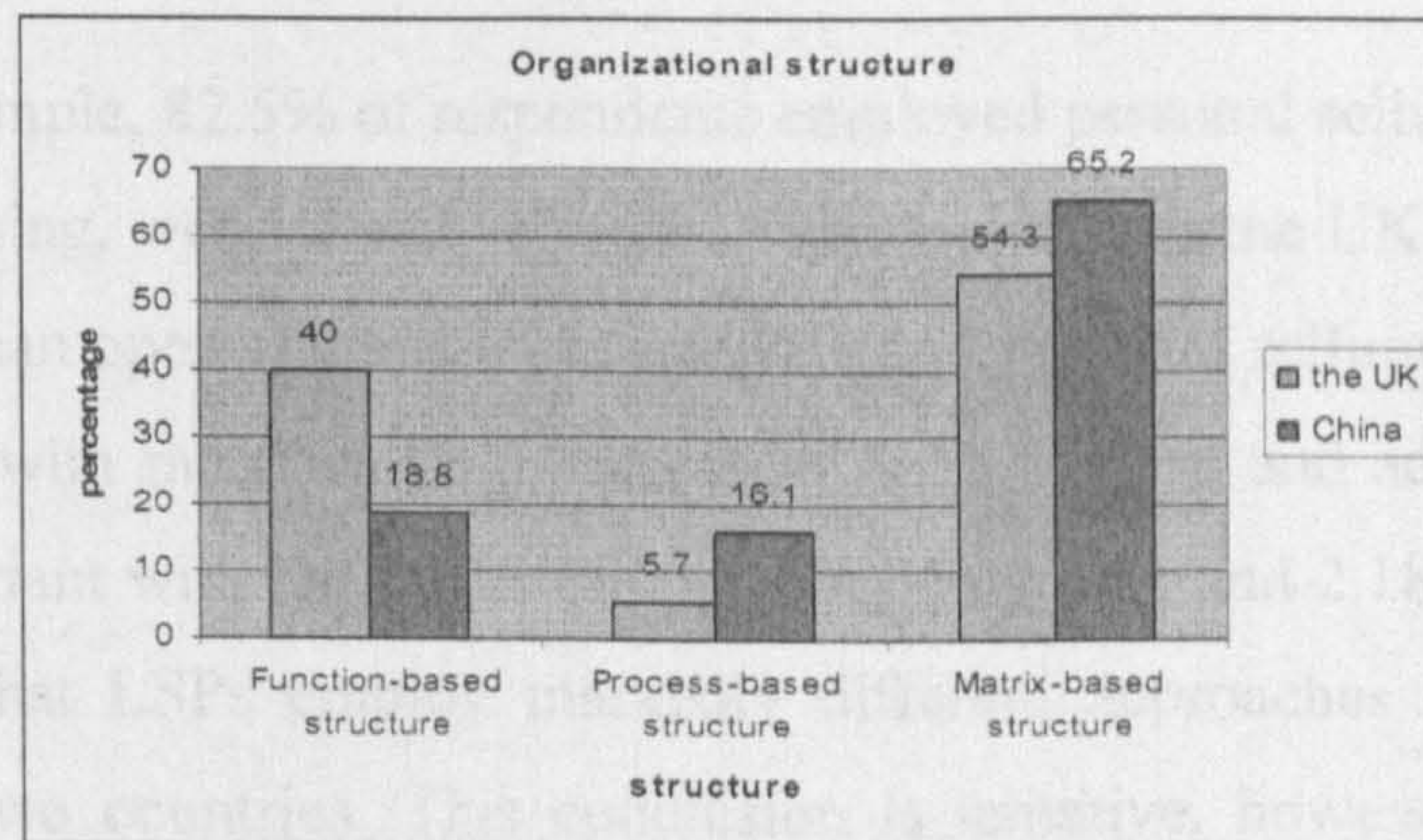


Figure 8.18 Comparison by Organizational Structure

Over half of UK respondents and about two-thirds of Chinese respondents employed the matrix-based structure. This is the most important of the three categories, followed by function-based structure and then process-based structure. However, in the UK, the former two categories are both with large proportions, while in China the matrix-based structure was by far the most prevalent, the proportions of the latter two categories being similar. The purely process-based structure was the least common among both UK and Chinese respondents. A Chi-square test indicates that there is a significant difference between the two samples in designing their organizational structure. Overall, the results reveal that the managers in both countries have recognized the value of a matrix-based structure.

8.7.7 Marketing

Five marketing strategies were considered: personal selling, referrals, website, advertising and exhibitions. In China, respondents were asked which marketing strategy

they used, while in the UK, respondents were required to rate further the importance of different marketing strategies, as shown in Table 8.17.

Table 8.17 Importance of Different Marketing Strategies

Marketing strategies	China	UK	
	Percent (%)	Mean score	SD.
Personal selling	82.5	4.20	1.023
Referrals	47.4	4.46	0.701
Website	48.2	3.65	1.070
Advertising	56.1	2.18	1.114
*Exhibition	--	1.94	1.027

Notes: 1=no importance, 5=high importance

* Exhibition was added in the UK survey.

In the Chinese sample, 82.5% of respondents employed personal selling. Approximately half used advertising, website and referrals. The results from the UK sample reveal that personal rather than open channel - i.e. referrals and personal selling - were considered more important, with mean value in excess of 4. Exhibition and advertising were not considered important with the mean values being only 1.94 and 2.18, respectively. The results suggest that LSPs employ markedly different approaches to marketing their services in the two countries. This conclusion is tentative, however, as the question about marketing was asked differently in the two countries.

8.7.8 Inventory management

All respondents from the UK and China were asked whether they offered inventory management services to their customers. The aim was to examine whether companies can gain competitive benefit from offering this value-adding service. The scale of assessing this benefit was 1, 2, 3 and 4 which represent no benefit, slight benefit, moderate benefit and great benefit respectively. The results are presented in Table 8.18.

Table 8.18 Inventory Management Service for Customers

	Offer inventory management	Benefit	
	Percentage	Mean score	SD.
UK	68.6	3.43	.590
China	96.5	2.87	.582

In the UK, about two thirds of the responding companies offered inventory management to their customers. A mean value of 3.43 suggests that companies gain substantial benefit from this supplementary service. In contrast, in China 96.5% of respondents provided this service, but the mean value at 2.87 was lower than that of the UK sample.

The results indicate that, although many Chinese LSPs offered this service for their customers, the benefit they obtained is not as great as that of their UK counterparts.

8.7.9 Innovation

Both UK and Chinese respondents were asked to rate the degree to which companies could gain service leadership through innovation, with a score of 1 indicating “not at all” and 5 “large extent”. The mean scores of 3.8 and 4.14 being above the mid-point 3 from the UK and Chinese samples respectively reveal that companies could gain service leadership through innovation. A Mann-Whitney test with p -value 0.024 shows the statistically significant difference between the two samples on the rating. Likewise, this might reflect the cultural characteristic to use numerical scoring.

Table 8.19 shows how service, management and technology were all identified as important sources of innovation in the two countries. In the UK, service innovation and management innovation rank joint first. In China, the ranking was service innovation, management innovation and technological innovation. The importance of service innovation echoes the findings of the study by Flint *et al.* (2005) which called for more service innovation. The Mann-Whitney test for the three types of innovation shows significant difference (i.e. p -value 0.004, 0.000 and 0.000) between the two samples. Thus it is likely to reflect a cultural characteristic in using numerical scoring between UK and Chinese respondents.

Table 8.19 Innovation Resources

Main sources	UK			China		
	Mean score	SD	Rank	Mean score	SD	Rank
Service innovation	3.91	.853	1	4.67	.564	1
Management innovation	3.91	.818	1	4.51	.630	2
Technological innovation	3.63	.877	2	4.13	.932	3

Note: 1=low, 5= high

In order to improve competitiveness, companies also adopted different innovative activities. Figure 8.19 shows the relative importance of innovations adopted by these two national samples.

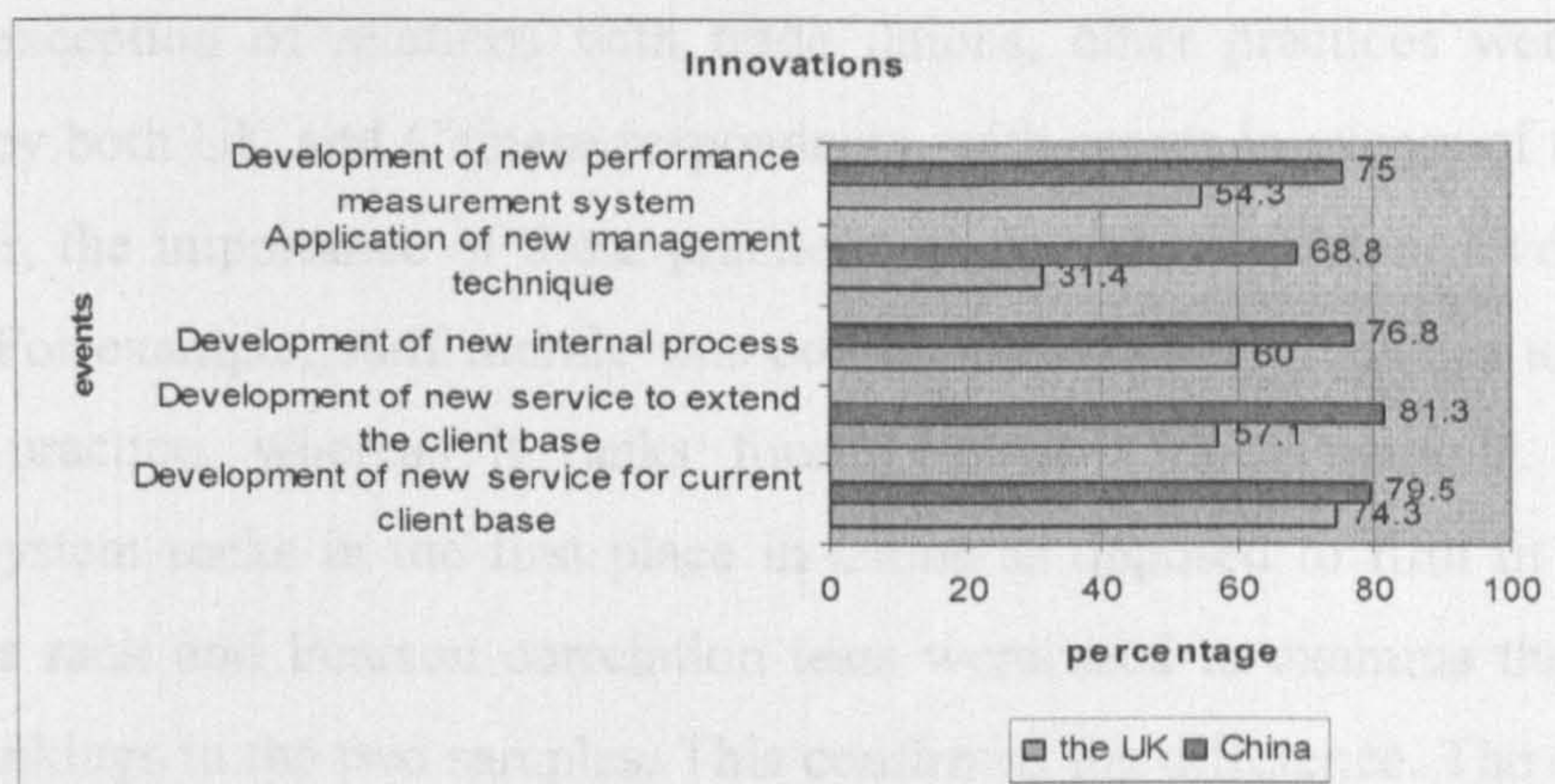


Figure 8.19 Comparison by Innovations

The results reveal a relatively high level of adoption of these innovations by UK and Chinese companies, such as the development of new service for current client base and the development of new internal process, as shown in Figure 8.19. The Chi-square test shows that there is no significant difference between the two samples, indicating that the adoption of the two innovations has been generally accepted by both UK and Chinese companies. There are differences between the two countries in viewing the other three kinds of innovations as shown by the Chi-square tests. This may be partly explained by the different focuses in the pursuit of innovation for UK and Chinese LSPs since they are in different growth phases: greater maturity of the LSP sector in the UK and a much earlier stage of development among LSPs in China.

8.7.10 Human resource management (HRM)

Table 8.20 displays the results of the responses of both countries on the importance of HRM practices to competitiveness. Since there are no trade unions in China¹⁹, dashes are put against this activity.

Table 8.20 Importance of HRM Activities

HRM activity	UK			China		
	Mean score	SD	Rank	Mean score	SD	Rank
Staff morale	4.23	.731	1	4.50	.633	4
Staff training provision	4.09	.853	2	4.66	.529	2
Company ethos	4.03	.785	3	4.48	.629	5
Staff recruitment procedures	4.00	.767	4	3.76	.890	8
Performance appraisal system	3.80	.994	5	4.68	.541	1
Employee empowerment	3.71	.836	6	4.07	.779	6
Reward and compensation system	3.60	.847	7	4.56	.612	3
Disciplinary procedure	3.03	1.071	8	3.98	.917	7
Relations with trade union	2.71	1.274	9	—	—	—

Note: 1= no importance, 5= high importance

¹⁹ In China workers can belong to organizations which have a social function but do not negotiate worker rights or wages.

With the exception of relations with trade unions, other practices were considered important by both UK and Chinese respondents, with scores in excess of the mid-point 3. However, the importance of these practices is viewed at different levels in the two countries. For example, staff morale was considered by UK companies to be the most important practice, whereas it ranks fourth in the Chinese sample. Performance appraisal system ranks in the first place in China as opposed to fifth in the UK. The Spearman's rank and Pearson correlation tests were used to examine the relationship between rankings in the two samples. This confirmed the difference. The correlation of the eight practices between the two samples, excluding relationship with trade unions, is not statistically significant. This observed that the difference between the two samples on HRM issues may reflect variations in national cultures.

8.7.11 Cost management

All respondents from the UK and China were asked which accounting tool they used to manage and control the cost of logistics activities. The main choice was between the traditional cost system and activity-based costing system (ABC), as shown in Table 8.21.

Table 8.21 Cost Accounting Tools

Accounting tool	UK (%)	China (%)
Traditional cost system	34.3	17.0
ABC	11.4	13.4
Both of the above	54.3	69.6
Neither of the above	0	0

The results show that there are differences in the degree of reliance on these two main methods of cost accounting. 54% of UK respondents and 68% of Chinese respondents employed both methods of cost accounting. In the UK, 34% and 11% of respondents, respectively, used only one of the two methods, while in China, the corresponding proportions are 17% and 13% only. A Chi-square test shows that there is no significant difference between the two samples in using accounting tools to manage cost. ABC is the more widely accepted tool but it is the more recently developed approach. One might have expected it to be more widely used in the UK where the LSP sector is at a more advanced stage. The survey suggested, however, that Chinese companies make greater use of ABC than their UK counterparts.

8.7.12 Corporate culture

UK and Chinese respondents were asked which attributes reflected the corporate culture of an LSP. The results show a high degree of similarity on the four attributes: service quality, customer satisfaction, quality of management and relationship, as indicated by Chi-square tests with no significant difference. Nevertheless, there is a divergence on the other attributes: teamwork, employee loyalty and morale, and environmental and community responsibility, as shown in Figure 8.20. Chi-square tests also show that there is a significant difference for the three attributes.

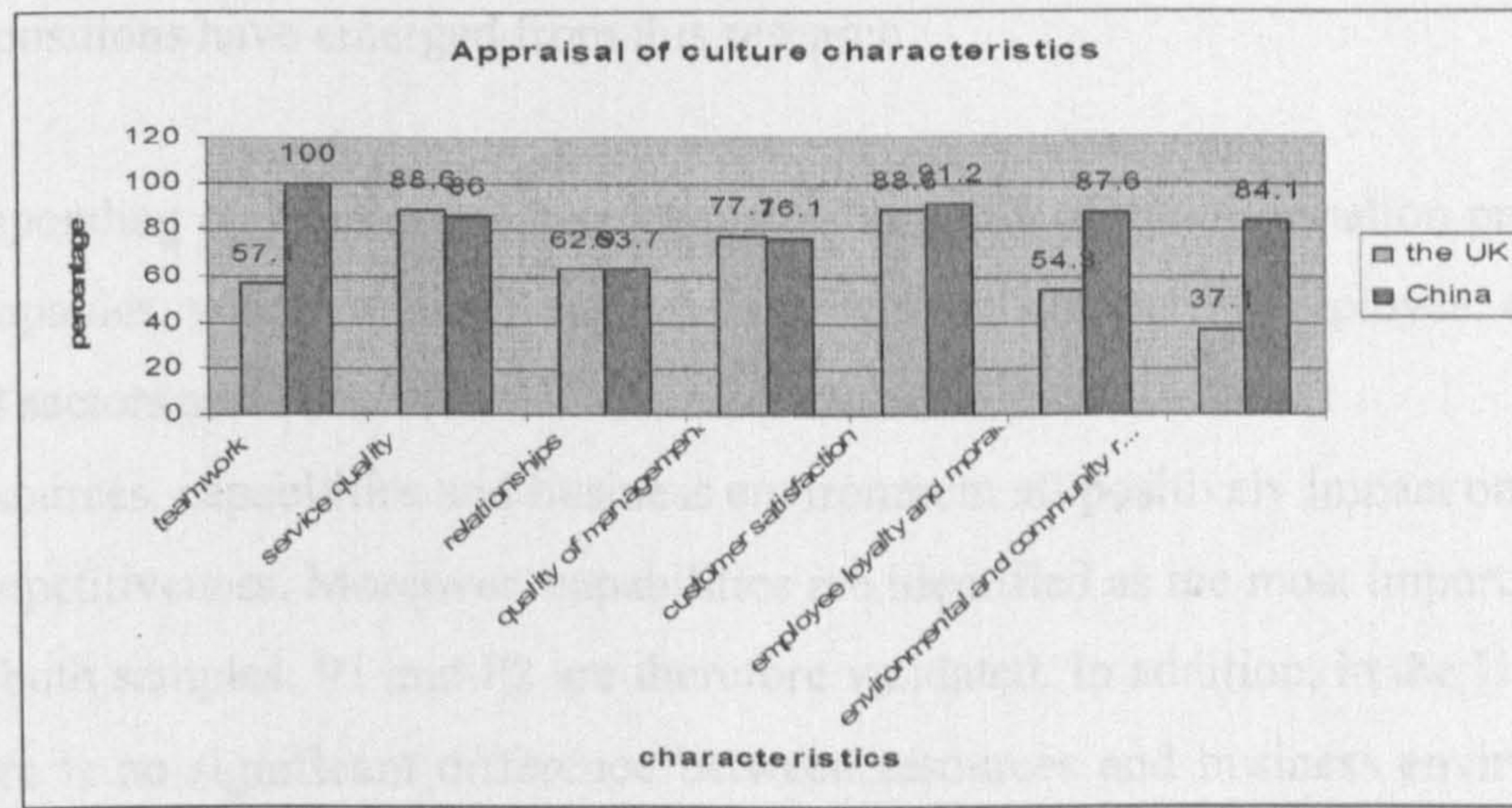


Figure 8.20 Attributes of Corporate Culture

In China, teamwork is fully identified by all respondents as the best embodiment of a company's culture, while in the UK, just over half confirmed its importance. In addition, another discrepancy is manifested in company views of environmental and community responsibility. 84.1% of Chinese respondents perceived this attribute as a key characteristic of a company's culture, whereas only 37.1% of UK companies chose it. This attribute is suggested by Elashmawi (2000) as likely to be very representative of corporate culture in the future. Given the high profile awarded to environmental issues and corporate social responsibility in the UK, it is surprising that less than 40% of UK LSPs considered them to be a key aspect of corporate culture.

In summary, numerous practices, attitudes and perceptions of UK and Chinese LSPs have been examined in this section. As described at the start of this section, the aim has been to explore their relative importance in influencing competitiveness. The results have revealed general agreement between the UK and Chinese samples on some issues, and marked differences of opinions on others. Overall, both UK and Chinese LSPs have

established various practices conducive to the achievement of their competitiveness. The implementation of these practices has influenced their competitiveness as perceived. These practices have involved many capabilities of companies, such as strategic management, operations management, service quality, CRM, IT, BPM, marketing, inventory management, innovation, HRM, cost management and corporate culture.

8.8 Summary

This chapter has given a general analysis of the postal questionnaire survey and validated four research propositions, P1, P2, P6 and P7. Five key findings related to the four propositions have emerged from this research.

- (1) Responding companies are heterogeneous in terms of the information provided by companies, which included business origin, ages, number of employee, ownership and sectors served.
- (2) Resources, capabilities and business environment all positively impact on an LSP's competitiveness. Moreover, capabilities are identified as the most important source by both samples. P1 and P2 are therefore validated. In addition, in the UK sample, there is no significant difference between resources and business environment in terms of their individual impacts on competitiveness, while in the Chinese sample, resources were considered more important than business environment.
- (3) The importance of the thirteen contributing factors to an LSP's competitiveness has been examined. The results from the UK and Chinese samples reveal that all thirteen contributing factors except one, i.e. marketing in the UK sample, are identified as being important by companies in both countries. Service quality is identified as the most important of the thirteen factors. The companies in both countries view the importance of each contributing factor differently except in the case of operations management. However, the perception of the two samples on viewing ranking of the importance of the thirteen contributing factors is similar.
- (4) Companies have used different measures to assess their competitiveness. Market share, growth in market share, profitability, productivity, service quality and innovation are the measures used by UK and Chinese companies. In addition, in China, companies have rated measures differently with respect to actual competitiveness and potential competitiveness. P6 is thus validated.
- (5) The analysis of the survey data reveals that companies have implemented various management practices reflecting their underlying capabilities in order to achieve

competitiveness. Evidence was found of many good practices which will have improved companies' competitiveness. The management practices used by both UK and Chinese companies in this survey involve the following: strategic planning and positioning; the adoption of different growth strategies; the utilization of ISO 9000/9001 for service quality; the measurement of operational performance; the identification of customer service criteria; the adoption and cultivation of two different types of relationship with customers (long-term contractual relationship and short-term transaction arrangement); the application of IT; innovative activities; the implementation of HRM activities; the adoption of marketing strategies; the service offering of inventory management; and the utilization of two cost accounting tools: traditional cost system and ABC. On the basis of these identified management practices, P7 is also validated.

The thirteen contributing factors comprise the underlying constructs of capabilities, each contributing factor being an individual capability, as discussed in Chapter 5. Given that capabilities have been identified as the most important source of competitiveness by both the UK and Chinese samples, the next chapter will further investigate the extent to which the thirteen contributing factors (individual capabilities) exert their influence on competitiveness.

CHAPTER 9 CORRELATION AND FACTOR ANALYSIS OF THE QUESTIONNAIRE DATA

9.1 Introduction

This chapter will analyse the relationship between the thirteen contributing factors (individual capabilities) and competitiveness. Three research propositions will be discussed. These are:

P3: An LSP's competitiveness is the combined result of a series of individual capabilities.

P4: Some individual capabilities are more important than others in contributing to an LSP's competitiveness.

P5: Each capability has several attributes which vary in their relative importance.

Multiple regression, exploratory factor analysis (EFA) and factor analysis regression (FAR) will be used in the analysis. Given the small size of the UK sample, only multiple regression will be performed on this data set. The aim in this case is to explore which contributing factor is the most important predictor in explaining capabilities, and hence competitiveness. EFA and FAR will be applied to the Chinese sample for its larger sample size. EFA will identify the underlying structure of the thirteen contributing factors and allow inferences to be drawn about the combined effect of the thirteen factors on an LSP's competitiveness, while FAR will further assess the combined influence of the thirteen factors. In addition, multiple regression will also be carried out to study the relationship between service quality and the nine customer service criteria. The purpose of this analysis is to explore the relative importance of different attributes of each capability. This analysis will be conducted on both the UK and Chinese samples.

In addition, as noted in Chapter 8, although both regression analysis and factor analysis are developed for analyzing interval variables, it is a common practice in social sciences to apply them to Likert scale data. Therefore it is appropriate for this study to use these multivariate statistics on the basis of five-point Likert scale data.

9.2 Regression Analysis for Capabilities

As analysed in the last chapter, the results have shown that capabilities are the most important source of an LSP's competitiveness, and all of the thirteen contributing factors, which comprise the underlying constructs of capabilities, are important to competitiveness. The thirteen factors are strategic management, operations management, service quality, CRM, IT, service network, BPM, marketing, inventory management, innovation, HRM, cost management and corporate culture. One of the questions to be considered is which contributing factor can be the most important predictor of the capabilities, and hence competitiveness. Towards this end, multiple regression was conducted with capabilities as the dependent variable (DV) and the thirteen factors as independent variables (IVs) or predictors.

9.2.1 The UK sample

Multiple regression analysis was first conducted on the UK sample. As this sample comprised 35 cases, regression technique was appropriate to be used.

Specifically, the regression analysis was built by stepwise regression. Stepwise regression is a popular tool for selecting significantly correlated IVs. Using this approach, the contribution of each IV to the regression model can be estimated step by step. First of all, the IV with the largest contribution is selected. The remaining IVs are then selected for inclusion on the basis of their relative contribution to the explanation of the DV. The selection process stops when no variables in the model can be removed and no further variables can be introduced (Stevens, 2002). While stepwise regression is a useful tool for selecting predictors, it has limitations. As commented by Stevens (2002), "one of the problems with the stepwise methods, which are very frequently used, is that they have led many investigators to conclude that they have found the best model, when in fact there may be some better models and/or several other models that are about as good" (p. 97). Therefore substantive knowledge of the subject area is required in applying this technique, as suggested by many authors (e.g. Cohen and Cohen, 1975; Nunnally and Bernstein, 1994; Miles and Shevlin, 2001; Stevens, 2002).

Stepwise regression was performed on all of the thirteen IVs and resulted in two predictors finally being selected, i.e. service quality and IT. These two predictive variables were the most strongly correlated to the DV, as shown in Table 9.1. The

significance level used for entry and removal are $\alpha_1 = 0.05$ and $\alpha_2 = 0.1$ respectively. These are the default values in SPSS.

Table 9.1 Correlation between the Thirteen IVs and Capabilities - UK

13 contributing factors	Capabilities	
	r	p-value
Strategic management	.390*	.023
Operations management	.340*	.045
Service quality	.632**	.000
CRM	.372*	.030
IT	.618**	.000
Service network	.191	.271
BPM	.469**	.005
Marketing	.325	.057
Inventory management	.393*	.021
Innovation	.306	.074
HRM	.377*	.026
Cost management	.297	.083
Corporate culture	.171	.326

Notes: * Correlation is significant at the 0.05 level (2-tailed)

** Correlation is significant at the 0.01 level (2-tailed)

However, additional IVs could be selected if the significance levels α_1 and α_2 were enlarged. When the significance levels were set to be $\alpha_1 = 0.20$ and $\alpha_2 = 0.25$, strategic management became the third predictor selected. In fact, in terms of the correlation magnitudes shown in Table 9.1, the third predictor should be BPM (with $r = 0.469$) rather than strategic management (with $r = 0.390$), in terms of their r values. The reason for strategic management being selected despite its smaller r value is that the correlation of BPM to service quality and IT selected are larger than those of strategic management to service quality and IT. This can be seen in Table 9.2. The r values in the former case are 0.337 and 0.360, while they are 0.248 and 0.292 in the latter case, as shown in bold numbering in Table 9.2. This indicates that BPM will not account for more of the additional variance in capabilities not explained by service quality and IT, the two variables already selected. That is the reason for strategic management being selected. Nevertheless, $\alpha_1 = 0.20$ and $\alpha_2 = 0.25$ seem to be relatively high to be used as entry and removal levels. However, it will be seen that this will result in a better regression model.

Table 9.2 Correlation between Capabilities and Four IVs - UK

		Capabilities	Service quality	IT	BPM	Strategic management
Pearson correlation	Capabilities	1.00	.623	.618	.469	.390
	Service quality	.623	1.00	.398	.337	.248
	IT	.618	.398	1.00	.360	.292
	BPM	.469	.337	.360	1.00	.262
	Strategic management	.390	.248	.292	.262	1.00

As there are missing values in the 35 cases which could impact on the sequence of selected predictors by stepwise regression in SPSS, the calculation using the three selected variables was performed again. Two models were therefore finally produced. One set of predictors contains two variables (i.e. service quality and IT), while the other contains three variables (i.e. service quality, IT and strategic management). The two models, called Model A and Model B respectively, are:

$$\text{Model A: } Y = 0.533 x_1 + 0.349 x_2 + 0.551,$$

$$\text{Model B: } Y = 0.572 x_1 + 0.298 x_2 + 0.155 x_3 - 0.041,$$

where x_1 = service quality, x_2 = IT, x_3 = strategic management, and Y = capabilities.

Table 9.3 displays more details of the two models. Now the discussion will centre on which one of models A and B is better to explain the DV.

Table 9.3 Stepwise Regression of Capabilities with the Three Selected IVs

Model	Predictor	Coefficient (B)	p-value (t-test)	R	R ²	Adjusted R ²	p-value (F-test)
A	(constant)	.551	.393	.748	.559	.532	.000
	Service quality	.533	.001				
	IT	.349	.002				
B	(constant)	-.041	.956	.772	.596	.555	.000
	Service quality	.572	.002				
	IT	.298	.008				
	Strategic management	.155	.179				

Notes:

1. R: represents the correlation between predictors and DV
2. R²: proportion of total variance on DV that is accounted for by predictors.
3. Adjusted R²: a reduced value of R² which takes the effect of the number of IV's into account.

Usually, R², called the coefficient of determination, may be used to measure the predicative or explanatory power of the regression model. R² indicates the amount of

variance in the DV that is accounted for by the IVs. The larger the value of R^2 , the greater the predictive/explanatory power of the model. However, R^2 cannot be used to select the better model, because it increases with the number of IVs. In contrast to R^2 , adjusted R^2 can be used to select a better model as it has taken the effect of the number of IV's into account. The results show that the adjusted R^2 value for Model B with three predictors is higher than for Model A with two predictors. Therefore Model B is better than Model A and should be used to explain capabilities.

Model B indicates that three of the thirteen IVs, i.e. service quality, IT and strategic management, explain around 60% of the variation in capabilities. The coefficients of the three contributing factors show that the increase of each unit of them will cause an increase of 0.572, 0.298 and 0.155 respectively in capabilities. Service quality is the most important IV which contributes more explanation to capabilities, followed by IT and strategic management. The results reveal that the capabilities of an LSP are essentially affected by the three contributing factors, in particular, service quality. Capabilities have been proved to be the most important source for an LSP's competitiveness, as shown in Chapter 8. The results suggest that the three factors may exert much more contribution to the competitiveness.

Furthermore, it is noted that the intercept in Model B is about zero. Hence, Model B is indeed the weighted sum of the three selected contributing factors. Furthermore, it will be seen that Model B also provides a counterpart of the FAR model for the Chinese sample given in Section 9.3.5.

Compared with the findings of other logistics research on related topics which use multiple regression, the value of R^2 (0.595) is fairly high and has good explanatory power. For example, values of R^2 with 0.30-0.56 were formed in the study by Knemeyer and Murphy (2005) where the potential impact of relationship characteristics and customer attributes on the outcomes of third-party logistics arrangements was explored. Only 0.20-0.30 in the study by Morash *et al.* (1996b) of the relationship between strategic logistics capabilities and firm success was investigated. There are at least two possible reasons for the fact that about 39.5% of variation remains unexplained. First, not all IVs have been taken into account. Second, in addition to these IVs, there is also a "noise" factor (i.e. uncontrollable factor) which may prevent the model from fully explaining all variance in the DV.

9.2.2 Chinese sample

Given the large sample size and the results of the Pearson correlation test, regression analysis was appropriate for the Chinese sample. Table 9.4 presents the results of Pearson correlation for the Chinese sample.

Table 9.4 Correlation between Thirteen Contributing Factors and Capabilities - China

13 contributing factors	Capabilities	
	r	p-value
Strategic management	.295**	.002
Operations management	.148	.127
Service quality	.267**	.005
CRM	.436**	.000
IT	.354**	.000
Service network	.270**	.004
BPM	.234*	.014
Marketing	.385**	.000
Inventory management	.415**	.000
Innovation	.187*	.050
HRM	.360**	.000
Cost management	.273**	.004
Corporate culture	.400**	.000

Notes: *Correlation is significant at the 0.05 level (2-tailed)

** Correlation is significant at the 0.01 level (2-tailed)

However, the validity of this analysis was in doubt because of multicollinearity. Multicollinearity refers to high intercorrelations between one IV and any other IVs. The impact of multicollinearity can reduce the predictive ability of a model, and make it difficult to determine the importance of any particular IV because of the influence of other IVs (Stevens, 2002).

A common phenomenon of multicollinearity is the wrong-sign problem, meaning some coefficients may have a sign different from that of r caused by multicollinearity (Mullet, 1976; Ryan, 1997). For example, with regard to a simple regression between innovation and capabilities, the value of the coefficient for innovation shows a positive sign, i.e. 0.177. However, in a model selected by stepwise regression, the coefficient for innovation was -0.282 with a minus sign. This problem is caused by multicollinearity. For this reason, regression analysis on the Chinese sample will not be discussed further.

9.3 Exploratory Factor Analysis (EFA) for Competitiveness

Exploratory factor analysis (EFA) was carried out on the Chinese sample to examine the underlying structure of the thirteen contributing factors and then make an inference about the combined effect of the thirteen factors on an LSP's competitiveness. EFA is a

data reduction technique. The purpose of EFA is to identify the factor structure of a set of variables by determining the number and nature of common factors. EFA is particularly appropriate for use in an exploratory study when there is no prior theory on the inter-relationship between the variables (Stevens, 2002). In this case, as the underlying structure of the thirteen contributing factors was not known, EFA was an appropriate tool.

EFA is a complex analytical procedure underpinned by numerous rules. The implementation of EFA in this study is based on these rules, which are data inspection, factor extraction, number of factors retained, rotation and interpretation.

9.3.1 Data inspection

Before performing this technique, data were first inspected to assess whether it met the requirement of EFA. Usually, this inspection includes two facets: sample size and whether there is a correlation between variables. Generally speaking, the greater the sample size, the better the results of EFA. Basically, there are two general rules. First, the sample size should be 100 or larger (Gorsuch, 1983; Hair *et al.*, 1998; Kline, 1979; Stevens, 2002). Secondly, the minimum necessary sample size should be at least five times the number of variables to be analyzed (Gorsuch, 1983; Hair *et al.*, 1998; Hatcher, 1994). In terms of the two rules, EFA can be applied to the Chinese sample, since its sample size is 114 with thirteen variables. The Pearson correlation test was conducted to identify whether the thirteen variables were correlated. The results are presented in Table 9.6. Hair *et al.* (1998), and Tabachnick and Fidell (2001) suggest that if there is no correlation in excess of 0.30 in visual inspection, it is inappropriate to implement EFA. The results in Table 9.6 show that all the variables correlate with other variables. Furthermore, most of the correlations between the thirteen variables are statistically significant. In total of 78 correlation coefficients, 50 values are greater than 0.30.

Table 9.5 Correlation between the Thirteen Contributing Factors - China

		SM	OM	SQ	CRM	IT	SN	BPM	M	IM	I	HRM	CM	CC
SM	Pearson Correlation	1												
	Sig. (2-tailed)													
OM	Pearson Correlation	.186	1											
	Sig. (2-tailed)	.053												
SQ	Pearson Correlation	.257**	.309**	1										
	Sig. (2-tailed)	.006	.001											
CRM	Pearson Correlation	.222*	.422**	.539**	1									
	Sig. (2-tailed)	.020	.000	.000										
IT	Pearson Correlation	.290**	.187	.080	.261**	1								
	Sig. (2-tailed)	.002	.051	.399	.006									
SN	Pearson Correlation	.199*	.230*	.143	.209*	.437**	1							
	Sig. (2-tailed)	.037	.016	.131	.028	.000								
BPM	Pearson Correlation	.330**	.333**	.434**	.461**	.395**	.281**	1						
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.003							
M	Pearson Correlation	.223*	.375**	.223*	.317**	.468**	.336**	.471**	1					
	Sig. (2-tailed)	.019	.000	.018	.001	.000	.000	.000						
IM	Pearson Correlation	.278**	.506**	.393**	.418**	.350**	.232*	.479**	.508**	1				
	Sig. (2-tailed)	.003	.000	.000	.000	.000	.014	.000	.000					
I	Pearson Correlation	.413**	.213*	.171	.225*	.407**	.255**	.392**	.353**	.424**	1			
	Sig. (2-tailed)	.000	.025	.070	.017	.000	.007	.000	.000	.000				
HRM	Pearson Correlation	.409**	.363**	.236*	.459**	.322**	.451**	.418**	.352**	.399**	.532**	1		
	Sig. (2-tailed)	.000	.000	.012	.000	.011	.000	.000	.000	.000	.000			
CM	Pearson Correlation	.269**	.273**	.397**	.281**	.344**	.248**	.534**	.299**	.363**	.275**	.303**	1	
	Sig. (2-tailed)	.005	.004	.000	.003	.000	.009	.000	.001	.000	.003	.001		
CC	Pearson Correlation	.432**	.264**	.306**	.338**	.320**	.375**	.452**	.348**	.466**	.629**	.660**	.362**	1
	Sig. (2-tailed)	.000	.005	.001	.000	.001	.000	.000	.000	.000	.000	.000	.000	

Notes: * Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

SM: Strategic management; OM: Operations management; SQ: Service quality; CRM: Customer relationship management; IT: Information technology; SN: Service network; BPM: Business process management; M: Marketing; IM: Inventory management; I: Innovation; HRM: Human resource management; CM: Coat management; CC: Corporate culture

Moreover, in order to examine further the data that are likely to factor well, the Kaiser-Meyer-Olkin measure of sampling adequacy (KMO) (Kaiser, 1974) and Barlett's test of sphericity (Bartlett, 1937) were adopted, as displayed in Table 9.6.

Table 9.6 KMO and Barlett's Test for the Probability

KMO and Barlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.854
Bartlett's Test of Sphericity	Approx. Chi-Square	516.636
	Df	78
	Sig.	.000

In terms of the KMO, a value close to 1 means that patterns of correlations are highly compact so that factor analysis should generate reliable factors. The value 0.5 is regarded as acceptable. The results in Table 9.6 show the value by KMO test is 0.854. It indicates that patterns of correlations are well compacted. Barlett's test of sphericity examines whether the correlation matrix has significant correlations among variables in terms of statistical probability. This statistical test shows that correlations among variables are statistically significant with p -value 0.000. Thus EFA is appropriate for the Chinese data set.

A further assumption underpinning much statistical analysis is the normality of measured variables. Tabachnick and Fidell (2001) point out that "if variables are normally distributed, the solution is enhanced. To the extent that normality fails, the solution is degraded but may still be worthwhile" (p. 588). Some researchers, such as Costello and Osborne (2005), Fabrigar *et al.* (1999) and Ford *et al.* (1986), elaborate on this issue. They explain that the need for a normality test depends on the choice of method used to extract factors. In reality many methods could be used to extract factors. For example, the SPSS program provides seven methods, which include principal components analysis (PCA), unweighted least squares, generalized least squares, maximum likelihood, principal axis factoring (PAF), Alpha factoring and imaging factoring. Normality of the data is strictly required only when maximum likelihood (ML) is used for extracting factors (Costello and Osborne, 2005; Fabrigar *et al.*, 1999; Ford *et al.*, 1986). Given the above suggestions, whether the measured variables are normally distributed is not a critical issue if maximum likelihood (ML) is not considered as a means of extracting factors.

9.3.2 Factor-extraction procedure

Factor extraction and the identification of factors are crucial to the interpretation of EFA results. As mentioned earlier, there are numerous procedures for factor extraction. These different methods are built on different rationales. Generally speaking, the seven extraction methods available in SPSS fall into two categories of factor models: component analysis and factor analysis (Costello and Osborne, 2005; Fabrigar *et al.*, 1999; Ford *et al.*, 1986; Tabachnick and Fidell, 2001). PCA belongs to component analysis, while the other six methods apply to factor analysis. Most widely used among these methods are PCA, PAF and ML (Costello and Osborne, 2005; Fabrigar *et al.*, 1999; Ford *et al.*, 1986; Tabachnick and Fidell, 2001). Table 9.7 displays the characteristics of the three factor-extraction procedures.

Table 9.7 Summary of Three Extraction Methods

Extraction method	Goal of analysis	Special features
PCA	Maximize variance extracted by orthogonal components	Mathematically determined, empirical solution common, unique, and error variance mixed into components; Useful as an initial step in factor analysis where it reveals a great deal about maximum number and the nature of factors
PAF	Maximize variance extracted by orthogonal factors	Estimate communities to attempt to eliminate unique and error variance from factors; Sometimes not as good as other extraction methods in reproducing the correlation matrix
ML	Estimate factor loadings for population that maximize the likelihood of sampling the observed correlation matrix	Require significance test of normality for the measured variables; Especially useful for confirmatory factor analysis (CFA) based on prior theory

Sources: adapted from Tabachnick and Fidell (2001, p. 610)

Table 9.7 shows that ML sets a high requirement for the measured variables, while PCA and PAF have lower requirements and are similar, the difference lying in whether they discriminate variance. PAF differentiates shared variance from unique variance, with only shared variance appearing in the results. The advantage of this extraction method is to confirm the factor analytical model where common variance is analyzed with unique and error variances eliminated (Tabachnick and Fidell, 2001). However, the major drawback of PAF is that it gives much more limited scope for goodness-of-fit indices

(Costello and Osborne, 2005; Fabrigar *et al.*, 1999). PCA does not discriminate shared variance and unique variance. For example, if all components are retained, the result is exactly the same as the measured correlation matrix. PCA is useful as an initial step in factor analysis (Tabachnick and Fidell, 2001). Nevertheless, PCA and PAF often yield very similar results in reducing a large number of variables down to a small number of components/factors (Costello and Osborne, 2005; Fabrigar *et al.*, 1999; Ford *et al.*, 1986, Hair *et al.*, 1998; Stevens, 2002; Tabachnick and Fidell, 2001). In this study, given the skewed five Likert scale data, a normality test is meaningless. The ML method was not used. PAF was also not considered for use for its major problem. PCA was thus used to extract factors.

9.3.3 Identification of factors

Kaiser's criterion of eigenvalues greater than 1 and Catell's scree test are widely recommended for determining the number of factors. Eigenvalues measure the amount of variation accounted for by each factor. According to Kaiser's rule, factors with eigenvalues less than 1 are regarded as contributing little to the explanation of variances in the measured variables, and may be ignored. The problem with Kaiser's criterion is that it may overestimate or underestimate the true number of factors (Costello and Osborne, 2005; Fabrigar *et al.*, 1999; Hair *et al.*, 1998; Stevens, 2002; Tabachnick and Fidell, 2001). Catell's scree test is the graph of eigenvalues plotted against factors. This method identifies the optimum number of factors by looking for the break point in the data at which the curve flattens out. Catell's test is essentially subjective. Sometimes the observed trend in eigenvalues is ambiguous as there is no clear break point (Costello and Osborne, 2005; Fabrigar *et al.*, 1999; Hair *et al.*, 1998; Stevens, 2002; Tabachnick and Fidell, 2001).

PCA extraction procedures yielded three identical eigenvalues greater than 1 (5.280, 1.380 and 1.117) after extraction. Catell's test plot is presented in Figure 9.1.

The three-factor solution for the 13 variables after rotation is presented in Table 9.8.

9.8.

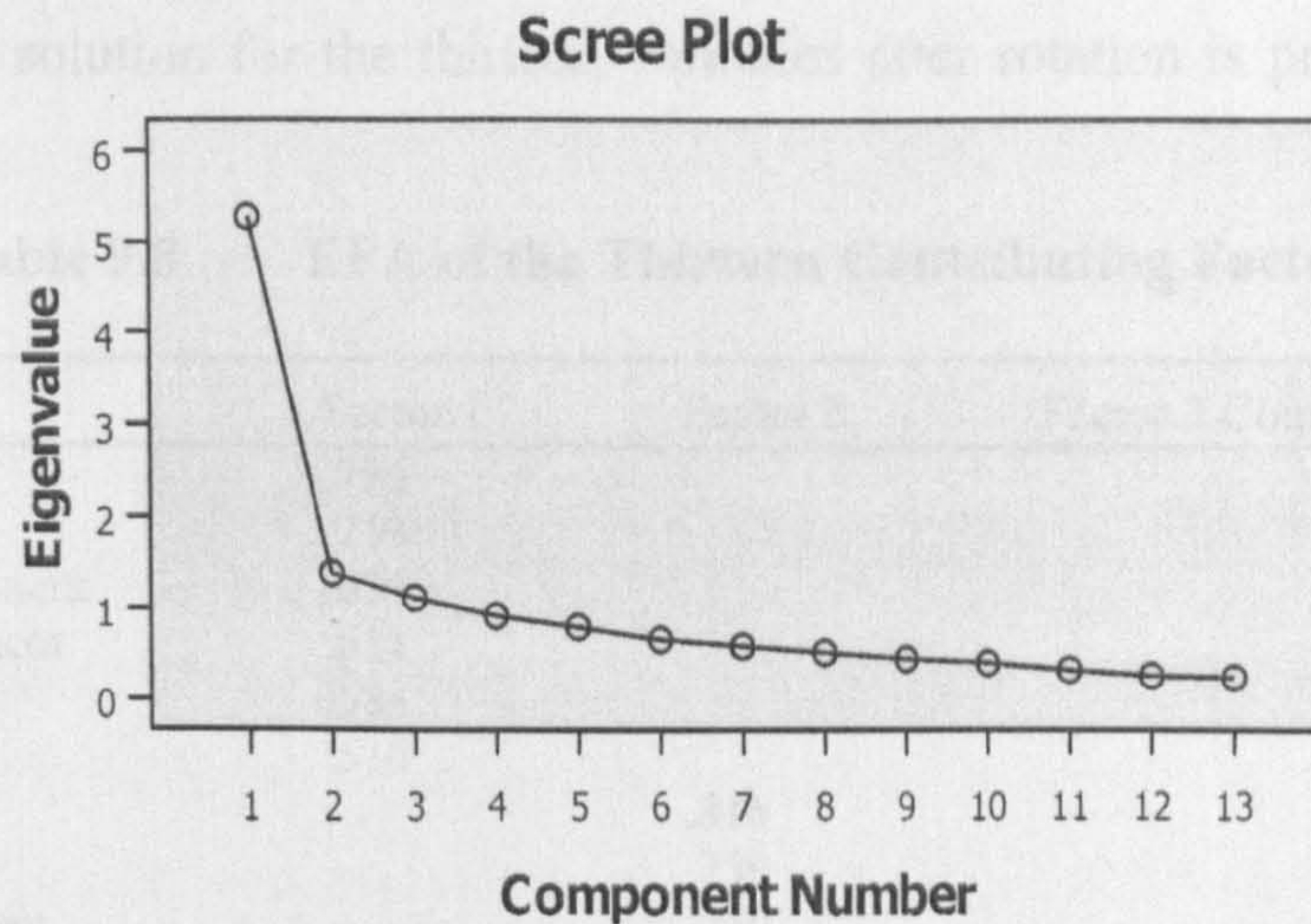


Figure 9.1 Catell's Scree Test Plot

Figure 9.1 shows that there are three factors whose eigenvalues are greater than 1. The curve tends to level off after two factors. In this case, either two or three factors may be extracted. Given Kaiser's criterion, three factors were finally extracted.

9.3.4 Rotation

The results of factor extraction are usually difficult to interpret if unrotated. Therefore factor rotation was used to simplify and clarify the structure of the extracted factors. The purpose of the rotation is to increase the interpretability and usefulness of the solution. Rotation cannot improve the quality of the mathematical fit between the measured and reproduced correlation matrices (Tabachnick and Fidell, 2001). This is because the total amount of variance accounted for by extracted factors is the same before or after rotation. What changes is the amount of variance accounted for by each rotated factor, as this gets reallocated and recalculated (Stevens, 2002). Orthogonal varimax rotation was used in the analysis. Mathematically, orthogonal rotation keeps extracted factors uncorrelated with the factor axes being all at right angles to one another. It makes it easier to interpret or describe each factor. The varimax approach is a form of orthogonal rotation. It may simplify the structure of factors. With varimax rotation, each factor tends to load high on a small number of variables and low on the other variables, hence showing a clear correlation between variables and factors. Orthogonal varimax rotation was found to be useful in interpreting the three extracted factors in this study.

9.3.5 Results and interpretation

The three-factor solution for the thirteen variables after rotation is presented in Table 9.8.

Table 9.8 EFA of the Thirteen Contributing Factors

Variable	Factor 1	Factor 2	Factor 3	Communalities (h^2)
Service quality	.796			.698
CRM	.719			.575
Operations management	.639			.472
Inventory management	.611			.555
BPM	.581			.551
Cost management	.516			.380
Corporate culture		.816		.762
Innovation		.759		.683
Strategic management		.730		.528
HRM		.696		.684
IT			.792	.690
Marketing			.725	.702
Service network			.632	.497

Initial Eigenvalues	5.280	1.380	1.117	
Variance explained	40.615%	10.615%	8.594%	
Cumulative Variance	40.615%	51.231%	59.824%	
Coefficient Alpha	0.788	0.810	0.676	

Notes: 1. Extraction Method: Principal Component Analysis
 2. Rotation Method: Varimax with Kaiser Normalization
 3. Factor loading level is 0.512

Table 9.8 shows that the three-factor solution accounts for 59.8% of the total variance. Such a value is not unusual in social sciences. As commented by Hair *et al.* (1998), “in the social sciences, where information is often less precise, it is not uncommon to consider a solution that accounts for 60 percent of the total variance (and in some instances) even less as satisfactory” (p. 104). Factor 1 contains six variables and accounts for 40.6% of the total variance. The six variables are service quality, CRM, operations management, inventory management, BPM and cost management. Factor 2 contains four variables, i.e. corporate culture, innovation, strategic management and HRM, and accounts for 10.6%. Factor 3 contains three variables, i.e. IT, marketing and service network, and accounts for 8.6%.

Three issues arise when interpreting these results: communalities, factor loading and reliability.

(1) Communalities (h^2) are estimates of the shared variance among the variables.

The communality of a variable is the amount of variance on a variable explained by all the factors. Mathematically, communality is the sum of squared loadings

for a variable across factors. The bigger the value of communalities, the higher the degree of explanation. There is no clear standard identified for the magnitudes of communalities. In social sciences, the magnitudes of low to moderate communalities (h^2) are considered to be 0.40 to 0.70 (Stevens, 2002; Costello and Osborne, 2005). In the current study, communalities (h^2) are all between 0.47 and 0.76 except for one, which is 0.38. This indicates that the three factors provide a moderately high level of the explanation.

(2) Factor loading is the Pearson correlation between the measured variables and factors. The squared factor loading indicates the amount of the variance in a measured variable accounted for by a factor. The size of factor loading required usually depends on the sample size. Therefore, there is no identified standard for the size of factor loading. Stevens (2002) recommends 0.512 for the sample size with 100 cases. Similarly, Hair *et al.* (1998) suggest 0.55 and 0.50 for the sample size with 100 and 120 cases respectively. Given both suggestions, 0.512 was used in the current study with 114 cases for interpretation, which would explain the 26.2% variance of the corresponding variable.

(3) Cronbach's alpha was used to assess the reliability of the variables loaded in each factor. This reliability test was calculated using item-total correlations. By convention, 0.70 is considered a benchmarking level for the value of coefficient alpha, while 0.60 is an acceptable level for reliability (Nunnally and Bernstein, 1994). In this study, the reliability coefficient alpha values of factor 1 and factor 2 are 0.79 and 0.81 respectively, greatly exceeding the benchmarking level. The value of factor 3 is 0.68, also significantly above the acceptable level and close to the benchmarking level. It indicates that the item-total correlations within factor 1, factor 2 and factor 3 are reliable.

In addition, in EFA, each variable is the linear combination of the three factors and a unique factor. It may be manifested with equation $Y_i = r_{1i} x_1 + r_{2i} x_2 + r_{3i} x_3 + \varepsilon_i$, where Y_i denotes the i -th variable with standardized value; r denotes the Pearson correlation coefficient, namely, factor loading; x_1, x_2, x_3 denote three factors; ε_i denotes a unique factor whose contribution to the squared variation is $(1-h^2)$. In this study, there are thirteen such linear equations. This linear combination also indicates that each variable can be approximated by the three factors.

The three factors appear to have different characteristics. Factor 1, which includes six variables (with factor loading bigger than 0.512), i.e. service quality, operations, CRM, inventory management, BPM and cost management, tends to reflect operational attributes, while factor 2 with four variables, i.e. corporate culture, innovation, strategy and human resource, is associated more with strategy. With regard to Factor 3, the three underlying variables, i.e. IT, service network and marketing, are possibly related to an LSP's network. The three factors have thus been entitled operational capability factor, strategic capability factor and networking capability factor respectively.

In addition, an interesting link emerged between the EFA for the Chinese sample and previous regression analysis for the UK sample. In the regression analysis, three predictive variables were shown to be important: service quality, IT and strategic management. They are individually associated with each of the three factors: service quality-operational capability factor, IT-networking capability factor and strategic management-strategic capability factor. The predictors may therefore be representatives of each of the three factors found here. This provides further evidence of why Model B not Model A in Section 9.2 should be chosen.

9.3.6 Inference about the combined effect of contributing factors

The three factors having been found, their factor scores were then used to assess the competitiveness. Factor scores are the values of a factor taken for all companies. In the current sample with 114 cases, each factor has 114 factor scores; three factors have a total of 342 (i.e. 3×114) factor scores. The calculation of the factor score for a given company for a given factor is the sum of the company's standardized values of the variables multiplied by the corresponding loadings of the variables for the given factor (Field, 2005; Hair *et al.*, 1998; Stevens, 2002; Tabachnick and Fidell, 2001), as shown in Table 9.9. Factor score coefficients can represent "a composite of all variables loading on the factor" (Hair *et al.*, 1998, p. 120).

Table 9.9 Factor Score Coefficient Matrix of Three Factors

x_i	Factor		
	1	2	3
Strategic management	-.033	.368	-.188
Operation management	.277	-.155	.050
Service quality	.409	-.008	-.308
CRM	.311	-.036	-.106
IT	-.133	-.074	.479
Service network	-.126	-.010	.353
BPM	.181	-.020	.071
Marketing	.077	-.219	.418
Inventory management	.207	-.057	.077
Innovation	-.131	.353	.000
HRM	-.078	.313	.001
Cost management	.180	-.034	.037
Corporate culture	-.067	.392	-.109

Extraction Method: Principal Component Analysis.
 Rotation Method: Varimax with Kaiser Normalization.

Each factor is the linear combination of standardized values of the thirteen variables multiplied by the corresponding factor score coefficients. The factor score coefficients in bold (i.e. those with large values) indicate the underlying variables which contribute the most to each factor. Given that $F1$, $F2$ and $F3$ represent the factor scores of operational capability factor, strategic capability factor and networking capability factor respectively, factor scores of the three factors are therefore shown in the following three equations:

$$\begin{aligned}
 F1 &= -.033x_1 + .277x_2 + .409x_3 + .311x_4 - .133x_5 - .126x_6 + .181x_7 + .077x_8 \\
 &\quad + .207x_9 - .131x_{10} - .078x_{11} + .180x_{12} - .067x_{13} \\
 F2 &= .368x_1 - .155x_2 - .008x_3 - .036x_4 - .074x_5 - .010x_6 - .020x_7 - .219x_8 - \\
 &\quad .057x_9 + .353x_{10} + .313x_{11} - .034x_{12} + .392x_{13} \\
 F3 &= -.188x_1 + .50x_2 - .308x_3 - .106x_4 + .479x_5 + .353x_6 + .71x_7 + .418x_8 \\
 &\quad + .077x_9 + .000x_{10} + .001x_{11} + .037x_{12} - .109x_{13}
 \end{aligned}$$

where x_i , i from 1 to 13, stands for the standardized rating values of the thirteen variables.

No single factor can give an overall assessment of competitiveness, since the three factors reflect different aspects of the competitiveness. Therefore, according to the contribution of each factor to the variance, the average factor score of the three factors was calculated to estimate the competitiveness, as shown by the following equation.

$$F = \frac{\lambda_1}{\lambda_1 + \lambda_2 + \lambda_3} F1 + \frac{\lambda_2}{\lambda_1 + \lambda_2 + \lambda_3} F2 + \frac{\lambda_3}{\lambda_1 + \lambda_2 + \lambda_3} F3$$

$$= 0.679 F1 + 0.177 F2 + 0.144 F3$$

where λ_i ($i = 1, 2, 3$) denotes the percentage of variance for each factor;

F is the weighted average of the three factor scores.

Hence the relative competitiveness of the companies in the sample could be estimated using the average factor score F . This might be illustrated by the following example. Table 9.10 shows the factor scores of the three factors ($F1$, $F2$ and $F3$) and the average factor score (F) for ten selected companies in the sample. They were selected from the 114 cases, comprising two groups with early (77) and late (37) respondents (see section 6.5.1 regarding the test for non-response bias). This selection is used merely for illustration.

Table 9.10 Assessing the Competitiveness for Ten Selected Companies

Company	$F1$	$F2$	$F3$	F	Rank
1	.67285	.56334	.82950	.68	1
2	.19560	-.93937	.82449	.09	7
3	.00891	.38285	.15568	.10	6
4	-.79888	-2.12341	1.72761	-.67	10
5	-.66878	2.01667	-2.77053	-.50	9
...	
78	.57358	.84729	.28767	.58	2
79	1.13012	-.92842	-.64842	.51	3
80	.20267	.67280	.69266	.36	5
81	.51305	-.18654	.69004	.41	4
82	-.88445	.38704	.49081	-.46	8

The results reveal that the thirteen contributing factors can be combined together in influencing the competitiveness through the factor scores. Moreover, the contribution of each factor for the competitiveness is likely to be different. For instance, companies 1, 78 and 79 rank the top three within the ten selected companies in terms of their values (i.e. 0.68, 0.58 and 0.51). According to the scores for each factor, the networking capability factor ($F3 = 0.82950$) of company 1 was particularly important in

contributing to its relatively high competitiveness ranking, whereas companies 78 and 79 were inclined to gain much of their competitiveness from the strategic capability factor ($F2 = 0.84729$) and operational capability factor ($F1 = 1.13012$) respectively, as shown by the values in bold. The results indicate that the surveyed companies placed different emphases on different factors, operational, strategic or networking capabilities to their competitiveness.

In terms of the above analysis, the competitiveness is the combined result of the three factors underlying the thirteen contributing factors. In addition, the coefficients of each of the contributing factors in F , determined by the weights for each factors and their factor scores coefficients in Table 9.9, are quite different. This indicates that some contributing factors are more important than others.

9.4 Factor Analysis Regression (FAR) for Competitiveness

The combined effect of contributing factors and the extent of different contributing factors can also be corroborated by FAR through setting up DV and IVs. As explained earlier, the Chinese sample is not suitable for ordinary multiple regression analysis, owing to the impact of multicollinearity. As a means of overcoming this problem, factor scores of three factors were used to perform a regression analysis (Hair *et al.*, 1998; Stevens, 2002; Tabachnick and Fidell, 2001). This is possible because factors extracted from a large number of variables tend to be uncorrelated and do not share the problem of multicollinearity, as seen in Table 9.11, where the Pearson's correlation test indicates that there is no significant correlation between these three extracted factors.

Table 9.11 Correlation between Three New Predictors

		<i>F1</i>	<i>F2</i>	<i>F3</i>
<i>F1</i>	Pearson Correlation	1		
	Sig. (2-tailed)			
<i>F2</i>	Pearson Correlation	-.009	1	
	Sig. (2-tailed)	.926		
<i>F3</i>	Pearson Correlation	.000	-.006	1
	Sig. (2-tailed)	.998	.952	

In addition, since new predictors arising from factor scores are uncorrelated with each other, each predictor can make a separate contribution to explain the variance in the DV (Stevens, 2002). This approach is also called factor analysis regression (FAR) (Scott, 1966; Basilevsky, 1981; Kosfeld and Lauridsen, 2004). More important, the relationship between the thirteen variables and capabilities could be explored in this way in the case

of the Chinese sample, because all of the thirteen variables are included in the model through the three factors.

9.4.1 Implementation of FAR

What is used in the current case is the so-called FAR of the 1st type (Kosfeld and Lauridsen, 2004), where the regression between capabilities as DV and the factors as new IVs were calculated. The fitted regression model with the three factors is presented as follows.

$$\text{Model FAR: } \hat{Y}_i = 0.319 F1_i + 0.260 F2_i + 0.284 F3_i^{20},$$

where Y_i denotes the i -th standardized value of capabilities;

$F1_i$ is the i -th factor score of the operational capability factor obtained previously;

$F2_i$ is the i -th factor score of the strategic capability factor obtained previously;

$F3_i$ is the i -th factor score of the networking capability factor obtained previously.

The p -value of the F-test for the whole model is 0.000 and the p -values of the t -test for each of the coefficients are 0.001, 0.007 and 0.004 respectively, indicating that the thirteen IVs via the three factors all make a significant contribution to the DV. The values of R and R^2 regarding this model are 0.499 and 0.249 respectively. This means that the three new predictors together account for 24.9% of the variance in capabilities.

9.4.2 Interpretation

The results indicate that three factors, i.e. operational capability, strategic capability and networking capability, are positively related to capabilities. The three factors can be used to explain capabilities, and hence competitiveness. The different contributions of the three factors suggest that an increase of one unit of each of them will cause 0.319, 0.260 and 0.284 increases in capabilities respectively. Operational capability contributes slightly more explanation to capabilities than the other two factors. In addition, given the relatively low value of R^2 (0.249), this model does not have strong explanatory

²⁰ This is a regression model without the constant term. In this case, the DV (Y) is the standardized score of capabilities.

power. The FAR model provides a regression model for the Chinese sample but it is not as powerful as that obtained from the UK sample. Nevertheless, this model indicates that the combined effect of the thirteen factors contributes to capabilities and hence competitiveness. Table 9.9 shows that the coefficients in the model and the factor score coefficients are all very different. It can also be concluded that some contributing factors are more important than others.

9.5 Regression Analysis for Service Quality

In the last chapter, it was revealed that service quality is the most important contributing factor seen by both UK and Chinese managers. Previous regression analysis of the UK sample has established service quality as a significant determinant in explaining capabilities, and hence competitiveness. Moreover, in the factor analysis of the Chinese sample, service quality falls into the “operational capability factor” with the largest factor score coefficient. This also illustrates that service quality makes a much greater contribution to competitiveness than the other twelve contributing factors. Further, following factor analysis regression (FAR), the “operational capability factor” including service quality has been identified as being the largest coefficient in accounting for capabilities, and hence competitiveness. All these findings suggest that it is meaningful to choose service quality as an example for analyzing the attributes in individual capabilities.

The regression analysis was done between service quality and the nine customer service criteria surveyed (see Table 8.13). Service quality is perceived resulting from “a comparison of customer expectations with actual service performance” (Parasuraman *et al.*, 1985, p. 42). Its attributes are derived from customer services, as discussed by many authors (e.g. Grant, 2004; Harding, 1998; Mentzer *et al.*, 1989; Mentzer *et al.*, 1999, 2001; Parasuraman *et al.*, 1985, 1988). Therefore the nine criteria, each being an attribute of service quality, are analyzed. The aim is to identify the relative importance of different attributes of service quality.

Stepwise regression was conducted on both the UK and Chinese samples, whereby service quality was the DV, and the nine customer service criteria were the IVs.

Primary data inspection is presented in Table 9.12. Across the nine correlation coefficients for the UK sample, it was found that two variables (i.e. staff conduct and

billing accuracy) are not significantly correlated to service quality. Moreover, the two values of their correlation coefficients are shown to have minus signs. Therefore, the two variables were excluded from the list of IVs, and the remaining seven IVs are used to run a stepwise regression with the DV. In addition, in the Chinese sample, one variable (i.e. IT support) is also shown not to be statistically significant. Hence regression analysis was confined to the remaining eight IVs and the DV.

Table 9.12 Correlation between Service Quality and Nine Customer Service Criteria

Customer service	Service quality			
	UK		China	
	r	p-value	r	p-value
Staff conduct	-.033	.851	.262**	.005
Reliability of delivery	.677**	.000	.224	.018
Response time	.533**	.001	.352**	.000
Billing accuracy	-.025	.886	.346**	.000
Communication with client	.450**	.008	.491**	.000
IT support	.231	.190	-.006	.950
Complaint/claim procedure	.346*	.045	.260**	.006
Value-added services	.454**	.008	.353**	.000
Customer loyalty/retention	.628**	.000	.256**	.007

Notes: * Correlation is significant at the 0.05 level (2-tailed)

** Correlation is significant at the 0.01 level (2-tailed)

The results of the stepwise regression are presented in Table 9.13. The UK and Chinese models are both statistically significant, yielding an F-test with *p*-value 0.000. The selected predictors are also significant according to *t*-tests. It means that the two models are useful in explaining variations in service quality.

Table 9.13 Model Assessment of Service Quality

Model	Predicator	Coefficient (B)	p-value (t-test)	R	R ²	p-value (F-test)
UK	(constant)	.265	.709	.750	.562	.000
	Reliability of delivery	.574	.002			
	Customer loyalty/retention	.365	.008			
China	(constant)	2.448	.000	.548	.300	.000
	Communication with client	.385	.000			
	Value-added services	.130	.024			

The two models reveal that different criteria of customer service are used by UK and Chinese samples in assessing service quality. In the UK model, two predictors, which account for a large proportion of the variation in the DV, are selected. These two predictors are reliability of delivery and customer loyalty/retention, which can explain 56.2% of the variation in service quality. The results reveal that the two predictors are most likely to cause the variation of service quality. Moreover, the results also show that

an increase of one unit in each predictor will cause an increase of 0.574 and 0.365 respectively in service quality. This indicates that the reliability of delivery is the more important factor in explaining service quality.

In the Chinese model, likewise, two predictors are selected, i.e. communication with clients and value-added service. The variance in service quality explained by these two variables is 30%. The two predictors are most important in causing the variation of service quality. However, the Chinese model has less explanatory power than the UK model for its lower value of R^2 . The coefficients indicate that increases of one unit in each of them will cause an increase of 0.385 and 0.130 respectively in service quality. This result shows that the communication with clients is the more important factor in accounting for service quality.

9.6 Summary

This chapter has further examined the relationship between thirteen contributing factors (individual capabilities) and competitiveness, and has validated P3, P4 and P5. The use of different statistical approaches, i.e. regression analysis of the relationship between DV and thirteen IVs, and EFA on the underlying structure of thirteen variables, has provided similar results for the UK and Chinese samples.

In the UK sample, the thirteen contributing factors are correlated with capabilities, although to varying degrees. Service network and corporate culture have weak correlation with capabilities, while the remaining eleven contributing factors are moderately and highly correlated with capabilities. Service quality, IT and strategic management are the most important predictors in accounting for capabilities. Given that capabilities proved to be the most important source of competitiveness in Chapter 8, the results indicate that at least service quality and IT (with their largest correlation coefficients) are more important than the other factors in contributing to competitiveness. P3 and P4 are therefore validated in the UK setting.

With respect to the Chinese sample, the underlying structure of the thirteen contributing factors has been examined by EFA. The thirteen contributing factors reflect three attributes: operational capability, strategic capability and networking capability. Further analysis reveals that competitiveness is built on these three factors. Moreover, the focus of companies on the three factors in contributing to competitiveness is different. The

following FAR further corroborated that the three factors are correlated with capabilities and can have a combined effect on the competitiveness of an LSP. They also support the outcome of the regression analysis in the UK sample. These results illustrate that the two propositions, P3 and P4 validated in the UK setting, have also been confirmed in the Chinese setting.

The attributes of individual capabilities have been analyzed by using service quality. Regression analysis was conducted between service quality and nine relative attributes (nine customer services criteria surveyed). In the UK sample, reliability of delivery and customer loyalty/retention are the most important attributes in assessing service quality. The results indicate that the two attributes are more important than others (with their largest correlation coefficients) in the UK setting. In the Chinese sample two other attributes dominate: communication with clients and value-added service, indicating that they are more important than others (with their largest correlation coefficients) in the Chinese setting. P5 is thus validated in both settings.

The validation of P3, P4 and P5 on the basis of advanced statistical techniques in two settings, China and the UK, indicates the effect of the thirteen contributing factors (individual capabilities) on competitiveness. The implications of these validated propositions will be discussed in the next chapter.

CHAPTER 10 DISCUSSION OF EMPIRICAL RESULTS

10.1 Introduction

This chapter will further interpret and discuss the results of the empirical investigation presented in chapters 7-9. It will also consider whether the results support or refute the earlier theoretical observations based on published literature. The chapter is organized as follows. First, a refined model of LSP competitiveness, derived from the empirical examination, will be presented. Subsequently, the theoretical implications of the research will be explored. Finally, recommendations for managers arising from the study will be proposed.

10.2 Refined Model of the LSP competitiveness

Modifications have been made to the model of LSP competitiveness in the light of the empirical investigation. The revised model is shown in Figure 10.1. This differs from the original model presented in Figure 4.1. The main differences are as follows:

- (1) Competitiveness is now measured by two dimensions: competitive performance and competitive potential.
- (2) Thirteen contributing factors are now classified into three categories on the basis of the factor analysis, entitled strategic capability, operational capability and networking capability respectively.
- (3) Service quality is now assessed with respect to key attributes (i.e. four attributes identified by managers, including reliability of delivery and customer loyalty/retention in the UK, communication with clients and value-added service in China).

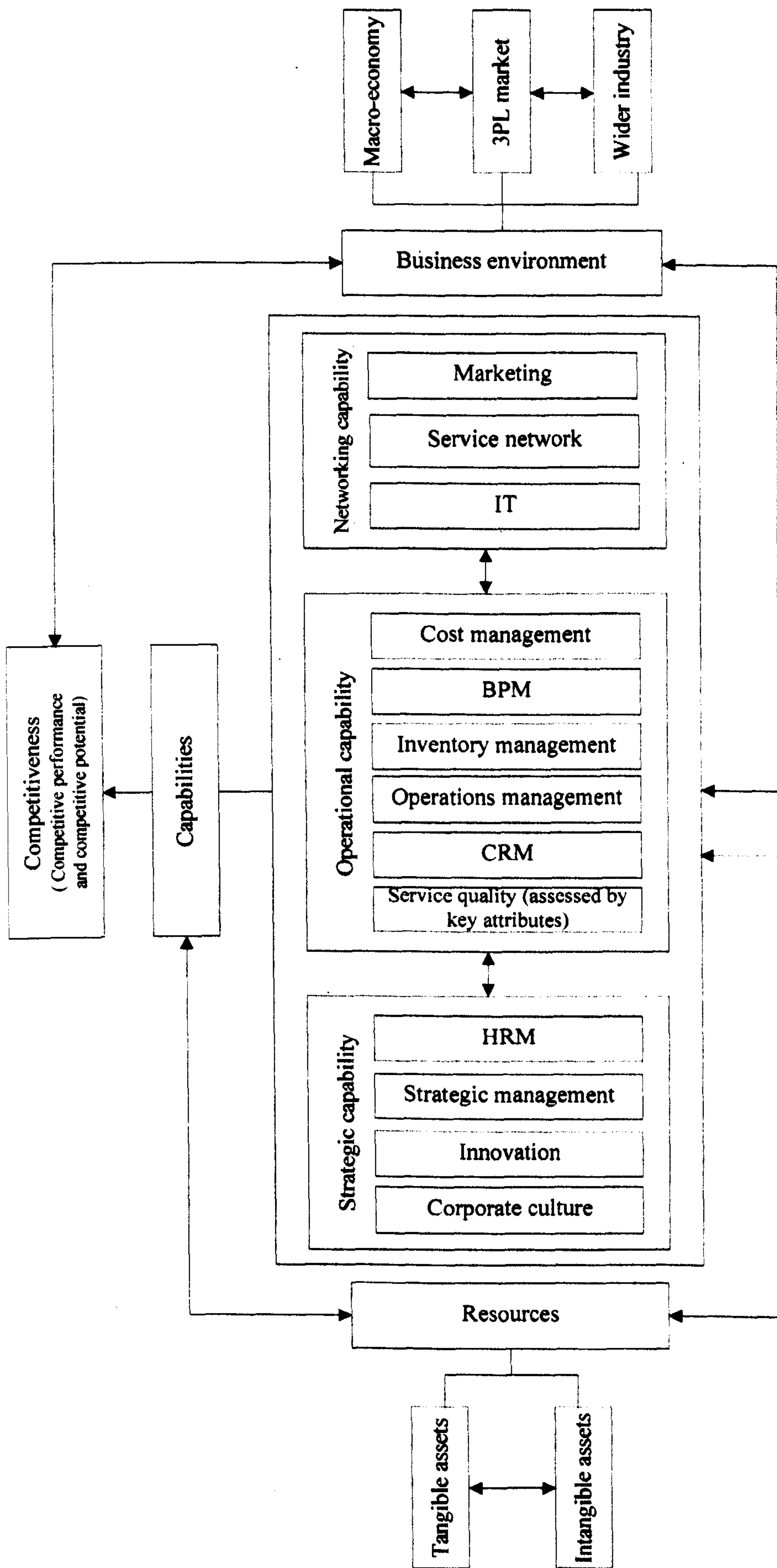


Figure 10.1 Refined Model of the Competitiveness of Logistics Service Providers

The key features of this refined model can be summarized as follows:

- (1) An LSP's competitiveness is derived mainly from capabilities, although it may be impacted by resources and business environment.
- (2) Overall capabilities involve three main elements: strategy, operation and network.
- (3) Each of these three elements may be disaggregated into different individual capabilities in terms of their functions. Strategic capability includes corporate culture, innovation, strategic management and HRM; operational capability includes service quality, CRM, operations management, inventory management, BPM and cost management; and networking capability includes IT, service network and marketing.
- (4) Of the thirteen individual capabilities, service quality is the most important.
- (5) Each individual capability can be assessed by key attributes; e.g. service quality can be measured by reliability of delivery, customer loyalty/retention, communication with client and value-added services.
- (6) The degree of an LSP's competitiveness may be measured by two dimensions: competitive performance and competitive potential. Each dimension can be separately quantified by different measures.

10.3 Theoretical Implications

The theoretical foundation of the study is grounded in much of the work of economists and strategists on firm-level competitiveness, in particular, the resource-based view (RBV) and Porter's competitive theory of strategic management. It was decided that the RBV would be the more appropriate for the present study. The theoretical implications of this study are outlined below. This discussion focuses on four topics: primary sources, different patterns of capabilities, competitive potential and sustainability, and comparison of Chinese and UK environment and attitudes.

10.3.1 Primary sources of an LSP's competitiveness

The empirical investigation has not only demonstrated that three primary sources (i.e. resources, capabilities and business environment) all positively impact on an LSP's competitiveness, but also shown their relative importance varies, with capabilities the most important, followed by resources and business environment. The results, on the one hand, suggest that elements of both the RBV and Porter's theory are relevant in

understanding an LSP's competitiveness. On the other hand, it supports the RBV more strongly, suggesting that endogenous factors (i.e. capabilities/resources) inside companies are more important than exogenous factors (i.e. business environment) in leading to an LSP's competitiveness. Differences in the relative importance of the three sources are related to the different attributes of the three sources, as addressed by the RBV and Porter's theory.

What the RBV argues is that a firm's resources and its capabilities to convert these resources into sustainable competitive advantage are the key to superior performance. The essence of this theory is that to the extent that resources and capabilities can resist duplication by competitors and thus result in sustainable competitive advantage. Usually resources - which include tangible and intangible assets - are necessary inputs for a production process. The quantity and the quality of resources available to a company have an important influence on what it can do. However, it can be hard to resist duplication of resources by competitors (Fahy, 2000). Tangible assets, such as plants, are easily duplicated by competitors. Intangible assets are more difficult to replicate in the short term, but they can still be available to competitors in the medium to long term. For instance, a company's brand may be bought by its competitors. Nevertheless, as invisible assets, capabilities are quite complicated (Itami, 1987). Capabilities involve "complex patterns of coordination between people and between people and other resources" (Grant, 1991, p. 122). Some capabilities may arise from the contribution of a single resource, while others may involve a highly complicated interrelation between different resources. The inherent complexity of capabilities makes them hard to duplicate and more critical in maintaining sustainable competitive advantage.

In contrast to the endogenous characteristics of resources and capabilities, business environment is an exogenous factor for companies. The environment may shape "how activities are configured, which resources can be assembled uniquely, and what commitments can be made successfully" (Porter, 1991, p. 110). The influence of the environment on competitive advantage is exerted by many extraneous factors, such as technological advancement, demand, rivals and government, all of which belong to the macro-economy, market and industry. For example, the proper role of the government is considered to be a "catalyst and challenger" despite being partial and indirect (Porter, 1991, p. 113). The government may formulate policies conducive to creating an environment in which companies can freely and fairly compete rather than involve itself

directly in the business process (Porter, 1991). The environment may not be the determinant factor in affecting competitive advantage, because “firms sometimes fail not because their environment is unfavorable but because of organizational or managerial rigidities that block improvement and change. The environment can provide important pressures to advance, but firms differ in their responsiveness to them” (Porter, 1991, p. 114).

The differences between the three sources are more likely to explain the extent of their impacts on competitiveness, as evidenced by the empirical investigation. The results of both the qualitative interviews and the quantitative questionnaire survey reveal that LSPs have been able to differentiate the different roles of the three primary sources in attaining competitiveness. Generally speaking, the empirical investigation suggests that the competitiveness of LSPs does not only depend on external environmental forces, and thus is acquired by companies in a reactive way, as claimed by Porter’s theory. Instead, LSPs may proactively create their competitiveness by exploiting their particular capabilities and resources, as suggested by the RBV. In addition, capabilities were identified as the most important source of an LSP’s competitiveness in the two countries. This not only supports the RBV, but also accords with numerous conceptualized models of firm-level competitiveness, as presented in Chapter 2, where firm-level competitiveness is basically defined or interpreted by ability/capability. This also implies that the competitiveness of LSPs is broadly in line with the general understanding of firm-level competitiveness. Capabilities are the enablers of an LSP’s competitiveness.

10.3.2 Different patterns of capabilities

Thirteen individual capabilities have been identified as being important to an LSP’s competitiveness, with service quality the most important. In terms of their rankings, several capabilities (e.g. service quality, operations management, cost management and CRM) tend to receive more attention than others (e.g. inventory management and marketing) from managers in both countries. Further multivariate statistical analyses (i.e. stepwise regression, EFA and FAR) indicate that the thirteen individual capabilities have their underlying structure, explained with reference to three factors: operational, strategic and networking capabilities. Furthermore, an LSP’s competitiveness is the combined result of different individual capabilities, some capabilities contributing more to the competitiveness than others. Further examination on service quality reveals that

each individual capability can be assessed with respect to key attributes. In terms of the results, three issues deserve to be discussed further: (1) combined effect of capabilities; (2) distinctive capabilities; and (3) key attributes of each individual capability.

(1) Combined effect of capabilities

The results of the EFA and FAR analyses indicate that the thirteen individual capabilities make different contributions to the competitiveness, and that their interlinkage can give an LSP a unique competitiveness. As claimed by Grant (1991), the most important capabilities are those arising from an integration of individual functional capabilities for most firms.

This combined effect of individual capabilities can be seen in practice. For example, in China, COSCO Logistics has successively ranked first among the Top 100 China-based LSPs for three years. The success of COSCO Logistics was primarily ascribed to three capabilities: people, technological innovation and strategic alliances, as concluded by its CEO, Weilong Ye (Wuliutianxia, 2006). Under the tenet “talents are the core of a company’s competitiveness”, COSCO Logistics invests a large amount of funds in human resource training and developing programmes. For example, since 2003 they have been selecting managers to go to Cranfield in the UK to learn logistics. Those managers have played key roles in the businesses and operations of COSCO Logistics on their return. Innovation is an extremely important capability for COCSO to win in the marketplace. COCSO Logistics is proud of its innovative patents. One of many technical innovations is equipment which unloads extra and heavy cargoes, called “Si Liang Buo Qian Jin”. The heaviest cargo COSCO Logistics has ever unloaded was 1824 Tons. When these cargoes have to be unloaded from ships to land, cargoes are rolled from ships directly to land against the force of tide instead of using traditional cranes and wharfs. As a result of this important innovation, COSCO Logistics has won many bids, exploiting its technological strength rather than a low price strategy. In addition, COSCO Logistics has built up different forms of strategic alliances with many large manufacturers. These strategic alliances have not only brought a stable customer base for COSCO Logistics, but also enabled it to follow its customers into overseas markets.

(2) Distinctive capabilities

Regression analysis indicates that service quality, IT and strategic management make much more contribution to an LSP’s competitiveness. This suggests that these three

individual capabilities are critical in the differentiation of an LSP from its competitors. In addition, both EFA and FAR indicate that the competitiveness of each LSP is built on different aspects of capabilities. Some LSPs may excel in performing operations, while others may have excellent strategic or networking capabilities (see Table 9.10). This suggests that the success of an LSP needs those distinctive capabilities to outperform their competitors.

Various examples can illustrate how the success of companies is largely to the result of distinctive capability. Wal-Mart's cross-docking logistics system is a distinctive capability contributing to its success (Stalk *et al.*, 1992). In this system, the goods are continuously delivered to Wal-Mart's warehouses, where they are sorted, repacked, and dispatched to stores. The transfer of the goods from one loading dock to another takes less than 48 hours. This greatly reduces inventory and handling costs.

Wincanton has become a leading UK LSP, partly through its ability to provide supply chain solutions, at a European level in particular. Wincanton has built its businesses and operations in many European countries, such as Germany, France and Poland. It has also established a strategic joint venture in 2007 with Kerry Logistics, a Hong-Kong based logistics and freight forwarding company, to design and operate supply chain solutions linking Europe and Asia (Wincanton, 2007).

Based on the "three nets" (i.e. physical net, financial net and information net), China Post Logistics Co., Ltd (CNPL) has formed a unique supply chain business model and made great progress in expanding home delivery. CNPL has optimized the product distribution network of Avon, the global cosmetics business, by not only offering transportation and distribution services from Avon's finished products warehouse, but also providing financial support for the company, such as collecting payment on-line (Tian, 2005).

(3) Key attributes of each individual capability

According to the RBV, only key attributes can be valuable and become a direct source of sustained competitive advantage. The empirical analysis examined the variation of several attributes of service quality. The view of Teece *et al.* (1997) is that "quality performance is driven by specific organizational routines" (p. 519). The empirical results show that the service quality of LSPs is particularly associated with key

attributes, such as reliability of delivery, customer loyalty/retention (in the UK sample), communication with clients and value-added service (in the Chinese sample). This suggests that these key attributes are likely to be more important in assessing service quality performance.

In summary, it appears that LSPs whose competitiveness is embedded in high level capabilities are more likely to retain their competitive position.

10.3.3 Competitive potential and sustainability

The empirical investigation suggests that six measures can be used to assess competitiveness. The six measures can be classified in terms of competitive performance and competitive potential. With respect to competitive performance, it is seen that three quantitative measures (i.e. market share, profitability and productivity), and one qualitative measure (i.e. service quality) can be used. The measurement of competitive potential is more speculative but can be assessed by forecasting potential growth in market share and assessing the degree of innovation, in both cases qualitatively. Competitive potential is closely associated with the sustainability of competitiveness, as recognized in the case of LSPs by several authors (e.g. Buckley *et al.*, 1988; Gorynia, 2001; Feurer and Chaharbaghi, 1994; Zairi, 1994).

Competitive advantage can be eroded by the depreciation of resources and capabilities or through the imitation by competitors over time (Barney, 1991; Grant, 1991). Porter also emphasizes that such erosion may be caused by “competitor behavior and industry evolution”(Porter, 1985, p. 20). In general, the theories of both the RBV and Porter suggest that the sustainability of competitive advantage depends on the extent of competitive duplication. To resist this duplication, companies should realize their potential more fully by identifying and exploiting resources and capabilities that are more difficult to replicate. These may include resources upgrading (e.g. increasing large capital investment) and reinvesting capabilities (e.g. applying patented innovation and developing the high-level technical skills of staff).

10.3.4 Comparison of Chinese and UK environment and attitudes

The survey reveals that UK and Chinese logistics managers share similar views on competitiveness, despite their different business contexts and backgrounds. For example, capabilities were regarded in both countries as the most important source of an LSP's

competitiveness, and service quality was considered to be the most important capability to an LSP's competitiveness. There were, nevertheless, several topics on which the views of UK and Chinese LSPs diverged. These differences of opinion are discussed below:

(1) Perceived importance of some capabilities to competitiveness

Despite a high degree of similarity between respondents' ratings of the thirteen capabilities contributing to competitiveness in the two countries, three capabilities showed big gaps in their ratings. They are strategic management, corporate culture and marketing (see Table 9.8).

(a) Strategic management

Of the thirteen capabilities, strategic management ranked second in China as opposed to sixth in the UK. It should not be surprising that the importance of strategic management was perceived so highly by Chinese managers. Two reasons may be offered for this relatively high ranking: the impact of transition to the market economy and the recent emergence of an LSP market in China. Chinese LSPs are now operating in the socialist market economy, a new system completely different from the former centrally planned one. In response to this drastic transition, one of the changes for Chinese companies is that the authority of planning and determining companies' development has been moved from the government to companies themselves. Companies have had to learn how to become business entities independent of the government and acting according to market rules rather than plans. Strategic management is a relatively new thing for them but they, nevertheless, consider it important. In addition, many Chinese LSPs are growing out of traditional transportation and warehousing companies and seeking to reposition themselves in the logistics market, hence the importance of strategy. They need to make better positions for their own transitions. This finding reflects a pressing need for Chinese LSPs to develop skills in strategic management. In the UK sample, on the other hand, the rating of strategic management suggests that it tends to be taken for granted and is often perceived as less important than operations management (its ranking being first).

(b) Corporate culture

While the rankings of corporate culture awarded by both UK and Chinese managers were not very high, the gap between the two samples (eighth in the UK vs. twelfth in China) deserves to be explored. Corporate culture is considered to be intrinsically

intertwined with a company's unique history and heritage and to be a source of competitive advantage (Barney, 1986a; Bharadwaj *et al.*, 1993). This indicates that corporate culture is likely to be affected by the company's age. In this study, the average age of the surveyed Chinese companies was younger than the mean for UK companies (see Figure 8.2). This suggests that the impact of corporate culture may be greater for UK LSPs.

(c) Marketing

It is rather surprising that marketing was given a relatively low weighting with a value of only 2.83 in the UK sample. To some extent, this indicates that UK respondents placed a higher emphasis on traditional operations rather than marketing. In contrast, marketing received a mean score of 4.27 in the Chinese sample, despite its ranking being eleventh. Marketing has recently been developed in China but is still regarded as important in absolute terms, if not relative to other factors.

(2) Different focuses on management practices

Different focuses on management practices have also been shown by UK and Chinese companies. Some were explained earlier in Chapter 8. Here, four aspects will be discussed further: time scale of strategic planning, operational KPIs, HRM activities and the criteria for measuring service quality.

(a) Time scale of strategic planning

UK and Chinese respondents choose different time scales for the planning of their strategy. The Chinese LSPs prefer to plan strategy on medium and long (> 5 year) term bases. This possibly reflects the transitional nature of the Chinese economy and rapid rate of growth. Companies want to make longer term preparation for economic development. In contrast, UK companies tended to engage in short (1-3 years) or medium (4-5 years) planning. This possibly reflects the more mature logistics service market in the UK but also the general "short-termism" in the UK economy, partly attributed to the workings of the stock market.

(b) Operational KPIs

Two rankings of operational KPIs reflect a discrepancy between UK and Chinese companies: flexibility ranked second in the UK, while its ranking was second bottom in China. Conversely, the degree of specialization ranked second in China as opposed to

second bottom in the UK. In the UK, where there is already a large degree of specialization by LSPs, this is not perceived as a strong competitive differentiator as in China, where the LSP market is a much earlier stage in its development.

(c) HRM activities

Two HRM activities showed gaps between Chinese and UK companies. Staff morale ranked first in the UK, while it ranked fourth in China. Performance appraisal system ranked first in China as opposed to fifth in the UK. The results may indicate that in the UK, it is felt that the improvement of staff morale is more likely to result in value creation for companies. Nevertheless, owing to the severe lack of qualified logistics professionals in China, seeking, recruiting, cultivating and appraising logistics specialists is a more important issue for most Chinese LSPs.

(d) Service quality criteria

The assessment of service quality is based on many factors in a logistics service context. Generally, it is suggested that service quality can be measured using both operations-based and relationship-based definitions of services, as discussed by many authors (e.g. Grant, 2004; Harding, 1998; Mentzer *et al.*, 1989; Mentzer *et al.*, 1999, 2001; Parasuraman *et al.*, 1985, 1988). In addition, it is noted that if a company can focus on a limited number of high priority logistics service features, overall service quality can be more effectively managed (Harding, 1998). In the UK sample, the two most popular criteria, i.e. reliability of delivery and customer loyalty/retention, are associated with operations-based and relationship-based service respectively. This indicates that both operation-based and relationship-based services may be useful in the assessment of service quality in the UK setting. In the Chinese sample, on the other hand, communication with client and value-added services are most highly rated and essentially relationship-based criteria. The results are likely to indicate that relationship-based measures are more important than traditional operational indicators in assessing service quality in the Chinese setting. The results reveal probable differences between UK and Chinese LSPs in the way that they assess service quality.

The above divergences reflect not only national differences in understanding competitiveness by LSPs, but also variations in the extent to which the business environment influences an LSP's competitiveness. These environments vary both internationally and inter-regionally. For example, UK and Chinese LSPs compete in

very different markets. The logistics service market in the UK is much more mature and embedded with an advanced, developed economy and liberal political system. Some of the world's largest LSPs are UK-owned. In contrast, the Chinese logistics service market is emerging within a less developed, but rapidly expanding economy. It is also a market with wide inter-regional variations. For instance, there appears to be a gap of competitiveness between Chinese LSPs in the west and in the east, as indicated by a three-year survey of Top 100 LSPs in China (CCTA, 2004, 2005 and 2006). The main reason for this is that economic development in the west area has long lagged behind that of other parts of China. There appears to be less pronounced inter-regional differences in the UK logistics market, partly reflecting the smaller size of the country.

10.4 Recommendations for Managers

The empirical investigation also sheds light on the managerial aspects of gaining and maintaining competitiveness. This requires LSP managers to identify, manage and develop new sources of competitiveness. The seven-step process outlined in Figure 10.2 can be used by managers aiming to assess and improve competitiveness. This process can be broken into seven stages: (1) assess competitive position; (2) conduct SWOT analysis; (3) formulate competitive strategy; (4) devise management practices to implement strategy; (5) implement the strategy; (6) evaluate the strategy; and (7) identify resource and capability gaps and reassess the business environment.

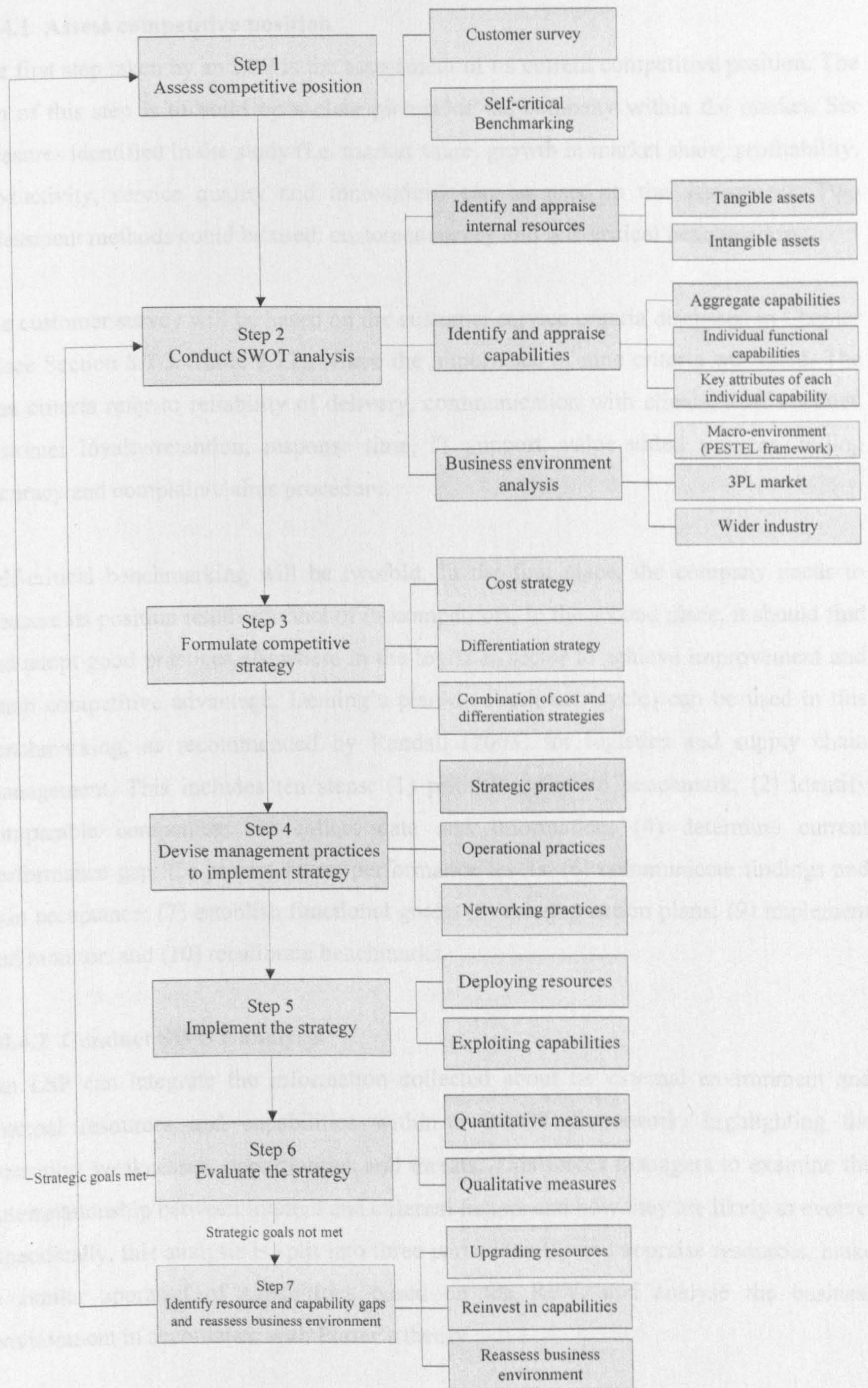


Figure 10.2 Seven-Step Process for LSPs to Assess and Improve Competitiveness

10.4.1 Assess competitive position

The first step taken by an LSP is the assessment of its current competitive position. The aim of this step is to build up a clear picture of the company within the market. Six measures identified in the study (i.e. market share, growth in market share, profitability, productivity, service quality and innovation) can be used in the assessment. Two assessment methods could be used: customer survey and self-critical benchmarking.

The customer survey will be based on the customer service criteria discussed in Chapter 8 (see Section 8.7.3, Table 8.13), where the importance of nine criteria was rated. The nine criteria refer to reliability of delivery, communication with clients, staff conduct, customer loyalty/retention, response time, IT support, value-added services, billing accuracy and complain/claims procedure.

Self-critical benchmarking will be twofold. In the first place, the company needs to measure its position relative to that of its competitors. In the second place, it should find and adopt good practices elsewhere in the logistics sector to achieve improvement and attain competitive advantage. Deming's plan-do-check-act (cycle) can be used in this benchmarking, as recommended by Randall (2003) for logistics and supply chain management. This includes ten steps: (1) prioritise what to benchmark, (2) identify comparable companies; (3) collect data and information; (4) determine current performance gap; (5) project future performance levels; (6) communicate findings and gain acceptance; (7) establish functional goals; (8) develop action plans; (9) implement and monitor; and (10) recalibrate benchmarks.

10.4.2 Conduct SWOT analysis

An LSP can integrate the information collected about its external environment and internal resources and capabilities within a SWOT framework, highlighting the strengths, weaknesses, opportunities and threats. This forces managers to examine the interrelationship between internal and external factors and how they are likely to evolve. Specifically, this analysis is split into three parts: identify and appraise resources, make a similar appraisal of capabilities based on the RBV, and analyse the business environment in accordance with Porter's theory.

(1) Identify and appraise resources

Two major categories of resources can be used to appraise tangible and intangible assets. In this step, the LSP should ascertain its resource position compared with that of its competitors, identifying opportunities for the better utilization of resources. As recommended by Grant (1991), LSPs can find opportunities to economize on their use of resources and the possibilities to employ resources more effectively and more profitably. This can involve using fewer resources to sustain the same level of business or existing resources to support a larger scale of business.

(2) Identify and appraise capabilities

An LSP's capabilities can be identified and appraised through activities/routines/business processes/practices, as recommended by many researchers (e.g. Day, 1994; Grant, 1991; Ray *et al.*, 2004; Voss *et al.*, 1997). The process could be applied at three levels. The first level is the aggregate capability, which includes strategic, operational and networking capabilities. The second level includes diversified functional capabilities, as shown by the thirteen contributing factors in this study. The third level comprises the key attributes of each individual capability. The purpose of this step is to examine whether the company could do more than its competitors using its various capabilities, and how its capabilities can be strengthened. The LSP should assess capabilities relative to those of its competitors and then try to exploit these relative strengths. As Grant (1991) notes, however, the failure of some companies is the result of their strategies extending their activities beyond the scope of their capabilities. In addition, the company should maintain objectivity in appraising capabilities because many companies frequently "fall victim to past glories, hopes for the future, and wishful thinking" (Grant, 1991, p. 121).

Given the different contributions of individual capabilities to competitiveness, the LSP should explore which capability offer the greatest leverage. According to the empirical investigation of the thirteen individual capabilities identified, and service quality being recognized as the important determinant of an LSP's competitiveness, the LSP should focus on the contributions of the thirteen capabilities, service quality in particular. In addition, the LSP should pay particular attention to an integration of individual capabilities.

(3) Business environment analysis

This analysis will be conducted at three levels: macro-environment, the 3PL market and wider industry. The PESTEL framework can be used to scan the macro-environment, systematically, examining factors such as political, economic, social, technology, environmental and legislative trends. The analysis at the 3PL market level can focus on customers and suppliers, such as customer expectations and requirements, and supplier capabilities. The industry analysis should be reviewed at the wider industry trends.

10.4.3 Formulate competitive strategy

In the light of the above analyses, an LSP should formulate a strategy which makes best use of its resources and capabilities relative to external opportunities and threats. Towards this end, it may choose (1) a cost advantage strategy; (2) a differentiation advantage strategy; and (3) a combination of cost and differentiation strategies.

10.4.4 Devise management practices for the implementation of the strategy

To accomplish the selected strategy, the company should devise management practices which can measure the company's capabilities. There are various practices conducive to acquiring competitiveness, as shown by both UK and Chinese companies in the study. Particular practices can be applied to each of the individual capabilities in strategy, operations and networking. For example, to attain sustainable competitive advantage, an LSP may adopt many innovative practices, such as developing new services for the current client base or to extend this base; developing a new internal process; application of new management techniques or the introduction of a new performance measurement system.

10.4.5 Implement the strategy

This step can be done over differing time scales, depending on the degree of strategic realignment and amount of capital investment required. It is also the process whereby the company deploys resources and exploits capabilities to achieve competitive advantage. First, the LSP should assemble, by quantity and quality, the resources required by the selected strategy. Secondly, on the basis of the identified and appraised capabilities the LSP possesses shown in Step 2, it may exploit the capability better than its competitors in implementing the strategy. Otherwise, the company may have to rebuild its capability.

10.4.6 Evaluate the strategy

This evaluation will be based on a range of competitive criteria, including customer service, personal efficiency, profitability, market share and others. The choice of criteria would be tailored to the strategic objectives and be a mix of quantitative and qualitative variables. The assessment of the success of the strategy would be judged relative to the company's position in the logistics market, repeating the first stage in the process. This would act as a feedback loop. If the LSP's position had not improved as expected, it would be necessary to re-examine its resources and capabilities.

10.4.7 Identify resource and capability gaps and reassess business environment

Where the strategy underperforms it is necessary to find the weaknesses in the resource base and set of corporate capabilities. Also, the LSP should reassess its business environment to seek new opportunities and avoid potential threats. Further feedback loops link this stage back to stage 2 in the process. The development of a competitive strategy then becomes a cyclical process until the strategic objectives are achieved.

It should be noted that there are "prescriptive limits" in applying a systemic approach to developing strategy (Barney and Arian, 2001, p. 173). As suggested by Barney (1991), some resources or capabilities are based on historical legacy, causal ambiguity and social complexity, making it very difficult to measure their effect on competitiveness. As he notes, it is sometimes hard to understand why one company always outperforms other companies.

10.5 Summary

This chapter has interpreted and discussed the concept of an LSP's competitiveness in greater detail, by drawing upon the empirical investigation. The discussion focuses on two aspects: the theoretical implications and practical advice offered to practitioners.

From a theoretical perspective, this study largely endorses the RBV, although support has also been given to the view that Porter's theory and the RBV are essentially complementary. An LSP's competitiveness is derived mainly from capabilities, although it is also impacted upon by resources and business environment. There are different patterns of capabilities influencing competitiveness. The combined effect of capabilities and distinctive capabilities are both important to an LSP's competitiveness, given the complexity of capabilities in exerting a contribution to competitiveness. The

sustainability of competitiveness deserves much more attention, as competitive advantage can be eroded by the depreciation of resources and capabilities or through imitation by competitors over time. To maintain sustainable competitive advantage, LSPs should continuously upgrade resources and reinvest in capabilities.

The chapter also summarises the main differences observed in the views of competitiveness, as expressed by LSP managers in China and the UK. This includes: (1) different perceptions of the importance of some capabilities for competitiveness, such as strategic management, corporate culture and marketing; (2) different focuses on management practices, such as the time-scale of strategic planning, operational KPIs, HRM activities and the criteria for measuring service quality.

From a managerial perspective, the concern for managers is how to identify, manage and develop sources of competitiveness. Based on the results of the interview and questionnaire surveys, a seven-step procedure for LSPs to assess and improve their level of competitiveness has been proposed. This procedure includes: (1) assess competitive position; (2) conduct SWOT analysis; (3) formulate competitive strategy; (4) devise management practices to implement strategy; (5) implement the strategy; (6) evaluate the strategy; and (7) identify resource and capability gaps and reassess the business environment. Managers might employ this procedure in practice.

The next chapter will briefly summarize the thesis and discuss answers to the research questions. It will also consider the limitations of the work and directions for future research.

CHAPTER 11 CONCLUSIONS

11.1 Introduction

This Chapter provides a summary of the thesis and further discussion concerning the four research questions posed in Chapter 1. The wider contributions of the study will then be discussed. The concluding section outlines the limitations of the study and recommends some directions for future research.

11.2 Thesis Summary

The aim of this thesis was to develop a comprehensive understanding of the competitiveness of LSPs. The applicability of general theories of firm-level competitiveness was tested in a logistics setting using several forms of empirical investigation. The research endeavour was implemented in two phases: developing a conceptual model and verifying it empirically.

(1) Development of the conceptual model

In this phase, four research questions were identified: (a) primary sources of competitiveness; (b) contributing factors; (c) measurement of competitiveness; and (d) practices of achieving it.

The two most influential theories of strategic management were applied to the issue of LSPs' competitiveness. The two theories are the resource-based view (RBV) and Porter's theory of competitive advantage. The focus of the RBV is that firm-specific resources are the primary sources of competitive advantage. The starting point of the RBV is the firm. In contrast, Porter insists that it is the environment in which firms exist that is the primary source of competitive advantage. He takes an essentially industry-level perspective. Both theories, nevertheless, acknowledge the role of resources, capabilities and environment in influencing a firm's competitive advantage.

Built on this common ground of the two theories, this study rationally developed a conceptual model of an LSP's competitiveness, arguing that its origins lie in resources, capabilities and business environment and probably a mix of all three. Each source acts upon the competitiveness through its various attributes. These different attributes comprise the underlying dimensions of the three sources. Taken together, they can give an LSP a unique set of competitive advantages and disadvantages.

The dimensions of the three sources were disaggregated as follows:

- Resources: two dimensions, i.e. tangible assets and intangible assets
- Capabilities: thirteen dimensions, i.e. strategic management, operations management, service quality, customer relationship management (CRM), service network, business process management (BPM), IT, marketing, inventory management, cost management, HRM, innovation and corporate culture
- Business environment: three dimensions, i.e. macro-environment, the 3PL market and wider industry

Since no single measure can capture all the nuances of competitiveness (Buckley *et al.*, 1988), it must be assessed, as suggested by many studies using multiple measures, six measures in particular were identified as critical to use in assessing an LSP's competitiveness: market share, growth in market share, profitability, productivity, service quality and innovation are considered to use in assessing an LSP's competitiveness.

(2) Empirical verification of the conceptual model

In order to test the proposed model rigorously, a three-phase survey of UK-based and China-based LSPs was conducted. The first phase involved a pilot survey of Chinese LSPs by telephone interviews and email survey. The second and third phases comprised semi-structured face-to-face interviews and large-scale postal questionnaire surveys of both China-based and UK-based LSPs. A combination of qualitative and quantitative approaches was employed to interpret and explain results of the various surveys.

The semi-structured face-to-face interviews were held with twenty-one China-based LSPs and two UK-based LSPs. The two countries' LSPs shared many common perceptions of the research questions. Many of the differences that emerged could be attributed to differences in the economic systems of the two countries and cultural backgrounds of the respondents and their companies. The questionnaire surveys yielded 35 and 114 useable responses from the UK and China respectively. This large body of questionnaire data was analysed using a range of descriptive and inferential statistical tests. The UK and Chinese samples contained a wide range of respondents by type, age, ownership, number of employee and service sector.

In the UK sample, resources, capabilities and business environment were all shown to impact on an LSP's competitiveness. Capabilities are the most important, followed by resources and business environment. The statistical analysis suggested that twelve of the contributing factors are important to an LSP's competitiveness, with service quality the most important. Rather surprisingly, marketing was not deemed to have a significant impact on competitiveness by the sample of UK LSPs. Service quality, IT and strategic management were shown by the multiple regression analysis to be the most important factors, with service quality the most closely correlated with capabilities. Reliability of delivery and customer loyalty/retention are considered the two key attributes of service quality.

In the Chinese sample, as in the UK, resources, capabilities and business environment were all found to positively impact on an LSP's competitiveness. Capabilities are also the most important. Unlike in the UK, all thirteen contributing factors were suggested as being important to an LSP's competitiveness. However, service quality was again identified as the most important factor. The two key attributes of service quality, namely, communication with clients and value-added service concerning relationship, differed from those prioritised by UK LSPs.

Exploratory factor analysis (EFA) indicated that there is an underlying structure in the thirteen factors contributing to competitiveness as reflected in three factors: operational capability, strategic capability and networking capability. The operational factor is composed of six contributing factors: service quality, CRM, operations management, inventory management, BPM and cost management. The strategic factor is manifest in four contributing factors: corporate culture, innovation, strategic management and HRM. The networking factor combines three contributing factors: IT, marketing and service network. EFA also inferred that an LSP's competitiveness is built on the combined effect of these three factors. In addition, the factor analysis regression (FAR) suggested that the thirteen contributing factors have a combined effect on an LSP's competitiveness through the correlation between capabilities and the three factor clusters.

Different measures were used by companies in assessing actual and 'potential' competitiveness. Market share, profitability, productivity and service quality tend to be

used in assessing actual competitiveness, while growth in market share and innovation are used to evaluate 'potential' competitiveness.

There was a high degree of similarity in the perceptions and attitudes of UK-based and China-based LSPs despite being from completely different cultural and economic contexts.

11.3 Answers to Research Questions

On the basis of the empirical investigation, the four research questions can be answered as follows.

(1) What are the primary sources of an LSP's competitiveness? To what extent does an LSP's competitiveness depend on the exogenous and endogenous factors?

The empirical investigation indicates that resources, capabilities and business environment are all primary sources of an LSP's competitiveness with capabilities exerting the strongest influence, followed by resources and business environment. Capabilities are essentially endogenous factors. This implies that an LSP can be proactive in gaining competitiveness rather than simply reacting to its business environment. This finding broadly corroborates the RBV view of competitiveness.

(2) What specific factors can contribute to an LSP's competitiveness? What is the relative contribution of these identified determinants to an LSP's competitiveness?

Thirteen individual capabilities can contribute to an LSP's competitiveness: strategic management, operations management, service quality, CRM, service network, BPM, IT, marketing, inventory management, cost management, HRM, innovation and corporate culture. They exert their roles either individually or in a combined way, making different contributions to the competitiveness. Among the thirteen identified capabilities, service quality makes the most important contribution to an LSP's competitiveness. In addition, the attributes of each capability vary in their relative importance. Each capability can be assessed by key attributes. For example, the assessment of service quality can be measured by reliability of delivery and customer loyalty/retention in the UK setting and by communication with clients and value-added service in the Chinese setting.

(3) *What are the possible measures that LSPs can use to assess their competitiveness?*

To what extent can they be quantified?

Six measures: market share, growth in market share, profitability, productivity, service quality and innovation are the main KPIs that LSPs use to assess their competitiveness. The former four are quantitative measures, while the latter two are qualitative measures. Differing combinations of the six are used for actual and 'potential' competitiveness.

(4) *What are the management practices that LSPs should be adopting to enhance their competitiveness? What procedure should they adopt to measure and improve competitiveness?*

Much evidence of good practices was found among the UK and Chinese LSPs in their capabilities. There are many good practices which help companies to create competitiveness, which include:

- (a) Strategic practices: effective strategic planning and positioning; developing different growth strategies; pursuing different competitive strategies; being innovative in service diversification, technology and management; implementing various HRM activities in recruiting professionals and developing staff's skills; cultivating different cultural attributes.
- (b) Operational practices: utilizing different service standards, in particular ISO 9000/9001 to build high-level service quality; using KPIs to measure operational performance, in particular quality of operation; adopting key customer service criteria such as reliability of delivery and communication with clients; cultivating customer relationships, particularly long-term contractual relationship; applying accounting tools to improve cost control such as activity-based costing system (ABC); providing value-added service offerings such as inventory management.
- (c) Networking practices: upgrading IT; developing service networks to extend geographical coverage; adopting different marketing strategies such as personal selling, referrals, website and advertising.

In the light of the theoretical and empirical research, it is suggested that a seven-stage procedure be employed by LSPs to assess and improve their level of competitiveness. However, there is no 'one-size-fits-all' model for gaining competitiveness. Each LSP must develop a specific competitive strategy that exploits its particular mix of resources and capabilities.

This study also suggests that LSPs' perceptions and attitudes to competitiveness vary internationally. For example, although China-based and UK-based LSPs share a high degree of similarity between respondents' ratings of the thirteen capabilities contributing to competitiveness, they diverge on the ratings of some capabilities, in particular, strategic management, corporate culture and marketing. In addition, LSPs in the two countries share many common views on the practices contributing to competitiveness, particularly on strategic planning and positioning, measuring service quality, measurement of operational performance, CRM, application of IT, innovations and cost management. However, they diverge on some specific issues, e.g. operational performance criteria and HRM practices.

11.4 Contributions of the Research

This research was contributed to knowledge in the field of logistics in several ways.

(1) Transferring relevant theory from other disciplines

Logistics is an outgrowth primarily from the business disciplines of management and marketing with some inputs from engineering (Kent and Flint, 1997; Stock, 1997). It has no well developed theory of its own, but tends to draw upon other cognate disciplines (Kent and Flint, 1997; Stock, 1997). It has been of benefit for logistics research to borrow and apply existing theories from other disciplines, thereby enhancing the linkages between logistics and these disciplines. The present study has reviewed general research on competitiveness in the strategic management literature. It has used two of the most influential theories in strategic management to better explain an LSP's competitiveness. It has therefore strengthened the linkage between logistics research and strategic management.

(2) Filling a research gap

An extensive review of existing literature could find no academic studies of LSPs' competitiveness. In addition, feedback from many researchers, practitioners and professionals in the logistics research community in the UK, America and China, confirmed a lack of research on this topic. This study appears therefore to be one of the first exploratory investigations of this topic.

(3) Practical advice to LSPs

The study does not confine itself to conceptual aspects of an LSP's competitiveness, like many previous studies on firm-level competitiveness. Empirical investigation has been used to validate and extend the theory. It has also been used to develop a seven stage procedure that LSPs can use to improve their competitive position. This could be of practical benefit to LSPs.

(4) Empirical investigation across two countries

Unlike much logistics research which is undertaken in one cultural context, this study examined two cultural, economic and political contexts: China and the UK. This provides a firmer basis for generalizing the findings internationally and also shows the extent to which views on LSP competitiveness reflect national characteristics. This is particularly important to the theme of competitiveness because, as suggested by Porter (1990), it is "the nation in which the essential competitive advantages of the enterprise are created and sustained. It is where a firm's strategy is set and the core product and process technology (broadly defined) are created and maintained" (p. 19). To the best of the author's knowledge, this is the first comparative study of LSPs in China and the UK.

(5) Methodological diversity and innovation

The study employs a broad range of statistical techniques. Two of which (the application of factor scores in exploratory factor analysis and factor analysis regression) appear not to have been widely applied by logistics researchers. This study has illustrated how different techniques can be applied to the analysis of the different types of data generated by a questionnaire survey on competitiveness.

11.5 Limitations and Recommendations for Further Research

This research was subject to several limitations which could be overcome in future projects.

(1) Sole focus on LSPs' views of competitiveness

This study has examined competitiveness only from the LSP's perspective. Essentially, this approach is one-dimensional. To gain a more comprehensive view of LSPs' competitiveness, a dyadic approach in which the perception of users is included would also be desirable. LSPs may tend to over-estimate their own competitiveness. Getting input from customers might help to correct this bias.

(2) Under-specification of the dimensions of both resources and business environment

As capabilities were identified as making the greatest contribution to an LSP's competitiveness, they were analyzed in the greatest detail, disaggregated into thirteen factors. In contrast, the analysis of resources and business environment was more aggregated. The resources were given only two constructs, i.e. tangible and intangible assets, while business environment was given three: macro-environment, the 3PL market and wider industry. Future research could decompose resources and business environment into more dimensions and analyze their impact on competitiveness in greater depth.

(3) No consideration of the acquisition and evolution of capabilities

This study has taken an essentially static view of an LSP's capabilities. Further research may explore, in much more detail, how capabilities develop in an LSP, and how they can be used to leverage resources inside the company to gain sustainable competitive advantage through time. In addition, while the study empirically examined the impact of the thirteen capabilities on competitiveness, it is possible that there may be other capabilities that have not been fully evaluated. Further research may identify other capabilities not listed here.

(4) Inability to explore the relationship between the sources of competitiveness and the six measures of competitiveness

The research was not designed to analyze the relationship between the sources of competitiveness and the key measures such as profitability and market share. Further research may explore the relationship between sources and the six measures so that the relative impact of each source/capability on competitiveness could be assessed. However, it would be difficult to access data on the six measures as some are financial indicators that would be considered confidential and not necessarily published in annual reports.

(5) Differing degrees of survey coverage in the two countries

Much more empirical research was undertaken in China than in the UK, The interview and postal questionnaire surveys were much larger in China. The analysis was therefore unbalanced. Because of differences in sample sizes in the UK and China, not all the same statistical techniques could be used in the two cases. This affected some of the

inferences made from the results. This limited the generalisability of the results. It would be desirable in future research to include other countries and compare LSP competitiveness in other cultural, economic and political contexts. Researchers should aim to achieve similar degrees of survey coverage in these countries to permit greater standardization of analytical techniques and more consistent comparison.

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Appendix 1: Main Themes of Telephone Interviews

Regarding the Competitiveness of Logistics Service Providers (LSPs)

Company (name): _____
Interviewee (name): _____
Educated background of interviewee: _____
Position: _____
Department: _____
No of years with the company: _____

1. How do you understand an LSP's competitiveness? Could you give a specific example to explain your insight?
2. From your point of view, what are the general sources of an LSP's competitiveness? Could you give a brief explanation of your insight?
3. From your point of view, which specific contributing factors affect an LSP's competitiveness? Which is the most important factor? Could you give a brief explanation of your insight?
4. For your standpoint, what criteria should be used to assess the performance of an LSP's competitiveness? Could you give a brief explanation of your insight?
5. What procedure should an LSP use to measure its relative competitiveness? Is it a general impression (subjective) or based on benchmarking (objective) of key indicators? What is your insight?
6. From your point of view, what are the main ways can an LSP gain and enhance its competitiveness? Could you give an explanation of your insight?
7. How do the competitive strategies of LSPs vary? Could you give a specific example to explain this?

Appendix 2: Structured Questionnaire for E-mail Survey

THE COMPETITIVENESS OF LOGISTICS SERVICE PROVIDERS

Logistics Service Provider (LSP) Perspectives

SECTION A: GENERAL ISSUES ON LSPS' COMPETITIVENESS

1. From your point of view, how important is each of the following sources of LSPs' competitiveness? (1= unimportant; 5= very important)

a. Resources	1	2	3	4	5
b. Capability	1	2	3	4	5
c. Business environment	1	2	3	4	5
d. Others (Please specify) _____	1	2	3	4	5

2. Among the sources mentioned above, please identify the most important one for LSPs' competitiveness. (Tick the most appropriate box)

- Resources
 Capability
 Business environment
 Others (Please specify) _____

3. From your point of view, how much do the following factors contribution to the competitiveness of an LSP? (1= little contribution; 5= much contribution)

a. Price factors, e.g. price, cost	1	2	3	4	5
b. Non- price factors, e.g. management, service	1	2	3	4	5

4. From your point of view, which of the following criteria can be used to access the competitiveness of an LSP?
(Tick appropriate boxes)

- Market share Growth in market share Profitability
 Productivity Cost Service quality Innovation
 Others (Please specify) _____

5. From your point of view, which of the following criteria can indicate the competitive potential of an LSP?
(Tick appropriate boxes)

- Market share Growth in market share Profitability
 Productivity Cost Service quality Innovation
 Others (Please specify) _____

6. From your point of view, how important is each of following factors in achieving and improving LSPs' competitiveness? (1= unimportant; 5 = very important)

a. Strategic management	1	2	3	4	5
b. Business process management	1	2	3	4	5
c. Customer relationship management	1	2	3	4	5
d. Service quality	1	2	3	4	5
e. Information technology	1	2	3	4	5
f. Logistics network	1	2	3	4	5
g. Inventory management	1	2	3	4	5
h. Human resource management	1	2	3	4	5
i. Cost management	1	2	3	4	5
j. Innovation	1	2	3	4	5
k. Corporate culture	1	2	3	4	5
l. System and mechanism	1	2	3	4	5
m. Others (please specify) _____	1	2	3	4	5

18. What is the typical type of relationship your company has with customers?
(Tick appropriate boxes)

- Long-term contractual relationship
- Short-term transactional arrangement
- Others (Please specify) _____

19. How do you view the quality of your company's overall relationship with customers?

(1= very poor; 5= very good)

1 2 3 4 5

20. How does your company manage the relationship with customers? (Tick appropriate boxes)

- Developing detailed knowledge of customer's requirement
- Timely response to customer's requests
- Willing to help customer resolve problems
- Customize or tailor service to customer's needs
- Provide customers with up-to-date delivery information
- Others (Please specify) _____

21. What are the attributes related to customer satisfaction? (Tick appropriate boxes)

- On-time delivery rate
- Damage rate
- Others (Please specify) _____
- Order lead time
- Responsiveness

22. Does your company use any of the following service quality standards?

- Yes (please specify which standards adopted)
 - ISO 9000
 - Other kinds of international or country's standards
(Please specify) _____
 - Others (please specify) _____
- No

23. How good is your IT networking? (1= very poor; 5= very good)

- a. Internal 1 2 3 4 5
- b. External (to customer and/or partner) 1 2 3 4 5

24. Please indicate which of the following information technologies are being used in your company? (Tick appropriate boxes)

- Electronic Data Interchange (EDI)
- Warehousing Management System (WMS)
- Transportation Management System (TMS)
- Enterprise Resource Planning (ERP)
- Delivery Resource Planning (DRP)
- Order Management System (OMS)
- Client Relationship Management (CRM)
- Automatic Vehicle Identification (AVI)
- Automated Guided Vehicle System (AGV)
- Global Positioning System (GPS)
- Virtual Private Network (VPN)
- Decision Support System (DSS)
- Radio Frequency Identification (RFID)
- Others (Please specify) _____

25. How effective are the external IT links with customers/partners?
(1= ineffective; 5 = very effective)

- a. Goods tracking 1 2 3 4 5
- b. Order fulfilment 1 2 3 4 5
- c. Fund checkout 1 2 3 4 5
- d. Others (Please specify) 1 2 3 4 5

36. From your point of view, to what extent can you gain service leadership through innovation?

(1= not at all; 5= to a large extent)

1 2 3 4 5

37. How does your company build and strengthen its corporate culture?

(Tick appropriate boxes)

- Continuously improve internal and external communications
- Define explicit statements of shared values
- Take deliberate measures (Please specify) _____
- Others (Please specify) _____

38. How centralized is the decision making structure?

(1= highly centralized; 5= highly decentralized)

1 2 3 4 5

39. Which kinds of mechanisms does your company have for managing and operating well?

(Tick appropriate boxes)

- Control mechanism
- Measurement mechanism
- Reward mechanism
- Others (Please specify) _____

SECTION C: BACKGROUND INFORMATION

40. Your company is a: (Tick appropriate boxes)

- Transportation-based LSP
- Warehouse-based LSP
- Forwarder-based LSP
- Integrated LSP
- Others (Please specify) _____

41. Number of years your company has been in logistics business in China _____.

42. The ownership structure of your company is: (Tick appropriate boxes)

- State-owned enterprise (SOE)
- Private enterprise
- Joint venture (If link is with foreign company, please specify foreign country) _____
- Wholly foreign-owned enterprise (please specify foreign country) _____
- Others (please specify) _____

43. Number of employees in your company _____

44. Please identify industry sectors in which your company serves. (Tick appropriate boxes)

- Industrial machinery and equipment
- Textile & apparel
- Electronic products, computer and telecommunication
- Automotive part
- Household appliances
- Furniture
- Fast-moving consumer goods
- Pharmaceutical
- Chemical
- Parcels
- Home delivery
- Construction materials
- Raw materials
- Others (Please specify) _____

45. What services does your company offer to customer? (Tick appropriate boxes)

- Total logistics solution
- Freight forwarding
- Transportation
 - Air
 - Sea
 - River
 - Trunk
 - Rail
- Warehousing
- Integrated distribution service
- Assembly and installation
- Packaging and repacking
- Consolidation
- Customer clearance
- Express shipping
- IT-support
- Inventory management
- Insurance agent
- Financial service (e.g. inventory-backed financing)
- Order processing
- Others (please specify) _____

Appendix 3: Main Themes of Face-to-Face Interviews in China

Regarding the Competitiveness of Logistics Service Providers (LSPs)

Company (name): _____
Interviewee (name): _____
Educated background of interviewee: _____
Position: _____
Department: _____
No of years with the company: _____

PART ONE GENERAL ISSUES ON LSPS' COMPETITIVENESS

1. How do you understand an LSP's competitiveness? Could you give a specific example to explain your insight?
2. From your point of view, what are the general sources of an LSP's competitiveness? Could you give a brief explanation of your insight?
3. From your point of view, which specific contributing factors affect an LSP's competitiveness? Which is the most important factor? Could you give a brief explanation of your insight?
4. For your standpoint, what criteria should be used to access the performance of an LSP's competitiveness? Could you give a brief explanation of your insight?
5. What procedure should an LSP use to measure its relative competitiveness? Is it a general impression (subjective) or based on benchmarking (objective) of key indicators? What is your insight?
6. From your point of view, what are the main ways can an LSP gain and enhance its competitiveness? Could you give an explanation of your insight?
7. How do the competitive strategies of LSPs vary? Could you give a specific example to explain this?

PART TWO YOUR COMPANY'S COMPETITIVENESS

8. How do you view your company's overall competitiveness in current market?
(1= very weak, 5 = very strong) 1 2 3 4 5
9. How does your company develop strategy? Could you give a specific example to explain it?
10. Which kinds of strategic positioning does your company focus on? Why does your company adopt this focus?
11. From your point of view, what criteria could be assessed the performance of operations?

Appendix 4: Main Themes of Face-to-Face Interviews in the UK

Regarding the Competitiveness of Logistics Service Providers (LSPs)

Q1: What measures would you use to assess the competitiveness of a logistics services provider?

Q2: Do you formally assess your own company's competitiveness using these criteria?

Q3: Do you think that a logistics service provider should be or become a networked organization?

Q4: What practical problems do you encounter in trying to measure the competitiveness?

Q5: Are you aware of any other studies of the competitiveness of logistics service providers?

Appendix 5: Postal Questionnaire for the UK

COMPETITIVENESS OF LOGISTICS SERVICE PROVIDERS (UK)

Logistics Service Provider (LSP) Perspective

- Instructions:** 1. Please answer the following questions by circling the appropriate response.
2. Please use a "✓" in the "□", and fill in your answer in "_____"

SECTION A GENERAL ISSUES

1. On the basis of your experience, please indicate to what extent each of the following impact on the competitiveness of a logistics service provider?
(Please rate on a scale of 1-5, 1 = no impact, 5 = high impact)

a. LSP's resources	1	2	3	4	5
b. LSP's capabilities	1	2	3	4	5
c. Business environment	1	2	3	4	5

2. Which of the following indicators would you use in assessing the competitiveness of an LSP?
(Please tick appropriate boxes)

- Market share
 Growth in market share
 Profitability
 Productivity (i.e. labor productivity, asset utilization)
 Service quality
 Innovation
 Others (Please specify) _____

3. How important are the following factors in contributing to the competitiveness of an LSP?
(Please rate on a scale of 1-5, 1 = unimportant, 5 = very important)

a. Strategic management	1	2	3	4	5
b. Operations management	1	2	3	4	5
c. Service quality	1	2	3	4	5
d. Customer relationship management (CRM)	1	2	3	4	5
e. Information technology (IT)	1	2	3	4	5
f. Service network	1	2	3	4	5
g. Business process management (BPM)	1	2	3	4	5
h. Marketing	1	2	3	4	5
i. Inventory management	1	2	3	4	5
j. Innovation	1	2	3	4	5
k. Human resource management	1	2	3	4	5
l. Cost management	1	2	3	4	5
m. Corporate culture	1	2	3	4	5
n. Others (Please specify) _____	1	2	3	4	5

SECTION B STRATEGIC PLANNING AND OBJECTIVES

4. Does your company undertake strategic planning?

Yes No (If "Yes", please specify time scale to which it relates)

1-3 year 4-5 year > 5 year

5. Which kind of competitive strategy does your company aim to pursue?

Cost leadership Value leadership Cost and value leadership

6. Please describe the geographical extent of your company's service network.

Global European National Regional

7. Which kind of organizational structure does your company have?
- Function-based structure Process-based structure
 Matrix-based structure i.e. function and process –based structure
8. Does your company have a strategic objective of expanding geographically?
- Yes No (If "Yes", please indicate how it plans to expand)
- By merger/acquisition By strategic alliance with other LSPs
 Organic growth Franchising
 Other means (Please specify) _____
9. Does your company plan to diversify its range of services?
- Yes No (If "Yes", please indicate how it plans to diversify)
- By merger/acquisition By strategic alliance with other LSPs
 Organically Other means (Please specify) _____
10. In developing a strategy has the company employed the services of external advisers?
- Yes No (If "Yes", please indicate the type of adviser)
- Consultancy company University / college
 Others (Please specify) _____
11. In recent years, how reactive / proactive has the company been in its relations with the majority of clients: (Please circle the appropriate score)
- Highly reactive 1 2 3 4 5 Highly proactive
12. How does the company market its services? (1= no importance, 5 =high importance)
- | | | | | | |
|---------------------|---|---|---|---|---|
| a. Personal selling | 1 | 2 | 3 | 4 | 5 |
| b. Advertising | 1 | 2 | 3 | 4 | 5 |
| c. Website | 1 | 2 | 3 | 4 | 5 |
| d. Referrals | 1 | 2 | 3 | 4 | 5 |
| e. Exhibitions | 1 | 2 | 3 | 4 | 5 |
13. Does your company offer an inventory management service for customers?
- Yes No (If "Yes", please indicate the degree of the benefit to your company)
- No benefit Slight benefit Moderate benefit Great benefit
14. Which of the following tools does your company use to determine the cost of logistics activities? (Please tick the most appropriate box)
- Traditional cost accounting systems, i.e. allocating cost according to department
 Activity-Based Costing (ABC) system, i.e. allocating cost according to activities performed
 Both of the above
 Neither of the above

SECTION C ASSESSING PERFORMANCE AND COMPETITIVENESS

15. Does your company use any of the following quality standards? (Please tick appropriate boxes)
- ISO 9000/9001 European Quality Award (EQA) Charter mark (UK)
 Others (please specify) _____

16. Please rate the importance of the following operational factors in terms of their impact on the competitiveness of an LSP: (Rating scale on 1-5, 1= no importance, 5= high importance)

a. Quality of operation (failure rate)	1	2	3	4	5
b. Speed of operation	1	2	3	4	5
c. Flexibility	1	2	3	4	5
d. Process integration	1	2	3	4	5
e. Innovation	1	2	3	4	5
f. Capacity utilization	1	2	3	4	5
g. Standardization of operations	1	2	3	4	5
h. Degree of specialization	1	2	3	4	5
i. Others (please specify) _____	1	2	3	4	5

17. Please rate the importance of the following customer service factors in terms of their impact on the competitiveness of an LSP:

(Rating scale on 1-5, 1= no importance, 5= high importance)

a. Staff conduct	1	2	3	4	5
b. Reliability of delivery	1	2	3	4	5
c. Response time	1	2	3	4	5
d. Billing accuracy	1	2	3	4	5
e. Communication with client	1	2	3	4	5
f. IT support	1	2	3	4	5
g. Complaint / claims procedure	1	2	3	4	5
h. Value-added services	1	2	3	4	5
i. Customer loyalty / retention	1	2	3	4	5
j. Others (please specify) _____	1	2	3	4	5

18. What is the typical type of relationship your company has with customers?

(Please tick appropriate boxes, and indicate the weight by number of customers)

- Long-term contractual relationship _____ % of customers
- Short-term transactional arrangement _____ % of customers
- Others (Please specify) _____, _____ % of customers

19. Which of the following approaches would you use to cultivate the relationship with customers?

(Please tick appropriate boxes)

- Frequent meetings
- Joint initiatives
- Mutually agreed performance measurement system
- Others (please specify) _____
- Regular customer reviews
- Customized services

20. How much competitive advantage has your company gained from the application of the following IT systems?

(Please rate on scale 1 no advantage to 5 large advantage)

a. Enterprise Resource Planning (ERP)	1	2	3	4	5
b. Electronic Data Interchange (EDI)	1	2	3	4	5
c. Internet	1	2	3	4	5
d. Warehousing Management System (WMS)	1	2	3	4	5
e. Fleet Management System (FMS)	1	2	3	4	5
f. Decision Support System (DSS)	1	2	3	4	5
g. Computerised Vehicle Routing and Scheduling	1	2	3	4	5
h. Others (Please specify) _____	1	2	3	4	5

21. Please rate the main sources of innovation in your business? (1 = low 5 = high)

a. Technological innovation	1	2	3	4	5
b. Management innovation	1	2	3	4	5
c. Service innovation	1	2	3	4	5

22. Has your company adopted any of the following innovations over the past year?
(Please tick appropriate boxes)

- Development of new service for current client base
- Development of new service to extend the client base
- Development of new internal process
- Application of new management technique
- Development of new performance measurement system

23. To what extent can your company gain service leadership through innovation?

(.1= not at all 5= to a large extent)

1 2 3 4 5

24. Please rate the importance of the following aspects of human resource management in terms of their contribution to the competitiveness of an LSP. (1= no importance 5= high importance)

- | | | | | | |
|-----------------------------------|---|---|---|---|---|
| a. Staff recruitment procedures | 1 | 2 | 3 | 4 | 5 |
| b. Staff Training provision | 1 | 2 | 3 | 4 | 5 |
| c. Company ethos | 1 | 2 | 3 | 4 | 5 |
| d. Employee empowerment | 1 | 2 | 3 | 4 | 5 |
| e. Staff morale | 1 | 2 | 3 | 4 | 5 |
| f. Performance appraisal system | 1 | 2 | 3 | 4 | 5 |
| g. Reward and compensation system | 1 | 2 | 3 | 4 | 5 |
| h. Disciplinary procedures | 1 | 2 | 3 | 4 | 5 |
| i. Relations with trade union | 1 | 2 | 3 | 4 | 5 |
| j. Others (please specify) _____ | 1 | 2 | 3 | 4 | 5 |

25. Which of the following attributes would you use to appraise the cultural characteristics of a logistics service provider? (Please tick appropriate boxes)

- Teamwork Service quality Relationships Quality of management
- Customer satisfaction Employee loyalty and morale
- Environmental and community responsibility Others (please specify) _____

26. How big an influence do company environmental policy, corporate social responsibility and risk management have on the competitiveness of an LSP? (1 = no influence 5= large influence)

- | | | | | | |
|------------------------------------|---|---|---|---|---|
| a. Company environmental policy | 1 | 2 | 3 | 4 | 5 |
| b. Corporate social responsibility | 1 | 2 | 3 | 4 | 5 |
| c. Risk management | 1 | 2 | 3 | 4 | 5 |

SECTION D BACKGROUND INFORMATION

27. Your company is a : (Please tick the most appropriate box)

- Transportation-based LSP Warehouse-based LSP
- Forwarder-based LSP Integrated LSP
- Others (Please specify) _____

28. Number of years your company has been in logistics business in UK _____.

29. The ownership structure of your company is: (Please tick the most appropriate box)

- Private company Joint venture (JV)

30. Number of employees in your company _____.

31. Please identify main industry sectors that your company serves. (Please tick appropriate boxes)

- | | |
|---|---|
| <input type="checkbox"/> Industrial machinery and equipment | <input type="checkbox"/> Textile & apparel |
| <input type="checkbox"/> Electronic products, computer/telecoms | <input type="checkbox"/> Automotive part |
| <input type="checkbox"/> Furniture | <input type="checkbox"/> Household appliances |
| <input type="checkbox"/> Pharmaceutical | <input type="checkbox"/> Chemical |
| <input type="checkbox"/> Parcels | <input type="checkbox"/> Home delivery |
| <input type="checkbox"/> Construction materials | <input type="checkbox"/> Raw materials |
| <input type="checkbox"/> Retail | <input type="checkbox"/> Fast-moving consumer goods |
| <input type="checkbox"/> Paper and paper product | <input type="checkbox"/> Other (please specify) _____ |

Appendix 6: Postal Questionnaire for China

COMPETITIVENESS OF LOGISTICS SERVICE PROVIDERS

Logistics Service Provider (LSP) Perspective

- Instructions:** 1. Please answer the following questions by circling the appropriate response.
2. Please use a "✓" in the "□", and fill in your answer in "_____"

SECTION A GENERAL ISSUES

1. On the basis of your experience, please indicate to what extent each of the following impact on the competitiveness of a logistics service provider? (Please rate on a scale of 1-5, 1= no impact, 5 = high impact)

a. LSP's resources	1	2	3	4	5
b. LSP's capabilities	1	2	3	4	5
c. Business environment	1	2	3	4	5

2. Which of the following indicators would you use in assessing the competitiveness of an LSP? (Please tick appropriate boxes)

Measures	Actual Competitiveness (i.e. Realized)	Potential Competitiveness (i.e. Competitive potential)
a. Market share	<input type="checkbox"/>	<input type="checkbox"/>
b. Growth of market share	<input type="checkbox"/>	<input type="checkbox"/>
c. Profitability	<input type="checkbox"/>	<input type="checkbox"/>
d. Productivity (i.e. labor productivity, asset utilization)	<input type="checkbox"/>	<input type="checkbox"/>
e. Service quality	<input type="checkbox"/>	<input type="checkbox"/>
f. Innovation	<input type="checkbox"/>	<input type="checkbox"/>
g. Others (Please specify) _____	<input type="checkbox"/>	<input type="checkbox"/>

3. How important are the following factors in contributing to the competitiveness of an LSP? (Please rate on a scale of 1-5, 1= unimportant, 5 = very important)

a. Strategic management	1	2	3	4	5
b. Operations management	1	2	3	4	5
c. Service quality	1	2	3	4	5
d. Customer relationship management (CRM)	1	2	3	4	5
e. Information technology (IT)	1	2	3	4	5
f. Service network	1	2	3	4	5
g. Business processes management (BPM)	1	2	3	4	5
h. Marketing	1	2	3	4	5
i. Inventory management	1	2	3	4	5
j. Innovation	1	2	3	4	5
k. Human resource management	1	2	3	4	5
l. Cost management	1	2	3	4	5
m. Corporate culture	1	2	3	4	5

SECTION B STRATEGIC PLANNING AND OBJECTIVES

4. Does your company undertake strategic planning?

Yes No (If "Yes", please specify time scale to which it relates)

1-3 year 4-5 year > 5 year

5. Which kind of competitive strategy does your company aim to pursue?

Cost leadership Value leadership Cost and value leadership

6. Please describe the geographical extent of your company's service network.

Global National Regional

7. Which kind of organizational structure does your company have?
- Function-based structure Process-based structure
 Matrix-based structure i.e. function and process –based structure
8. Does your company have a strategic objective of expanding geographically?
- Yes No (If "Yes", please indicate how it plans to expand)
- By merger/acquisition By strategic alliance with other LSPs
 Organic growth Franchising
 Other means (Please specify) _____
9. Does your company plan to diversify its range of services?
- Yes No (If "Yes", please indicate how it plans to diversify)
- By merger/acquisition By strategic alliance with other LSPs
 Organically Other means (Please specify) _____
10. In developing a strategy has the company employed the services of external advisers?
- Yes No (If "Yes", please indicate the type of adviser)
- Consultancy company University / college
 Others (Please specify) _____
11. In recent years, how reactive / proactive has the company been in its relations with clients:
(Please circle the appropriate score)
- Highly reactive* 1 2 3 4 5 *Highly proactive*
12. What type of marketing strategies does your company use?
(Please tick appropriate boxes)
- Personal selling
 Advertising
 Website
 Referrals
13. Does your company offer inventory management for customers?
- Yes No (If "Yes", please indicate the degree of the benefit to your company)
- No benefit Slight benefit Moderate benefit Great benefit
14. Which of the following tools does your company use to determine the cost of logistics activities?
(Please tick the most appropriate box)
- Traditional cost accounting systems, i.e. allocating cost according to department
 Activity-Based Costing (ABC) system, i.e. allocating cost according to activities performed
 Both of the above
 Neither of the above

SECTION C ASSESSING PERFORMANCE AND COMPETITIVENESS

15. Does your company use any of the following quality standards? (Please tick appropriate boxes)
- ISO 9000/9001 GB/T 19000-2000 Others (please specify) _____

16. Please rate the importance of the following operational factors in terms of their impact on the competitiveness of an LSP:

(Rating scale on 1-5, 1= no importance, 5= high importance)

a. Quality of operation (failure rate)	1	2	3	4	5
b. Speed of operation	1	2	3	4	5
c. Flexibility	1	2	3	4	5
d. Process integration	1	2	3	4	5
e. Innovation	1	2	3	4	5
f. Capacity utilization	1	2	3	4	5
g. Standardization of operations	1	2	3	4	5
h. Degree of specialization	1	2	3	4	5
i. Others (please specify) _____	1	2	3	4	5

17. Please rate the importance of the following customer service factors in terms of their impact on the competitiveness of an LSP:

(Rating scale on 1-5, 1= no importance, 5= high importance)

a. Staff conduct	1	2	3	4	5
b. Reliability of delivery	1	2	3	4	5
c. Response time	1	2	3	4	5
d. Billing accuracy	1	2	3	4	5
e. Communication with client	1	2	3	4	5
f. IT support	1	2	3	4	5
g. Complaint / claims procedure	1	2	3	4	5
h. Value-added services	1	2	3	4	5
i. Customer loyalty / retention	1	2	3	4	5
j. Others (please specify) _____	1	2	3	4	5

18. What is the typical type of relationship your company has with customers?

(Please tick appropriate boxes, and indicate the weight by number of customers)

- Long-term contractual relationship _____ %
- Short-term transactional arrangement _____ %
- Others (Please specify) _____ %

19. Which of the following approaches would you use to cultivate the relationship with customers? (Please tick appropriate boxes)

- Frequent meetings Regular customer reviews
- Joint initiatives Customized services
- Mutually agreed performance measurement system
- Others (please specify) _____

20. How much competitive advantage has your company gained from the application of following IT systems? (Please rate on scale 1 no advantage to 5 large advantage)

a. Enterprise Resource Planning (ERP)	1	2	3	4	5
b. Electronic Data Interchange (EDI)	1	2	3	4	5
c. Internet	1	2	3	4	5
d. Warehousing Management System (WMS)	1	2	3	4	5
e. Fleet Management System (FMS)	1	2	3	4	5
f. Decision Support System (DSS)	1	2	3	4	5
g. Computerised Vehicle Routing and Scheduling	1	2	3	4	5
h. Others (Please specify) _____	1	2	3	4	5

21. Please rate the main sources of innovation in your business? (1 = low 5 = high)

a. Technological innovation	1	2	3	4	5
b. Management innovation	1	2	3	4	5
c. Service innovation	1	2	3	4	5

22. Has your company adopted any of the following innovations over the past year?
(Please tick appropriate boxes)

- Development of new service for current client base
- Development of new service to extend the client base
- Development of new internal process
- Application of new management technique
- Development of new performance measurement system

23. To what extent can your company gain service leadership through innovation?

(.1= not at all 5= to a large extent)

1 2 3 4 5

24. Please rate the importance of the following aspects of human resource management in terms of their contribution to the competitiveness of an LSP. (1= no importance 5= high importance)

- | | | | | | |
|-----------------------------------|---|---|---|---|---|
| a. Staff recruitment procedures | 1 | 2 | 3 | 4 | 5 |
| b. Staff Training provision | 1 | 2 | 3 | 4 | 5 |
| c. Company ethos | 1 | 2 | 3 | 4 | 5 |
| d. Employee empowerment | 1 | 2 | 3 | 4 | 5 |
| e. Staff morale | 1 | 2 | 3 | 4 | 5 |
| f. Performance appraisal system | 1 | 2 | 3 | 4 | 5 |
| g. Reward and compensation system | 1 | 2 | 3 | 4 | 5 |
| h. Disciplinary procedures | 1 | 2 | 3 | 4 | 5 |
| i. Relations with trade union | 1 | 2 | 3 | 4 | 5 |
| j. Others (please specify) _____ | 1 | 2 | 3 | 4 | 5 |

25. Which of the following attributes would you use to appraise the cultural characteristics of a logistics service provider? (Please tick appropriate boxes)

- Teamwork Quality service Relationships Quality of management
- Customer satisfaction Employee loyalty and morale
- Environmental and community responsibility Others (please specify) _____

26. How big an influence do company environmental policy, corporate social responsibility and risk management have on the competitiveness of an LSP? (1 = no influence 5= large influence)

- | | | | | | |
|------------------------------------|---|---|---|---|---|
| a. Company environmental policy | 1 | 2 | 3 | 4 | 5 |
| b. Corporate social responsibility | 1 | 2 | 3 | 4 | 5 |
| c. Risk management | 1 | 2 | 3 | 4 | 5 |

SECTION D BACKGROUND INFORMATION

27. Your company is a : (Please tick the most appropriate box)

- Transportation-based LSP Warehouse-based LSP
- Forwarder-based LSP Integrated LSP
- Others (Please specify) _____

28. Number of years your company has been in logistics business in CHINA _____.

29. The ownership structure of your company is: (Please tick the most appropriate box)

- State -owned enterprise (SOE) Private company Joint venture (JV)

30. Number of employees in your company _____.

31. Please identify main industry sectors that your company serves. (Please tick appropriate boxes)

- | | |
|--|---|
| <input type="checkbox"/> Industrial machinery and equipment | <input type="checkbox"/> Textile & apparel |
| <input type="checkbox"/> Electronic products, computer and telecommunication | <input type="checkbox"/> Automotive part |
| <input type="checkbox"/> Furniture | <input type="checkbox"/> Household appliances |
| <input type="checkbox"/> Pharmaceutical | <input type="checkbox"/> Chemical |
| <input type="checkbox"/> Parcels | <input type="checkbox"/> Home delivery |
| <input type="checkbox"/> Construction materials | <input type="checkbox"/> Raw materials |
| <input type="checkbox"/> Retail | <input type="checkbox"/> Fast-moving consumer goods |
| <input type="checkbox"/> Paper and paper product | <input type="checkbox"/> Other (please specify) _____ |

Appendix 7: Cover Letter for Postal Questionnaire survey in the UK

9th June 2006

«Title» «FirstName» «LastName»
«Company»
«Address1»
«City»
«PostalCode»

Dear «Title» «LastName»,

As part of a doctoral research project, I am comparing the competitive strategies of logistics service providers (LSPs) in the UK and China.

The third-party logistics market in China is relatively young and currently undergoing major restructuring, partly as a result of market liberalisation but also in response to the rapid growth of the Chinese economy. Britain has, by comparison, a much more mature logistics services market and its LSPs are generally considered to be among the most efficient and innovative in the world. I am interested, therefore, in finding out how British and Chinese logistics companies differ in the development of competitive strategies. The main aim of my study is to gain an understanding of the competitiveness of LSPs in the two countries.

I am currently undertaking a postal questionnaire survey of LSPs in China in association with the China Communications and Transportation Association (CCTA), the main Chinese government agency responsible for logistics. I am now inviting a sample of British logistics companies to complete a similar questionnaire. As I would like to include your company in the sample, I would be very grateful if you, or one of your colleagues, could complete the enclosed questionnaire. This should take around 20 minutes and will only involve ticking boxes. All the questionnaire data will be treated as strictly confidential and the results aggregated for analysis and reporting. They will be used solely for academic purposes. All participating companies will receive a summary of the results, comparing the situation in the UK and China.

If you are willing to take part, please complete the enclosed questionnaire and mail it to me by **June 30, 2006** in the postage-paid envelope. If you have any queries about the study, please do not hesitate to contact me (x139@hw.ac.uk) or my supervisor, Professor Alan McKinnon (a.c.mckinnon@hw.ac.uk).

I would greatly appreciate your participation in this study.

Yours truly,

Xiaohong Liu

Appendix 8: Contributing Factors by 21 Chinese Companies Interviewed

Companies	Most important contributing factors to competitiveness
A	managerial and service capabilities, such as innovation, service quality, cost management
B	service quality arising from the reputation as a SOE
C	managerial capabilities, IT, service network
D	service network, service quality, operations management
E	IT
F	innovation (managerial and technological innovation drive service innovation), service network
G	human resource, service network, culture pertinent to reputation
H	sustained innovational capabilities
I	operational capabilities, business process management, marketing
J	sustained innovational capabilities, human resource
K	service capabilities, service quality, IT
L	strategic management, customer relationship management
M	IT, service network, human resource
N	adaptability to business environment by service capabilities and service quality, strategic management
O	strategic management
P	human resource, IT
Q	human resource, IT, service quality
R	Innovation, service network, IT, human resource, inventory management
S	innovation including managerial and technological innovation, IT, strategic management
T	service network, integrating public resources, service capabilities, human resource
U	business process management, IT, human resource

Appendix 9: Summary of Chi-Square Test Results for Section 8.7 in Chapter 8

	Null Hypothesis	χ^2	df	p-value
8.7.1(1)	No difference between two samples on time scales	14.797	2	0.001
8.7.1(3)	No difference between time scales and geographical extent in Chinese sample	1.53	4	0.821
	No difference between two samples on strategic objective of extending geographically	33.289	1	0.000
	No difference between two samples on means to expand geographical coverage by merger/acquisition	10.652	1	0.001
	No difference between two samples on means to expand geographical coverage through organic growth	5.763	1	0.016
8.7.1(4)	No difference between two samples on means to expand geographical coverage by strategic alliance with other LSPs	5.485	1	0.019
	No difference between two samples on plans to diversify the range of services	40.796	1	0.000
	No difference between two samples on means to diversify services by merger/acquisition	1.587	1	0.208
	No difference between two samples on means to diversify services organically	19.814	1	0.000
8.7.6	No difference between two samples on means to diversify services by strategic alliance with other LSPs	4.209	1	0.040
	No difference between two samples on designing organizational structure	7.666	2	0.022
8.7.9	No difference between two samples on adopting innovations: development of new service for current client base	0.218	1	0.641
	No difference between two samples on adopting innovations: development of new service to extend the client base	7.251	1	0.007
	No difference between two samples on adopting innovations: development of new internal process	3.153	1	0.076
	No difference between two samples on adopting innovations: application of new management technique	14.445	1	0.000
8.7.11	No difference between two samples on adopting innovations: development of new performance.	4.722	1	0.030
	No difference between two samples in using accounting tools to manage cost	4.827	2	0.090
8.7.12	No difference between two samples in appraising culture attributes: teamwork	49.235	1	0.000
	No difference between two samples in appraising culture attributes: service quality	0.157	1	0.692
	No difference between two samples in appraising culture attributes: relationships	0.001	1	0.974
	No difference between two samples in appraising culture attributes: quality of management	0.042	1	0.837
	No difference between two samples in appraising culture attributes: customer satisfaction	0.094	1	0.760
	No difference between two samples in appraising culture attributes: employee loyalty and morale	17.226	1	0.000
	No difference between two samples in appraising culture attributes: environmental and community responsibility	28.646	1	0.000
	No difference between two samples in appraising culture attributes: environmental and community responsibility	28.646	1	0.000