Exploring the Impact of Reshoring Decisions on Supply Chain and Business Performance: Evidence from 261 UK Manufacturers

By

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This thesis is submitted in partial fulfilment of the requirements for the degree of Doctor of Philosophy

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DECLARATION

This thesis is submitted to the University of Warwick in support of my application for the degree of Doctor of Philosophy. It has been composed by myself and has not been submitted in any previous application for any degree.

ABSTRACT

Since the emergence of reshoring, it has received huge interest and become a hot topic in academia, industry and policy circles. Most extant research has focused on defining the reshoring concept, its synonyms, the trends and the drivers behind reshoring decisions. Recently, the research scope has expanded to the reshoring decision-making process, right-shoring and advanced manufacturing having affected reshoring. However, this line of research is still in its infancy. The reshoring phenomenon and the concept are still not thoroughly understood. The impact of reshoring has been rarely researched. In addition, cross discipline research into the association between reshoring and other fields, such as the role of reshoring or shoring decisions played in global manufacturing strategy and business performance (BP) have remained under-researched. Besides, the entire body of research lacks empirical quantitative data as a methodology to enrich people's understanding of the practice of reshoring.

This research attempts to address these gaps empirically, by mainly focusing on an exploration of the current UK manufacturing reshoring status and the relationship between shoring decisions, competitive priorities and BP. The research develops a framework for reshoring to synthesize the related factors which need to be considered during the decision-making process by following a 360-degree approach. The framework also guides an exploration of the realities of reshoring from the UK perspective. In addition, a theoretical moderation model has been devised from the literature, supported by contingency and congruence theory, to explore the correlation between shoring decisions, competitive priorities and BP, with ten hypotheses built up.

This research conducted data collection through a survey and obtained 298 completed responses by UK manufacturers. The analysis is based on 261 reliable responses through descriptive analysis, and hierarchical regressions, by using Excel 2016, PPT 2016 and SPSS 24 tools.

From the descriptive analysis results, the research has revealed a clear current status of UK manufacturing reshoring from multiple perspectives including:

overview of shoring decisions, strategic realities, operational considerations focusing on competitive priorities and products, impacts on supply chains, and comparisons of BP. Based on the statistical analyses results, six out of the ten hypotheses have been supported, moderation relationships have been discovered to exist among the SC cost and BP, delivery and BP, and flexibility and BP. The results identified that SC cost and delivery are the key competitive priorities to improve BP for the companies who took no shoring decisions; delivery is the key competitive priority to improve BP for the companies who conduct both direct and indirect reshoring; delivery and SC cost are the key competitive priorities to improve BP for the companies who are indirectly reshored; and finally flexibility and SC cost are the key competitive priorities to improve BP for the companies who offshored overseas.

With a better understanding of reshoring decisions and their current status in the UK, also a clear role of shoring decisions made among manufacturing strategy and BP, academics can use the results of this research as a foundation for future research, industry practitioners can use it to make more considered reshoring or shoring decisions and develop an appropriate operational capability emphasis aligned with the shoring decision, and policy makers can develop more and suitable polices to further support this trend and revitalize the manufacturing and economics areas of the UK.

Keywords:

Reshoring, Offshoring, Shoring Decision (Location decision), Manufacturing Strategy, Competitive Priorities, Business Performance, Global Supply Network Design, Moderation.

LIST OF ABBREVIATIONS

ABS	Association of Business Schools
AM	Additive Manufacturing
AVE	Average Variance Extracted
BCG	Boston Consulting Group
BP	Business Performance
BSREC	Biomedical & Scientific Research Ethics Committee
CP	Competitive Priority
DIT	Department for International Trade
DV	Dependent Variable
ES	Economies of Scale
EFA	Exploratory Factor Analysis
FDI	Foreign Direct Investment
GEC	Global Economic Crisis
GEP	Globalisation and Economic Policy Centre
IJOPM	International Journal of Operations & Production Management
IJPE	International Journal of Production Economics
IP	Intellectual Property
IV	Independent Variable
JOM	Journal of Operations Management
JPSM	Journal of Purchasing and Supply Management
KBV	Knowledge-based View
LD	Location Decision
MOSM	Manufacturing and Service Operations Management
PPMA	Processing & Packaging Machinery Association
PWC	PricewaterhouseCoopers
R&D	Research and Development
RBT	Resource Based Theory
SC	Supply Chain
SCiP	Supply Chains in Practice
SCRG	Supply Chain Research Group
TCE	Transaction Cost Economics
TCT	Transcatheter Cardiovascular Therapeutics

1 Introduction

1.1 Chapter overview

This chapter introduces the rationale and importance of this research. As shown in Figure 1-1, the rationale for the research is discussed in section 1.2 and the UK context in section1.3. This provides the background to present the research gap in section 1.4, which leads to the research question in section 1.5. Sections 1.6 and 1.7 focus on the thesis design, justifying the value of this research and giving the structure of this thesis. A short summary of this chapter is provided in section 1.8.

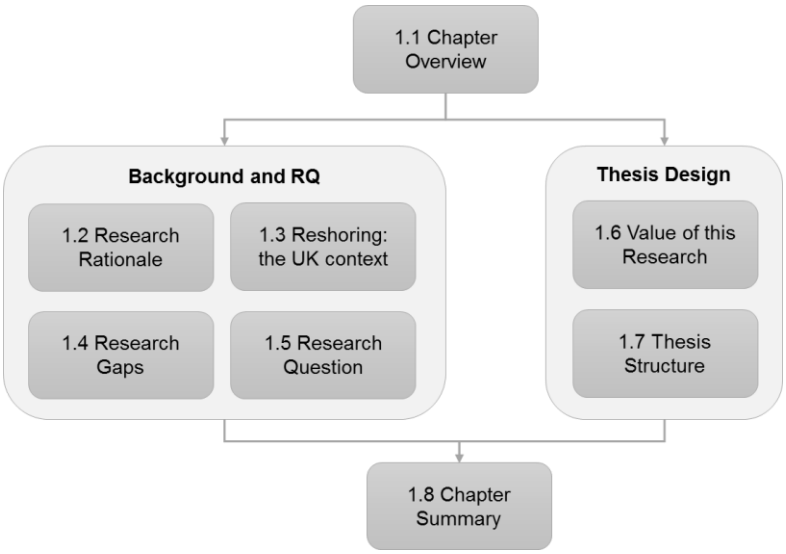


Figure 1-1 Introduction Chapter Structure

1.2 Research Rationale

1.2.1 Global Business Environment

The first evidence of global business transaction dates back thousands of years, to the Silk Road, which is ancient trade route that linked Europe and Asia. Later, in the 14th century, Zheng He's travelling to the west provided the opportunity for trading with the countries that lay across the coastline of the western Pacific and Indian oceans (e.g. India, Sumatra, Sulu Archipelago, Mogadishu et al.). During the 16th and 17th centuries, the Portuguese, Spanish, Dutch and British empires

conducted trades globally. But it was only in the late 20th century, the global business turned into what it is today.

Levitt (1983) identified “homogeny” as a feature for global customers, which argues that the customers’ needs of most products are actually on a global scale, rather than across several multi-countries. This means after a new technology is developed, the new products which adopt this technology will have been introduced to the market. As long as this new product has utility and is launched correctly, the demand for it has the potential to be global. Consequently, companies have the ambition to conduct global transactions where the internal and external environments permit.

Evidence of the continued expansion of global transactions is supported by data from the World Bank (shown in Figure 1-2), supporting Levitt’s (1983) perspective (Baier and Bergstrand, 2001; Christopher and Holweg, 2011).

Figure 1-2 World Export Value

Source: World Bank (2015)

World Bank data show that global transactions have increased for 55 years (1960-2015), with the exception of a substantial drop in 2009 due to the economic crisis. With the move to a more globalised business environment, companies have increased trade opportunities. More businesses have been established, and as companies start to explore the overseas market one by one, they start to form a global market. The role played by manufacturing has also changed over the last decades. The previous one-to-one model (an in-country factory to support sales

in that market) has changed to a one-to-many model. Products are produced in one country and then transported across national borders for further processing, packing, assembling, storage and sale (Ferdow, 1997). With many companies pursuing a similar strategy, competition within the global business environment has continued to intensify (Dangayach and Deshmukh, 2001).

1.2.2 Impact of Globalisation on Manufacturing Strategy and Location Decision (Shoring Decision)

To deal with the increasingly fierce competition within the global business environment, companies start to recognise the strategic importance of factory location decisions (which is also named as “shoring decision” in this study (Skinner, 1969). It is generally agreed that Skinner’s link between manufacturing and corporate strategy was the advent of modern manufacturing strategy. In the years that followed, many scholars echoed and enriched this view. Hill (1985) broke down corporate strategies to sub-level marketing strategies within his 5-Step model. In addition to Hill, along with the efforts of Fine and Hax (1985), Hayes and Wheelwright (1984), and Anderson et al. (1989), Skinner's view was developed into a hierarchical model in which corporate strategy drives the business unit strategies. This in turn drives the strategies of manufacturing and other functional areas strategies. Although the dominant view of the strategy process is top-down, Hayes (1985) states that functional capabilities should, in an uncertain and unstable environment, drive corporate strategy.

Meanwhile, the components of manufacturing strategy have also to be identified to help improve the operations. These components are cost, delivery, flexibility and quality, which have been named as competitive priorities (Hayes and Wheelwright, 1984; Krajewski and Ritzman, 1987; Leong, Snyder and Ward, 1990; Safizadeh, Ritzman and Mallick, 2000; Amoako-Gyampah and Acquaah, 2008).

Historically, some empirical studies have been conducted to support the argument that manufacturing strategy can contribute to a company’s competitive advantage (Gupta and Somers, 1996; Swamidass and Newell, 1987; Ward and Duray, 2000; Williams et al., 1995)

Finally, Leong et al. (1990) made an amalgam of the views represented by the above authors in his predominant process model (PPM), claiming that corporate strategy, business unit strategies and manufacturing strategies constitute the hierarchical layers from top to bottom of the entire business strategy and that they are linked and affect each other. However, due to the strategy being an abstract concept, the competitive priorities discussed above are used as the representational display of corresponding strategies (Amoako-Gyampah and Acquaah, 2008; Hill, 1985; Leong, Snyder and Ward, 1990; Safizadeh, Ritzman and Mallick, 2000) And further research clearly revealed all other competitive priorities work together to have a direct effect on business performance (Amoako-Gyampah and Acquaah, 2008; Kroes and Ghosh, 2010).

Manufacturing locations, as part of manufacturing strategy, play a significant role in both manufacturing and business operations. The configuration of infrastructures' locations can significantly affect the global supply network (GSN) structure and operation, and will further influence SC and business performances (Amoako-Gyampah & Acquaah, 2008; Skinner, 1969). Against this backdrop of increased global trade and competitiveness, adopting the right manufacturing location strategy is critical to achieving competitive advantage. As stated by Kinkel and Maloca (2009, p.156) *"Due to their long-term influence on competitiveness and almost all operational processes of an enterprise, location decisions for production activities are of highly strategic importance*". One of the most popular location strategies for the last two decades is offshoring, which means moving manufacturing plants overseas, i.e. outside the home country (Kinkel and Maloca, 2009).

1.2.3 Trend towards Offshoring

1.2.3.1 Emergence of Offshoring

As early as the late 1970s as companies sought to maintain competitive advantage, in an increasingly globalised world, the location of factories came under increased scrutiny (Lewin and Peeters, 2006). For industries where advanced manufacturing technology (AMT) was not prevalent, labour cost was perceived to represent a large proportion of overall manufacturing cost (Porter,

1985). As new manufacturing locations, with much lower labour costs became available, a shift was seen in manufacturing locations. This shift was typically to a Far Eastern location (often China) where the labour cost was a fraction of that in more developed countries (Jahns, Hartmann and Bals, 2006). Other drivers included access to resources (e.g. raw materials, capacity, skilled labour force) and entrepreneurship (e.g. access to new markets, vicinity to foreign customers). This phenomenon was commonly referred to as 'offshoring' (Lewin and Peeters, 2006), which was defined as the "*Relocation of parts of production to own locations abroad irrespective of the ownership mode*" (Kinkel & Maloca 2009, p.155). Offshoring gained momentum in the mid-1980s (Jahns, Hartmann and Bals, 2006) when Porter (1985) identified that if companies moved their production to low-cost developing countries, they could benefit significantly from manufacturing cost reduction. Since then, it has become a key aspect of the strategic positioning of enterprises (Dunning, 1998; Ferdow, 1997; Kinkel and Maloca, 2009)

1.2.3.2 Offshoring Phenomena and Motivation

Data from the Globalisation and Economic Policy Centre (GEP) reveals that 96% of UK manufacturing international companies have subsidiaries in order to perform different levels of offshoring on activities, including both manufacturing and service (Greenaway, Gorg and Kneller, 2005).

Many research in the offshoring field focus on identification of the drivers and motivations for this phenomenon. The drivers of offshoring have been summarised in Table 1 including cost advantages (labour cost and trade policies), access to skilled labour force, access to new technologies, capacity constraints in the home country, access to new markets, increasing speed to market, vicinity to foreigner customers (Canel and Das, 2002; Kinkel, 2012; Kinkel and Maloca, 2009; Massini, Perm-Ajchariyawong and Lewin, 2010; Roza, Van den Bosch and Volberda, 2011; Da Silveira, 2014). These motivation drivers can be classified into three main categories: cost drivers, resources drivers and entrepreneurial drivers (Canel and Das, 2002; Canham and Hamilton, 2013; Ellram, Tate and Petersen, 2013; Jahns, Hartmann and Bals, 2006; Kinkel and Maloca, 2009;

Roza, Van den Bosch and Volberda, 2011). Among them, cost is the original and most important one, especially reflected in the labour cost (Jahns et al., 2006), which is justified from the survey of 1664 German companies by Kinkel & Maloca (2009) who claim that wage cost is the most popular driver from 1999-2006. Moreover, its significance level is more than twice the second ranked driver "market opening".

Table 1-1 Offshoring Drivers from Literatures

Category	Offshoring Drivers	Literature
Cost	Cost advantages such as: -labour cost -trade policies	Canel & Das, 2002; Kinkel & Maloca, 2009; Massini et al., 2010; Roza et al., 2011; Kinkel, 2012; Canham & Hamilton, 2013; Ellram et al., 2013; Silveira, 2014
Resources	Access to skilled labour force	Canel & Das, 2002; Roza et al., 2011; Kinkel, 2012
	Access to new technologies	Kinkel & Maloca, 2009; Kinkel, 2012; Silveira, 2014
	Capacity constraints	Kinkel & Maloca, 2009; Massini et al., 2010; Canham & Hamilton, 2013
Entrepreneurial	Access to new markets	Canel & Das, 2002; Roza et al., 2011; Kinkel, 2012
	Increasing speed to market	Kinkel & Maloca, 2009; Roza et al., 2011; Kinkel, 2012
	Vicinity to foreign markets	Kinkel & Maloca, 2009; Roza et al., 2011; Kinkel, 2012

Offshoring continued to be a popular trend for manufacturing companies, until the Global Economic Crisis (GEC) in 2008. Unlike the previous crisis (e.g. the oil crisis of the mid-1970s) there was a significant increase in the price pressure of major commodities. Manufacturers were already facing a significant drop in global demand, but the opportunities to stimulate demand by reducing prices were diminished as the price of raw materials and oil for transportation saw significant price increases. This started to call into question the paradigm of offshored manufacture. This view was also supported by the theory "supply chain 2.0" regarding supply chain (SC) volatility. Christopher and Holweg (2011) argued that businesses had already stepped into a new context era, which is the "era of turbulence". This era even started prior to the GEC in 2008 and has been enhanced onwards with increasing expectation in the future. Within this new age, the business environment will be even more unstable, with a range of crises or shocks (e.g. the restriction on shipping, the sharply increased oil price etc. (Christopher and Holweg, 2011). Therefore, the most extant models and practices of SC management, which were built up from the stable period of this

context, i.e. prior to 2008, have a high possibility of not fitting into this turbulence age (Christopher and Holweg, 2011). The offshoring location strategy seems to be one of the “old” SC practices, built based on the economies of scale theory which has already been challenged in the early 20th century (Christopher and Holweg, 2011; Pil and Holweg, 2003). Christopher and Holweg claimed it is necessary for companies to improve their adaptability to respond to this turbulence era through moving from dynamic flexibility to building up structure flexibility (2011). This is obviously difficult to achieve by offshoring. Therefore, many problems for the offshoring strategy emerged and have made it lose its momentum around 2005 (Kinkel and Maloca, 2009), which will be discussed in detail in the next section.

1.2.4 Slowing of Trend: Emergence of Reshoring

Although manufacturing offshoring has been a popular location decision strategy for about several decades since mid-1980s, its risks and challenges are still present. A survey conducted by Manning (2013) investigated challenges faced by enterprises due to their offshoring strategy and the responses from 13 firms show that “communication barriers” and “culture differences” were the top concerns. Also, the increase in labour wages in developing countries is another concern and is a hard to reverse trend. Therefore, since 2005, several companies have started to move their offshored production back to their original countries, which means offshoring has started to lose its momentum (Kinkel and Maloca, 2009). Further, the GEC in 2008 speeded up this process. A serious economic recession followed the crisis which spread across the whole world (Madalina-Ioana, 2014). This caused oil prices to increase significantly, “to $140/barrel in the light of growing demand from the Brazil, Russia, India and China countries in 2008 amidst general concerns that we had reached the infamous point of ‘peak oil’” (Christopher and Holweg, 2011; Hubbert, 1956; Leggett, 2006). As a result, there are much higher transportation costs for long-distance deliveries. Meanwhile, there are more constraints regarding shipping, and the demand from markets for products, or services have been slashed significantly, all of which require a complete flexibility in production and operational capabilities

(Christopher and Holweg, 2011). Faced with these, offshoring has lost its advantages. Besides, due to the increased attention being given to customer satisfaction, the GSN needed to be more flexible and responsive, which is hard to achieve through offshoring (Fratocchi et al., 2011). In addition, the findings from research regarding offshoring and outsourcing reveal that a surprising number of firms were not really gaining real benefits from these "off" strategies(Christopher et al., 2007; Holweg, Reichhart and Hong, 2011). Therefore, more companies have started to re-evaluate their offshoring strategy and move back to original countries, namely "reshoring".

The original citation of "reshoring" seems to be that of McKinsey consultants Ritter and Sternfels' work (2004), based on a consultative work for the California State economy. Later, Fratocchi et al. defined it as "*Reshoring is the back relocation of earlier off-shored production activities, and one of the strategic options available to manufacturing firms in terms of international relocation of manufacturing activities irrespective of the ownership mode (in-sourced and out-sourced)*" (2014b, p.56).

Since reshoring started, many manufacturing companies, especially in the US and EU have announced they are returning part or the whole of their offshored production (either insourced or outsourced) to home nations (Fratocchi et al., 2014b), including industrial giants such as Caterpillar, Bosch, and Philips. Ancarani et al. (2015) have conducted research based on secondary data from 2007-2009, which shows, within both the US and EU, that there are 249 companies in total involved in reshoring initiatives (Li et al., 2015, 2017). By exploring the German secondary database "European Manufacturing Survey", Kinkel revealed the empirical evidence: offshoring activities of the German firms in manufacturing area declined by 17% from the mid-1900s to 2012 (Kinkel, 2014; Kinkel and Maloca, 2009), but "every fourth to sixth off-shoring activity is countered by re-shoring activities within two to five years" (Kinkel and Maloca, 2009, p.158). Therefore, it seems the era of reshoring starts.

1.2.5 Reshoring

1.2.5.1 Development of the Reshoring Phenomena

1.2.5.1.1 From a Content Perspective:

The historical line of reshoring research development with a list of research streams in the reshoring field has been summarised and is displayed in Figure 1-3. The reshoring research development can be divided to three phases: starting stage from 2004 to 2012, transition stage during 2013-2014, expanding stage from 2015 to the present day.

The first recognised use of the term “reshoring”, was in a McKinsey Quarterly report (Ritter and Sternfels, 2004). It challenged that offshoring lacking quick response, faster delivery, and flexibility of SC, productivities, collaboration of functional departments, key markets, and customers’ needs. Then, this idea has been further enhanced in 2005 by Coxon, Ritter, and Sternfels, through their report “The onshoring option: California can do more than dream about retaining manufacturing jobs.” In 2007, Kinkel first explicitly tried to define reshoring, but the most popular definition currently used is from Fratocchi et al.: “the back relocation of earlier off-shored production activities” (2014b, p.56). Historically, i.e. before 2004, there is also the word “reshoring” in academic work, always together with shoring, but in this instance, it refers to the method to build up construction over the sea, rather than making manufacturing location decisions.

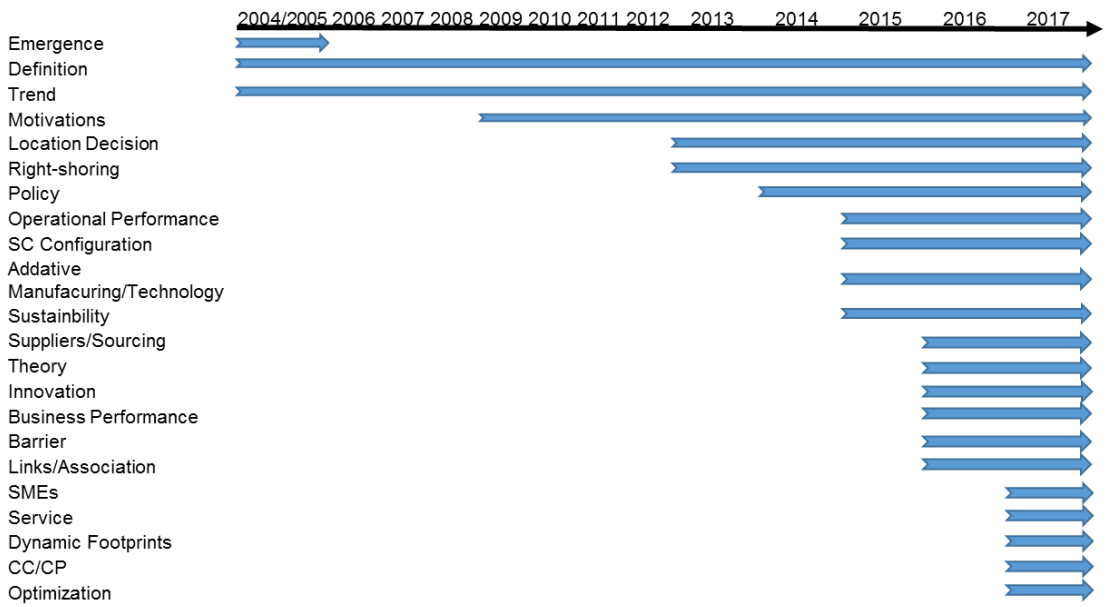


Figure 1-3 Summarising the development of the reshoring phenomena

As illustrated in Figure 1-3, since the emergence of the reshoring concept in 2004, almost all reshoring journal papers focus on discussing the reshoring definition, phenomenon and motivation up to 2012. The exploration of the trend and definition has been commonly discussed in papers published before 2009 (Cha, Pingry and Thatcher, 2008; Kinkel, Lay and Maloca, 2007). From 2009, besides definition and trend, the discussion regarding motivation of reshoring has emerged as well and been a hot topic since then. (Bishop, 2011; Fratocchi et al., 2011; Kinkel, 2012; Kinkel and Maloca, 2009; Micek, 2009; Nash-hoff, Sales and Diego, 2011; 2012; Sirkin, Zinser and Hohner, 2011).

2013 and 2014 are the transition years within the reshoring research development history. As shown in Figure 1-3, since 2013, even though the definition, trend and motivations for reshoring are still the research focuses for most papers, researchers also started try to move away from the pure reshoring or offshoring scope, to look at more fundamental and deeper levels, e.g. manufacturing shoring decisions and right-shoring (which means where to put the SC assets correctly around the globe) (Ellram, Tate and Petersen, 2013; Gray et al., 2013; Tate, 2014), through the comparisons between different shoring groups (Canham and Hamilton, 2013; Ellram, Tate and Petersen, 2013; Manning, 2013).

In 2014, an additional new research topic regarding how policy could support reshoring also started (Bailey and De Propris, 2014; Fratocchi et al., 2014a).

The latest development stage of reshoring research is from 2015 until the present day. Based on previous research regarding reshoring, the entire research direction of this stage starts to shift to the post-shoring stage discussion which refers to the impact of reshoring or shoring decisions, and the association between reshoring or shoring decisions and other operational aspects.

In more detail, some new research streams have attracted scholars' interest in 2015, including how the reshoring will affect operational performance, SC global configuration, or sustainability, and also what the association is between technology (specially AM: Additive Manufacturing) and reshoring (Ancarani, 2015; Brennan et al., 2015; Grandinetti and Tabacco, 2015; Grappi, Romani and Bagozzi, 2015; Gylling et al., 2015; Zanetti et al., 2015). In 2016, even more new research streams have been developed: how reshoring could affect supplier selection or company sourcing strategy; how reshoring could affect business performance (even though not a main research stream); what are the potential barriers to the conducting of reshoring; how innovation is linked to reshoring; and some papers try to explore what the underpinning theory is in the field, as well as some correlation relationship exploration between reshoring and other operational aspects (Carbone and Moatti, 2016; Foerstl, Kirchoff and Bals, 2016; Fratocchi et al., 2016; Johansson and Olhager, 2016; Stentoft, Mikkelsen and Jensen, 2016; Uluskan, Joines and Godfrey, 2016). In 2017, besides enhancing the above research streams, several new ones have been identified e.g. the link between reshoring and services, and SMEs engagement in reshoring. Some papers also started to look into the dynamic footprints rather than just static SC configuration, as well as optimization research on shoring decisions (Chen and Hu, 2017; Cohen et al., 2017; Gray et al., 2017; Wiesmann et al., 2017; Yegul et al., 2017).

During the whole history, the reshoring research either focuses on reshoring independently, or explores the association between reshoring and another perspective. However, the majority of research are only looking at the relationship

between two variables. An in-depth investigation regarding the relationship among multiple variables remains undeveloped.

1.2.5.1.2 From research Methodology Perspective

The section above discussed the development of the reshoring research from the research stream's perspective. This section looks at the methodology perspective of these studies to clarify the methodology employed in the field.

From the methodology perspective, to review the development of reshoring research field, we can see as shown above, the publication in the early years before 2015 are in the majority based on case research or pure conceptual discussion without empirical justification. However, after 2015 several quantitative empirical researches have been conducted but the data are from the existing secondary database. Then in recent years, more survey-based research has been conducted to justify the findings, but still appear in very few publications. Even though with quantitatively empirical data, most research is more reliant on descriptive analysis; there is little deep statistical analysis. Stentoft et al. (2016) conducted a systematic literature review of 20 papers in the reshoring field from 2009 to early 2016. They reviewed the methodology applied in research as shown in Figure 1-4 covering conceptual, case study, survey, modelling and mixed methods (Stentoft, Mikkelsen and Jensen, 2016).

Research Methodology	References
Conceptual (incl. Research notes)	Arlbjørn and Mikkelsen (2014); Fratocchi et al. (2014, 2016); Gray et al. (2013); Kinkel (2014); Tate (2014)
Case research (single or multiple case studies)	Gylling et al. (2015); Martínez-Mora and Merino (2014), Moser (2013); Pearce (2014)
Survey research	Canham and Hamilton (2013); Ellram et al. (2013); Kinkel (2012); Stentoft et al. (2015); Tate et al. (2014)
Mathematical modelling	Ancarani et al. (2015); Cho et al. (2014); Wu and Zhang (2014)
Mixed method	Bailey and De Propris (2014); Kinkel and Maloca (2009)

Figure 1-4 Research Methodology Summary

Source: Stentoft et al. (2016)

In this research, based on the 45 papers identified within the ABS (Association of Business Schools) list, the author has reviewed the methodology used in reshoring research which includes simulation, and secondary databases in addition to those identified by Stentoft et al (2016). Also, the information regarding type of data (primary or secondary) and the analysis method (statistical or non-statistical) in previous reshoring research have been summarised and displayed in Table 1-2. It can be seen among all the extant research, conceptual research and case-based research are the dominant research methods accounting for 31% and 18% respectively. Survey and secondary databases are also employed, but are not as popular as the qualitative approach above. Even though the majority of the data are the first hand primary data, most of them are from interview text. Therefore, it can be summarised that the current reshoring research is more based on a qualitative approach, and lacks the large scale primary quantitative data. For the existing eight survey-based studies, most of them analyse the data through simple descriptive analysis rather than in a statistical way. Therefore, it is clear that statistics-based research is really lacking in the reshoring field.

Table 1-2 Research Methodology Review for Reshoring Papers

Reference	SO (Sources)	ABS	Resarch Method							Data Type		Stastistical analysis?
			Conceptual	Case Study	Survey	Secondary Database	Modelling (Mathmatic)	Simulation	Mixed Method	Primary	Secondary	
Jahns, Hartmann, and Bals 2006	Journal of Purchasing and Supply Management	2	X							N/A	N/A	
Cha et al. 2008	MIS Quarterly	4*					X			N/A	N/A	
Kinkel and Maloca 2009	Journal of Purchasing and Supply Management	2				X					X	
Kinkel 2012	International Journal of Operations & Production Management	4				X					X	X
Baldwin and Venables 2013	Journal of international Economics	4					X				X	
Ellram 2013	Journal of Supply Chain Management	3	X							N/A	N/A	
Ellram et al. 2013	Journal of Supply Chain Management	3			X					X		X
Gray et al. 2013	Journal of Supply Chain Management	3	X							N/A	N/A	
Manning 2013	Journal of World Business	4		X						X		
Arlbjorn and Mikkelsen 2014	Journal of Purchasing and Supply Management	2			X					X		
Bailey and Propris 2014	Cambridge Journal of Regions Economy and Society	3	X							N/A	N/A	
Drauz 2014	Journal of Business Research	3		X						X		
Fratocchi et al. 2014	Journal of Purchasing and Supply Management	2				X					X	
Kinkel 2014	Journal of Purchasing and Supply Management	2				X					X	
Martinez-Mora and Merino 2014	Journal of Purchasing and Supply Management	2		X						X		
Mezzadri 2014	Competition and Change	2	X							N/A	N/A	
Pearce II 2014	Business Horizons	2	X							N/A	N/A	
Shih 2014	MIT Sloan Management Review	3	X							N/A	N/A	
Tate 2014	Journal of Purchasing and Supply Management	2	X							N/A	N/A	
Tate et al. 2014	Business Horizons	2			X					X		
Wu and Zhang 2014	Management Science	4*					X			N/A	N/A	
Zhai 2014	Economic Modelling	2					X			N/A	N/A	
Ancarani et al. 2015	International Journal of Production Economics	3		X		X			X	X	X	X
Brennan et al. 2015	International Journal of Operations & Production Management	4	X							N/A	N/A	
Grappi, Romani, Bagozzi 2015	Journal of the Academy of Marketing Science	4			X					X		X
Gylling et al. 2015	International Journal of Production Economics	3		X						X		
Carbone and Moatti 2016	Supply Chain Forum: An international journal	1	X									
Foerstl, Kirchoff, Bals 2016	International Journal of Physical Distribution and Logistics Management	2	X									
Fratocchi et al. 2016	International Journal of Physical Distribution and Logistics Management	2				X					X	
Huq, Pawar, Rogers 2016	Production Planning and Control	3							X	X		
Lacity, Khan, Carmel 2016	Communications of the Association for Information Systems	2		X						X		
Srai and Ane 2016	International Journal of Production Research	3			X					X		
Stentoft, Mikkelsen, Jensen 2016	Supply Chain Forum: An International Journal	1			X					X		
Uluskan, Joines, Godfrey 2016	Supply Chain Management:An International Journal	3			X					X		X
Albertoni et al. 2017	Journal of World Business	4			X					X		X
Brandon-Jones et al. 2017	Journal of Operations Management	4*				X					X	
Chen and Hu	Manufacturing and Service Operations Management	3					X			N/A	N/A	
Cohen et al. 2017	Manufacturing and Service Operations Management	3			X					X		
Gray et al. 2017	Journal of Operations Management	4*		X			X		X	X		
Hartman et al. 2017	Business Horizons	2	X							N/A	N/A	
Moradlou, Backhouse, anganathan 2017	International Journal of Physical Distribution and Logistics Management	2		X						X		
Tate and Bals 2017	International Journal of Physical Distribution and Logistics Management	2	X							N/A	N/A	
Wiesmann et al. 2017	European Business Review	2	X							N/A	N/A	
Yegul et al.2017	Computers and Industrial Engineering	2		X				X		X		
Zhao and Huchzermeier 2017	European Journal of Operational Research	4					X			N/A	N/A	

1.2.5.2 Definition

There are many arguments regarding the definition of reshoring. The most commonly used definition is from Fratocchi (2011): "*Re-shoring is the back relocation of earlier off-shored production activities, and one of the strategic options available to manufacturing firms in terms of international relocation of manufacturing activities irrespective of the ownership mode (in-sourced and out-sourced)*" (Fratocchi et al. 2014, p.56).

Later Gray et al. (2013) distinguished the difference between shoring and sourcing by using the matrix given in Figure 1-5 showing that sourcing is more relevant to the ownership difference of the activity and shoring is more focused on the geographical boundary movement.

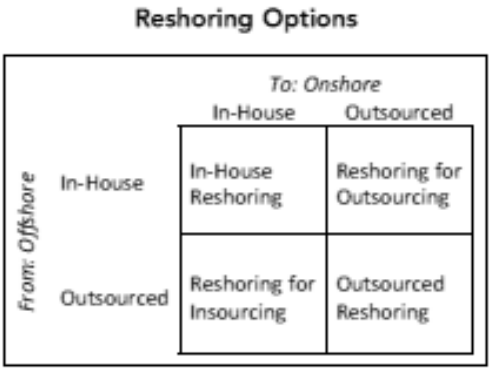


Figure 1-5 Shoring vs. Sourcing

The "Reshoring Initiative" in the US also define the concept from a practical perspective as shown in Figure 1-6, which also includes foreign direct investment as part of reshoring.

DEFINITIONS OF CATEGORIES (From a U.S. perspective)			
Category	**Where parent company is headquartered**	**Where the product has been produced**	**Where product will be produced**
Reshoring	U.S., Canada or Mexico	Outside headquarters country	In the headquarters country
Nearshoring	U.S.	Outside of N. America	Canada or Mexico
Kept from Offshoring	U.S., Canada or Mexico	Headquarters country	Headquarters country
FDI (Foreign Direct Investment)	Any country other than the N. American country where it will be produced	Any country other than where it will be produced	In a N. American country

Figure 1-6 Reshoring Definition (Practical Perspective)
Source: Reshoring Initiative

In 2016, Srai and Ané summarised the extant definitions of reshoring as shown in Table 1-3 (Srai and Ané, 2016). It is clear that multi-synonyms existed such as “backshoring” “backsourcing” “go back” etc., but it can also be concluded that there has not been a commonly accepted definition of reshoring until now.

Table 1-3 Reshoring Definition Summary (Academic Perspective)

Name	Sources	Definition
Reshoring	Ellram (2013)	‘moving manufacturing back to the country of its parent company’
Reshoring	Gray et al. (2013)	Phenomenon that follows a previous offshoring activity and that is a pure location decision as opposed to an ownership decision
Reshoring	Tate et al. (2014)	‘the relocation of manufacturing facilities from traditional offshore locations to more attractive offshore locations, or even home to the United-States’
Reshoring	Bellego (2014)	‘bringing back manufacturing operations to the country of origin’
Backshoring	Kinkel and Maloca (2009)	‘re-concentration of parts of production from own foreign locations as well as from foreign suppliers to domestic production site of the company’
Backshoring	Arlbjörn and Mikkelsen (2014)	‘Moving production in the opposite direction of offshoring’
Back-reshoring	Fratocchi et al. (2014)	‘a voluntary corporate strategy regarding the home-country’s partial or total relocation of (in-sourced or out-sourced) production to serve the local, regional or global demands’*

Source: Srai and Ané (2016)

This study will use the most commonly adopted definition of “reshoring” by Fratocchi (2014). However, this reshoring is actually “direct reshoring” in this study, since this research also enriches the reshoring concept by adding another type of reshoring which is “indirect reshoring”. Indirect reshoring refers to “proactively/consciously keeping or increasing manufacturing activities in the UK instead of moving them abroad after a serious consideration of foreign locations”. The detail of this is in section 4.4.2.5.1.

1.2.5.3 Reshoring Trend

As shown in Figure 1-3 the reshoring trend is one of the original discussion streams and started around 2004, and has continued to the present time. But the majority of the exploration has been during the period between 2004 and 2014.

Although manufacturing offshoring has been a popular shoring decision strategy for about two decades, its risks and challenges are also present, such as communication barriers, culture differences, increased labour wages in developing countries, increased logistics cost, etc. (Kinkel and Maloca, 2009; Manning, 2013).

Since offshoring lost its momentum in 2005 (Kinkel and Maloca, 2009), and reshoring then occurred, the latter has become more and more popular in the developed countries (Fratocchi et al., 2014) including many industrial giants such as Caterpillar, Bosch, Philips and Jaguar Land Rover.

From Germany's manufacturing perspective, Kinkel and Maloca (2009) state that offshoring has lost its momentum. Among German firms, reshoring is a quantifiable but small phenomenon. In a follow-up study of European firms, Drauz (2014) confirm the essence of these findings. In the report from EEF (2014), they find that "some companies are bringing production closer to the UK – to Western Europe (9%) or Eastern Europe (12%)." In the UK, it is estimated that reshoring could create up to 200,000 jobs and boost GDP (Gross Domestic Product) by 0.8% in the next decade (PWC, 2014). The data have been updated by Ancarani et al. up to 2014 by identifying 249 companies around the world that have engaged in reshoring decisions, with 131 coming from the US and 109 from the EU (2015). Later in 2015, Fratocchi et al. have conducted research based on secondary data updated to March 2015, and reveal that there are 377 companies engaged in reshoring globally, among which 177 were conducted by North America and 194 by Western Europe (Fratocchi et al., 2015). Up to 2016, based on the US Reshoring Institute report, there are many thousands of US companies (including FDI (Foreign Direct Investment)) engaged in reshoring (as shown in Firgure 1-7) and creating an extra 338,000 job opportunities for the US labour market (Research Institute, 2017).

Reshoring + FDI by Industry, 2010-2016				
Ranking by job #s	Industry	NAICS Code(s)	Jobs	Companies
1	Transportation Equipment	336	133963	444
2	Electrical Equipment, Appliances, Components	335	35340	201
3	Plastic/Rubber Products	326	29220	218
4	Fabricated Metal Products	332	18725	245
5	Computer/Electronic Products	334	18393	137
6	Apparel/Textiles	313, 314, 315, 316	17166	287
7	Chemicals	325	16257	136
8	Machinery	333	15619	141
9	Wood & Paper Products	321, 322	10723	64
10	Furniture & Related Products	337	7170	55
11	Food & Beverage	311, 312	6968	64

Figure 1-7 Research Practice in US

Source: Reshoring Initiative

However, it can be seen, even though reshoring is a hot topic and companies are keen to engage in it, offshoring still happens more at the moment than reshoring. US is a very active country regarding reshoring, with support from government since Obama was President, as well as Trump now. The European countries are also engaged, especially Germany, Italy and Sweden. However, there is few research specifically looking at the reshoring from UK perspective. As one of the economic leaders in the world, it is necessary to have a good understanding of the UK's manufacturing reshoring status, in order to engage more and support companies to make the correct location decisions.

1.2.5.4 Motivations

Since the reshoring concept has been developed, together with definition and phenomenon development, many researchers and practitioners have been engaged in the research on the drivers of and motivations for reshoring, to try to clarify what causes this phenomenon (Ellram, Tate and Petersen, 2013; Fratocchi et al., 2011, 2014a; Kinkel and Maloca, 2009). As shown in Table 1-3, the reshoring motivations research is one of the stream, starting around 2009, and lasting until 2016.

The first paper which fully focuses on the discussion about what motivates companies to engage in reshoring is in 2009 from Kinkel and Maloca. There are five individual drivers identified by them, which can be summarised into two main categories: cost factors (coordination, infrastructure and labour costs) and qualitative factors (flexibility and quality) (Kinkel and Maloca, 2009). It can also be identified that qualitative factors have a greater importance than cost, as shown in Figure 1-8 (Kinkel and Maloca, 2009). Kinkel confirmed the essence of these findings and enriched the meaning of drivers by updating coordination and monitoring costs in 2012, through adding transportation/logistics costs and proximity to home-based R&D (Research and Development) in 2014, either naming them as “motivations” or “reasons” in his follow-up studies.

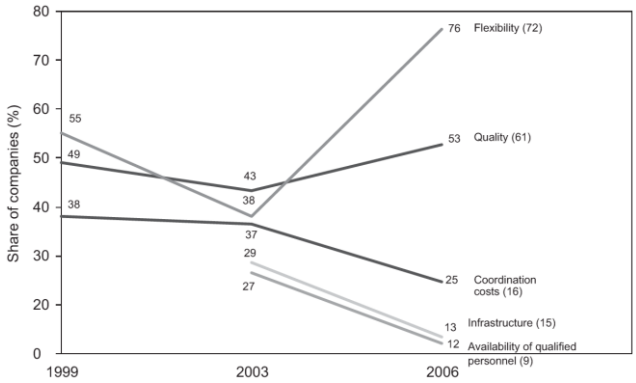


Figure 1-8 Drivers for Reshoring

Source: Kinkel (2009)

Further research conducted by Canham and Hamilton (2013) confirmed the previous findings and identified extra drivers for both offshoring (e.g. production capability, bottleneck manufacturing capabilities) and reshoring (quality, flexibility, the value of the “made in” effect, and staying close to customers).

With more and more drivers and motivations having been identified, some researchers started not only to explore individual drivers, but also tried to categorise them. Fratocchi et al. (2015) identified 31 motivations for backshoring through reviewing 33 relevant articles (both academic and non-academic), which have been categorized into seven groups: costs, logistics-related elements, global crisis, host country, home country, firm-specific elements, and sales and marketing. Followed by Ancarani et al. (2015), the drivers of reshoring have been

classified according to Dunning's location selection theory into four aspects: resource seeking, strategic asset seeking, market seeking and efficiency seeking (Dunning, 1989). In next year, Fratocchi (2016) further updated his category base on the reshoring matrix (shown in section 1.2.5.2) which was developed by him in 2011 and later confirmed by Gray et al. (2013).

It can be seen that most drivers of reshoring are developed through a comparison with offshoring. The reshoring drivers usually come from either the disadvantages of offshoring, or the motivation for/expectations of reshoring.

Since 2013, researchers have moved deeper to look into the motivations for location decision/selection, rather than pure reshoring as, fundamentally, reshoring is one type of shoring decision. Ellram et al. (2013) are the first to look at the drivers of manufacturing location choice. Their paper has identified 29 factors related to location choice through survey-based research, which have been initially grouped into eight aspects: input/product, cost, labour, logistics, SC interruptions risk, strategic access, country risk, and government trade policies (Figure 1-9). And it further classifies these groups into four directions, using the principle of Dunning's (1988) four perspectives.

Drivers of Manufacturing Location Choice: Exploratory Factor Analysis

		Factor Loadings	
Factor		Past 3 Years	Next 3 Years
Input/product	Currency	.750	.505
	Weight	.745	.491
	Raw materials location	.600	.566
Cost	Switching cost	.627	.733
	Labor cost	.751	.579
	Stability of labor cost	.680	.667
Labor	Availability of local management	.559	.807
	Availability of labor	.321	.778
Logistics	Availability of knowledgeable intermediaries	.719	.774
	Availability of transportation	.788	.794
	Stability of transportation cost	.552	.607
	Transportation reliability	.755	.576
Supply chain interruption risk	Distance to customer	.453	.514
	Terrorism	.786	.771
	Disaster	.759	.772
	Reputational risk	.625	.325
Strategic access	Market potential	.692	.610
	Customer presence	.463	.616
	Access to supplier or buyer knowledge	.610	.653
	Competitive pressure	.466	.533
Country risk	Global/political uncertainty	.619	.654
	Environmental issues	.672	.687
	Social/ethical	.575	.576
	Natural disaster	.510	.602
	Political instability	.610	.684
	Regulation risk	.617	.613
Government trade policies	Tax advantages	.756	.729
	Subsidies	.781	.830
	Countertrade requirements	.488	.376

Figure 1-9 Reshoring Drivers

Source: Ellram et al. (2013)

Tate et al. (2014) further justify Ellram et al.'s results. Later, Srai (2016) identified more motivations and categorized them into international business, strategic management political economy, and operations management perspectives. Finally, in the latest systemic iteration on reshoring, Stentoft et al.(2016) have also identified the location decision (shoring decision) drivers, and categorized them into cost, quality, time and flexibility, access to skills and knowledge, risks, market, and other.

Therefore, it can be seen that more motivation has been identified from the initial quality, and cost prospects, through to multiple factors' consideration across all aspects of the SC, such as operational factors, the "made in" effect, risk, culture, customers etc. Although with different categories, most of them are following the cost, flexibility, quality, time and other small or individual factors such as risk, "made in", personnel etc., which are actually based on the manufacturing competitive priorities dimensions.

From the literature, we can see researchers use different terms, such as drivers, reasons or motivation; however, they do not really define the meaning of these terms in their papers. Therefore, more researchers have started to doubt whether driver is an appropriate word; some people even argue that driver and motivation are different from the EurOMA 2017 annual conference – the special session on reshoring.

In the author's opinion, drivers and motivation may have slight differences, but more important is to distinguish them from another concept "competitive priorities". Drivers are what a company believes they should improve or what they believe they want to have/achieve, which they think can be arrived at through reshoring. Competitive priority is the capability that keeps a company focused and on which it has placed an amount of effort. Drivers refer to the activities which may not have happened yet, and competitive priorities are the actual operations undertaken at the moment. Therefore, if flexibility is one of the drivers of a previously offshored company to decide to reshore, it means this company has a bad performance on flexibility at the moment and they aim to improve their flexibility performance through moving back. If at the moment, this offshored

company does not do anything to improve their flexibility, then the flexibility is a driver only. However, if this company is doing something to improve their flexibility already, then the flexibility is a competitive priority and its further improvement is the driver of reshoring. After reshoring, there is no driver concept any more actually. If flexibility is still one of the capabilities, the company will put resources into it and want to retain its competitive advantage, then flexibility is one of the competitive priorities. Otherwise, flexibility would not be a competitive priority any more. Drivers are more like motivation, which may or may not be achieved through reshoring. It needs to be tested by comparing the before and after operational performance of the company.

Therefore, the business and manufacturing strategy is represented more by competitive priority than drivers. Also, the business performance is much more decided by what the company did rather than what the company thought (drivers).

The author's opinion above has been supported by Micek (2009) who started to look at competitive advantage rather than drivers, distinguishing between drivers and competitive priorities. Even clearer, from the research conducted by Kroes and Ghosh (2010), it has been clearly distinguished that drivers are different from competitive priority, and both them will affect a company's shoring decisions.

However, besides the research conducted by Micek (2009), it seems most reshoring research has overlooked competitive priorities. But the trend coming can be seen from the upgrade from motivation for reshoring, to factors of location choice and the perspectives researchers adopt to classify drivers.

It is not difficult to understand why researchers have overlooked competitive priorities in the reshoring field, which could be due to the immature development of the research field or due to drivers and competitive priorities having some overlap and both of them even could be measured by the same elements (Kroes and Ghosh, 2010). Therefore, the time horizon is very important to distinguish these two concepts and discover a very important research stream in reshoring regarding competitive priorities. Based on "congruence theory": strategy, competitive priority and location/shoring decisions need to be consistent in order

to efficiently improve business performance. Also, due to “contingency theory”: there is no best location, but there is a best optimization regarding how to conduct operations to match location decisions (more details will be discussed in section 3.2). Therefore, it is also necessary to discover what the key competitive priorities are under each shoring decision, rather than only looking at what causes people to think about reshoring. Therefore, in this study competitive priorities is the key variable rather than drivers, which will be discussed in detail in a later section (2.3.3.1).

1.2.5.5 Emerging Streams

As already briefed in section 1.2.5.1.1, in addition to the traditional research stream’s definition, trend and motivations, there are some new research streams that have been explored in recent years. This section is going to discuss the research on several keys, new streams.

Right-Shoring

In 2013, the concept of “right-shoring” was raised, which is actually the shoring decision including comparisons of all the shoring types, such as offshoring, reshoring, home companies and other groups as well. The view of right-shoring is to avoid the simple comparison between offshoring and reshoring, and move to a further level to look at the shoring decision (Ellram, Tate and Petersen, 2013; Gray et al., 2013), by arguing it is crucial to place the SC assets in the right places around the globe (Li et al. 2015). Therefore, we see some research focusing on the factors for location decisions rather than reshoring decisions (Ellram, Tate and Petersen, 2013; Gylling et al., 2015; Tate et al., 2014).

Location Decision Model and Process

After recognising the importance of the shoring decision as the root objective for conducting research, authors have started to focus on location decision making processes regarding how to make an accurate decision systematically, even though this is at a very early stage. Ellram et al. (2013) argue the importance of the production location and raise it as the key consideration dimension when making the location decision. Later, Sarder, Miller and Adnan (2014) developed

a reshoring decision process model by employing the Analytical Hierarchy Process (AHP). The work of Joubioux and Vanpoucke (2016) developed a transition process from offshoring to reshoring step by step and Albertoni (2017) compare the deficiencies of the decision process between offshoring and reshoring. Finally, Cohen et al. (2017) summarised these at the theoretical level, trying to aim at a shoring decision theory.

As claimed in the previous section 1.2.5.1, since 2015 the reshoring research started to transfer to from the pre-shoring stage discussion to a post-shoring stage discussion. Post-shoring research could be categorized as the research on the impact of reshoring and the association between reshoring and another field.

Impact of reshoring on supply chain configuration

In terms of the impact of reshoring, several research have been conducted around how reshoring could affect supplier selection and further affect SC network configurations and footprint dynamics. For example, Huq, Pawar and Rogers (2016) summarised the global SC network configurations for both offshoring and reshoring, to reveal the difference and consider multiple decision factors. Later, Cohen et al. (2017) did work to compare the production volume of offshoring and reshoring, and display the footprint of location moving by companies. However, the quantitative changes in the number of suppliers is still a blank area, which will be explored in this research.

Impact of Reshoring on Operational Performance

From the literature, there are few research that have tried to look at the impact of reshoring from a performance perspective since 2016. It is a very new trend, the work of Johansson and Olhager (2016) justified the plant benefits from reshoring regarding their operational performance, based on the Swedish context. However, their research only looked at the operational performance rather than business performance; Brandon-Jones et al. (2017) tried to explore the correlation between a reshoring announcement and shareholder wealth. However, the fundamental focus for a business is still business performance.

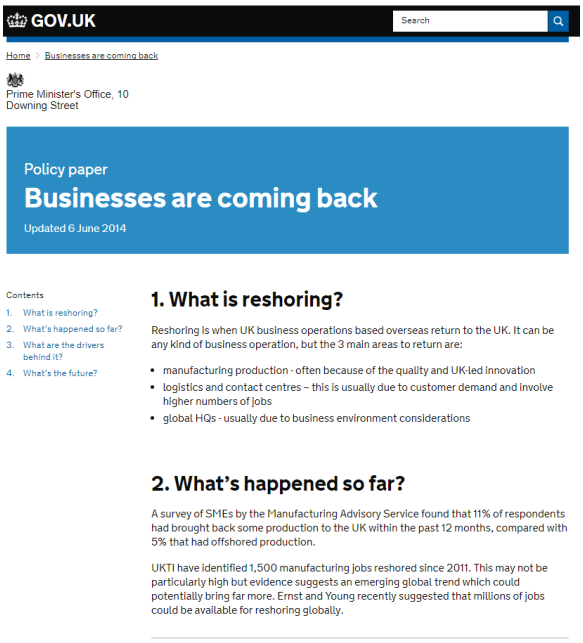
Therefore, it is necessary to see the impact of reshoring on business performance, and this research is going to look at it through empirical evidence.

1.3 Reshoring: The UK Context

Reshoring is not only a firm level topic, but also a country level topic. It is very important to the home country, which in this research means the UK.

The report "UK Economic Outlook" produced by PWC (2014, p.25) has viewed reshoring as "*a new direction for the UK economy*", by estimating that reshoring could *"create around 100-200,000 extra UK jobs over the next decade, and boost annual national output by around £6-12 billion at today's values (c.0.4-0.8% of GDP) by the mid-2020s."* Besides the consulting company, the reshoring trend has successfully attracted the UK government's interest and received significant attention and support from the government in 2014.

The UK government defines it as *"Reshoring is when UK business operations based overseas return to the UK. It can be any kind of business operation"* (Gov.com, 2014), which includes both manufacturing reshoring and service reshoring. In order to emphasise the importance of this trend and support it, the UK government even built a webpage on its official website to introduce what reshoring is, its current status, the reasons for it and its importance to the UK economy and society, as shown in Figure 1-10:



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Prime Minister's Office, 10 Downing Street

Policy paper

Businesses are coming back

Updated 6 June 2014

Contents

1. What is reshoring?
2. What's happened so far?
3. What are the drivers behind it?
4. What's the future?

1. What is reshoring?

Reshoring is when UK business operations based overseas return to the UK. It can be any kind of business operation, but the 3 main areas to return are:

- manufacturing production - often because of the quality and UK-led innovation
- logistics and contact centres – this is usually due to customer demand and involve higher numbers of jobs
- global HQs - usually due to business environment considerations

2. What's happened so far?

A survey of SMEs by the Manufacturing Advisory Service found that 11% of respondents had brought back some production to the UK within the past 12 months, compared with 5% that had offshored production.

UKTI have identified 1,500 manufacturing jobs reshored since 2011. This may not be particularly high but evidence suggests an emerging global trend which could potentially bring far more. Ernst and Young recently suggested that millions of jobs could be available for reshoring globally.

Figure 1-10 Reshoring Webpage on the UK Government Website

Source: Gov.com

The government reveals that during 2011-2014, around 1,500 manufacturing job opportunities have been created due to reshoring based on the report from UKTI (UK Trade & Investment), but now named the Department for International Trade (DIT). Besides this positive effect of reshoring back to the UK on society, the government has further justified the importance of reshoring to the UK for the economy. Based on the summer budget report, HM Treasury (2015) has claimed a productivity challenge in the UK. Based its analysis results, it has claimed that there is a large and long-term productivity gap existing between the UK and other major advanced economies. As shown in the results in Figure 1-11, the production output/hour within the UK was 17% lower than the average value of G7 countries, 27% below France, 28% lower compared to Germany and even 31% lower than the US in 2013. And the government strongly believes that "Manufacturing is essential for long term economic growth and economic resilience" and has decided that "Manufacturing is and must continue to be an essential part of the UK economy" (Foresight, 2013, pp.12–14). Therefore, the government is proactively working together with business communities to aim at

developing a proper policy and regulatory environment in which to support manufacturing reshoring (Gov.com, 2014).

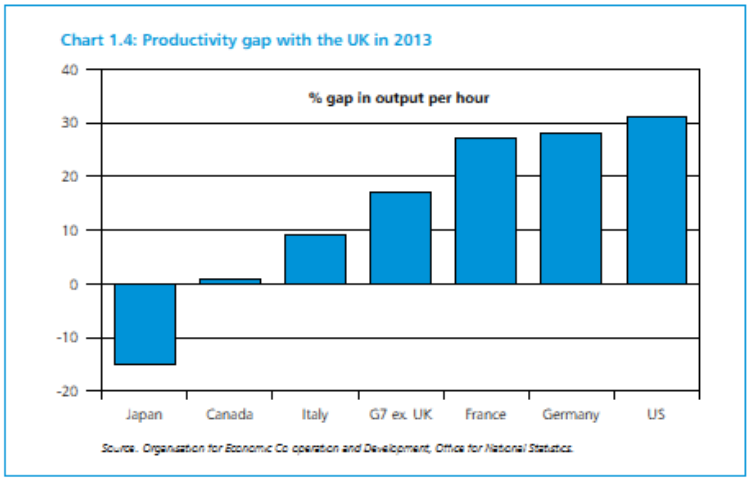


Figure 1-11 UK Productivity Challenges

Source: HM Treasury (2015, p.12)

"Rebalancing the UK economy" has been introduced to try to develop a long-term strong and stable partnership between government and business in the UK. The details of the governmental incentives are displayed in the budget report as shown in Figure 1-12 (HM Treasury, 2015).

Backing business and improving productivity

The best way to create jobs and raise living standards over the long term is to support business and increase productivity by making it more competitive and by prioritising investment in skills and infrastructure. This Budget sets out a plan to back business and support productivity by:

- cutting the corporation tax rate further to 19% in 2017 and 18% in 2020, benefitting over 1 million businesses, large and small
- setting the level of the Annual Investment Allowance to £200,000 from January 2016, its highest ever permanent level
- raising the Employment Allowance by £1,000 to £3,000 from April 2016 to support small businesses and charities to create jobs
- introducing a levy on large employers to fund 3 million new, high quality apprenticeships this Parliament
- supporting sustainable investment in universities by turning maintenance grants into loans, saving £2.5 billion by 2020-21
- reforming vehicle excise duty for new cars and hypothecating the revenue from 2020 to a Roads Fund to ensure sustained investment in the strategic road network

Figure 1-12 Government Incentives

Source: HM Treasury (2015, p.3)

The report from EEF (2014) further advocated the view that government places on the importance of reshoring to the UK, by estimating that companies will improve their quality by 49%, decrease delivery time by 49% and increase the availability of qualified personnel by 50%, through reshoring back to the UK.

Based on the above, it is not difficult to see the strategic cruciality of manufacturing reshoring to the UK economy and society.

However, within academia, little research has been conducted based on the UK perspective. As discussed in section 3.2.2, there is one (shown in Figure 1-13) extant research published in the ABS journal list that looks reshoring from a UK perspective.

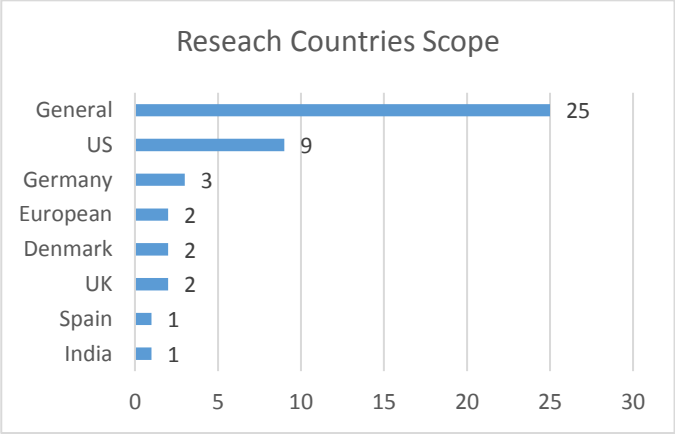


Figure 1-13 Research Countries Scope Summary

Even though conducting some practical research on reshoring with a list of reports and a dynamic webpage showing the companies listed who have engaged in the reshoring, as shown in Figure 1-14, it still seems everything has stopped in 2014 without any further updates. Therefore, in order for policy makers to make the most suitable policies and implement them, it is necessary to have a good understanding of the UK current manufacturing status.

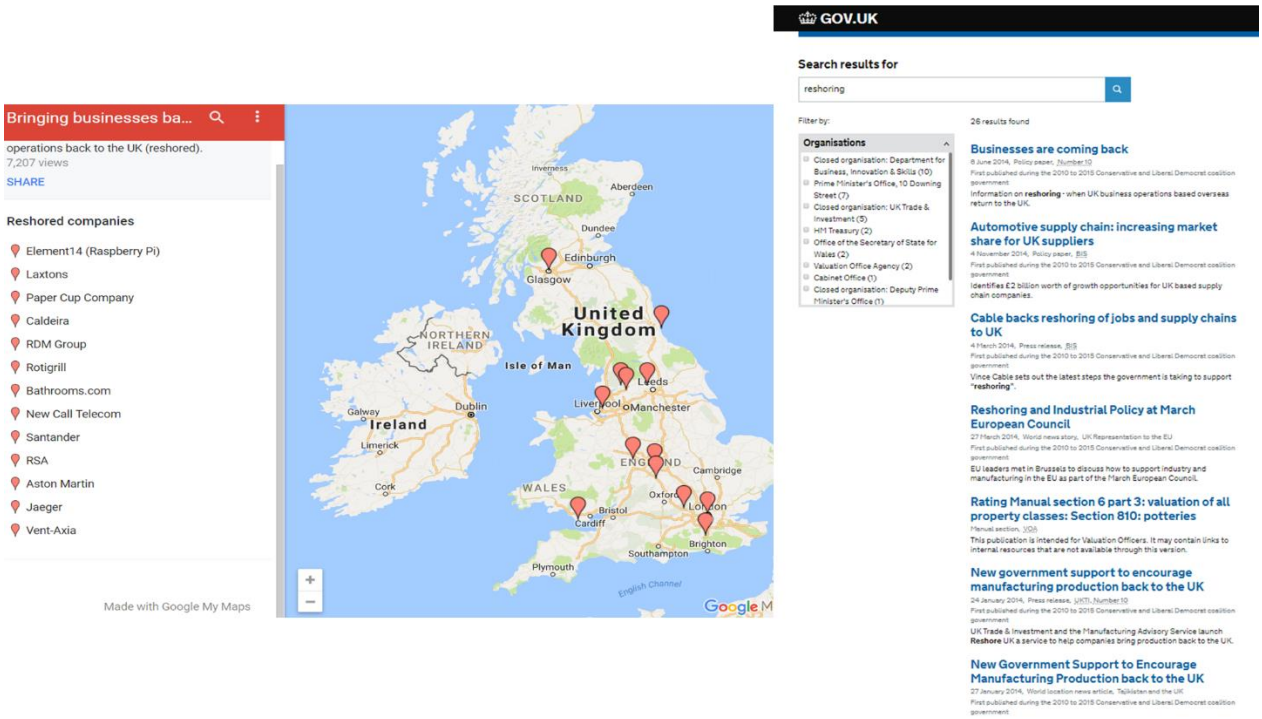


Figure 1-14 A list of Reshoring Companies in the UK

Sources: GOV.com

1.4 Research Gaps

In summary, the key challenges faced by enterprises due to offshoring strategies are communication barriers, culture differences, and increased wage and transportation costs (Manning, 2013). In addition, due to the increasing attention given to on customers, the GSN needs to be more flexible and responsive, which is hard to achieve through offshoring (Ancarani, 2015). Therefore, more companies have started to re-evaluate their offshoring and decided to reshore, which has caused it becoming a hot topic in operations management.

As discussed above in the literature review, most research to date has focused on defining the reshoring concept and its synonyms, trends and motivations. Kinkel revealed empirical evidence, saying: *"every fourth to sixth off-shoring activity is countered by reshoring activities within two to five years"* (Kinkel, 2009, p.158). In the UK, it is estimated that reshoring could create up to 200,000 jobs and boost GDP by 0.8% in the next decade (PWC, 2014). The reshoring motivations have been discussed in many research (Ancarani, 2015; Canham

and Hamilton, 2013; EEF, 2014; Ellram, Tate and Petersen, 2013; Fratocchi et al., 2011, 2015; Gray et al., 2013; Kinkel, 2012; Kinkel and Maloca, 2009; Tate et al., 2014). Among them, flexibility and quality account for a more important position, regarded as the main factor by Kinkel and Maloca (2009). Since 2014, the research scope has expanded to the reshoring decision-making process (Bals, Kirchoff and Foerstl, 2016; Sarder, Miller and Adnan, 2014; Tate and Bals, 2017), right-shoring (Ellram, Tate and Petersen, 2013; Gylling et al., 2015; Li et al., 2015; Tate et al., 2014) and AM associated with reshoring (Fox, 2015; Stentoft, Mikkelsen and Jensen, 2016).

However, this line of research is still in its infancy and there is a lot "unexamined" questions which requires further exploration, e.g. the understanding of the reshoring definition and phenomena needs to be further enhanced to products and the practical operations level, such as a common acceptable definition of the concept, reshored products, conduction methods and the impact on supply chain. The research stream of the impact of reshoring, especially focused on business performance, is nearly zero. In addition, getting rid of reshoring and looking at a fundamentally "shoring decision" namely location decision perspective, which are key competitive priorities that companies should focus on under different types "shoring decisions" in order to improve business performance, remain unexamined. In detail, the key research gaps have been summarized and listed below:

- Reshoring is not a well-defined concept. It lacks clarification for both academia and practitioner.
- The trend lacks clarity regarding its status, what is going on exactly at the moment, especially from UK perspective.
- Literature always discusses reshoring drivers and the phenomenon, but not how to re-shore, what to re-shore, and there is a lack of clarity on all the factors that a company must take into consideration.
- Lack the exploration of the role of reshoring (shoring) played among competitive priorities (manufacturing strategy) and business performance.
- Most extant research are developed based on the literature review or secondary data, lacking the quantitative empirical evidence.

In order to address some of the identified gaps above, this study has set up the research aim and research questions in following section 1.5.

1.5 Research Questions

The overarching Aim of this study is to explore the question:

To explore the impact of shoring decisions on the supply chain and business performance of UK manufacturers

There are two primary sub-research questions, which form the basis for the study:

RQ1: What is the current status of manufacturing reshoring in the UK?

RQ2: What is the relationship between the shoring decision types, competitive priorities, and business performance?

1.6 Value of this Research

This research could contribute to theory through the development of a framework for reshoring, revealing a better understanding of the current status of reshoring in the UK and fill in the gap of correlation among competitive priorities, business performance and shoring decisions, through justifying the moderation model. It also contributes to practice for both industrial specialists and government policy makers. Practically, this research will provide industry practitioners with what parameters need to be considered for a reshoring or shoring decision covering comprehensive perspectives, and what capabilities they should focus on, in order to maintain competitive advantage under each type of shoring decisions. It can also provide clear reference, evidence, and information from the country's perspective for policy makers to devise an appropriate policy to support the UK's manufacturing and economic recovery.

1.7 Thesis Structure

The structure of this thesis is shown in Figure 1-15. Chapter 1 introduces the background, rationale, and research questions in this study. Based on the sub-

research questions, Chapters 2 and 3 conduct the literature review to provide a framework for reshoring and a theoretical moderation model to answer sub-questions 1 and 2 respectively. Then, a survey-based research method has been designed in Chapter 4 as well as the data collection method. Chapter 5 reveals the descriptive results of this study regarding UK current reshoring status. Chapter 6 conducts and displays the statistical results of testing the theoretical moderation model and hypotheses. The results from the previous chapter 5 and 6 are discussed in Chapter 7, giving the reasons behind the results and critical discussion. Finally, Chapter 8 concludes this study and looks for future research.

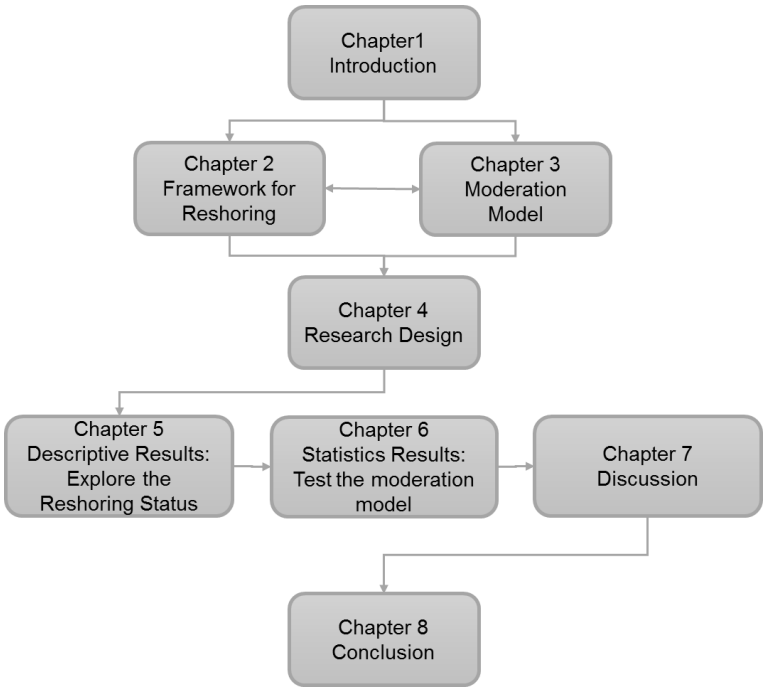


Figure 1-15 Thesis Structure

1.8 Chapter Summary

This chapter has reviewed the background of this research, starting from globalisation, and then its impact on manufacturing strategy and location decisions. Then the main location strategy for offshoring and reshoring has been discussed. Through an in-depth literature review of the reshoring field, combined with manufacturing strategy and performance, two sub-research questions have been raised regarding exploring the current UK manufacturing reshoring status and further exploring the relationship between shoring decisions, competitive

priorities and business performance. The research has justified the necessity for this study and shown how it could benefit academics, industries and policy makers as well

2 Framework for Reshoring

2.1 Chapter Introduction

This chapter includes two main sections. Section 2.2 analyses the reshoring literature. Next, a framework for reshoring decisions will be generated in section 2.3 to clarify all the aspects related to the reshoring phenomenon. This framework will guide the exploration of the current UK manufacturing reshoring status through data collection; it contributes by revealing a full list of parameters that need to be considered when taking reshoring decisions. The framework structure will be derived from the previous multiple location decision model, and details within the structured blocks will be enriched by literature from multiple fields including business strategy, manufacturing strategy and competitive priorities, productions, suppliers, plant location selection, and performance.

2.2 Descriptive Analysis of Reshoring Literature

2.2.1 Publication Types

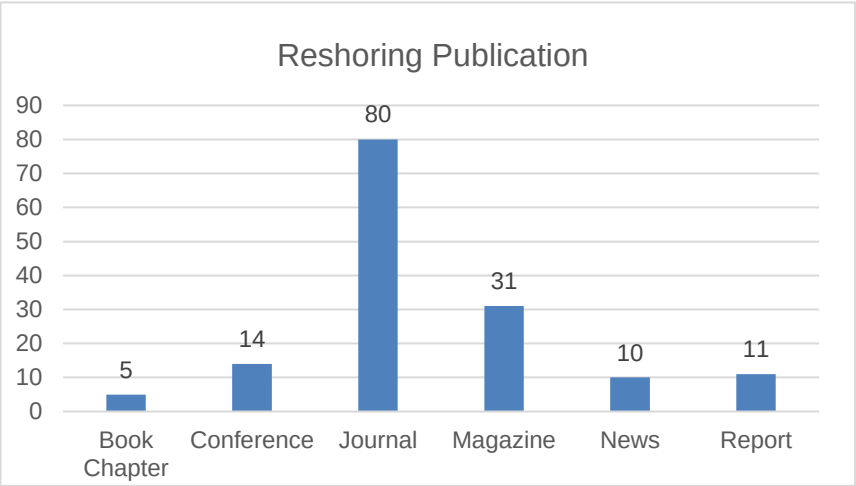


Figure 2-1 Reshoring Publication Types

As explained in section 4.4.1, in total, 151 non-duplicated results have been identified from the in-depth searching, which include different types of publication such as academic (book chapter, conference papers, journal articles and reports) as well as non-academic (magazine and news), as shown in Figure 2-1. After removing the magazine and news, 110 publications remain to further explore the

reshoring field development history through looking into the publication years, as shown in Figure 2-2, which shows the new publication volume for each year. It can be seen, up to August 2017, that reshoring publication started in 2004, but did not become popular until 2010. Then, the publications kept a significantly increasing status overall from 2010 to 2016. The published work number arrived at a peak point of 29 in 2016. But in 2017, even just for half the year, publications have risen to 15, therefore, it can be predicted with confidence that the publications have an increasing trend in 2017 and in subsequent years.

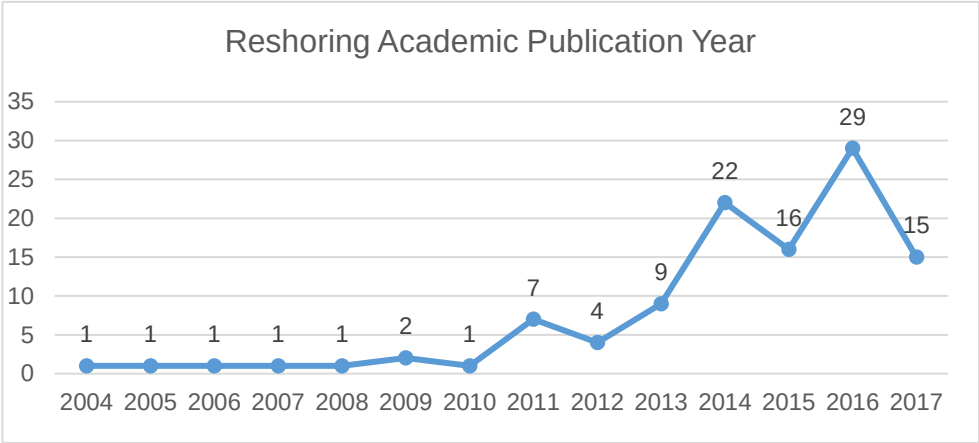


Figure 2-2 Reshoring Publication Year

Focusing on journal articles publication alone, as stated above, there are 80 journal articles available. In order to check for journal quality, the author has ranked the journals according to the ABS 2015 ranking guidance to distinguish the journal from level 1, 2, 3, 4 and 4* and non-ABS listed journals shown as "-" in Figure 2-3. It can be seen that 35 journals in the reshoring field are not in the ABS list. The majority of the publications are in level 2 journals, which means they are not the top journals in the operation management or SC fields. But this situation happened mainly before 2015, which is understandable since the reshoring field only emerged in 2004 and become academically popular in 2010. At the beginning, without enough understanding and exploratory detail of the field, it would have been difficult to be published in a top ranked journal. The research needs a period before the results start to come out. However, since 2015, more good quality papers have come out in top journals such as IJOPM, JOM, MOSM, IJPE etc. as shown in Figure 2-3. Acceptance from a top journal confirms that

academia has admitted the importance of this new field and requires more research within it.

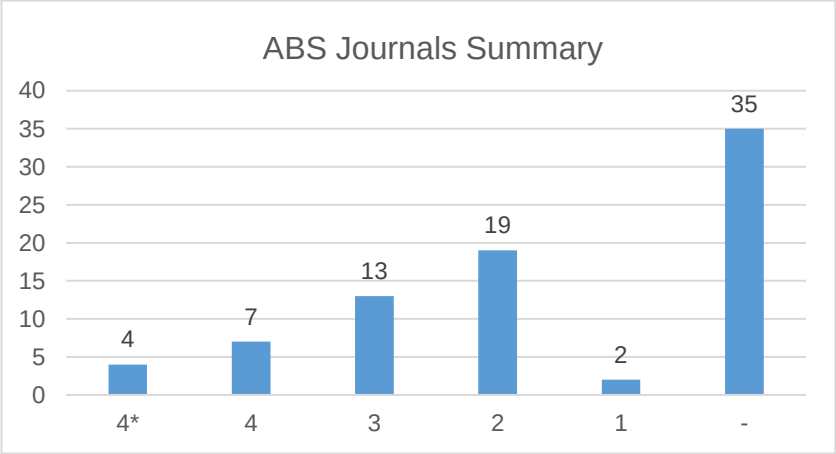


Figure 2-3 ABS Journal Summary

In detail, the top journals which are interested in the reshoring topic are listed in Table 2-1 and graphically shown in Figure 2-4. The author selected journals which have at least two publications on the reshoring topic and these are shown in Table 2-1. It can be seen the most welcoming journal is Operations Management Research, however it is not in the ABS list. The JPSM ranked 2nd with seven publications and IJPDLM ranked 3rd with four publications; these are level 2 journals in the ABS list. However, as stated above, the top journals IJOPM, JOM, IJPE, JSCM, MSOM are all in the top publication journal list, which is a strong indication of the importance of reshoring research.

Table 2-1 Top Reshoring Journal List

Journal Name	Publication Number
Business Horizons	3
International Journal of Operations & Production Management (IJOPM)	2
International Journal of Physical Distribution and Logistics Management (IJPDLM)	4
International Journal of Production Economics (IJPE)	2
Journal of Operations Management (JOM)	2
Journal of Purchasing and Supply Management (JPSM)	7
Journal of Supply Chain Management (JSCM)	3
Journal of Textile and Apparel, Technology and Management (JTATM)	2
Journal of World Business	2
Manufacturing and Service Operations Management (MSOM)	2
Metal Finishing	3
Operations Management Research	8
Strategic Outsourcing: An International Journal (SO)	2
Supply Chain Forum: An international journal (SCF)	2

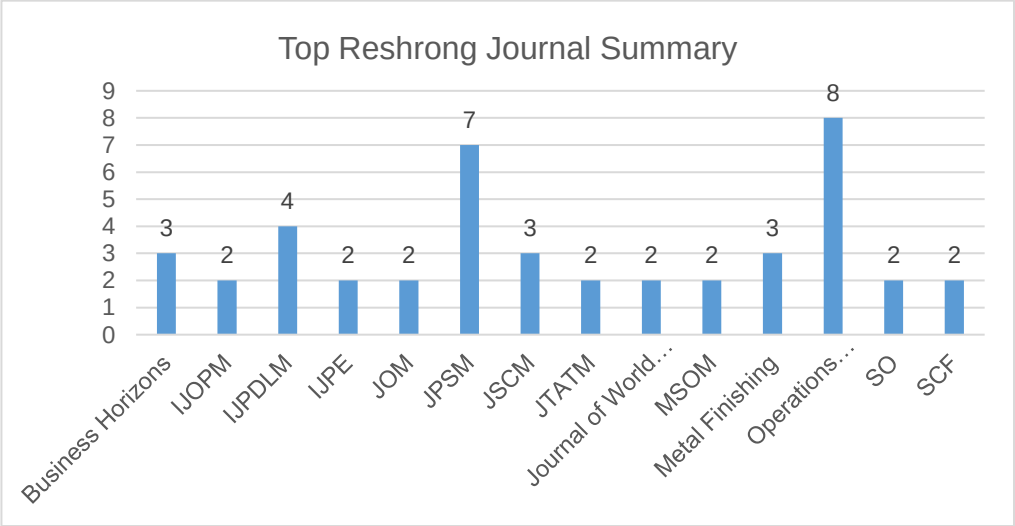


Figure 2-4 Top Reshoring Journal Summary

2.2.2 Key Conversances

Finally, within the 45 ABS listed journal articles, the author has also explored the most active authors in the reshoring field – the top 15 according to their involvement in publication volume. From Figure 2-5, it can be seen that Fratocchi, L. is the most active author at the moment in the reshoring field with six publications (including both first author work and non-first author work). Kinkel,

S. is in 2nd position with five publications together with another two authors as well. Even though having less publication volume, other authors have also contributed considerably, such as Tate, W.L. and Ellram, L.M published in JSCM, Cohen, M published in MOSM and Gray J.V. published in JOM.

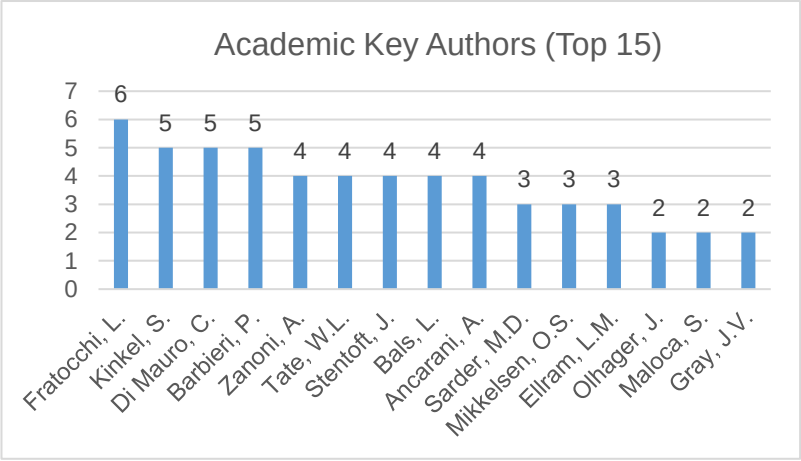


Figure 2-5 Key Authors Analysis

Besides, within these 45 articles, the countries' scope has also been analysed, as shown in Figure 2-6. It can be seen that around half the research in the reshoring area has been conducted based on the country context, and that most of the publications focus on the US. This makes sense due to the nature of reshoring being to return to the home country. The features, environment and situation of each country are distinct. Therefore, it makes sense to conduct the research based on context. However, besides the US, some research has been conducted from German and European perspectives. Few have been conducted from a UK perspective, which further justifies the necessity of this study to explore the reshoring current status in the UK.

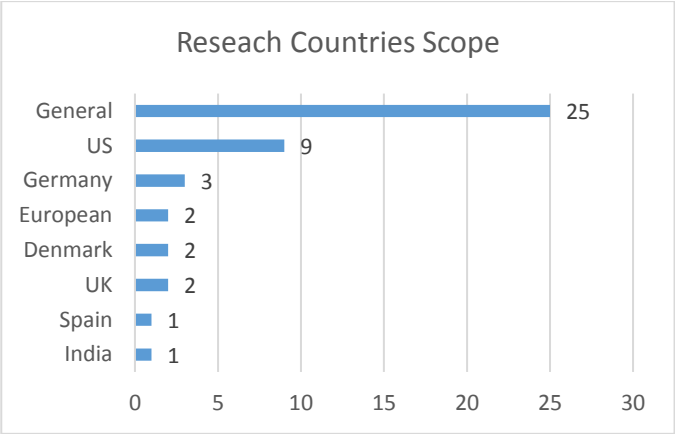


Figure 2-6 Research Countries Scope Summary

2.2.3 Summary of Descriptive Analysis

Based on the analysis above, it can be seen the research regarding reshoring is still in its infancy. Only 45 publications were found from the ABS journal list. The subject lacks empirical studies and lacks a focus on the UK. But a clear trend in the research interest and publications can be seen. Papers have started to appear in the top journals, such as JOM, IJOPM and so on, since 2016. The research is context sensitive. Majority of the extant research is US-based, rarely UK-based.

2.3 Developing the Framework for Reshoring Clarification

2.3.1 Location Strategy

2.3.1.1 Strategic Importance of Location Decision

Manufacturing locations, as part of manufacturing strategy, play a significant role in both manufacturing and business operations. Locating SC infrastructures is the foundation to build up business' supply networks across the globe. The configuration of infrastructures' locations can significantly affect the global supply network (GSN) structure and operation, and will further influence SC and business performances (Amoako-Gyampah and Acquaah, 2008; Skinner, 1969). Therefore, in order to achieve competitive advantages, the good manufacturing location configuration is the cornerstone. Kinkel and Maloca (2009, p156) stressed the strategic importance of manufacturing location as:

"Due to their long-term influence on competitiveness and almost all operational processes of an enterprise, location decisions for production activities are of highly strategic importance".

Fundamentally, both reshoring and offshoring are two types of location choice/shoring decision. If the research wants to have a fundamental understanding of reshoring current status in the UK, it does not make sense to only look at reshoring without thinking about other location options. A comparison among different shoring decisions should be conducted. Therefore, besides exploring the current status of UK manufacturing reshoring, the research also goes into greater depth, to explore the status of other shoring decisions, such as their engagement, strategy state, competitive priorities and current business performance. Then in Chapter 3, the research goes even further to explore the correlations among shoring decisions, competitive priorities and business performance.

2.3.1.2 Expanding the Process Model for Reshoring Decisions

In order to fulfil the first research aim which is to explore the current UK manufacturing reshoring status, the researcher aims to develop a fundamentally conceptual framework for reshoring as guidance to capture all the relevant aspects and information regarding the manufacturing reshoring status in the UK. To develop this guidance framework for reshoring, the researcher has gone deeply into the location decision making level to capture all the relevant aspects.

By reviewing the literature regarding location decision models since the 1980s, a list of representative papers has been summarised in Table 2-2. The reference refers to the resources of the paper; location decision type gives the model used for which type of location decision; the features column refers to the key features of the model, strategic based, process based or loop based; which identification of the underpinning theories the papers used to support their model; and finally a manual summary regarding which key aspects have been considered in the model during the decision making process.

Table 2-2 Location Decision Consideration Summary

Reference	Locaiton Decision Type	Method Features	Theory	Considered Aspects
Abetti, 1989	Abetti's Matrix outsourcing decision	Strategic Based; Competitiveness and Importance to Business	Not specific	Strategy; Operations (competitive capbility)
Venkatesan,1992	Venkatesan's flowchart for strategic outsourcing decision	Strategic Based; Strategical importance, capability; Competitive capability	Not specific	Strategy; Operations (competitive capbility)
Yang and Lee, 1997	Facility Location Selection	Process Based; AHP; Multi-criteria with priority	Multi-attribute utility theory	Strategy; Operations;
Brush et al., 1999	Plant Location Decision	Location determinants with category	Eclectic theory of international production	Operations
Liu et al.,2008	Offshore location selection	Process Based; AHP; Multi-criteria with priority	Transaction cost theory	Operations
Dou & Sarkis, 2009	Strategic offshoring decision	Process Based; ANP (analytical network process);Multi-criteria	International trade theory; Central Place Theory; Institutional approach	Straegy; Operations; SC(Supplier) Impact; Supplier performance
Bellgran et al., 2013	Production location decision process	Process Based; Briefly consider the strategic role, risks and drivers	Internationalization;Transaction cost economics; Multiple factors	Straegy; Operations; Performance
Sarder, Miller, Adnan 2014	Reshoring Decision-Making Process	Process Based; AHP;Multi-criteria	Not specific	Operations
Joubioux and Vanpoucke, 2016	Location decision-making	Process Based; Multiple stages	Transaction Cost Economics; The eclectic theory of international production (OLI)	Straegy; Operations
Gray et al. 2017	SMEs offshoring-reshoring decision	Causal Loop Diagram (CLD)	Not specific	Straegy; Operations; Performance

Based on Table 2-2, it can be seen, at the early stage, the location decision is following corporate strategy more, combining some criteria from the operational perspective, which is defined as a strategy based location decision. Later, from 2000-2010, the most location decision models transferred from strategy based to process based decision flows; AHP (Analytical Hierarchy Process) and ANP (Analytical Network Process) are the representative decision processes among them. The underpinning theories have also been identified to support location decisions such as transaction cost economics, internationalization, eclectic theory of internal production etc. (Brush, Martin and Karnani, 1999; Dou and Sarkis, 2010; Liu et al., 2008; Yang and Lee, 1997). The decision models research deeper into the operational factors, which may affect the location decision, and weight them for score calculations following the AHP or ANP process. Therefore, during this period, the key considered aspect is the operational perspective, but some models also considered the strategic view and go further to the supplier level. After 2010, some location decision models specific to reshoring have emerged. Even though most of them are still process based models, the process is not only limited to AHP and ANP, it is more dynamic and

considers more perspectives, such as performance, although this is supplier performance rather than company business performance. The latest one in 2017 has shown a 360-degree location decision model, which starts from strategy, considers operations and also pays attention to business performance. Although each decision model places different stresses on difference aspects, in summary it can be concluded that the key aspects that need to be considered during the location selection process are: business strategies, operational consideration, SC impact (suppliers) and performance (Abetti, 1989; Bellgran et al., 2013; Brush, Martin and Karnani, 1999; Dou and Sarkis, 2010; Gray et al., 2017; Joubioux and Vanpoucke, 2016; Liu et al., 2008; Sarder, Miller and Adnan, 2014; Venkatesan, 1992; Yang and Lee, 1997). In this research, the author refers to the 360-degree approach above (Gray et al. 2017), to develop the reshoring framework covering prior to the decision stage, which is strategic considerations; the decision conducting stage, which is operational considerations; after the conducting stage, which is impact on SC (focusing on suppliers); and performance, in order to capture all the key aspects of the reshoring phenomenon. Therefore, the overall structure of this reshoring framework is as shown in Figure 2-7.

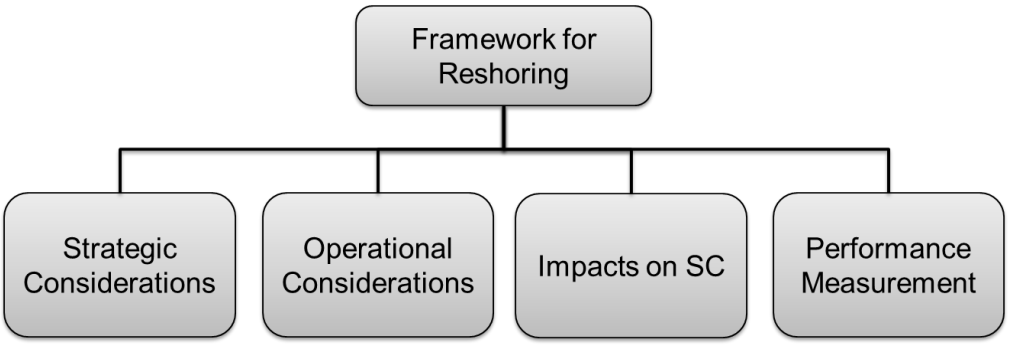


Figure 2-7 Structure of Reshoring Framework

Due to the operational perspective covering a wide range, the author has decided to divide operational considerations into several sub-aspects, i.e. “Why?, What?, Where? and How?” to capture the current reshoring status in the UK. According to the literature recommendation from Gray et al. (2013) “reshoring research lacks primary data; standard survey is difficult but required in the future research. We hope this assertion will, in turn, jumpstart an intellectual discourse, through

scientific research, into the what, how, when, where and why of the reshoring phenomenon." Therefore, the above structure has been further developed to following the updated version shown in Figure 2-8.

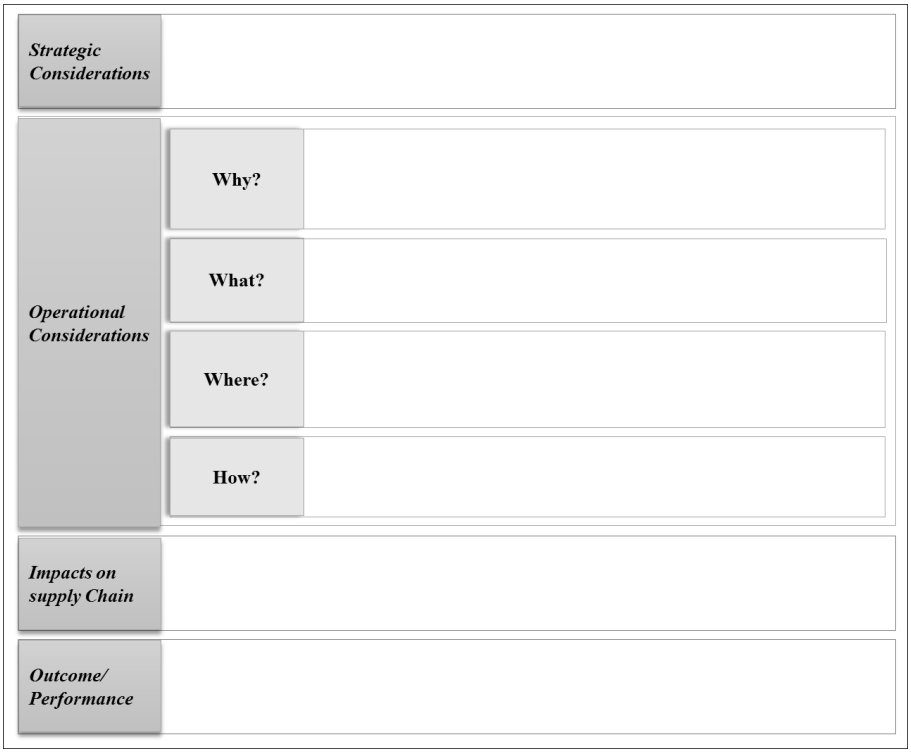


Figure 2-8 constructs of reshoring framework

As shown in the framework, the parameters under each sub-aspect have been developed from the literature. In this research, "why" refers to the competitive priorities regarding operations and the SC, rather than the drivers, which are going to be discussed in section 2.3.3.1.1.7, as drivers are not an accurate concept to show the company's actual conducting and implementation of the manufacturing practice. Also, previous research on drivers in the reshoring area is more than enough to clarify the picture for that section. Therefore, in this research it is looked at from a competitive priorities perspective, to see the actual emphasis companies place on each competitive element; The "what" refers to products, to discover what products have been reshored; The "where" refers to the proximity of reshoring, to explore where the reshoring has been conducted in order to be closer to which proximity; Finally, the "how" refers to the approach/method to conduct reshoring, to explore how the company implements

the movement when they decide to reshore. The detailed elements of each sub-aspect are going to be developed through the literature review, and are discussed in the following sections one by one.

2.3.2 Strategic Considerations

From a strategic considerations aspect, the most popular business strategy models have been applied as parameters in section 3.3.2.1 and the decision type information is given in section 3.3.2.4. These sections are going to discuss the applied business strategies and decision type in detail. Besides these, section 3.3.2.2 is going to introduce manufacturing strategy, and its relationship with business strategy is in section 3.3.2.3. Even though these have not been directly shown in the framework, they can help to achieve a better understanding of the relative aspects of reshoring, and act as a bridge to link with the computational considerations in the framework.

2.3.2.1 Business Strategy

Porter's Generic Strategy

As is known, Porter's generic strategy is one of the most used business strategies, which presents different typologies to describe a company's relative emphasis on generic competitive strategies (Hambrick, 1983; Miles and Snow, 1978; Porter, 1980, 1996).

		COMPETITIVE ADVANTAGE	
		Lower Cost	Differentiation
COMPETITIVE SCOPE	Broad Target	1.Cost Leadership	2.Differentiation
	Narrow Target	3A. Cost Focus	3B. Differentiation Focus

Figure 2-9 Generic Strategy

Source: Porter (1985)

As shown in Figure 2-9, the business strategy has been defined by Porter (1985) as either cost leadership, differentiation or focus. Porter (1985) claims that the basic strategy types are actual cost leadership and differentiation (Cleveland, Schroeder and Anderson, 1989). Cost leadership refers to a firm's aim to achieve competitive advantage (which means the firm's profitability is higher than the average level of the industry) within its industry by continually reducing the cost of production in other words, the firm sets itself up to always be the low-cost producer in its industry (Anderson, Cleveland and Schroeder, 1989; Kotha and Swamidass, 2000; Porter, 1985). This cost reduction can be achieved through multiple ways, including economies of scale, proprietary technology, preferential access to raw materials etc. A company with cost leadership as a business strategy means it always looks for and exploits all possible sources of cost advantage. It is supposed to have a better performance than the industrial average with a capability to produce at a cost that is lower than the industry average.

In contrast, differentiation strategy refers to a firm's aim to achieve competitive advantage within its industry through continually seeking to be unique along one or some specific dimensions which are widely and highly valued by customers; in other words, the firm sets itself up to always be the unique/niche product or service provider within its industry (Anderson, Cleveland and Schroeder, 1989; Kotha and Swamidass, 2000; Porter, 1985). This differentiation can be achieved through multiple ways, including R&D, segmentation, customization etc. The return on this uniqueness is a premium price with a higher profit margin. A company with differentiation as its business strategy means it always looks for and exploits all possible sources of uniqueness/distinction. It is supposed to have a better performance than the industrial average with the capability to obtain a higher price than the industry average without much attention given to the cost.

Porter also argues that these two basic strategies could be applied to board targets or focus markets, which refers to a narrow competitive scope or a segment within the industry. Therefore, there are four blocks within the matrix

shown above Figure 2-9 (Anderson, Cleveland and Schroeder, 1989; Porter, 1985).

Besides the focus market, later researchers further refined Porter's differentiation strategy into different dimensions, such as product, marketing, quality, service, and innovation differentiation strategies (Miller 1988; Mintzberg 1988; Kotha and Vadlamani 1995; Beal and Yasai-Ardekani 2000) and even later, due to the lean strategy, which argues that the trade-off between cost-leadership and differentiation (Porter 1996, p.67) could be achieved through a lean process.

In this research, the author decided to adopt the Porter's definition, as discussed above, for cost-leadership and differentiation strategies, since they are most common acceptable strategy dimensions in the OM literature and practices (Dess and Davis 1984; Nayyar 1993). Meanwhile, the author also accepts the companies to answer 50-50 for each strategy if they equally focus on both of them, to include all the possibilities of the company's strategy (Amoako-Gyampah and Acquaah 2008).

The measurements of cost leadership and differentiation have been adopted from Kotha and Swamidas (2000). The details are displayed in section 4.4.2.4.2.

2.3.2.2 Manufacturing Strategy

"Manufacturing strategy refers to the competencies that a firm develops around the operations function." (Amoako-Gyampah and Acquaah, 2008).

Manufacturing strategy, as a concept, was initially raised by Skinner (1969) in his work, which identifies the link between manufacturing strategy and business strategy, and claimed that people did not pay enough attention to the role of manufacturing strategy. Since then, the concept of manufacturing strategy has started to receive more and more attention and many research have been conducted on manufacturing strategy (Amoako-Gyampah and Acquaah, 2008).

Along the historical line, some empirical studies have been conducted to support the argument that manufacturing strategy can contribute to a company's competitive strength; in other words, to provide competitive advantages for

companies(Gupta and Somers, 1996; Swamidass and Newell, 1987; Ward and Duray, 2000; Williams et al., 1995).

Even more research have focused on the exploration and understanding of the content of manufacturing strategy (Dangayach and Deshmukh, 2001; Frohlich and Dixon, 2001; Leong, Snyder and Ward, 1990; Miller and Roth, 1994; Roth and Van Der Velde, 1991; Vickery, Droge and Markland, 1993; 1996; Ward, Leong and Boyer, 1994). Skinner (1974) discussed the key competitive criteria, as the content of manufacturing strategy, which are short delivery cycles, superior quality and reliability, dependable deliveries, fast new product developments, flexibility in volume changes and low cost. Then, Wheelwright (1978) revealed that efficiency, dependability, quality and flexibility are the most significant criteria. More discussion and enrichment followed from Hayes and Wheelwright (1984), Krajewski and Ritzman (1987), Leong et al. (1990), from which a comprehensive summary could be concluded that the key components of manufacturing strategy are cost, delivery, flexibility, and quality, which are named the competitive priorities (Amoako-Gyampah and Acquaah, 2008; Hayes and Wheelwright, 1984; Krajewski and Ritzman, 1987; Leong, Snyder and Ward, 1990; Safizadeh, Ritzman and Mallick, 2000).

Therefore, the content of manufacturing strategy is cost, delivery, flexibility and quality; then emphasis placed on these criteria forms competitive priorities. The manufacturing strategy is going to be implemented through the competitive priorities in practice and will deliver the final business competitive advantages for companies. More discussion regarding competitive priorities and their relationship with manufacturing strategy will be discussed in detail in section 2.3.3.1.1.6.

2.3.2.3 Link between Business Strategy and Manufacturing Strategy

It is generally agreed that modern manufacturing strategy was founded in the late 1960s when Skinner (1969) made the link between manufacturing and corporate strategy. In the years that followed, many scholars echoed and enriched this view. In 1985, Hill broke down corporate strategies to sub-level marketing strategies within his 5-Step model (Hill, 1985). In addition to Hill, along with the efforts of

Fine and Hax (1985), Hayes and Wheelwright (1984), and Anderson et al. (1989), Skinner's view was developed into a hierarchical model in which corporate strategy drives the business unit strategies. This in turn drives the strategies of manufacturing and other functional areas' strategies. Although the dominant view of the strategy process is top-down, Hayes (1985) cautions that functional capabilities should, in an uncertain and unstable environment, drive corporate strategy.

Therefore, Anderson et al. (1989) concludes clearly that manufacturing strategy is expected to be one of the parts of the business strategy or strongly integrated within a company's business strategy. This view has been further approved by the work of Adam and Swamidass (1989), Roth et al. (1989) and De Meyer et al. (1989), with arguments on competitive priorities that a company's manufacturing strategy should support that are in accordance with the overall business strategy. Further, this view has also been detailed by Amoako-Gyampah and Acquaah (2008) as being that the business strategy is actually implemented by manufacturing strategy as an approach, which means "business strategy adds details to manufacturing strategy".

Finally, Leong et al. (1990) made an amalgam of the views represented by the above authors in his predominant process model (PPM), claiming that corporate strategy, business unit strategies and manufacturing strategies constitute the hierarchical layers from top to bottom of the entire business strategy and that they are linked and affect each other. However, due to the strategy being an abstract concept, the competitive priorities discussed above are used as the representational display of corresponding strategies (Amoako-Gyampah and Acquaah, 2008; Hill, 1985; Leong, Snyder and Ward, 1990; Safizadeh, Ritzman and Mallick, 2000). And further research clearly revealed all other competitive priorities work together to have a direct effect on business performance (Amoako-Gyampah and Acquaah, 2008; Kroes and Ghosh, 2010).

The argument from Leong et al. (1990) has also been tested empirically in the work of Deane et al. (1991) and Williams et al. (1995), to reveal a strong relationship between each dimension of Porter's generic strategy and

manufacturing strategy separately. Further, the literature (e.g., (Amoako-Gyampah and Acquaah, 2008; Gupta and Somers, 1996; Kim and Arnold, 1993; Vickery, Droge and Markland, 1993; Ward and Duray, 2000; Ward et al., 1998; Williams et al., 1995; Yen and Sheu, 2004) claims that business strategy influences manufacturing strategy. But the work from Amoako-Gyampah and Acquaah (2008) also reveals that business strategy will not directly affect business performance, must through the pass of manufacturing strategy, namely Competitive Priorities.

Therefore, in summary, it has been widely accepted that business strategy could affect manufacturing strategy, and their alignment should be built up in a firm in order to achieve greater benefits (Kroes and Ghosh, 2010).

2.3.2.4 Decision Type

Besides capturing the business strategy status to the participant sample companies, the author also design to capture how the reshoring decision has been made, which has also been viewed as part of the strategy due to strategic importance of this decision. Based on the literature, some companies decide reshoring due to their strategy or operations, but some of them decide to reshore based pressure and request from customers. Therefore, the author has divided that decision of reshoring into two types, which are internal decision made within the business or a decision forced by customers/ suppliers.

Therefore, after discussion, the business strategy section will be developed as shown in Figure 2-10.

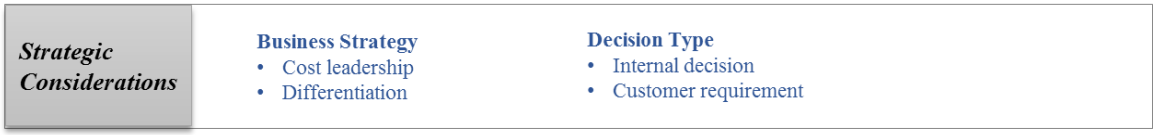


Figure 2-10 Strategic Consideration

2.3.3 Operational Considerations

This section is going to develop the criteria for the four aspects of operations consideration. Section 2.3.3.1 is going to produce the criteria for the “why”

perspective in the operation, which is actually the competitive priorities that the company implemented. Section 2.3.3.2 is going to produce the criteria for the "what" perspective in the operation, which refers to what products have been reshored. Section 2.3.3.3 is going to produce the criteria for the "where" perspective in the operation, which refers to the proximity that reshoring aims to be close to. Section 2.3.3.4 is going to produce the criteria for the "how" perspective in the operation, which refers to the governance methods that are applied during the implementation of reshoring.

2.3.3.1 Why? - Competitive Priority

This section will have a very detailed discussion regarding competitive priorities from multiple perspectives in session 2.3.3.1.1, to build up the foundation for both the framework for reshoring as well as the theoretical model in the next chapter. Then the criteria applied in this study within the reshoring framework will be developed in 2.3.3.1.2 for the internal competitive priorities, 2.3.3.1.3 external incentives and 2.3.3.1.4 risk mitigation. Finally, the link between competitive priorities and manufacturing strategy will be identified, and the difference between competitive priorities and drivers of reshoring (which is common to see in the extant reshoring literature) will be discussed.

2.3.3.1.1 Competitive Priority (CP)

2.3.3.1.1.1 Development and Definition of CPs

Identifying the competitive priorities of manufacturers' has been considered for a long time as a key element within manufacturing strategy research (Ward et al. 1998). The concept of competitive priorities has been given attention since Skinner's (1969) milestone contribution to the missing link between corporate strategy and manufacturing strategy, which brought to people's attention the role of manufacturing strategy. Since Skinner's (1969) early writing in the field, a common thread in operations strategy research has been manufacturers' need to choose among and achieve one or more key capabilities. Later, Skinner (1974) further discussed the "common competitive performance criteria" for manufacturing strategy, including "short delivery cycles, superior quality and reliability, dependable deliveries, fast new product developments, flexibility in

volume changes and low cost". However, Skinner did not clearly define the concept of competitive priorities in this research. In 1978, Hayes and Schmenner first explicitly use the words "competitive priorities". They use the term "competitive priorities" to describe the "capabilities" mentioned in Skinner's work, by further identifying efficiency, dependability, quality and flexibility as the most important general criteria for evaluating manufacturing strategy (Hayes and Schmenner, 1978). This concept and its dimensions have been further agreed and followed by Hayes and Wheelwright (1984), Wheelwright (1984), Roth and van der Velde (1991), and (Ward et al. 1998). But Hayes and Wheelwright (1984) delineated four basic competitive priorities: cost, quality, dependability and flexibility.

Later, the research from Krajewski and Ritzman (1987) further claimed that a firm may possess core capabilities and competencies to assist in determining which priorities a firm decides to focus on. When this determination has been made up of competitive priorities, a firm will further make decisions on the volume of time and resources that are going to be invested in the different areas of its operations across the competitive priority dimensions (Boyer and Lewis, 2002).

However, in some literature, the concept of competitive priorities and competitive capabilities are often used inconsistently and misunderstood across studies. Therefore, many authors have commented on the lack of clarity of existing definitions (Dean Jr and Snell, 1996; Noble, 1995; Peng, Schroeder and Shah, 2008; Swamidass and Newell, 1987).

Safizadeh et al. (2000) clearly distinguish between the competitive/ manufacturing capability and competitive priority, and clearly define these two concepts as follows: "Manufacturing capabilities are essential elements of manufacturing strategy. By "manufacturing capabilities," we mean a production system's ability to compete on basic dimensions such as quality, cost, flexibility, and time. We reserve the term "competitive priorities" to mean the importance attached to these same dimensions. Thus, capabilities deal with performance, while priorities deal with importance." Therefore, it can be seen that the dimensions of both are the same, and they can both be regarded as the content

of manufacturing strategy, just with different directions: one is focused on whether to have the capability of each element, and the other one on the importance of the elements.

This definition from Safizadeh et al. (2000) has been accepted and confirmed by Boyer and Lewis (2002): “Competitive priorities are a key decision variable for operations managers and researchers. Competitive priorities denote a strategic emphasis on developing certain manufacturing capabilities that may enhance a plant’s position in the marketplace.”, and also by later researchers’ work (Amoako-Gyampah and Acquaah, 2008; Hsu et al., 2009; Kroes and Ghosh, 2010; Peng, Schroeder and Shah, 2011).

Boyer and Lewis has agreed with Swink and Way’s (1995) finding, which justified that competitive priorities have become an increasingly important factor in empirical studies within OM research and this trend has become more popular after the clear definition provided by Safizadeh et al. (2000) and Boyer and Lewis (2002).

This research follows the core of the definition of competitive priorities from Safizadeh et al. (2000) and Boyer and Lewis (2002) and considers the modification from the latest research, such as from Hsu et al. (2009), by claiming that:

“Competitive priorities refer to the importance attached by a company to its manufacturing capabilities to be a success in the marketplace.”

2.3.3.1.1.2 Common Competitive Priorities

Even though there are some tiny semantic differences existing, a broad agreement claims that the common manufacturing competitive priorities consist of at least four basic components: low cost, quality, delivery time, and flexibility (Amoako-Gyampah and Acquaah, 2008; Fine and Hax, 1985; Wheelwright, 1984).

The development process of coming to this agreement is discussed below. Initially, it was Skinner (1974) who classified the common competitive

performance criteria for manufacturing strategy to include short delivery cycles, superior quality and reliability, dependable deliveries, fast new product developments, flexibility in volume changes and low cost. Then, based on Skinner's idea, Wheelwright (1978) modified and updated it to efficiency, dependability, quality and flexibility being the most significant general evaluation criteria for manufacturing strategy. Later, Hayes and Wheelwright (1984) further delineated and formally revealed four basic competitive priorities: cost, quality, dependability and flexibility. In 1987, Krajewski and Ritzman further identified five dimensions of competitive priorities: cost, high performance design, consistent quality, on-time delivery, and product and volume flexibility (Krajewski and Ritzman, 1987).

Later Leong et al. (1990) enriched the list of competitive priorities by introducing another component: innovativeness, which has been mentioned frequently in some conceptual studies, but has not been operational as a competitive priority in empirical literature (Boyer and Lewis, 2002; Schmenner and Swink, 1998; Ward et al., 1998). Therefore, innovativeness has not been taken into account as one of the common and basic competitive priorities.

Later research on either empirical or theory building within manufacturing strategy and operation management continues and has built up the four basic/traditionally accepted components/dimensions of competitive priorities, i.e. cost, delivery, flexibility, and quality (Amoako-Gyampah and Acquaah, 2008; Boyer and Lewis, 2002; Chi, Kilduff and Gargeya, 2009; Ferdows and De Meyer, 1990; Kathuria, 2000; Kathuria, Partovi and Greenhaus, 2010; Kroes and Ghosh, 2010; Peng, Schroeder and Shah, 2011; Safizadeh, Ritzman and Mallick, 2000; Santos, 2000; Schmenner and Swink, 1998; Vickery, 1991; Vickery, Droge and Markland, 1993; Ward et al., 1998; Watts, Kim and Hahn, 1995).

In detail, by referring to the work of Santos (2000) and Ward et al. (1998), the definitions of each competitive priorities component in this research are given below:

Cost refers to manufacturing cost, such as direct production costs, productivity, capacity utilization and inventory cost, which means seeking a lower manufacturing cost; Quality refers to offering accurate production, providing conformance, good design and reliable quality products and services to the customers; Delivery refers to the accomplishment of delivery tasks by reducing production lead time, increasing speed and meeting reliable delivery deadlines; Flexibility is mainly related to the innovation of products and services, the product mix and the production volume; seven measurements have been captured but it can be concluded that they are following the first four streams. Gerwin (1993) developed dimensions of flexibility: product mix, volume, changeover, and modification. The other three flexibility dimensions (rerouting, material, and sequencing) from Gerwin are not adopted as they are outside the scope of this research effort.

2.3.3.1.1.3 Measurements of Competitive Priorities

As discussed above, even though there is wide agreement that the common competitive priorities consist of four areas: cost, quality, delivery and flexibility since the end of the 20th century, the building up of the relevant measurements still lacked development at that time.

It is known that measurements are the foundation of primary empirical research. Without well-developed validated measurements of the four constructs of competitive priorities, the theory development in operations management has also been hampered (Cleveland et al. 1989; Ferdows & De Meyer 1990; Vickery, Droge & Markland 1993; Kroes and Ghosh 2010). Therefore, since 1993, Vickery et al. (1993) and Vickery, Droge et al. (1994) established a good start on addressing the measurement issues. However, until Ward et al.'s research work was published in 1998, there are no well-accepted reliable and validated measurements existing that can be used to represent and measure the common four competitive priorities (Ward et al., 1998).

Based on the foundation build up by Ward et al. (1998) regarding the measurements for the traditional common competitive priorities, more empirical research in the OM field could be conducted. Meanwhile, with the development

of the environment, the competitive priorities, and the measurements for competitive priorities, have also been developed, enriched and updated, but the four traditional dimensions as basic typical dimensions remain unchanged (Kroes and Ghosh, 2010).

2.3.3.1.1.4 Relationship among Competitive priorities

After determining its competitive priorities, a company will issue the amount of time and resources accordingly to invest in the different areas of its operations across these five competitive priority dimensions (Boyer and Lewis, 2002). This decision may result in a trade-off state where a firm ideally issues more resources to the activities related to its competitive priorities and fewer resources to non-priority activities (Boyer and Lewis, 2002; Kathuria, 2000; Kroes and Ghosh, 2010).

Therefore, the debate regarding the relationship between competitive priorities emerged. This debate has three different voices: the trade-off, cumulative, and integrative models. The trade-off option of competitive priorities is that established by Skinner (1969), which argues that companies must make decisions on which competitive priorities should receive the greatest investment of time and resources – in other words distinguish the priority ranking among competitive priorities. This results in managers of a company having to choose a manufacturing priority, then allocate their scarce resources accordingly (Hayes and Wheelwright 1984; Garvin 1993).

In contrast, some people support the cumulative model of the competitive priorities which claims that trade-offs are irrelevant and do not exist, especially in an intensely competitive environment and with the opportunities to adopt advanced manufacturing technologies (Corbett, van Wassenhove and Wassenhove, 1993; Noble, 1995). Boyer and Lewis (2002) argue that “competitive priorities are considered complementary, rather than mutually exclusive, as an existing capability (e.g., quality) may aid development of other capabilities (e.g., flexibility).” This view can be justified by the examples of “World Class Manufacturers” who are excelling with multiple dimensions of competitive priorities.

The integrative model tries to reconcile and balance differences between trade-off and cumulative perspectives. Advocates maintain that “these models address varied facets of operations strategy, allowing theorists to link their disparate insights” (Boyer and Lewis, 2002)

However, this research does not focus the trade-off or cumulative perspectives as they may both exist. The main effect hypotheses have no business with the above arguments since the regression will look at the impact of one CP on the business performance independently by controlling the other CPs. Therefore, in this research, the focus is on the reality of which CPs are the key to improve BP, when a company chooses a shoring decision, rather than the relationship within the CPs.

2.3.3.1.1.5 Links between Competitive Priorities and Manufacturing Strategy

“Manufacturing strategy refers to the competencies that a firm develops around the operations function.” (Amoako-Gyampah and Acquaah, 2008)

As is known, manufacturing strategy is a visual concept. This is why researchers, as discussed above, have spent time looking at the 20th century to develop it to be visually expressed.

The development process of coming to this decision is discussed below. Initially, it was Skinner (1974) who classified the common competitive performance criteria for manufacturing strategy to include short delivery cycles, superior quality and reliability, dependable deliveries, fast new product developments, flexibility in volume changes and low cost. Then, based on Skinner’s idea, Wheelwright (1978) modified and updated it to efficiency, dependability, quality and flexibility being the most significant general evaluation criteria for manufacturing strategy. Later, Hayes and Wheelwright (1984) further delineated and formally revealed four basic competitive priorities: cost, quality, dependability and flexibility as the key components of manufacturing strategy. In 1987, Krajewski and Ritzman further identified five dimensions of competitive priorities: cost, high performance design, consistent quality, on-time delivery, and product and volume flexibility.

In fact, together with the development of competitive priorities, even though the components may vary, the finally purpose is to use competitive priorities to describe the invisible and abstract manufacturing strategy, as the approaches to competitive strategies (Hayes and Wheelwright, 1984; Pires, 1995; Slack et al., 1995). In other words, within manufacturing firms, the manufacturing strategy is translated into competitive priorities and executed or operationalized through operational action plans (Hayes and Schmenner, 1978; Santos, 2000).

Therefore, in summary, it can be seen that manufacturing strategy is an invisible concept, and CP is its visual representation, as the true and practical content of the overarching concept of manufacturing strategy. Therefore, CP can be interpreted as the content or representation of a company's manufacturing strategy (Amoako-Gyampah and Acquaah, 2008; Oltra and Flor, 2010).

2.3.3.1.1.6 Differences between Drivers and Competitive Priorities

As discussed in Chapter 1, there are a lot extant literature research focusing on the drivers or motivations of reshoring. However, this study adopts and focuses on the concept "competitive priorities". It is necessary to clearly establish that drivers/motivations are not the same as competitive priorities. They are entirely different concepts, even though they share similar component dimensions and measurements. But they have fundamental differences in nature.

Within the extant literature, there is no clear definition to explain what is a "driver" or "motivation". Based on the meaning of the words, they can be understood as the reasons for companies' decision on reshoring. Therefore, drivers/motivations are more closely linked to location decisions. They are the factors that companies consider prior to making a decision, and the factors companies believe they should work on and can achieve through reshoring action. In other words, drivers/motivations exist in the prior decision stage. However, obviously, these factors are not all significant to companies' operations. The company may not currently conduct these factors in its operations, in other words, translate their beliefs into implementation.

However, competitive priorities have a clear definition, which refers to the importance attached by a company to its manufacturing capabilities. Therefore, competitive priorities are the factors that companies currently conduct and operate. They are more linked to actual operations than a belief in, which belongs to the post decision stage. Companies' priorities may or may not be linked to the location decision but they clearly represent the current business and manufacturing operation status; therefore, they will affect the final business performance.

Based on the discussion of motivations and competitive priorities, it can be seen that they have some overlap, which means that the most significant and implemented drivers could be competitive priorities. In other words, people could predict some drivers based on the competitive priorities if the priorities closely result in the location movement. In summary, competitive priorities are more related to operational practice and affect business performance more than drivers.

In this research, the focus is on competitive priorities for the following two key reasons. First, this research is more focused on operational practice for reshoring. It aims to determine the best match between operational practice and the shoring decision since the business performance is decided by the manufacturing practice rather than what they believe in what to do. Drivers include too many factors in a wide area and many of them are not significant enough for the actual operations. It makes more sense to research on something which is actually being implemented than on something still in the idea stage. Another reason is because the extant research has contributed much to the drivers/motivations side, which is even different to go further since 2016. However, there are few research on the operational practice side of reshoring.

As stated in section 2.3.3.1.1.2, the common traditionally accepted dimensions of competitive priorities are cost, quality, delivery and flexibility. These dimensions are all the companies' internal operational dimensions. This research inherits these dimensions, but also enriches them by expanding into external competitive priorities, such as risk and external incentives. The competitive

priorities adopted in this research will be discussed and are shown in the next three sections: 2.3.3.1.2 for internal competitive priorities, 2.3.3.1.3 for external incentives and 2.3.3.1.4 for risk mitigation.

2.3.3.1.2 Internal Competitive Priorities

As discussed above, the common competitive priorities are actually the company's internal competitive priorities. Therefore, this study inherits them as the internal competitive priorities within the reshoring framework.

However, following Ward et al. (1998), a further explanation of the cost is that "Manufacturing cost-related categories include (direct) production costs, productivity, capacity utilization, and inventory reduction. Individual survey items measure the importance that respondents place on each of these cost categories". It can be seen that the traditional cost competitive priority actually refers to the manufacturing cost. However, with the development of people's understanding of cost, the SC cost has been realized, which includes transportation cost, management cost, risk cost, exchange rate cost, etc. Starting from 2010, the concept has been named the total landed cost (TLC) as well as total cost of ownership (TCO) and has gained industrial specialists' attention and become popular to adopt to measure the company's holistic cost (Ellram et al. 2013). There is no specific calculation method available for TLC and TCO until now, neither is there a clear agreement on what they consist of. However, generally, they are used to address the importance of the role of SC cost in daily operation.

Therefore, in this study, the researcher has enriched the key competitive priorities by add a fifth element which is SC cost, considering the reality that management cost has attracted a considerable focus from companies These five dimensions (manufacturing cost, SC cost, quality, time, flexibility) have been taken as the key research objects of the internal competitive priorities regarding the operational perspective in this research. Also, they will be the independent variables (IVs) within the theoretical model in the next chapter.

2.3.3.1.3 External incentives

In addition, it should be kept in mind that the other research aim of this study is to clarify the current reshoring status in the UK. Therefore, in order to capture a full image, in addition to the internal operational competitive priorities above, the research has involved some other competitive priorities related to shoring decision making within the conceptual framework only, to guide the data collection of descriptive results. The other individual competitive priorities can be categorized into two streams: one is the external incentives in this section, the other is risk in section 2.3.3.1.4.

Sarder et al. (2014) claim that tax implications, incentives/subsidies etc. could motivate companies to reshore back to the US, by using the example of Michigan State which provided more than $60 million in incentives to GE over 12 years. Not only for reshoring decisions, government tax incentives have always been a factor that needs to be considered during the plant location decisions. Dou and Sarkis (2010) use “tax structure; government incentive; and repatriation allowances” as the factors in its facility location decision model and Brush et al. (1999) consider “access to protected markets’ tax conditions; regional trade barriers; government subsidies; exchange rate risk”. How much emphasis a company puts on government incentives will determine whether they will consider it to be a factor in location decisions. Therefore, the author also includes as an individual competitive priority “take governmental incentives (taxes, duties and subsidies etc.)” as external incentives within the framework.

2.3.3.1.4 Risk Mitigation

In order to make a shoring decision, it is necessary to understand well what the current strategic and operational reality of the company itself is. Risk is a key aspect that needs to be considered, which is agreed by Dou and Sarkis (2009) in their location decision model. They use the criteria “foreign exchange; government intervention; political risk; economic risk; legal risk; natural disaster risk” (Dou and Sarkis, 2009). This research also considers the risk competitive priorities, which include the most typical ones, i.e. cultural distance, political risks, and IP risks. In the survey, the criteria used are “Reduce cultural and institutional

distances", "Avoid political (e.g. government control over the industry), natural and economic issues", and "Reduce intellectual property (IP) risks".

Therefore, regarding the why section, the framework has been built up as shown in Figure 2-11:

Why?	Internal Competitive Priorities	External Incentives	Risk Mitigation
	• Manufacturing Cost • SC Cost • Quality • Time • Flexibility	• Governmental subsidies (e.g. taxes, duties or subsidies etc.)	• Cultural distance • Political risk • IP risk • SC risk

Figure 2-11 Operational Considerations – Why

2.3.3.2 What? – Products

Based on the literature, very few research focuses on what has been reshored regarding products. Therefore, this research is going explore, through a very detailed study, exactly what type of product has been reshored; each type of product has been looked at through what method has been used, and the volume changes. Therefore, this section is going to develop the criteria to capture the products that are involved in reshoring. The criteria have been designed to identify from four perspectives, including the product type in 2.3.3.2.1, product heritage in 2.3.3.2.2, remanufacturing products in 2.3.3.2.3 and finally the production volume changes are considered in section 2.3.3.2.4.

2.3.3.2.1 Product Type

As claimed above, the extant reshoring research has rarely discovered what products have been reshored. Only Martinez-Mora and Merino (2014) tried to link product type to shoring decisions, as exploration. However, the product type they defined is simply based on the complexity and labour skills requirements into low, mid and high ranges of product, which is overall too broad for this study.

Therefore, in this research, the author has categorized the type of products based on the traditional manufacturing and assembly definition. The products have been classified into three types: finished good, subassembly and component.

2.3.3.2.2 Product Heritage

Similarly, to product type, the previous literature has no discussion on product heritage. Therefore, this study, in order to further understand the reshored products, has classified the product into three heritage types: original/existing product, updated or new variant and new product. In the survey, the research has not only collected data purely regarding the different types of heritage, it also combines them with the product types above, to investigate for each product, what the heritage situation is behind it.

2.3.3.2.3 Remanufacturing

Remanufacturing refers to the process of rebuilding of a product to the specifications of the original product. Therefore, there is no a specific product specifically matched with remanufacturing; any product could be remanufactured based on its needs. Therefore, within the remanufacturing section, the research has been designed to include the product types of finished good, subassembly and component from section 2.3.3.2.1 as sub-groups of the remanufactured products.

2.3.3.2.4 Volume Considerations

In terms of production output volume, only the work from Cohen et a. (2017) starts to try and look at the production volume increase or decrease. Therefore, the researcher has decided to capture the UK production volume changes due to the implementation of reshoring. The definition of reshoring is either directly or indirectly moving manufacturing activities back to the home country, which is the UK. Therefore, the production volume will either increase or remain the same. The design has further included the range of the increase level to marginal level (up to 5% increase), modest level (increase between 5-10%) and significant level (10+% increase).

In summary, the criteria for product perspectives under the operational consideration are shown in Figure 2-12.

What?	Product Type • Finished good • Sub-assembly • Component	Product Heritage • Original/Existing • Update or new variant • New product	• Remanufacturing • Product Volume

Figure 2-12 Operational Considerations - What

2.3.3.3 Where? – Proximity

The next perspective within in the operational consideration is where, referring to where the reshoring decision proximity is. Yang and Lee (1997) claimed that companies changing location could be due to the proximity to services; Brush et al. (1999) further claimed companies' consideration of proximity included upstream (proximity to key suppliers and proximity to other facilities) and downstream of SC (e.g. proximity to important markets; proximity to key customers). Dou and Sarkis (2009) explore the proximity to production material sources, to natural markets, to national markets, and to large cities, and Sarder et al. (2014) favour the consideration of proximity to customers. Therefore, it can be seen the design of proximity elements depends on the research context. Therefore, in this research, based on the reshoring definition and literature review, the proximity has been designed to include the following four options: R&D, head office, registration country and main market, which are shown in Figure 2-13.

Where?	Proximity • R&D Centre • Head office • Registration country • Main market

Figure 2-13 Operational Considerations – Where

2.3.3.4 How? – Governance

Location decisions often are conflated with governance decisions (Tsay, 2014), therefore, refer to how the company has conducted reshoring, through what method or approach.

Gray et al. (2017) further claimed that "governance considers the level of administrative control of the operation that can range from complete (in-house,

hierarchical governance) to intermediate (close partnerships with suppliers, hybrid governance), to essentially no control (arms-length, market governance)". In this research, the author adopts the three dimensions of governance and defines the elements as conducted by the company itself, a joint venture involving the focal company, through an existing strategic supplier (outsourcing) or through a new supplier (outsourcing). The details are shown in Figure 2-14.

How?	**Governance** • Our company • An existing strategic supplier • A joint venture • A new supplier

Figure 2-14 Operational Considerations – How

2.3.4 Impact on Supply Chain

In terms of the impact of reshoring, a number of research have been done on how to select suitable suppliers when conducting reshoring, and how the reshoring could affect the SC network configuration and footprint dynamics. However, the quantitative changes in the number of suppliers will be explored in this research.

Therefore, from the SC impact perspective, the amount of supplier information has been captured by asking suppliers about increased, decreased and no change impacts, as shown in Figure 2-15.

Impacts on Supply Chain	**Local Supply Base** • Local supply base increased • Local supply base decreased • No change

Figure 2-15 Impacts on Supply Chain

2.3.5 Business Performance

According to Cleveland et al. (1989), performance includes business performance and manufacturing/operation performance, both of which are employed in this research. There are several discussions in the reshoring literature that focus on how reshoring could affect performance, but the majority of the papers discuss operational performance (Johansson and Olhager, 2016).

Only Albertoni et al. (2017) and Johansson and Olhager (2016), start to pay attention to business performance, even though the former focus on marketing performance and the latter only mention one business measurement – “profitability”. However, the main core purpose of changing location is finally to increase business benefits. Therefore, this research is looks at business performance and manufacturing performance through an empirical exploration. The following sections will discuss them in more detail.

Business performance, also known as firm performance or financial performance, is used to describe the financial outcome of an organization. It refers to how well a firm achieves its financial goals compared with the firm’s primary competitors (Barua et al., 2004; Li et al., 2006; Morash, Droge and Vickery, 1996; Tan et al., 1999; Yamin, Gunasekaran and Mavondo, 1999).

In OM, there are many variables that can affect a business unit's performance; however, the research is going to focus on how competitive priorities and shoring decisions could make a measurable impact on the performance of a business. The variations in performance due to variables not included in the proposed model are accounted for by the disturbance term (Swamidass and Newell, 1987).

Even though the proposed relationship could be supported clearly by the literature, the measurement of performance in empirical studies is always a problematic issue; it is difficult to obtain the objective financial measures of performance (Bourgeois, 1980). The difficulty has been described by Bourgeois (1980) as “the adoption of any particular set of indicators embroils the researcher in the quagmire of problems of quantification and dimensionality, not to mention the issue of validly choosing the set of indicators which meets universal acceptance” (p.235).

However, even though there are difficulties, researchers have overcome them and gradually developed suitable measurements for business performance. Venkatraman (1990) initially explored the measures of business performance including return on assets (ROA), operating income, cost per sales, and sales per number of employees, which is a good start. Jahera and Lloyd (1992) proposed

another measure of return on investment (ROI) as a valid instrument for business performance, especially for midsized companies. Later, Morash et al. (1996) made a significant contribution by developing more professional financial metrics of ROA, ROI, return on sales (ROS), ROI growth, ROS growth, and sales growth, and also raised the importance of measuring a company's performance relative to its industrial competitors. Morash et al.'s (1996) view has been advocated by Tan et al. (1999) through capturing a firm's performance in comparison to that of a major competitor in their work and enriched it to link certain SCM practices within firms.

Although the measurements have been developed, the data collection of these measurements is another issue for researchers. As is known, there are two methods that can be employed to collect data. One is to collect the objective real value data of the performance and the other one is to collect the data based on managers' perceptions of the measurements by comparing them with competitors.

Since 1987, Swamidass and Newell have already identified that access to accurate financial and other performance data often pose real challenges to the empiricist. Therefore, although objective performance measures are preferable to perceived measures of performance, the latter have been used and recommended as a substitute when objective measures are unavailable (Dess and Robinson JR, 1984; Venkatraman and Ramanujam, 1987). Some research argue that the adoption of perceptual data could lead to the common methods variance (CMV) problem, which was tested using the Harman 1967 one-factor test. The same test has been used in similar studies in the Operations Management literature (e.g., (Bozarth and Edwards, 1997). They claimed that if the measures were to be affected by CMV, then they would tend to load on a single factor. Fortunately, later research have justified that CMV risks could be migrated through the demonstrated statistically significant correlations between perceptual and corresponding objective measures of performance (Dess and Robinson JR, 1984; Vickery, Dröge and Markland, 1997; 1998; Ward, Leong and Boyer, 1994), and finally indicate the reliability of perceptual ratings of

performance can be accepted (Rosenzweig, Roth and Dean, 2003). Therefore, it can be concluded that the adoption of perceptual measures will not cause big issues for this research.

The appropriateness of the performance measure adopted may vary and depend on the unique circumstances of a study. In this study, the most common measurements of business performance are adopted based on the above previous research. Based on the measurement development above and also considering Dess and Beard's (1984) comment that "Growth" is one commonly used measurement of business performance, in this study, growth concepts have been adopted through three major dimensions of performance: growth in return on sales (ROS growth), growth in return on investment (ROI growth) and growth in market sharing (Dess and Robinson JR, 1984; Swamidass and Newell, 1987; Venkatraman and Ramanujam, 1987; Youndt et al., 1996). Besides the growth factors, typical financial metrics are also adopted, such as market share, ROI, ROS, ROA (Droge et al., 1994). In addition, Rosenzweig et al. (2003) claimed that customer satisfaction, which serves to capture the customer perspective, could also involve the evaluation of business performance. Therefore, the final measurement in this research is "customer satisfaction".

The above eight measurements have been designed to be collected through a perceptual approach, compared to the business industry competitors. They were assessed using a seven-point Likert scale with "worst in industry" (=1) and "best in industry" (=7). These subjective ratings attempted to capture realized positional advantage (Droge and Vickery 1994). In detail, participants have been requested to indicate their company's current performance relative to their competitors for each of the measurements. The instrument and references used to acquire perceptual performance data are summarised in Chapter 4, the research design chapter. Figure 2-16 shows details of the performance perspective in the framework.

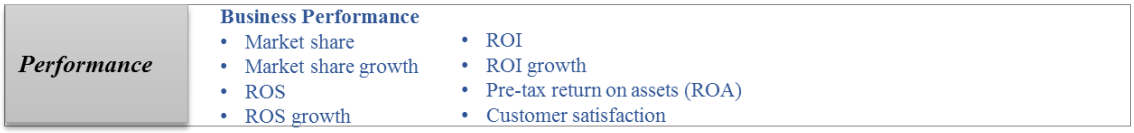


Figure 2-16 Business Performance

2.3.6 Framework for Reshoring

To sum up the discussion above, a complete framework for reshoring has therefore been developed, as shown in Figure 2-17. When capturing the reshoring status, it needed to include all the key metrics below following a loop/360-degree approach covering strategic, operational, SC impact and performance outcomes perspectives.

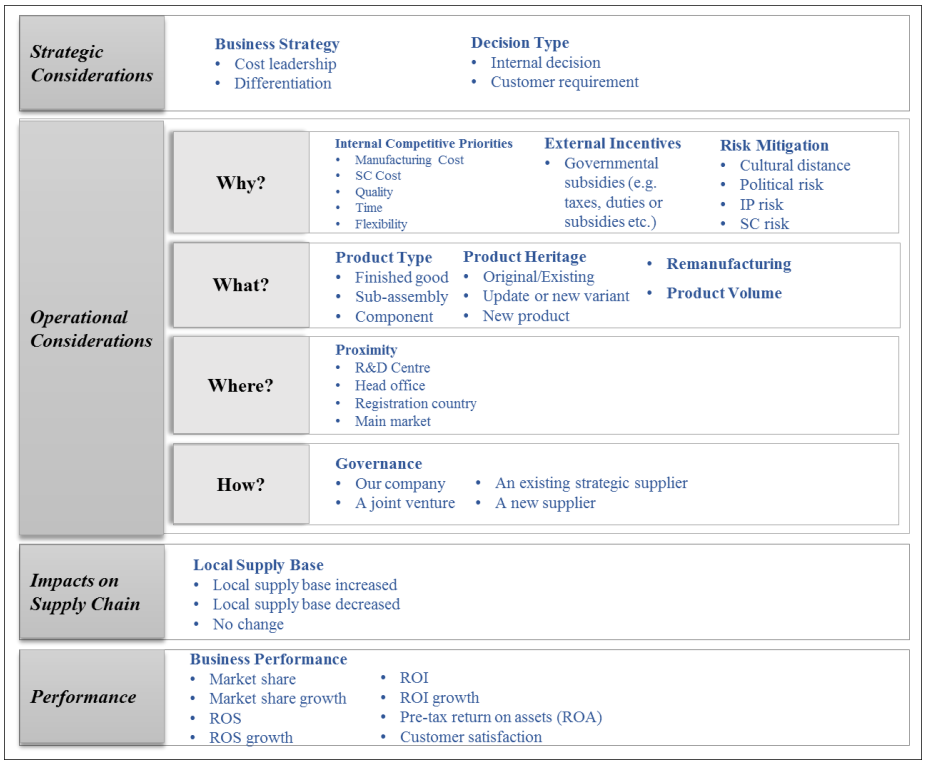


Figure 2-17 Framework for Reshoring

2.4 Chapter Summary

In summary, this chapter has developed a framework for reshoring following the loop/360-degree approach considering strategic, operational, impact and performance perspectives and has identified the detailed instruments under each dimension, through a deep analysis and synthesis of the literature covering

location decision strategy, business strategy, manufacturing strategy, competitive priorities, operational practices, and business performance. This framework fills the blank in the reshoring literature regarding decision model. It also provides a guide to collecting data for exploring the current manufacturing reshoring status in the UK. This chapter has also displayed a detailed discussion on competitive priorities and business performance, which are the key focuses of this research, and will be employed in the theoretical model derived in the next chapter.

3 Theoretical Model and Hypothesis

3.1 Chapter Introduction

Fundamentally, both reshoring and offshoring are two types of location/shoring decisions. It does not make sense to purely look at research without thinking about other location options. Therefore, the research, besides exploring the current UK manufacturing reshoring status, also moves to a further depth, to explore the correlations among shoring decisions, competitive priorities and business performance. A moderation theoretical model has been built up to show the correlations among these variables. In detail, section 3.2 starts discussion of the theories which may related to the model; Section 3.3 focuses on the correlation purely between competitive priorities and business performance as the main effect; Section 3.4 is the theoretical justification of moderations relationship. Then, it comes to section 3.5 for a display of completed moderation model and associated hypotheses. Section 3.6 is a short summary of this chapter.

3.2 Underpinning Theories

The most active theories in operation management, and also mentioned by location strategy, could include Economies of Scale, Transaction cost economics (TCE), Resource based theory (RBT) and knowledge-based view (KBV) of the firm (Ellram, Tate and Petersen, 2013; Kroes and Ghosh, 2010).

As it is known, Economies of Scale refers businesses could achieve lower cost through the mass production. It is more suitable to low skilled requested, but high-volume products e.g. the consuming products. Therefore, it has been widely used to support offshoring decision to Far East countries (Ellram, 2013). Transaction cost economics (TCE) means that firms could minimize transaction costs by employing the governance structures (Williamson, 1975, 1985). Linked to the location/shoring decisions, TCE is more associated with outsourcing, which can predict that firms will make an outsourcing decision when outsourcing results in a reduction in firm size that leads to an overall reduction in the required transaction costs (Holcomb and Hitt, 2007; Schniederjans, M.J. Schniederjans,

A.M. Schniederjans, 2005). The resource-based view is usually applied by companies for unique firm resources, such as capital assets, specific capabilities, or processes, to enable a firm a well executive of their strategies and thus assist to better efficiency (Barney, 1991). However, this theory is more associated with resources balance, which may not directly linked with shoring decision (Holcomb and Hitt, 2007). The knowledge-based view posits that a core capability is a knowledge set that distinguishes one group from another and provides a competitive advantage (Leonard-barton, 1992). By examining shoring decisions through a knowledge-based view, it could be interpret the location changings is an approach to gain the unique competitive advantage. However, this theory seems too broad and difficult to land it to ground and guide a location selection (Capron and Mitchell, 2004).

In addition, a common thread between Economies of Scale, TCE, the knowledge-based view, and the resource-based view that has an important bearing on the shoring decision activities of an organization, is that firms should attempt to exploit offshoring which can provide cost advantages to them (Kroes and Ghosh, 2010). Accordingly, firms should maintain manufacturing activities in-home if their internal resources or knowledge sets provide a core capability that generates a significant competitive advantage for them. While these fundamental theories are well recognised in the literature regarding the motivations of offshoring or reshoring decisions, the literature does not adequately address how a firm should link its shoring decisions to its competitive priorities. In order to explore the correlation among competitive priorities, business performance and shoring decisions, three extra theories have been identified: contingency theory, dynamic capabilities theory, and congruence theory. The theoretical model of this study in section 3.5 could be supported by them.

Contingency theory and dynamic capabilities theory are sub-constructs of organization theory. Contingency theory is one of the organizational theories that were originially described by Scott (1981) who stated that “The best way to organize depends on the nature of the environment to which the organization must relate”. Later, contingency theory has been interpreted as the best way to

organize a company, lead an organization, or make decisions does not exist; instead, the most optimal action is to be contingent (dependent) upon the firm's internal and external environment. This theory has been agreed by Manning (2013) who states that there are two types of major contingencies: "task features and the local environment". The task features refer to how over-complexity and knowledge intensity of a task may trigger operational challenges that a firm finds it difficult to respond to effectively (Manning 2013). In terms of local environment, it refers to how the dynamics and uncertainty of a change will affect the effectiveness and accuracy of strategic choices, such as the approaches to mitigate operational challenges (Manning, 2013; Peng, 2003; Pfeffer and Salancik, 1978). In addition, Manning (2013) also employed contingency theory in his work regarding offshoring decisions, and concluded that companies need to be critical of their capacities when they make decisions regarding offshoring.

In this research, following the contingency theory, the author argues that there is no best choice for shoring location. From a long-term horizon, it is common sense and also a necessity for companies to change their manufacturing place. Companies need to be dynamic in their locations in order to respond to economic and environmental changes. Therefore, it does not make sense to simply say that reshoring is better than offshoring or vice versa. The optimal choice depends on the company's internal and external context.

Therefore, following the contingency practice of the environment, companies need to build up and keep improving their dynamic capabilities to fulfil the changes from internal and external.

Dynamic capability is "the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments" (Teece, Pisano and Shuen, 1997). Capabilities can be defined as the result of complex interactions and coordination between resources (Teece, Pisano and Shuen, 1997). Dynamic capability is a perspective of overall capabilities; it focuses on the role of management regarding adapting, integrating, and reconfiguring internal and external organizational skills, resources, and functional competences to match the requirements of a changing environment (Eisenhardt

and Martin, 2000; Teece, Pisano and Shuen, 1997). Arlbjorn and Mikkelsen (2014) displayed clearly in their work that SC design must be viewed as a dynamic capability, following Fine's (1998) view, and stress the importance of employing the dynamic perspective when conducting the design of global SCs (Arlbjørn and Mikkelsen, 2014).

In applying the theory to shoring decisions, the company needs to quickly adjust its manufacturing strategy (the competitive priorities) to correspond to its location changes due to contingent changes of the environment, in order not to lose its marketplace within the industry. To possess this capability, the company not only needs to know itself well regarding its manufacturing capabilities and priorities, but also needs to know the best fit between the priorities and location decisions, according to congruence theory.

The predecessor of ***congruence theory*** is alignment theory which was been mentioned in a series of research. The work of Hayes and Wheelwright (1984); Adam and Swamidass (1989); Anderson et al. (1989); Leong et al. (1990); and Hill (1994) have achieved a common agreement view that the effectiveness level of a company's operations strategy is determined by the degree of consistency between the competitive priorities and the company's corresponding decisions on its structure and infrastructure. Later Miller and Roth (1994) enrich the theory by advocating consistencies between business strategy, competitive priorities, and manufacturing activities, in line with the opinion that "The degree of fit between an organization's competitive priorities and its key decisions regarding structural and infrastructural investment provides the key to developing the full potential of operations as a competitive weapon." (Boyer and McDermott, 1999). Further the work from da Silveira (2005) and Ketokivi and Schroeder (2004) (2004) argued that the strategic alignment level will even affect a firm's performance. Recently, Kroes and Ghosh (2010) have tested the suitability of this theory to outsourcing decisions, which is one of the manufacturing activities, and the infrastructural decisions. The work of Kroes and Ghosh (2010) has justified the congruence across competitive priorities and outsourcing decisions will be positively and significantly related to a firm's business performance.

Therefore, whether fit, alignment or congruence, based on the literature findings above, the nature of the theory is concluded to be “the degree of fit or congruence between a firm’s competitive priorities and operational activities or decisions are positively related to performance” (Devaraj, Hollingworth and Schroeder, 2004; Kroes and Ghosh, 2010).

Following this theory, the shoring decision is one of the operational activities or decisions. Therefore, the company business performance will be improved if the manufacturing competitive priorities retain congruence with shoring decisions. Based on previous research, competitive priorities affect business performance, and manufacturing location decisions will also affect business performance. However, based on the congruence theory, whether the business performance can be improved or not depends on the common interaction effects from competitive priorities and shoring decision, rather than on individual effects. In other words, competitive priorities and shoring decision should come up with a suitable match, as a condition to improve business performance. For companies, exploring what this congruence between competitive priorities and shoring decision is becomes the key, which provides the need to conduct the following study: coming up with the moderation model to reveal what the key competitive priorities are that could significantly affect business performance, under different/each shoring decision.

3.3 Competitive Priority and Performance (Main Effect)

As discussed in previous sections regarding the development of a measurement for competitive priorities, since Miller and Vollmann (1984) and Vickery et al. (1993, 1994) started to research the measurements developed for competitive priorities, the empirical research around competitive priorities has become a key stream. This is especially so after 1998, when Ward completed the empirically tested measurements of competitive priorities, which have since allowed researchers to capture more accurate data and conduct even more studies on competitive priorities through survey-based methods to identify the correlations between competitive priorities and other operational variables.

Prior research has clearly identified the conceptual relationship between business strategy and manufacturing strategy, which need to be in alignment with each other. Also, in the relationship between competitive priorities and manufacturing strategy, it has been stated clearly that competitive priorities are the visual representations of the manufacturing strategy, or serve as the content of manufacturing strategy. Then, researchers moved on to performance, to discover what the relationship is between competitive priorities and business performance.

Therefore, since 1998, many research regarding the correlation between competitive priorities and business performance (BP) have been established (Amoako-Gyampah and Acquaah, 2008; Kim and Arnold, 1993; Miller and Roth, 1994; Prajogo and Sohal, 2006; Swamidass and Newell, 1987; Vickery, Droge and Markland, 1993; Ward and Duray, 2000; Williamson, 1985). Some of the research have specifically conducted an examination of several dimensions of manufacturing strategy on firm performance (e.g. (Gupta and Somers, 1996; Kekre and Srinivasan, 1990; Sluti, 1992; White, 1996; Wood, 1991). The results justified a clear direct link between competitive priorities and firm performance, in that competitive priorities support business performance, in other words, competitive priorities including quality, delivery, flexibility, and/or cost positively contribute to business performance, either acting alone or in concert with other capabilities (Swamidass and Newell, 1987; Kekre and Srinivasan, 1990; Wood, 1991; Kim and Arnold, 1993; Sluti 1992; Vickery et al. 1993, 1994, 1997; Ward et al., 1994, 1995; Williams et al., 1995; Gupta and Somers, 1996; White 1996; Badri et al., 2000; Corbett and Claridge, 2002; Rosenzweig et al., 2003; Prajogo and Sohal, 2006; Amoako-Gyampah and Acquaah, 2008; Oltra and Flor, 2010; Peng et al., 2011).

In detail, from a manufacturing cost perspective, the research by Porter (1985) has clearly determined the positive role that manufacturing cost reduction plays in supporting business benefits, which also agrees with Philips et al. (1983). A low-cost strategy leads to improvements in efficiencies which a firm could take advantage of to increase its profit margin or reduce its product price, therefore all

the above will contribute together to achieve an increase in profits, market share and sales growth (Wood, 1991; White, 1996; Amoako-Gyampah and Acquaah, 2008). Therefore, manufacturing cost reduction has a positive association with business performance, which is **hypothesis 1** (**H1**) of this study (shown below).

In terms of product quality, the research by Schoeffler, Buzzell and Heany (1974) and Buzzell (1978) reveal that product quality could positively affect a firm's ROI. Later, Philips et al. (1983) argued that product quality will also positively contribute to a company's ROA. The reason behind this is that good product quality allows businesses to defend higher prices, and thus extend and protect their profit margin, based on the "niche theory" (Gale and Swire, 1977; Porter, 1980).

It has also been identified that product quality will also be positively related to cost reduction, and delivery capability, including both speed and dependability (Philips et al., 1983; White, 1996), which will increase market share and further increase the business performance (Philips et al., 1983; White, 1996). Further research clearly found a close and positive link between quality and business performance, by advocating that quality is the basis of premium manufacturing (Ferdows and DeMeyer, 1990; Noble, 1995; Ward and Duray, 2000), even though some research has argued that quality and flexibility will produce a significant financial increase only when a plant progresses from the state of 'weakling' to 'middleman', which means over-achievement in quality will not actually provide positive returns (Roth and Miller, 1990).

Therefore, a good quality product, with high design and conformance quality, will not only help to reduce the production cost and increase productivity, it will also lead to a good reputation of the brand and provide better delivery, all of which could be translated to bigger profit margins and higher sales growth and directly contribute to business performance (Ward and Duray, 2000; Amoako-Gyampah and Acquaah, 2008). Therefore, a positive correlation has been predicted in the **H3** at the end of this section.

Delivery priority describes the ability to deliver both on time (delivery dependability) and fast (Oltra and Flor, 2010). Delivery is a special competitive priority compared to others since it is linked closely to service and communicating with customers directly. Therefore, the delivery service will positively contribute to firm performance through improving profits, reducing cost and increasing market share, based on the research from Thompson, DeSouza and Gale (1985) (1985). Work from both Wood et al. (1990) and Roth and Miller (1990) found that business performance could consistently increase with the development of delivery. Later, Avlonitis, Papastathopoulou and Gounaris (2001) further claimed that innovative delivery processes are positively related to a firm's business performance, especially in increasing profitability and sales, which has also been confirmed by the empirical work from Chen et al. (2009). Therefore, it is clear that reliable and fast deliveries can provide an even greater customer satisfaction, which will result in higher market share and profits (Amoako-Gyampah and Acquaah 2008). Therefore, the **H4** regarding positive relationship between delivery and business performance is acceptable.

Besides manufacturing cost and quality, research have claimed that the best competitors within world class manufacturers are normally competing on a variety of manufacturing capabilities, rather than a single one (Flynn et al., 1995b; Ward et al., 1996; Collins et al., 1998; Ward and Duray, 2000). Therefore, more competitive priorities have been investigated such as flexibility. The POM literature has brought people's attention to manufacturing flexibility (Buffa, 1984; Schonberger, 1982; Wheelwright, 1984), especially after Schonberger cite the Japanese manufacturers' comments on western productions, saying that western manufacturers rarely achieve good flexibility (Schonberger, 1982). Later, Hall (1983) refers to the importance of flexibility and defines it as plants' capabilities to adapt to change: *"Flexibility means that plants should be capable of switching very quickly from one product to another, or from one part to another . . . almost instantly"* (p.2). Further research work from Swamidass and Newell (1987) clearly justified the positive relationship between flexibility and business performance empirically, and even stressed that flexibility also offers a company advantages in terms of dealing with environmental uncertainty. Some researchers also reveal

that flexibility has a positive and significant effect on manufacturing cost and delivery, even though some research did not find the effect to be significant. However, there is no argument regarding that improving flexibility (volume and mixed flexibility) will enhance companies' response to speed in market changes, which will result in achieving higher business performance (Amoako-Gyampah and Acquaah, 2008; Oltra and Flor, 2010). Therefore, in this research, the **H5** has been set up that the flexibility will positively associate with firms' business performance.

Base on the discussion above, and keeping aligned with the view from Wood et al. (1990) that "*financial performance consistently improved with the achievement of any competitive priority (delivery, cost, and product performance) except quality"* and the reality from White's study (1996) revealing that "*there was a significant relationship between business performance and the capabilities of conformance quality, product flexibility, delivery and cost respectively*" (Corbett and Claridge, 2002), this study believes a greater emphasis on CPs (cost, quality, delivery time, flexibility) will have a positive effect on business performance (Ward et al., 1995; Kathuria, 2000; Rosenzweig et al., 2003; Amoako-Gyampah & Acquaah 2008).

The above link/relationship between competitive priorities (operations strategy) and business performance has been raised/regarded as one of the most seminal works in OM research, which laid the foundations for the future research development on strategic operations management (Buffa, 1984; Hayes and Schmenner, 1978; Hayes and Wheelwright, 1984; Skinner, 1969, 1974; Stobaugh and Telesio, 1983; Wheelwright, 1978).

In this research, the author also adopts the above fundamental correlation between competitive priorities and business performance, and decided to integrate it with manufacturing location decision types (shoring engagement types) into a moderation model.

As shown in Figure 3 1, it is part of the theoretical model in this research to explain the main effect. We inherit the common competitive priorities and their correlation

with business performance that competitive priorities have a positive influence on business performance. Therefore, the first four hypotheses are shown as in Figure 3-1.

However, the researcher also decided to enrich the key traditional competitive priorities by introducing a fifth element “supply chain cost”, as explained in section 2.4.1.5. This is due to the rising awareness of and important evaluation from people on management cost, following a TCO concept. Similarly, to the other four competitive priorities, the reduction in SC cost could reduce the product price or increase the profit margin, which could cause more orders from the market or directly contribute to net profits. Therefore, the SC cost is also expected to positively contribute to business performance, as **H2**. The five hypotheses of the main effect are shown below.

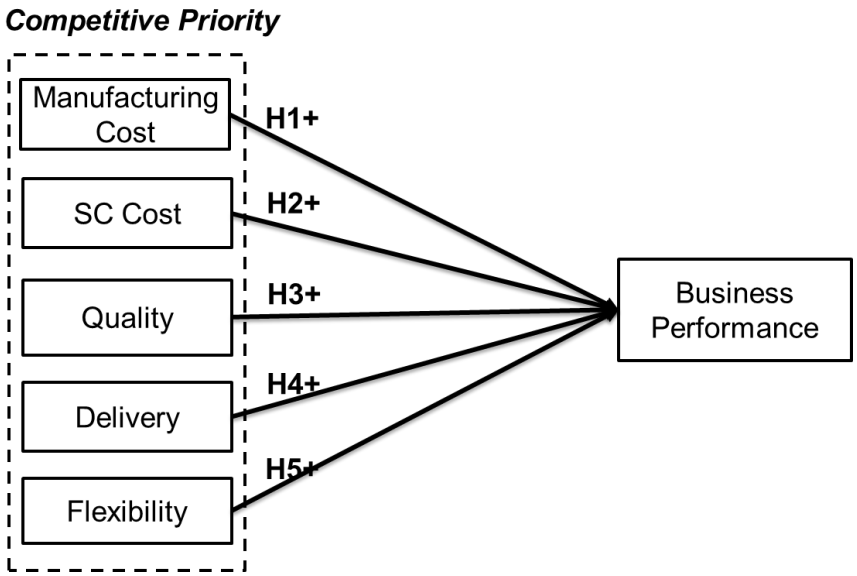


Figure 3-1 Main Effect

H1: *Emphasis on the competitive priority of* ***Manufacturing Cost*** *has a positive association with business performance*

H2: *Emphasis on the competitive priority of* ***SC cost*** *has a positive association with business performance*

H3: *Emphasis on the competitive priority of* ***Quality*** *has a positive association with business performance*

H4: *Emphasis on the competitive priority of* ***Delivery*** *has a positive association with business performance*

H5: *Emphasis on the competitive priority of* ***Flexibility*** *has a positive association with business performance*

Taking the above correlation as the foundation, many empirical research have been built up to discuss how the relationship will be affected when introducing a third, fourth or even fifth variable to consist of a single or multiple two-way or three-way association exploration, either through moderation or mediation, or both. This third variable has covered many research fields in the extant literature such as SC integration stream (Rosenzweig, 2003), sustainability stream, corporate strategy perspective (Oltra and Flor, 2010), purchasing perspective (Kroes and Ghosh, 2010), HRM field (Santos, 2000), AM technology et al.

3.4 Competitive Priority, Shoring Decisions and Business Performance (Interaction Effect)

3.4.1 Shoring Decisions and Business Performance

As is known, Porter (1985) claimed that if companies were to move their production to low-cost developing countries, they could benefit from significant manufacturing cost reductions, e.g., lower labour costs. Then offshoring become extremely popular, labelled as a new managerial practice (Jahns et al. 2006) and become a key aspect of the strategic positioning of enterprises (Dunning 1988; Hill, Hwang and Kim 1990; Ferdows 1997; Kinkel & Maloca 2009; Roza et al. 2011). The dominant reason for companies to change their production location from their home country to Far East countries is the cheap labour costs overseas. Due to the cost being cheaper, then the profit margins of a product will increase, which could increase the net profits for the same volume of sales. This logic has been justified by the practices that data from the Globalisation and Economic Policy Centre (GEP) Centre reveal, i.e. that 96% of UK manufacturing international companies have subsidiaries in order to perform different levels of offshoring activities. These include both manufacturing and services within OECD countries (Organisation of Economic Co-operation and Development),

and 20% among non-OECD countries (Greenaway, Gorg and Kneller, 2005) and most companies experienced significant cost benefits within the offshored countries (Kinkel, 2014).

Therefore, from these simple offshoring cases, it can be easily identified that by changing the production location, business performance could be affected. In fact, not only the cost, there are many other factors, such as enterprises' competitiveness and the labour market situation, that will be changed as well, due to the location update (Porter 1990; 1998). This is due to production locations being the core and foundation of an OEM-based supply chain.

As is well known, fundamentally, both reshoring and offshoring are two types of the location choice/shoring decision. Manufacturing locations, as part of the manufacturing strategy, play a significant role in both manufacturing and business operations. Locating SC infrastructures is the foundation to build up business' supply network across the globe. The configuration of infrastructures' locations can significantly affect the global supply network (GSN) structure and operations, and will further influence SC and business performances (Amoako-Gyampah & Acquaah, 2008; Skinner, 1969).

Therefore, under the global economic environment with expansion and increasing competitiveness, in order to achieve competitive advantages within the market, a good SC assets location configuration deriving from location decision processes is the cornerstone. Therefore, Kinkel and Maloca (2009) stressed the importance of SC assets location decisions as:

"Due to their long-term influence on competitiveness and almost all operational processes of an enterprise, location decisions for production activities are of highly strategic importance".

Besides the static location/production configuration, the dynamic footprint changes of a company with accumulated location moving experience will also affect the nature and operations of the company. This will further translate into influence on business performance. Therefore, it is not difficult to conclude that the different shoring decision type groups (which will be discussed in detail in

section 4.4.2.5.1 and 4.4.2.5.2) may have different business performance, namely,

"The shoring decision types will closely relate to the business performance of a company."

3.4.2 Moderation Effect

As concluded from the literature and claimed in the previous chapter, besides clarifying the current UK manufacturing reshoring status, the second aim of this study is to explore the relationship among competitive priorities, shoring engagement types and business performance. As shown in Figure 3-2, a moderation theoretical model has been built up to show the correlations among these three variables. Details of the theoretical development of this model have been stated below.

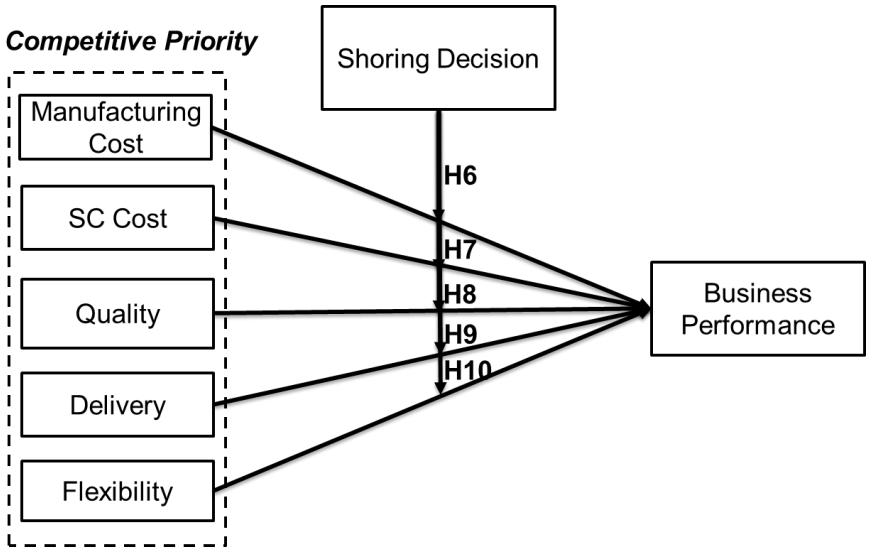


Figure 3-2 Interaction Effect of the Theoretical Model

As discussed in section 3.1, the main effects between competitive priorities and business performances have been inherited from the extant literature and it is further demonstrated in discussions above that competitive priorities (manufacturing cost, SC cost, quality, delivery time and flexibility), have a positive influence on business performance. From the literature reviews, it has been seen many empirical research have been built up upon this correlation as the foundation, to discuss how the relationship will be affected when introducing a

third variable which could come from any research fields in the supply chain area, such SC integration (Rosenzweig 2003), sustainability, corporate strategy (Oltra and Flor 2010), purchasing (Kroes and Ghosh 2010), HRM (Santos 2000), AM technology et al. Some of them, as a third variable, have consisted of a moderation effect and some of a mediation model. In this study, the author believes that the correlation between competitive priorities and business performance will be distinct when the company has different location footprints changes/has different types of shoring engagements. Therefore, the research argues that the shoring decision type will moderate the correlation between competitive priorities and business performance to come up with a moderation model rather than mediation model, and fitting the moderation definition below.

The evidence to demonstrate a moderation relationship will be discussed below following four reasons from both practical and theoretical perspectives.

The moderation model refers to the fact that the independent variable X may have a positive/negative affect on dependent variable Y which means an increase in X will result in a Y increase. But this relationship between X and Y could be enhanced or weakened (even reversed) or modified by a third variable M (as shown in Figure 3-3).

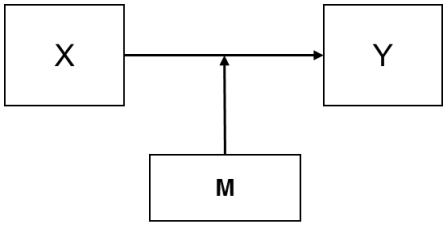


Figure 3-3 Moderation Model

There are two types of moderator: continuous moderator and categorical moderator, as discussed in Chapter 4. Due to the shoring decision engagement practice, the moderator “shoring decision type” in this study is a categorical moderator. Therefore, the moderation definition could be updated to the existing relationship between X and Y and could be modified (distinct) for different categories of M (Oltra and Flor, 2010).

From a practical perspective, there are many actual examples and news of reshoring, which have been major research resources since the beginning stage of reshoring research, around 2012. From the practical examples, the moderation model can be supported. Adidas announced on October 7, 2015 that the company would be moving their production back to Germany after 20 years in Asia, for its future in performance footwear with the Futurecraft 3D series. Adidas has partnered with Materialise, a pioneer and leading specialist in 3D printing, for its Futurecraft initiative. The purpose of developing this new product and reshoring back to Germany is to create a flexible, fully breathable carbon copy of the athlete's own footprint; by matching exact contours and pressure points, it will set the athlete up for the best running experience. Linked with existing data sourcing and foot scan technologies, it opens unique opportunities for immediate in-store fittings. The new factory in Germany completed the first batch production in the third quarter of 2016 and they were ready for customers around December 2016. Obviously, Adidas' reshoring is following its corporate strategy and it is the first shoe producer to move back to its home country. After one year of its reshoring having been conducted, figures show that by the end of the 3rd quarter in 2016, Adidas' net income had grown by 38% to €350 million, compared to other industry competitors. In addition, Adidas Group is 5th in the Global 100 Most Sustainable Corporations in the world. This practical evidence shows a clear difference of the business performance between Adidas and its competitors, who still produce in Asia (e.g. Nike, Puma, etc.), due to the difference in shoring decisions (reshoring vs. pure offshoring). Therefore, within the same industry and a similar position in the industry, the business performance, which is a result of combination work of competitive priorities and the different location experience, this practice justifies that the shoring decision engagement will modify the correlation between competitive priorities and business performance. Therefore, the model should be a moderation relationship.

Similarly, the reshoring literature also discussed the impacts of reshoring by comparing with other shoring engagement groups, such as offshoring and remain at home groups (Canham and Hamilton, 2013; Ellram et al., 2013), which also potentially reveal the support for the moderation model.

Also, the research regarding congruence theory, which focuses on “fit” between strategy and operational activities, was originally called by researchers “throughout the literature, several of these studies have enunciated calls to conduct additional empirical research to investigate the role that the congruence between a firm’s manufacturing strategies and its operational actions plays on firm performance” (Bozarth and McDermott, 1998; Kathuria and Porth, 2003). Kroes and Ghosh (2010), and justified by Boyer and McDermott (1999) state that “The degree of fit between an organization’s competitive priorities and its key decisions regarding structural and infrastructural investment provides the key to developing the full potential of operations as a competitive weapon.” Later, it has been further established by Devaraj et al. (2004) and applied by Kroes and Ghosh (2010) to outsourcing areas, that “Empirical research has also confirmed that the degree of fit or congruence between a firm’s competitive priorities and operational activities are positively related to performance. For example, Devaraj et al. (2004) found that the fit between generic manufacturing strategies and manufacturing objectives is positively related to plant performance.” (Kroes and Ghosh 2010).

Kroes and Ghosh’s (2010) research concludes that “*Recent research strongly advocates that to realize the potential for improved competitiveness, outsourcing decisions should be strategic in nature, and made in alignment with the competitive priorities of the firm*.” and find “*outsourcing congruence across all five competitive priorities to be positively and significantly related to supply chain performance*.” According to the reshoring decision matrix developed by Gray (2013), outsourcing is, in the majority, offshored outsourcing, which is one sub-group of shoring decisions (offshoring).

Therefore, Kroes and Ghosh’s (2010) research justifies when competitive priorities are aligned with outsourcing decision, business performance can be improved. In other words, congruence theory could be applied to shoring decisions, claiming that different shoring decision types will match different competitive priorities to result in different business performance, namely shoring decision types, and CPs are associated with each other, which matches the moderation definition. Therefore, when looking at all the shoring decision types,

the shoring decision will moderate the relationship between competitive and business performance.

Besides the grand congruence theory, through the literature review, the association between competitive priorities and shoring decision types could be predicted as well, but lack enough evidence, especially the empirical types. However, this is why it is necessary to conduct this study. From the previous literature review, it has been clearly demonstrated that manufacturing strategy remains aligned with corporate activities, and competitive priorities are used to represent manufacturing strategy. Location decisions are part of corporate activities, which are supposed to be relevant to competitive priorities (Boyer and McDermott, 1999; Kroes and Ghosh, 2010; Grappi et al., 2015). In addition, location configuration provides the infrastructure of the operations, and as discussed in 3.2.1, the shoring decision type will affect business performance and also the manufacturing performance which are linked to competitive priorities. Therefore, shoring decision types could be linked to competitive priorities and competitive priorities could be associated with shoring decision types.

The final evidence to justify the moderation relationship is through distinguishing between moderation and mediation. Moderation has been explained above. Mediation refers to the relationship between X and Y not being a direct relationship. It is actually mediated by M, which means X is actually causing M first and then M causes Y, as shown in Figure 3-4. So, mediation can help people find the invisible mediator.

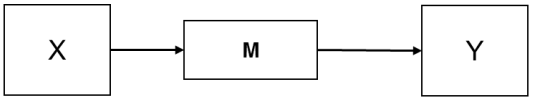


Figure 3-4 Mediation Model

Therefore, it can be seen that the clear distinction between moderation and mediation is the time/order of action that happened. The mediation must require X to happen first prior to M and M to happen prior to Y. However, the variables in the moderation model do not have an order of happening as a strict requirement.

In this study, competitive priorities are not the drivers. The competitive priorities always exist within a business no matter in what way the firm changes the location (location changing happens dynamically and occasionally). There is no absolute order of competitive priorities and shoring decision. When this research was designed, in order to match the same time cross section, companies' were asked for their competitive priorities and shoring decisions during the same time period, i.e. 2008-2016, and their current business performance, as shown in Figure 3-5.

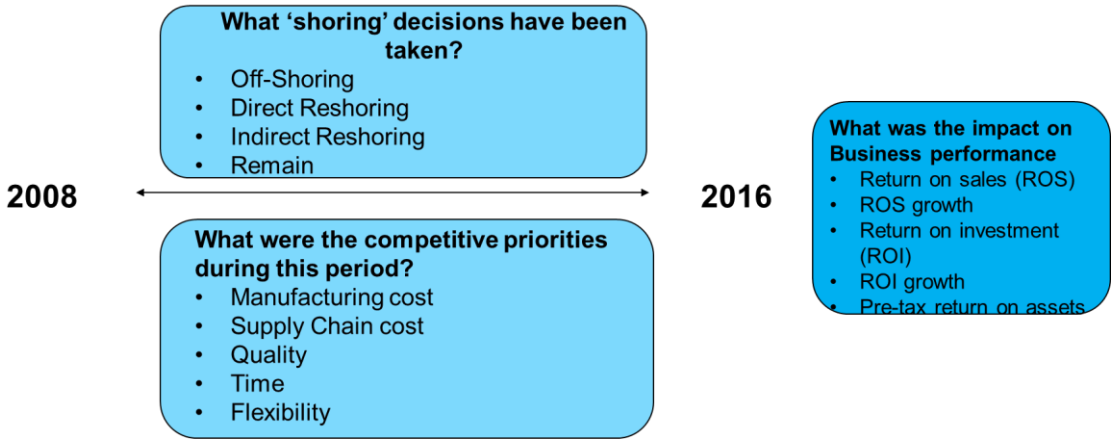


Figure 3-5 Time Line

Therefore, without a clear order of the action conducted, the mediation model is definitely not suited to this study, which has justified moderation as the reasonable option. However, whether this moderation relationship exists or not needs the statistical tests in the following chapters.

Due to the lack of the research on competitive priorities within reshoring articles, and the field still being in an exploration stage, the hypotheses have been phased in a general way, without predicting the detailed trend. In addition, this way of forming hypotheses is more suitable for categorical moderator (Myhr and Spekman 2005; Oltra and Flor, 2010; Cao and Zhang, 2011; Chen, Preston and Xia 2013). The exact details will be explored through the analysis and discussed in Chapter 7.

Following the main effect logic, every dimension of the competitive priorities should be moderated by the shoring decision type. Therefore, the hypotheses for interaction effects are:

H6: Shoring decision type moderates the relationship between the emphasis on the competitive priority of **manufacturing cost** and business performance

H7: Shoring decision type moderates the relationship between the emphasis on the competitive priority of **SC cost** and business performance

H8: Shoring decision type moderates the relationship between the emphasis on the competitive priority of **quality** and business performance

H9: Shoring decision type moderates the relationship between the emphasis on the competitive priority of **time** and business performance

H10: Shoring decision type moderates the relationship between the emphasis on the competitive priority of **flexibility** and business performance

3.5 Theoretical Model and Hypotheses

As demonstrated in the section above, the relationship between competitive priorities, business performance and shoring decision types/shoring engagement experience should be the moderation model. The final model is shown in Figure 3-6.

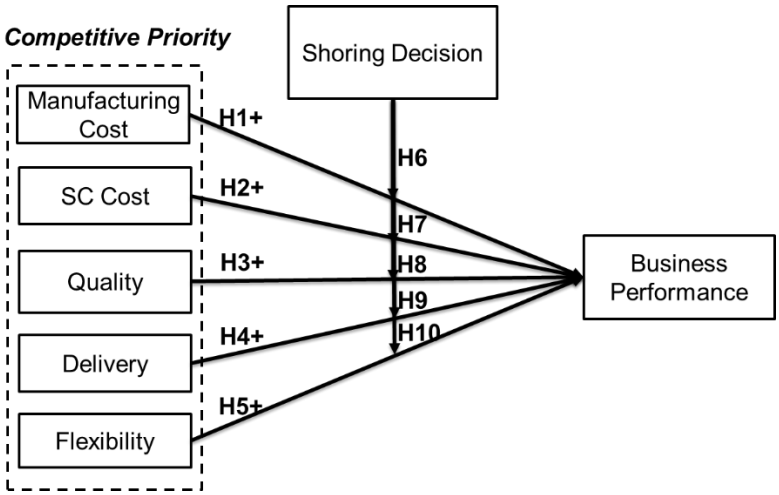


Figure 3-6 Theoretical Moderation Model

The details of each shoring engagement type have been listed and explained in Table 3-1:

Table 3-1 Shoring Decision Groups

Shoring decision types	Shoring activities undertaken
Remain	Made no conscious shoring decisions
Offshored	Only offshored
Indirect reshore	Consciously chosen to retain or expand manufacturing activity in UK instead of overseas (could also have offshored)
Direct + indirect	Directly and indirectly reshored manufacturing activity to the UK

Also, the summary of the hypotheses for both main effects and interaction effects is shown in Table 3-2:

Table 3-2 Hypotheses Summary

Hypotheses Summary	
Main Effect	H1: Emphasis on the competitive priority of **manufacturing cost** has a positive association with business performance
	H2: Emphasis on the competitive priority of **SC cost** has a positive association with business performance
	H3: Emphasis on the competitive priority of **quality** has a positive association with business performance
	H4: Emphasis on the competitive priority of **time** has a positive association with business performance
	H5: Emphasis on the competitive priority of **flexibility** has a positive association with business performance
Interaction Effect	H6: Shoring decision type moderates the relationship between the emphasis on the competitive priority of **manufacturing cost** and business performance
	H7: Shoring decision type moderates the relationship between the emphasis on the competitive priority of **SC cost** and business performance
	H8: Shoring decision type moderates the relationship between the emphasis on the competitive priority of **quality** and business performance
	H9: Shoring decision type moderates the relationship between the emphasis on the competitive priority of **time** and business performance
	H10: Shoring decision type moderates the relationship between the emphasis on the competitive priority of **flexibility** and business performance

3.6 Chapter Summary

In summary, this chapter has developed a moderation model to explore the relationship between manufacturing competitive priorities, business performance and shoring decisions. The related underpinning theories have been identified and discussed first. The following discussion is regarding the main effects of competitive priorities on business performance. The moderation relationship has been raised and conceptually established by evidence from multiple perspectives theory, literature and practical examples. Finally, the model claimed that not only the competitive priorities and shoring location will affect business performance. The interaction between competitive priorities and shoring decisions plays a key role in influencing business performance as well, which is supported by congruence theory.

4 Research Design

4.1 Chapter Introduction

The previous chapter 3 has developed the theoretical model and hypotheses based on an in-depth and wide literature review. This chapter introduces the research design and methodology adopted within this study. It will firstly explain how the research is undertaken, including the theoretical and philosophical assumptions upon which the research is based in section 4.2 and 4.3. It will also identify methods for this entire study at section 4.4, and move to details regarding designing the most appropriate method to capture the UK manufacturing status and to validate the proposed theoretical model developed above at 4.4.2. In order to do this, a good understanding of the empirical research process and finding validation procedures is necessary. To achieve this understanding, this chapter will discuss different research approaches, strategies, and data collection methods to justify the most suitable methodology, with a completed design of the survey.

4.2 Ontology

"Ontology is concerned with nature of reality. This raises questions of the assumptions researchers have about the way the world operates and the commitment held to particular views." (Saunders, Lewis and Thornhill, 2009, p.110).

The two aspects of ontology, i.e. objectivism and subjectivism, have a wide number of devotees among business and management researchers. Objectivism refers to the position that "social entities exist in reality external to social actors concerned with their existence" (Saunders, Lewis and Thornhill, 2009, p.110). Subjectivism is where "social phenomena are created from the perceptions and consequent actions of those social actors concerned with their existence." (Saunders, Lewis and Thornhill, 2009, p.110).

The author of this research follows the objectivism perspective to explore the reality of the current UK reshoring status and the statistical relationships among competitive priority, business performance and location strategy. The research will include the reality through primary data collected from companies by survey. Also, this adoption of the ontology direction is much more consistent with the epistemology “positivism” adopted within this research.

4.3 Epistemology

4.3.1 Epistemology Types

Epistemology is “a branch of philosophy that studies the nature of knowledge and what constitutes acceptable knowledge in a field of study (Saunders, Lewis and Thornhill, 2009, p.112)”. As Bourdieu et al. (1991) argue, epistemological vigilance is extremely significant and necessary since a defined, stated and consistent epistemological framework for research will influence the particular view of the relationship between knowledge and the process by which it is developed (Saunders, Lewis and Thornhill, 2009, p.108). The four popular epistemological frameworks include: positivism, interpretivism (social constructivism), critical realism, and pragmatism (Saunders, Lewis and Thornhill, 2009, p.119).

Positivism

Positivism is a philosophical foundation which has existed for a long time and has been widely adopted when working in the tradition of the natural sciences, e.g., mathematics, physics, chemistry, biology etc. (Potter, 2000; Saunders, Lewis and Thornhill, 2009, p.112). The philosophical stance of the natural scientist is “working with an observable social reality and that the end product of such research can be law-like generalisations similar to those produced by the physical and natural scientists” (Remenyi and Brian, 1998, p.32; Saunders, Lewis and Thornhill, 2009, p.119). In other words, the key aim of the research is to identify causal explanations and fundamental laws that explain regularities in human social behaviour. The researcher holds an objective view of the reality and only accepts observable phenomena as resources providing credible data and facts

(Creswell, 2009, p.7; Karlsson, 2009, p.63; Saunders, Lewis and Thornhill, 2009, p.119). Under positivism, the “researcher is independent of and neither affects nor is affected by the subject of the research” (Remenyi et al. 1998, p.33) and “the research is undertaken in a value-free way” (Saunders, Lewis and Thornhill, 2009, p.119) to test the hypothesis (Collis and Hussey, 2014, p.62). It is usually a highly structured quantitative approach, and based on precise measurements and large samples (Collis and Hussey 2009, p. 62; Saunders, Lewis and Thornhill, 2009, p.119).

Therefore, due to the strict principles of the facts, one strength of positivism is to be able to test a theory against irreducible statements of observation and thus produce results that correspond to an independent reality (Johnson and Duberley, 2000). The outcome following a positivism philosophy is always a single truth, namely, to prove or disprove. In particular, the objective ontology view of positivism can confirm that the results of a research are optimized in terms of reducing errors since it leaves little space for variance (Alvesson and Sköldberg, 2009). However, the highly constructed quantitative method could be a limitation for positivism when applied to social sciences, since objects in social sciences are human beings rather than ‘dead stuff’, e.g., positivism does not take enough account of moral options sometimes, which clearly has an effect on human behaviour (Potter, 2000; Pratten, 2007) . However, this limitation does not affect the application of positivism within social science, or business and management areas; in particular it is popular within operations and SC management.

Interpretivism

Interpretivism was introduced as an opposite philosophical position to positivism. In 1962, Thomas Kuhn recognised the weakness of traditional positivism and argued there was a need for a new paradigm: “First, the new candidate must seem to resolve some outstanding and generally recognized problem that can be met in no other way. Second, the new paradigm must promise to preserve a relatively large part of the concrete problem solving activity that has accrued to science through its predecessors.” (Kuhn, 1962; Moore, 2009). Therefore,

interpretivism argues that knowledge is neither discovered from an external reality nor produced by reasons independently of such a reality. It is the outcome of people perceiving and making sense of their encounters with the physical world and with other people (Blaikie, 2007, p.23). Interpretivists criticise “that the social world of business and management is far too complex to lend itself to theorising by definite ‘laws’ in the same way as the physical sciences” (Saunders, Lewis and Thornhill, 2009, p.115). In detail, interpretivists are more socially constructed and addicted to subjectivity from an ontological perspective. They are more interested in and focus on details of a case and the reality behind them, as well as the subjective meanings of the relative motivating actions. Therefore, the research is value bound and researchers are part of what is being researched, and cannot be separate and independent (Saunders, Lewis and Thornhill, 2009, p.119). The most popular research method following interpretivism is the qualitative approach to investigate a small sample-size but in depth (Collis and Hussey 2009, p.62; Saunders, Lewis and Thornhill, 2009, p.119). Compared with positivism, the features of interpretivism are entirely upside-down as shown in Table 4-1. Obviously, interpretivism overcomes the “only focused on observable facts” of positivism, but it is overvalued on subjective feelings. Besides, another limitation of it is not to enter the social world of our research subjects and understand the world from their point of view.

Table 4-1 Comparisons between Positivism and Interpretivism

Positivism	Interpretivism
Scientist: Legislator	Scientist: Interpreter
Monologue	Dialogue
Objectivity	Valid Subjectivities
Explanation	Understanding
Observation	Embodiment
Objective observer	Partial participant
Knowledge as Truth	Knowledge as Power
Discovering facts	Creating interpretations
Truth: Singular (universal)	Truth: Plural (multiple aspects)

Critical Realism

The “Third” philosophy position, Critical Realism, originally emerged from the work of Roy Bhaskar in the 70s. He argued that realism is applicable to both natural science and sociology; however, researchers have to understand that the social world is much more dynamic and complicated than the natural world. Therefore, it is necessary for researchers to adopt different strategies (Bhaskar, 1975).

Critical realists hold objective attitudes from an ontological perspective. They believe there exist realities which are independent from the human beliefs of their existence; however, they will be interpreted based on social conditions. The essence of critical realism is: what we experience through our senses portrays the world accurately. It actually involves two steps to experience the world: “First, there is the thing itself and the sensations it conveys. Second, there is the mental processing that goes on some time after that sensation meets our senses.” (Saunders, Lewis and Thornhill, 2009, p.115). From an epistemological perspective, critical realists believe observable phenomena provide credible data (Karlsson, 2009, p.63; Saunders, Lewis and Thornhill, 2009, p.119). Meanwhile, the phenomena can also create possibilities which are open to misinterpretation. The results achieved following a realism philosophy can properly answer the what and why questions, but the results are available only in a certain context. In addition, a key difference from positivism is from an axiology perspective. The research is value laden by researchers and critical realists are biased by world views, culture and experience as the researchers. Within critical realism, either or both quantitative and qualitative methods can be adopt depending on their fit to the research subject.

The strength of critical realism is its ability to recognise the importance of multi-level study (e.g. at the level of the individual, group and institute). Each of these levels has the capacity to affect the researcher’s understanding of the research subject. Therefore, it could be argued that critical realists believe the social world is constantly changing, which gives more flexibility (Bhaskar, 1989). It allows researchers to use an objective measurement to conduct experiments and gain

knowledge from the real-world scenario by recognising the importance of seeing things differently, from different people's perspectives, and taking account of these in formulating research findings (Alvesson and Sköldberg, 2009).

However, it has weakness in its basic and contradictory premises: critical realism accepts that the social world is far different from the natural world, and argues that the laws and measurements observed in the natural world are not directly applicable to the social world; also, the research is value laden by researchers and critical realists are biased by personality, culture and experience of the researchers. Therefore, any biased views may impact on the research validity and generalization (Saunders, Lewis and Thornhill, 2009, p.119).

Pragmatism

The last epistemological framework to be discussed is pragmatism. The essence of pragmatism can be concluded as having “no specific principles”, which means all of the choices and approaches are acceptable as long as they can answer the research question. So either or both observable phenomena and subjective meanings can provide acceptable knowledge, depending upon the research question. The research adopt pragmatism is always the practically applied, focused research whose major task is the interpretation of the data. A researcher’s value plays an extremely significant role in the research, especially in results interpretation. Mixed or multiple methods are the dominant data collection methods following pragmatism (Saunders, Lewis and Thornhill, 2009, p.119). Comparisons among the four philosophies are summarised in Table 4-2.

Table 4-2 Comparisons among Philosophies

	Positivism	Realism	Interpretivism	Pragmatism
Ontology: *the researcher's view of the nature of reality or being*	External, objective and independent of social actors	Is objective. Exists independently of human thoughts and beliefs or knowledge of their existence (realist), but is interpreted through social conditioning (critical realist)	Socially constructed, subjective, may change, multiple	External, multiple, view chosen to best enable answering of research question
Epistemology: *the researcher's view regarding what constitutes acceptable knowledge*	Only observable phenomena can provide credible data, facts. Focus on causality and law like generalisations, reducing phenomena to simplest elements	Observable phenomena provide credible data, facts. Insufficient data means inaccuracies in sensations (direct realism). Alternatively, phenomena create sensations which are open to misinterpretation (critical realism). Focus on explaining within a context or contexts	Subjective meanings and social phenomena. Focus upon the details of situation, a reality behind these details, subjective meanings motivating actions	Either or both observable phenomena and subjective meanings can provide acceptable knowledge dependent upon the research question. Focus on practical applied research, integrating different perspectives to help interpret the data
Axiology: *the researcher's view of the role of values in research*	Research is undertaken in a value-free way, the researcher is independent of the data and maintains an objective stance	Research is value laden; the researcher is biased by world views, cultural experiences and upbringing. These will impact on the research	Research is value bound, the researcher is part of what is being researched, cannot be separated and so will be subjective	Values play a large role in interpreting results, the researcher adopting both objective and subjective points of view
Data collection techniques most often used	Highly structured, large samples, measurement, quantitative, but can use qualitative	Methods chosen must fit the subject matter, quantitative or qualitative	Small samples, in-depth investigations, qualitative	Mixed or multiple method designs, quantitative and qualitative

Source: Saunders, Lewis and Thornhill (2009, p.119).

4.3.2 Rationale for Adopting Positivism

Based on the discussion above regarding different research philosophies and also through comparisons below, this research will adopt positivism as the most suitable philosophy.

One aim of this research is to clarify the current UK reshoring status which needs to be strictly objective and independent to show the reality. This makes interpretivism unsuitable since it focuses on subjective meaning. Also, the knowledge in this research from the conceptual framework is an objective independent reality which has been developed based on a wide literature review rather than the researcher's personal beliefs and interests. This conceptual framework requires an empirical test of its validity, which is what interpretivism could not provide. Research adopting interpretivism as a philosophical foundation usually use a qualitative method. However, qualitative methods, such as interviews, are more aimed at building up theory, rather than testing it (Collis and Hussey 2009, p.62).

Even though critical realism is a popular philosophy within the business research area and has more flexibility in terms of research methods, it does not fit well with this research. In this research, as mentioned above, the reshoring correlation conceptual model is developed from literature and exists independently as knowledge. The researcher is entirely independent of the data and research, which is in conflict with critical realists' value laden research. The reality of this research exists as truth, which will be disclosed and tested by the primary empirical data, and will not be determined by social or historical values that become reified as time passes (Karlsson 2009, p.63).

Pragmatism is also not the best option for this research for two main reasons. One is that pragmatists accept subjective meanings as knowledge which is opposite to planned research. The other reason is that practically applied, driven research will be more focused on the interpreting of data into a practical value added, rather than developing and testing the theoretical framework to fill the research gaps. In this planned research, however, the development and validation of the theatrical framework is the key focus and contribution. Overall, pragmatism is a philosophy which floats above positivism, interpretivism and critical realism. Its ontology and epistemology coordinates are not fixable nor fit sufficiently with this research.

In terms of this research project, a theoretical model and hypotheses have been derived from the existing theories and literature. They need to be tested by a large sample of companies' applications, which is undertaken by the use of a survey. According to the ontological assumption, which is concerned with the theory of reality regardless of our knowledge of it, this study is concerned with the nature of reality, such as the relationship between competitive priorities, business performance and location strategies that exist, regardless of our awareness of their existence. Hence, it requires a social fact. In addition, the exploration of a relationship by researchers does not add any value to the existence of the presence of the relationship (Bryman and Bell, 2015). Besides, researchers can choose which philosophy to use based on the need for compatibility between the philosophy, the nature of the research and the research problem (Collis and Hussey 2014). Accordingly, in the context of the present study, positivism is consistent and supportive given the fact that the aim of this research is to validate the proposed theoretical framework and hypotheses empirically.

4.4 Methods

As shown in Figure 4-1, the research has been designed in the following way to answer the research questions. The author has conducted a literature review of reshoring research to clarify the current research status. Based on this, and combined with a review of the relevant fields a framework is derived for reshoring, in order to clarify all the reshoring decision factors and guides for exploration of the current UK manufacturing reshoring status. Also, a theoretical model has been developed to further explore the statistical relationships among competitive priorities, shoring decisions and business performance. Then the data have been collected through a survey to explore the current UK manufacturing status following the reshoring framework. Also, the data have been used to test the moderation model introduced in the theoretical model.

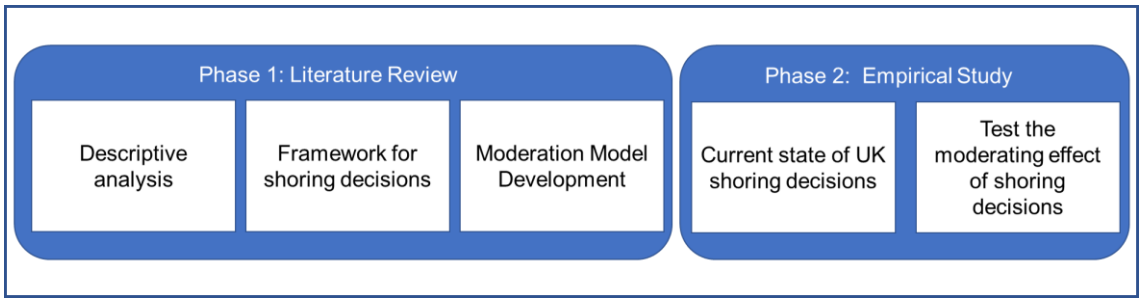


Figure 4-1 Overall Research Design

4.4.1 Literature Review

4.4.1.1 Literature Descriptive Analysis

This research starts with a literature review to have an overview of the reshoring current research status, which is also useful to identify the research gaps and contribute to the building of a framework for reshoring, and a theoretical model for shoring decisions. Due to the nature of reshoring research, which is in an early stage, the author did not conduct a systematic literature review. However, the researcher has referred to the systematic literature method, but conducted a traditional style literature review and displayed this in Chapter 2 in a structured way. The process of how this structured literature review has been conducted is now explained in detail.

The author has searched for the relevant key words such as “reshoring, re-shoring, back shoring, back-shoring, right-shoring, right-shoring, go back” within multiple academic databases and search engines, such as Scopus, Web of Science, and Google Scholar etc. In total, 151 non-duplicated results have been identified from an in-depth search, which include different types of publication, such as academic publications (book chapters, conference papers, journal articles and reports) as well as non-academic publications (magazines and news). The author analysed the search results by considering the type and year of publication, the published journal resources, the key research stream and research methods. The details have been summarised and are displayed in Chapter 2. There are 110 academic and 41 non-academic publications. Among them the journal articles are the dominant publication type, including 80 papers, which is one of the key resources of this research.

4.4.1.2 Framework for Reshoring

Following the literature review of reshoring, a clear gap regarding lacking of UK manufacturing reshoring status has been identified. In order to fill the research gaps, a framework for reshoring is developed to synthesize all the aspects that need to be considered for a reshoring decision. In aiming to identify all the relevant consideration parameters and also capture the full picture of the reshoring status, the researcher has started from the fundamental location decision processes model to extract the key aspects for reshoring decisions. Following the 360-degree approach from begging of strategy till final performance (Gray et al., 2017), several other fields also need to be reviewed to devise the framework, which include, business strategy, manufacturing strategy, operations considerations, supply chain (suppliers) and performance. In detail, the author also goes further into the literature, from the fields' strategy, to identifying the related strategy options, and the manufacturing operations/strategies, to identifying the key competitive priorities, products, suppliers and production governance, in order to identify the operation related factors. Further, the author also considers the performance perspective to identify the key performance factors. Through all of this, a synthesized framework has been built up as a contribution in itself, meanwhile it also guides the data collection in order to explore the current UK manufacturing reshoring status and test for the theoretical moderation.

4.4.1.3 Model for Shoring Moderation

In addition, based on the reshoring literature, a research gap regarding the relationship among shoring decision types, manufacturing strategy and business performance, has been identified. Through the further literature regarding multiple fields when develop the framework for reshoring above, the existence of this potential gap could be confirmed. In order to explore the theoretical model, the researcher goes further into the literature to identify the relationship between competitive priorities and business performance, and also the relationship after considering a shoring decision. Then, a moderation model has been derived from the literature, which is going to be tested by the primary data collected through

the survey. The model will explore what the different key competitive priorities significantly affect business performance, under each shoring decision type.

4.4.2 Design for Two Empirical Studies

4.4.2.1 Research Approach

4.4.2.1.1 Inductive and Deductive

The common research approaches include the "deductive approach, in which you develop a theory and hypothesis (or hypotheses) and design a research strategy to test the hypothesis, or the inductive approach, in which you would collect data and develop theory as a result of your data analysis." (Saunders, Lewis and Thornhill, 2009, p.124). The deductive process is shown in Figure 4-2:

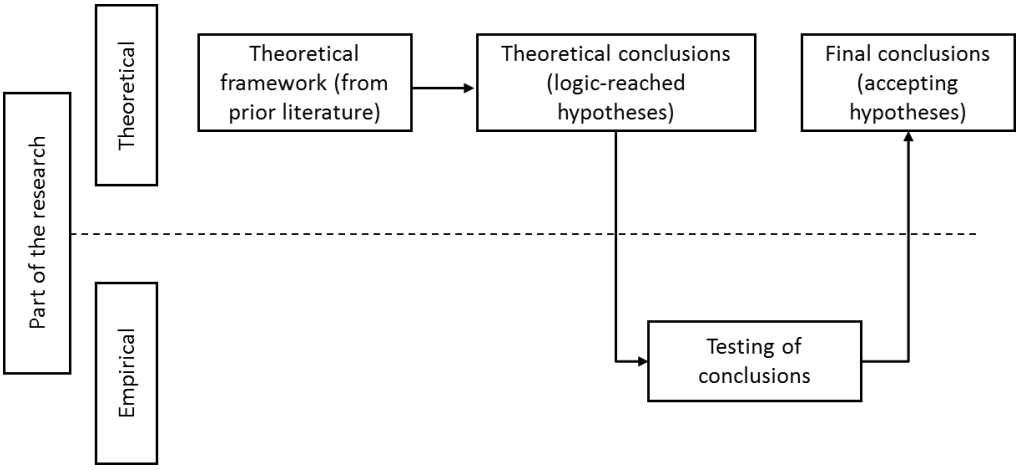


Figure 4-2 Deductive Research Approach

Source: Kovács and Spens (2005)

4.4.2.1.2 Rationale for Adopting Deductive

"Insofar as it is useful to attach these research approaches to the different research philosophies, deduction owes more to positivism and induction to interpretivism, although we believe that such labelling is potentially misleading and of no real practical value" (Saunders, Lewis and Thornhill, 2009, p.124). Robson (2002) lists five sequential stages of deductive research progress: deducing a hypothesis from the theory; expressing the hypothesis in operational terms; testing this operational hypothesis; examining the specific outcome of the inquiry; if necessary, modifying the theory in the light of the findings. Deduction

possesses several important characteristics. The above five stage processes are exactly how this research will be conducted. Besides, this research also closely fits the typical characteristics of a deductive approach. First, deduction usually aims to explain correlation relationships between variables, which perfectly match with the aim of this research to explore the correlations among competitive priorities, business performance and location strategies. Second, in order to pursue the principle of scientific rigour, deduction dictates that the researcher should be independent of what is being observed. The researcher is fully independent and does not add any human value to the research results. Finally, deduction is where concepts need to be operationalised in a way that enables facts to be measured quantitatively. The survey is the main method adopted in this research. Primary data will be analysed objectively to test the hypotheses (Saunders, Lewis and Thornhill, 2009, p.125).

4.4.2.1.3 Qualitative and Quantitative

The quantitative approach is more associated with a positivist philosophy and deductive approach, which primarily attempts to test theory to increase the predictive understanding of a phenomenon (Saunders, Lewis and Thornhill, 2012). Moreover, quantitative approaches place emphasis on quantification in data collection and analysis (Bryman and Bell, 2015).

In contrast, qualitative studies are more consistent with interpretivism and induction approach, where researchers focus on the collection and analysis of opinions, words, and viewpoints rather than statistical primary data, where a new theory is the result of research (Collis and Hussey, 2014). The main differences between the quantitative and qualitative approaches are presented in Table 4-3, as summarised from Saunders, Lewis and Thornhill (2009).

Table 4-3 Quantitative and qualitative approaches in relation to this study

Areas	Quantitative	Qualitative	This Study
Characteristics	Examines the relationship between variables that are measured numerically and analysed statistically	Studies participant's meanings and their relationships by using a variety of data collection techniques, to develop a new theory	Quantitative
Approach	Deductive	Inductive	Deductive
Philosophy	Positivism	Interpretivism	Positivism
Research strategy	Experimental Surveys	Case study, grounded theory, narrative research, and ethnography	Experimental Surveys

Source: Saunders Lewis and Thornhill (2009)

As can be seen in Table 4-3, Saunders, Lewis and Thornhill (2009) have made a clear distinction between quantitative and qualitative approaches from four perspectives: characteristics, role of theory in research, philosophy, and research strategy. This study adopted a quantitative approach due to the rationales discussed within the following section.

4.4.2.1.4 Rationale for Adopting Quantitative

Collis and Hussey (2014) demonstrated that the selection of a research approach should be based on the aims and objectives of a research project. This research aimed to develop and validate a theoretical framework with hypotheses to explain how the location decision strategies affect the correlation between comparative priorities and company performance based on the existing literature. The proposed conceptual framework aims to examine the empirical relationship between independent and dependent variables. Hence, this research adopted the quantitative approach in order to collect and analyse data, further to test the hypotheses (Saunders, Lewis and Thornhill, 2009).

In detail, first, from the methodological perspective, this study developed hypotheses from existing literature to explain the correlation relationships between independent and dependent variables. Second, from the ontology perspective, this study is concerned with the nature of reality, especially to achieve the first research aim, which is to clarify the current reshoring status in

the UK. Therefore, the researcher is required to objectively observe the adoption of different location strategies (Saunders, Lewis and Thornhill, 2009). Finally, in line with the positivist philosophy, the phenomena regarding location strategies can be validated by observation and measuring social phenomena (Saunders, Lewis and Thornhill, 2009). In addition, the quantitative approach supports the usage of large samples to improve the generalizability of empirical results, which is necessary to summarise the current reshoring status and to conclude what competitive priorities should be focused on, based on different location strategies (Saunders, Lewis and Thornhill, 2009). In summary, given the nature and research aims of this research, a positivism philosophy with deductive and quantitative approaches is more relevant than the other options.

4.4.2.2 Methodology

4.4.2.2.1 Methods

“The term method refers to the technique of data collection and analysis rather than the interpretation of empirical findings” (Karlsson 2009, p.67). It has also been named as a research strategy according to the research onion (Saunders, Lewis and Thornhill, 2009). A range of commonly used methods include survey, case research, action research, modelling and simulation, experiments, ethnography and underpinning theory (Karlsson, 2009; Saunders, Lewis and Thornhill, 2009). As shown in Figure 4-3, it matches different methods with philosophical and ontology perspectives. It seems survey based research, sitting in the middle of Figure 4-3, is more suitable to this study since it matched with the researcher’s positivist beliefs and objective reality of the ontology. Especially, considering the research aim of revealing the practice of UK reshoring status and test the statistical correlations, this study requires a big sample size of primary data, which can only be achieved properly through survey approach.

RATIONAL ↑ / EXISTENTIAL ↓	NATURAL ←		→ ARTIFICIAL
	DIRECT OBSERVATION OF OBJECT REALITY	PEOPLE'S PERCEPTIONS OF OBJECT REALITY	ARTIFICIAL RECONSTRUCTION OF OBJECT REALITY
AXIOMATIC			• REASON/LOGIC/ THEOREMS • NORMATIVE MODELING • DESCRIPTIVE MODELING
LOGICAL POSITIVIST/ EMPIRICIST	• FIELD STUDIES • FIELD EXPERIMENTS	• STRUCTURED INTERVIEWING • SURVEY RESEARCH	• PROTOTYPING • PHYSICAL MODELING • LABORATORY EXPERIMENTATION • SIMULATION
INTERPRETIVE	• ACTION RESEARCH • CASE STUDIES	• HISTORICAL ANALYSIS • DELPHI • INTENSIVE INTERVIEWING • EXPERT PANELS • FUTURES/ SCENARIOS	• CONCEPTUAL MODELING • HERMENEUTICS
CRITICAL THEORY		• INTROSPECTIVE REFLECTION	

Figure 4-3 A Framework for Research Methods

Source: Karlsson (2009, p.71)

4.4.2.2.2 Survey

Surveys are an economical way of data collection from a sample, from the viewpoint of analysing the results statistically and generalizing them to a population (Collis and Hussey, 2014). Surveys are often linked to positivism and the deductive approach, which attempt to test theories or hypotheses, leading to their confirmation or revision/rejection (Bryman and Bell, 2015). There are several reasons for employing the survey method. First, it is helpful for obtaining straightforward information from respondents (Bryman and Bell, 2015). Second, this method is inexpensive when obtaining data from a large sample (Collis and Hussey, 2014). Third, there are a number of data collection methods available for

surveying: postal, Internet-based self-completion questionnaires, and telephone and in-person interviews (Collis and Hussey, 2014).

Surveys using the face-to-face method can be adopted at any place and time convenient to the participant and the researcher (Saunders, Lewis and Thornhill, 2009). This method is not the best one for the present research because of the time and cost considerations, given the large and geographically widespread sample (Collis and Hussey, 2014).

Using telephone interviews to conduct surveys allows one to survey a large sample at low cost (Saunders, Lewis and Thornhill, 2012). However, the telephone method might lead to bias in terms of restricting the sample to persons who choose to respond in this way (Collis and Hussey, 2014). Therefore, this method is also not best option as the main method for the present study.

In this study, the author employed an online questionnaire survey as the main data collection approach. The term “online” refers to internal surveys hosted on a website. Participants can be recruited from potential participant databases available through search agencies or panel management companies (McDaniel and Gates, 2011). We selected this method because it allowed us to target a large sample with low cost and high speed (Collis and Hussey, 2014). Furthermore, from the participants’ viewpoint, it is convenient because they are free to fill in the questionnaire at any time to suit themselves (Bryman and Bell, 2015).

Online survey tools include the use of pop-up instruction boxes, dropdown menus, choice of colour and font (Saunders, Lewis and Thornhill, 2009). Furthermore, graphical images, animations, and links on the survey website can be customised based on the survey topic (McDaniel and Gates, 2011). A well thought out visual layout and optimum website design could also enhance the participants’ experience (McDaniel and Gates, 2001), yielding better, more committed responses. Furthermore, online questionnaire surveys can also be conducted with mobile devices. Smartphones and tablets offer many possibilities for data collection in terms of both portability and immediacy, without placing

temporal or spatial limitations (Gray, 2014). Such devices help researchers to reach and engage with participants who may be difficult to access via other forms of survey (McDaniel and Gates, 2011). Furthermore, online questionnaire surveys have been used widely in the literature (Bryman and Bell, 2015). Table 4-4 summarises the advantages and disadvantages of online surveys.

Table 4-4 Advantages and Disadvantages of Online Surveys

Advantages	Disadvantages
Speed: Relatively quicker than other methods	Sampling frames: Researchers do not know whether participants are really representative of the target population
Cost: no printing, stationery, and postage costs	Access to the web: researchers may not be able to engage participants to access the survey website
Response Quality: design features can make surveys more appealing and interesting	Technical problems: virtually no uniform standards for online surveys exist

Source: Collis and Hussey (2014)

In order to encourage the response rate, this study finally adopts the online survey as the major data collection method and combines it with a few face-to-face data collections.

There are three important stages in conducting a survey: sampling, data collection, and instrument development (Collis and Hussey, 2014). Sampling aims to generalize a finding from a chosen smaller group of a population to the entire population (Gray, 2014). Data collection refers to choosing a suitable method, such as postal or Internet self-completion questionnaires, and telephonic and in-person interviews (Collis and Hussey, 2014). Instrument development aims to elicit quality information in order to answer research questions. All of these will be discussed in detail in sections 4.4.2.4.2, 4.4.2.4.3 and 4.4.2.4.5.

4.4.2.2.3 Research Process

This research attempts to examine the correlation among independent variables such as competitive priorities, location strategies, and dependent variables such as business performance, and the role of location decisions played within the manufacturing sector in the UK. In order to achieve this, according to Saunders,

Lewis and Thornhill (2012), a clear research plan in terms of the process to answer the selected research question is essential, because this will provide the researcher with a detailed plan which will help to guide them in completing the study efficiently and successfully. The detailed research plan should include clear objectives based on the research question/aims, specifics of the sources of data collection, and a list of methods adopted for data analysis and ethical issues (Saunders, Lewis and Thornhill, 2009). The research process employed in this study will be an entire detailed plan, which covers from very beginning of the research, such as the literature review and framework developments, then data collection including method selection, followed by measurement and questionnaire development and the data collecting process, and finally the data analysis procedure, as shown in Figure 4-4.

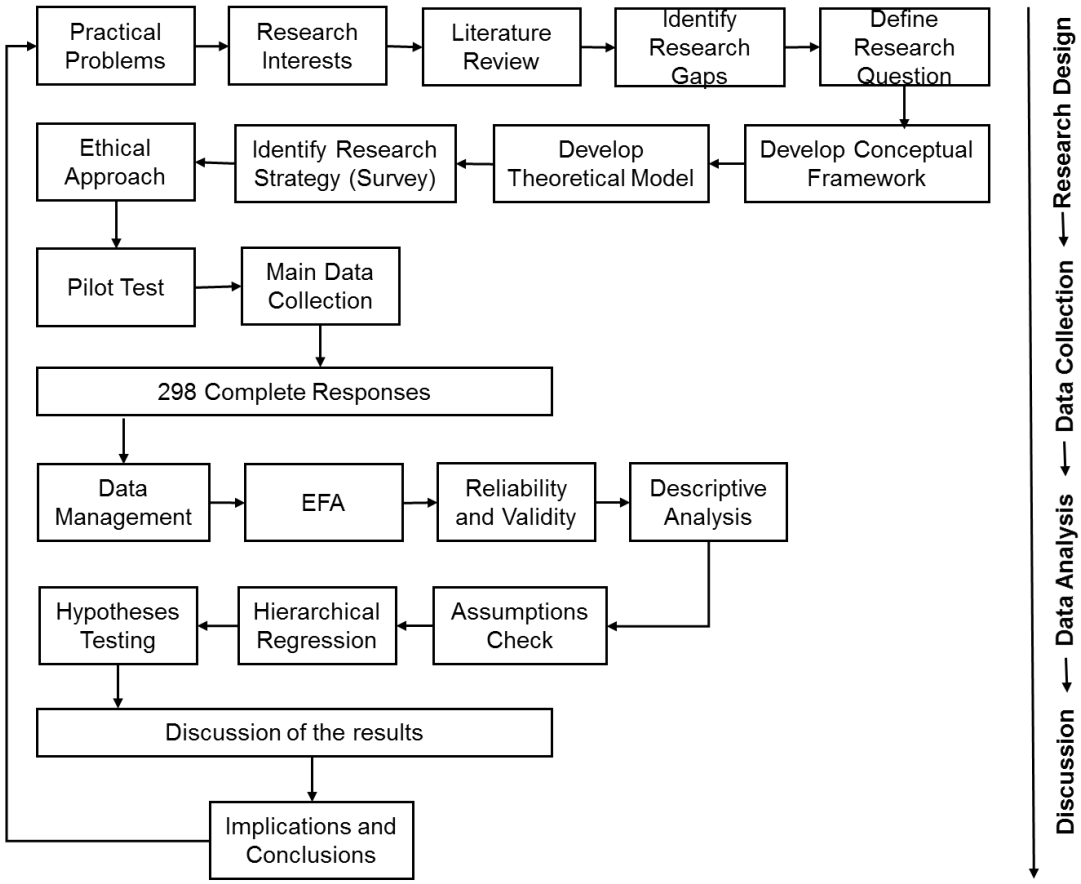


Figure 4-4 Research Process

As shown in Figure 4-4, in the first stage of the literature review and research design, the researcher conducted a review of relevant articles published in the ABS-journal ranking list regarding several fields linked with reshoring, such as offshoring, reshoring, business and manufacturing strategies, competitive priorities, and performance, to identify the research gaps and research questions. Based on the research aims, a theoretical model was developed based on the literature review, and ten hypotheses were formulated. Then, the survey has been selected as the research method in alignment with the positivism philosophy, deductive approach and quantitative approach, as justified in the previous sections. Further, within the data collection phase, a pilot test has been conducted to test and validate the design of the questionnaire prior to the main data collection. Through multiple routes and several pushes of the survey dissemination, finally, 298 completed survey responses have been received. Within the third stage, data analysis has been conducted through descriptive and statistical analysis, and the hierarchical regression has been adopted to test the theoretical relationships that are informed by the theoretical model and hypotheses. Then, the final stage is the discussion, interpretation of the results and matching them to the literature for the final findings, explanations, suggestions and conclusions.

4.4.2.3 Sampling Strategy

Sampling involves determining a suitably sized sample within a population because collecting data from the entire population is practically impossible (Hair et al. 2010). A sample is a representative part of a population, while a population is defined as the universe of units from which a sample is selected (Saunders, Lewis and Thornhill, 2012).

4.4.2.3.1 Targeted Participates

The population of this study includes all manufacturing companies in the UK. The manufacturing industry includes companies that produce goods for use or sale by using labour and machines, tools, and chemical and biological processing or formulation (Zhu et al., 2011) and as defined in the Standard Industrial Classification (SIC) code 2007.

It needs to be clarified that the target population is all UK-based manufacturers, irrespective of whether they have reshored or not. This is due to the research aims of this research, which are not only to explore the current reshoring status in the UK, but also to discover what will be the best match between a company's competitive priorities and location/shoring strategies regarding improving business performance. In order to achieve these aims, a comparison is required between different shoring decisions type. Therefore, the target companies are not only the reshored companies. The target respondents from companies for this survey are SC managers, plant managers or senior members of staff (e.g. CEO, general manager, and general director) who have enough awareness of their companies' manufacturing activity location decisions.

4.4.2.3.2 Sampling

There are two approaches for sampling: probability and non-probability. The former is often adopted when each unit in the population has a known chance of being selected, while the latter is used in the exploratory phase and/or pre-testing of survey questionnaires (Saunders, Lewis and Thornhill, 2012). Table 4-5 shows the differences between the probability and non-probability sampling approaches (Saunders, Lewis and Thornhill, 2012; Karlsson, 2009).

Table 4-5 Differences between Sampling Approaches

Probability (random) sampling	Non-Probability (Non-random) sampling	This study
Can be generalized to the population defined by the sampling frame	Cannot be generalized beyond the sample	Result needs to be generalized to the population
Allows use of statistics, tests hypotheses	Exploratory research, generates hypotheses	Hypotheses tests
Can estimate population parameters	Population parameters are not of interest	Estimate population parameters
Eliminates bias	Adequacy of the sample cannot be known	Eliminate bias
Must have random selection of units	Cheaper, easier, and quicker to carry out	Ensure random selection of units

4.4.2.3.3 Control Variables

In order to enhance the validity of the research results, two control variables have been taken into consideration within this study, one of which is the firm size. According to the Company Warehouse, even though there is no unique definition of SMEs from the UK government perspective, however the common standard adopted is that SMEs are companies with fewer than 250 employees and a turnover under £50 million. In detail:

- Micro Business = fewer than 10 employees and a turnover under £2 million
- Small Business = fewer than 50 employees and a turnover under £10 million
- Medium Business = fewer than 250 employees and a turnover under £50 million

As Cao and Zhang (Cao and Zhang, 2011) reveal, "*there are many other factors that might impact on firm performance including environmental or contextual variables such as firm size (Frohlich and Westbrook 2001; Hendricks and Singhal 2005; Danese 2007; Devaraj et al. 2007; Johnson et al. 2007; Krause et al. 2007; Småros 2007; Heim and Peng 2008; Yeung 2008; Ramaswami et al. 2009*)".

The other control variable is from the industry perspective; the research has categorized industries into high technology and low technology groups based on their SIC code according to the UK government manufacturing analysis report (BIS Department for Business Innovation & Skills, 2010), as shown in Table 4-6.

Table 4-6 Classifications of Industry Technology Level based on SIC code

High technology	Medium High Technology
Pharmaceuticals	Chemicals (excluding Pharmaceuticals)
Office, Accounting and Computing Machinery	Machinery and Equipment n.e.c.
Radio, Television and Communication Equipment	Electrical Machinery and Apparatus n.e.c.
Medical, Precision and Optical Instruments	Motor Vehicles, Trailers and Semi-trailers
Aircraft and Spacecraft	Railroad Equipment and Other Transport Equipment n.e.c.
Medium Low Technology	**Low Technology**
Coke, Refined Petroleum Products and Nuclear Fuel	Food Products, Beverages and Tobacco
Rubber and Plastic Products	Textiles, Textile Products, Leather and Footwear
Other Non-metallic Mineral Products	Wood, Products of Wood and Cork
Basic Metals and Fabricated Metal Products	Pulp, Paper, Paper Products, Printing and Publishing
Building and Repairing of Ships and Boats	Manufacturing n.e.c.

Source: BIS Report (2010, p.4)

The company size and industry support the control variable selection; and the results of the control variable. the likelihood of termination of offshore manufacturing and the return to the home country may be accelerated by technology-based industries, small firm sizes, shrinking cost differentials, the physical distance between home and host countries, the organizational archetypes, and quality related motivations (Ancarani, 2015; Foerstl, Kirchoff and Bals, 2016).

4.4.2.3.4 Sample Size

It is important to determine the sample size to reflect the population after selecting a sampling approach. The sample size should be large enough to address the research question and to represent the population fairly (Collis and Hussey 2014). The author used hierarchical regression to analyse the theoretical model, and the method warrants a large sample size. The sample size depends on the numbers of the variable and measurements. Usually, the sample size is five times the total number of both variables and measurements (Cohen et al., 2003; Hair et al.,

2006, p.196; Jaccard and Turrisi, 2003). As shown in the theoretical framework, there are 35 measurements and constructs in total. Therefore, at least 175 samples are required. Therefore, based on this argument and in order to get a good the regression results, the author designed aiming to collect sample size around 200-300.

4.4.2.4 Research Instrument and Measurement Scale

4.4.2.4.1 Variables

The literature review chapter described the development of the hypotheses to be tested empirically in this study. Measurement scales were selected to examine the competitive priorities and business performance. Churchill (1979) suggested two steps to develop measurement scales. First, measurement scales can be adopted from previous research to ensure content validity. Second, the measurement items for each construct are selected from literature reviews for the generation of measurement scales. The measurement items in this study were adopted from a systematic review of competitive priority, competitive capability, performance, SC management, and social science literature on global SC network design and manufacturing location decision (offshoring, reshoring, and outsourcing) fields.

All the measurements related to the variables within the moderation model were adopted from previous research as shown in Table 4-8. The competitive priorities have five constructs (IVs). There are seven items to measure manufacturing cost: increase capacity utilization, reduce total landed cost, reduce production cost, reduce labour cost , increase labour productivity and reduce material cost; five items to measure SC cost: reduce coordination of operation cost, reduce taxes and tariffs, reduce currency changes risk, reduce transportation costs, reduce overhead costs; six items to measure quality: ensure conformance to produce specifications, ensure accuracy in manufacturing, offer consistently low defect rates, provide reliable products, improve supplier quality assurance, design high-performance product; three items to measure delivery: increase delivery speed, reduce production lead time, and meet delivery performance; seven items to measure flexibility: make rapid design changes, adjust capacity quickly, make

rapid volume changes, make rapid product mix changes, make rapid timing of delivery changes, introduce new-product quickly, make rapid timing of delivery changes (Boyer and McDermott, 1999; Ward et al., 1995, 1998; Joshi et al., 2003; Hill et al., 1990). In terms of business performance, the measurements include Return on sales (ROS), ROS growth, Return on Investment (ROI), ROI growth, Pre-tax return on assets (ROA), market share, and market share growth, which are also adopted from previous research (Anderson et al., 1989; Droge et al., 1994).

Participants have been asked to declare their companies' competitive priorities within the last eight years (since 2008) and the current performance through a seven-point Likert scale.

In this study, a total of seven constructs (manufacturing cost, SC cost, time, quality, flexibility, location decision, business performance) were formed along with 29 measurements. In survey questionnaires, a Likert scale is commonly used to measure perception and attitudes (Saunders, Lewis and Thornhill, 2012). Therefore, the author used the Likert scale (Bryman and Bell, 2015) for rating the questions or for collecting respondents' opinions. A seven-point Likert rating scale was used in this study where 1 = very little emphasis, 7 = very high emphasis. It used a seven-point rating scale because seven points tends to be a good balance between having adequate points of discrimination without providing too many response options (Bryman and Bell, 2015), also providing a better reliability of data than five Likert (Hensley, 1999).

4.4.2.4.2 Measurement Scale for Business Strategy

The measurements for business strategy are adopted from previous research Kotha and Swamidas (2000), which has been further confirmed by Amoako-Gyampah and Acquaah (2008).

There are eight measurements in total: four of them for cost-leadership and the other four for differentiation. The detail of each measurement is shown in Table 4-7.

Table 4-7 Measurements Scales for Business Strategy

Constructs	Code	Measurement	Reference
Cost-leadership	S_Cost 1	Operating efficiency of the business unit	(Kotha and Swamidass, 2000)
	S_Cost 2	Continuing concern for cost reduction in terms of products	
	S_Cost 3	Continuing concern for cost reduction in terms of processes	
	S_Cost 4	New product development	
Differentiation	S_Differenciation1	Enforcement of strict product quality control procedures	
	S_Differenciation2	Quality of the products	
	S_Differenciation3	Extensive service capabilities	
	S_Differenciation4	Specific efforts to insure a pool of highly trained experienced personnel	

4.4.2.4.3 Measurement Scale for Competitive Priorities

As discussed in the previous sections regarding the literature review, competitive priorities generally include cost, quality, time and flexibility. This research has been enriched by adding an extra construct “supply chain cost”. Table 4-8 summarises the measurement scales for the independent variables of manufacturing cost, SC cost, quality, delivery and flexibility. The items were adopted from multiple articles with common scales of the variables.

Table 4-8 Measurement Scales for Competitive Priorities

Constructs	Code	Measurements	Reference
Manufacturing Cost	MC1	Increase capacity utilization	(Boyer and McDemott, 1999; Ward et al., 1995; Ward et al.,1998)
	MC2	Reduce total landed cost	
	MC3	Reduce production costs	
	MC4	Reduce labour costs	
	MC5	Increase labour productivity	
	MC6	Reduce material costs	
	MC7	Reduce Inventory level	
SC Cost	SCC1	Reduce coordination of operation cost	(Slack et al., 2007; Ward et al., 1995; Ellram 2013, 2014)
	SCC2	Reduce taxes and tariff	
	SCC3	Reduce currency changes risk	
	SCC4	Reduce transportation/logistics costs	
	SCC5	Reduce overhead costs	
Quality	Quality1	Ensure conformance to product specifications	(Kim and Arnold,1996; Slack et al., 2007)
	Quality2	Ensure accuracy in manufacturing	
	Quality3	Offer consistently low defect rates	
	Quality4	Provide reliable/durable products	
	Quality5	Design high-performance products	
	Quality6	Improve supplier quality assurance	
Delivery	Delivery1	Increase delivery speed	(Boyer and McDemott 1999;Joshi, Kathuria, and Porth, 2003; Ward et al.1995;Ward et al.1998;)
	Delivery2	Meet delivery promises	
	Delivery3	Reduce production lead time	
Flexibility	Flexibility1	Make rapid design changes	(Boyer and McDermott, 1999; Joshi, Kathuria and Porth, 2003; Kim and Arnold, 1993; Slack, Randon-Jones and Johnston, 2013; Ward et al., 1998)
	Flexibility2	Adjust capacity quickly	
	Flexibility3	Make rapid volume changes	
	Flexibility4	Offer a large number of product variety	
	Flexibility5	Introduce new-product quickly	
	Flexibility6	Make rapid product mix changes	
	Flexibility7	Make rapid timing of delivery changes	

4.4.2.4.4 Measurement Scales for Performance

Performance in this research refers to business performance. Business performance is a very material concept which has been explored within survey-based studies and from multiple perspectives for many years. Therefore, the measurements for business performance can be easily found from previous empirical research. The researcher has reviewed the relevant articles and identified the common and popular measurements from within them. Table 4-9 summarises the popular measurement scales for business performance adopted

by previous research, which also include the Droge, Vickery and Markland (1994) and Cleveland et al. (1989), the two fundamental articles for business performance measurements.

In this study, manufacturing performance is only used in the descriptive analysis process to catch the whole picture of the current UK manufacturing reshoring status. It is not involved in the theoretical model and therefore is not going to be used in the statistical and model analysis.

The participants were asked to indicate their company's current performance relative to its competitors following a seven-point Likert scale (1 = "worst in industry", 7 = "best in industry"), as suggested Cleveland et al. (1989).

In this study firm performance is measured by ROS, ROS growth, Market share, market share growth, return on investment (ROI), and growth in ROI, ROA and customer satisfaction. These measurements almost current all the perspectives of a firm financial performance, and they have been widely used in previous research because they are primary yardsticks for most stakeholders (Cao and Zhang 2011; Chi et al. 2009; Chang and King, 2005; Cleveland, Schroeder and Anderson 1989; Droge, Vickery and Markland 1994; Liu et al. 2016; Morash et al. 1996; Vickery et al. 1999)

Table 4-9 Measurement Scales for Performance

Constructs	Code	Measurements	Reference
Business Performance	BP1	Return on sales (ROS)	(Cao and Zhang 2011; Chi et al. 2009; Chang and King, 2005; Cleveland, Schroeder and Anderson 1989; Droge, Vickery and Markland 1994; Liu et al. 2016; Morash et al. 1996; Vickery et al. 1999)
	BP2	ROS growth	
	BP3	Market Share	
	BP4	Market share growth	
	BP5	Return on investment (ROI)	
	BP6	ROI growth	
	BP7	Pre-tax return on assets (ROA)	
	BP8	Customer Satisfaction	

4.4.2.4.5 Categorical Moderator

As discussed within the literature review, the manufacturing location decision is not a continuous variable which can be measured by scales. It is a categorical variable which consists of different types. Based on the literature review, it can be seen that location decision includes offshoring, direct reshoring and indirect reshoring. As explained within 4.4.2.5.2 the different combinations of the above decisions could divide the manufacturing companies within the UK into six different groups with different location strategies. These six groups are the original unmanaged groups based on practice, with some duplicated features among different groups. It is necessary to have a further management of these groups according to their common features to be more suitable for future research, interpretation and analysis purpose (Aiken and West, 1991; Hair et al., 2006; Jaccard and Turrisi, 2003). Therefore, the six groups have been further merged and regrouped into five groups as shown in Figure 4-5.

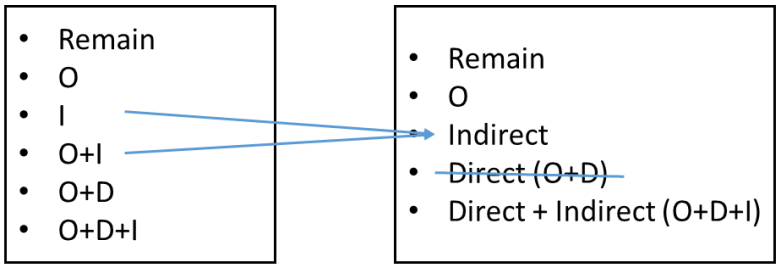


Figure 4-5 Categorical Moderator Groups

The regroups above is based on the nature and features of the shoring decision. In detail, when conducting the analysis, and based on the reshoring decisions involved, the original six groups have been reorganized. Group F has been is named the “Remain” as an independent group, since the companies were not involved in any offshoring, or direct or indirect reshoring, and. Group E was only involved in offshoring activities and is named the “Offshoring” as an independent group. Groups C and E have been merged into the “Indirect reshoring” group, since both of them end with an indirect reshoring decision. Also, offshoring is a default for reshoring according to Gray et al. (2013), there not no need to distinguish wherther offshored prior an indirect shoring. Group B has been named the “Direct reshoring” as an independent group since the companies directly

moved the offshored products back to the UK. Group A is named the "Direct+Indirect" reshoring group, since the companies were involved in both indirect and direct reshoring activities. After this reorganizing, the five groups now consist of the location strategies (moderator variable). The descriptive analysis has been conducted using comparisons of these five groups. However, due to the responses number of the "Direct Reshoring" (O+D) group is only seven, which does not qualify for statistical analysis (Hair et al., 2006). Therefore, within the further hierarchical regression analysis conducted to test the moderation model, O+D has been dropped. Finally, four groups are involved as the moderator for the statistical analysis.

4.4.2.5 Questionnaire Development

4.4.2.5.1 Direct and Indirect Reshoring

The literature usually discusses reshoring which refers to the physical re-location of offshored manufacturing activities back to the home country (UK within this study). However, physical relocation is actually only one type of reshoring which could be named "direct reshoring", and it is only able to happen with the condition of offshoring happened first (Gray et al., 2013). In reality, reshoring is more than just moving back. Rather than directly bring their overseas plants back to the home country, some companies also engage in reshoring through proactively and consciously keeping and increasing their manufacturing activities in the UK instead of moving them abroad after a serious considerations of foreign location options. For example, when a company wants to introduce a new product or increase production of existing products, the company proactively decides to conduct this extra production in the UK rather than go aboard, after a systematic decision procedure of considering all the possible production locations within and outside the UK. This trend of "not going out" has been named as "indirect reshoring" in this research, which comes from agreement with the US Reshoring Institute and is also supported by the work of Fratocchi et al. (2011). Different from direct reshoring, the indirect reshoring can happen without condition of offshoring happening first. For example, a company produces product A overseas (offshored), when they want to introduce a new product B or when they want to

significantly increase additional batch production of product A, they decide to conduct in the UK after comparing both overseas and UK options, which can define this company engaged in indirect reshoring. However, if a company never produce any product overseas (offshored) before, when they want to increase production (no matter for a new product or an existing product), they decide to stay in the UK after considering all the location possibilities of UK and overseas, which can also define this company engaged in indirect reshoring. Therefore, the key of indirect reshoring is proactively and consciously increase the company's UK production capability, and come to the final decision with systematic considerations of all the production location options. This kind of company is different from the company who always stays in the UK and increase their production in the UK automatically, without considering any other location options (defined as "Remain" in this study), even though they (indirect and remain) could both physically stay in the UK. The former has experienced a systematic location comparison and decision procedures, and the later did not. This is a huge different, since the different types of decision approach actually represent the companies' different attitudes and proactive levels to location decision, as well as the different levels of decision making experience, which relates to different operations philosophies, competitive priorities, and operational behaviours. Therefore, they need to be distinguished to different shoring groups in the research.

The relationship between direct and indirect reshoring is shown in Figure 4-6. The overlap refers to the companies who conduct both these two types of reshoring.

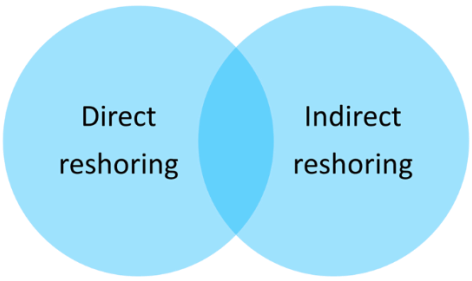


Figure 4-6 Direct and Indirect Reshoring

4.4.2.5.2 Groups

Based on the different possible combinations of manufacturing shoring decisions, the companies were divided into six groups (see Table 4-10) The instrument was constructed using “Qualtrics” and was mainly administered online. This permitted the creation of a tailored version for each respondent, based on their responses to the questions that allocated them into the right group.

Table 4-10 All the Shoring Decision Groups

Groups	Offshoring (O)	Direct Reshoring (D)	Indirect Reshoring (I)	Companies Activities
Group A (O+D+I)	√	√	√	Companies who have offshored and then engaged in both direct reshoring and indirect reshoring
Group B (O+D)	√	√		Companies who have offshored and then only engaged in direct reshoring
Group C (O+I)	√		√	Companies who have offshored and then only engaged in indirect reshoring
Group D (I)			√	Companies who have only engaged in indirect reshoring
Group E (O)	√			Companies who have only offshored
Group F (Remain)				Companies who never engaged in offshoring or reshoring

4.4.2.5.3 Decision Tree

The survey includes 123 questions consisting of seven sections: general information, location decision, indirect and direct reshoring product, strategy consideration, competitive priorities, performance, and future trend. As explained in the above section, each group would answer different sections within the survey. The dynamic of each group has been designed as shown in Figure 4-7:

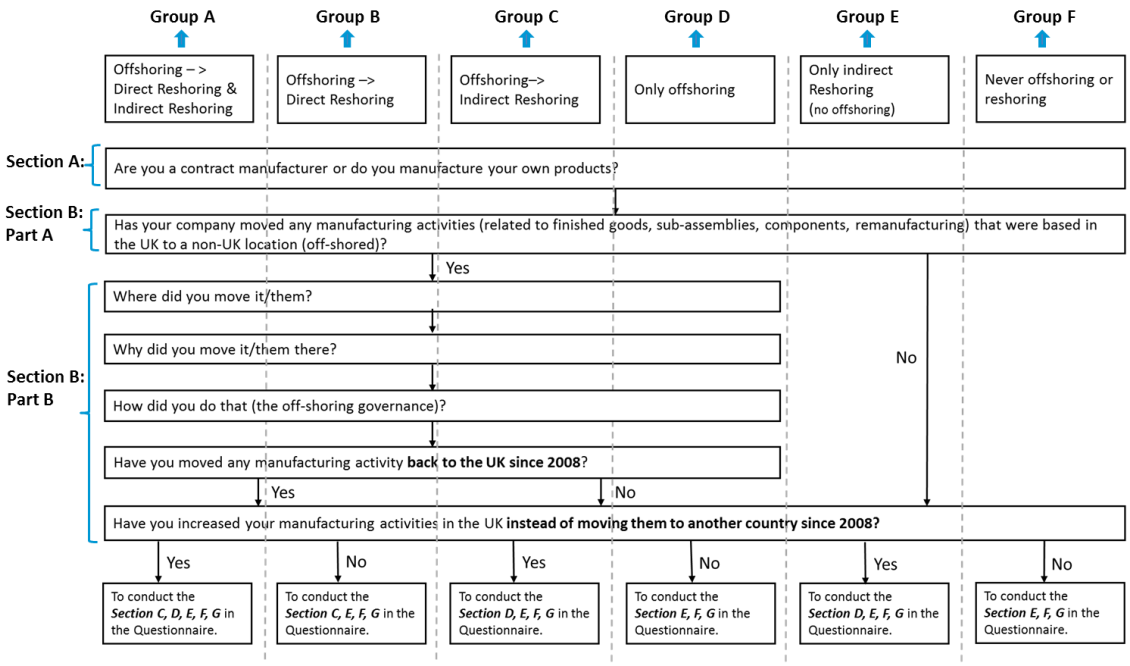


Figure 4-7 Dynamics of the Questionnaire Design

4.4.2.5.4 Questionnaire Design

The questionnaire is shown in appendix B.2. The author has put a huge emphasis on the design quality of the questionnaire with 20 versions modifications till achieving the final version, with an addition valid through Pilot test.

In order capture a full picture of the status, following the framework for reshoring, a 123-question long survey instrument has been developed includes items that tap business strategy (e.g. generic strategy), firm competitive priorities, manufacturing location decisions, reshored activities (related to finished goods, sub-assemblies, components, remanufacturing), conduction governance, reshoring impacts after implementation, and business performance. The questions have been designed base on the context of this research, and also refer the best wording of those papers which provide the measurements above and some recent quantitative research work as well (Kroes and Ghosh, 2010). The survey consists of 7 sections: general information, location decision, indirect and direct reshoring product, strategy consideration, competitive priorities, performance and future trend.

The instrument was constructed using “Qualtrics” and administered exclusively online. This permitted the creation of a tailored version for each respondent, based on their responses to the questions that allocated them in the right group.

4.4.2.5.5 Data Collection

The study used the quantitative data collected by an online questionnaire. Data were analysed descriptively through Qualtrics and Excel, and statistical analysis through SPSS IBM version 24. The target population was all UK based manufacturers, irrespective of whether they had reshored or not. The questionnaire includes a total of 123 questions. This research aimed for at least 300 responses for the analysis to produce robust results. However, since there are no population restrictions, it was expected to achieve a far greater absolute number of participating manufacturing firms, due to the multitude of databases and networks that the author exploited. For example, participants were identified through a contact database bought from a third-party data agency company “Data HQ”; a contact list from Supply Chain Research Group (SCRG) contact database; the databases of HVM (High Value Manufacturing) Catapult, EEF, and IMechE (Institution of Mechanical Engineers); the author’s supervisors; and her own private contact list. In addition, the databases of the SME team of WMG were also used. Meanwhile, the companies that have actually reshored back to the UK, identified from published articles, consulting reports, and public news, were targeted. The target respondents for this survey were Supply Chain Managers or senior members of staff who have enough awareness of their companies’ manufacturing activity location decisions.

For all groups the principle of non-discrimination applies, i.e., participants will not be selected based on their gender, age, ethnicity or any other characteristic. It was required however, that all participants should be adults aged 18 years or older, so that they could provide informed consent to the study participation themselves. The online consent form (see Appendix A.1 and A.2) is displayed at the beginning of the survey and the participant was informed explicitly that by continuing, he or she agreed to its terms. The participants were also expected to speak English sufficiently well enough to understand the instructions. These

restrictions were clearly communicated to all potential participants prior to the study. Information about the study was provided in the Participant Information Leaflet that the participant can access at the beginning of the study.

In detail, the data collection procedures have been designed in the following three stages: preparation, advertisement and survey dissemination, as shown in Figure 4-9 In the preparation stage, the cover letter of introduction to the research and survey has been developed for both a full version and a short website version; A copy of this letter can be found in Appendix B.1. These letters were used to advertise and disseminate the survey. Then, before the formal dissemination, the advertisement was displayed through the WMG and SCiP (Supply Chain in Practice) official websites. The aim of this advertisement was to attract more interest from industries in order to receive more responses when formally issuing the survey. Beside the advertisement, a winner draw was designed to attract people's engagement. The final dissemination stage adopted multiple approaches to contact target participants, including email, social media and websites, and face-to-face meetings. The detailed dissemination plan is shown in Figure 4-8. The major approach has been through email. The contacts were from different resources, including LinkedIn (2200), Data HQ (24k), private contacts, and the contact databases of HVM, Business Executive, and WMG professional and executive; the majority of active resources is clearly the contacts list of UK manufacturing companies from Data HQ.

The data collection started in mid-October and ended in mid-December. Emails were sent batch by batch (five batches in total). After testing, Tuesday and Thursday mornings were found to be the most active times for receipt by participants. In addition to sending emails, dissemination of the survey has also been conducted through social media and websites. The social media adopted included LinkedIn Groups, Twitter accounts (the author's personal twitter account and the SCiP official twitter account), and WMG and SCIP official websites as well. Every Monday, Thursday and Friday a push on social media was conducted. Meanwhile, in order to increase the response rate, the author attended several industry events held at the NEC (National Exhibition Centre) in Birmingham to

issue the survey and target people to complete the questionnaire face-to-face. The events were all UK manufacturing company relevant events including: TCT, PPMA, Manufacturing Leader conference, in addition to some events held at Warwick, such as SEMs team network, SCiP networking events.

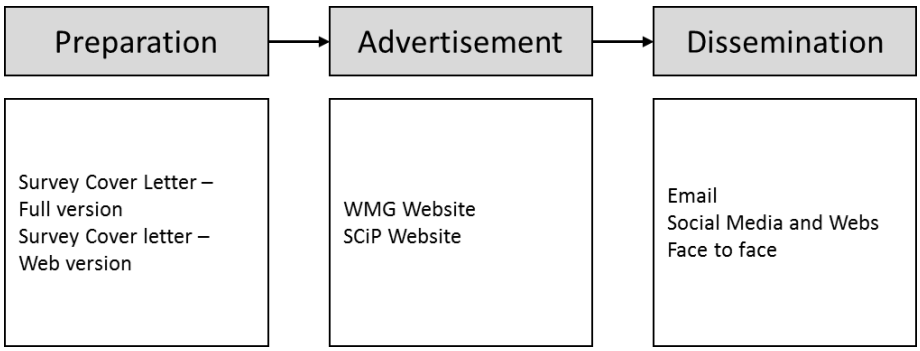


Figure 4-8 Data Collection Stages

Sources	Contact Number
LinkedIn Contacts	2K
Data HQ	24K
Other Private	0.5K

Dissemination Schedule	Oct			Nov				Dec		
	17th	24th	31st	7th	14th	21st	28th	5th	12th	19th
Batch 1 (1K)	S	R1		R2						
Batch 2 (10K)		S	R1		R2					
Batch 3 (3K)			S	R1		R2				
Batch 4 (10K)						S	R1		R2	
Batch 5 (2.5K)							S	R1		R2

Note: in above table, S refers "1st send"; R1 refers "1st reminder"; R2 refers "2nd reminder"

Figure 4-9 Email Dissemination Plan

4.4.2.5.6 Pilot Test

It is important to conduct a pilot test before using a questionnaire for formal data collection. The purpose of the pilot test is to refine the questionnaire and enable the researcher to assess the validity and reliability of the questions (Saunders, Lewis and Thornhill, 2009). Validity refers to the process of seeking advice from

experts on the representativeness and suitability of the questionnaire, while reliability is related to the consistency of responses to questions (Saunders, Lewis and Thornhill, 2009). Table 4-11 summarized a list of purposes which could achieves through pilot test, and the right column identified which purposes have been applied in this study (Creswell 2009; Karlsson 2009; Saunders, Lewis and Thornhill, 2009; Ticehurst and Veal 2000)

Table 4-11 Pilot Test Purposes

Purpose	In this study
Testing questionnaire wording	Yes
Testing questionnaire understandability	Yes
Testing questionnaire sequencing	Yes
Testing questionnaire layout	Yes
Gaining familiarity with respondents	No
Testing and training fieldworkers	No
Estimating response rates	No
Estimating questionnaire completion time	Yes
Testing analysis procedure	No

The validation of the questionnaire was conducted through 20 modifications within the research team, and then four experts from both academia and industry were consulted. Details of the participants' information is given in Table 4-12.

Table 4-12 Pilot Participants' Information

Participant Role	Specialist Fields	Type	Affiliation
Supply Chain Manager	Supply Chain, Strategy, Location Decision, Procumbent	Industry	JLR
Supply Chain Manager	Supply Chain, Global Sourcing and Production	Industry	Tata Beverage
Professor	Survey based Research, Research Methodology, Industrial Engineering, Information Systems (Business Informatics), Manufacturing	Academia	University of Padova
Managing Director	Manufacturing, Supply Chain, Consultancy	Academia and Industry	LMR Pty Ltd.

The pilot test was conducted in two rounds. The first round was with a Professor who is the key methodology researcher and survey-based master within Europe.

The pilot was conducted in July 2016 face-to-face and the professor was asked about the clarity of the instructions, for an opinion on the design, and whether the layout was clear and attractive. Based on the suggestions given, the questionnaire was modified and the second-round pilot test was then conducted for further validation. As shown in Table 4-12, four externals were involved. The participants were invited to WMG, staying together with the researcher, to complete the questionnaire online through Qualtrics. Therefore, the researcher observed the whole process face-to-face, while counting the time taken by participants. The researcher was not allowed to communicate with participants during the survey process. The researcher observed the responses including wording, facial and body responses from the participants when they completed the questionnaire. After they submitted the questionnaire online, the researcher communicated with participants to gain their feedback in terms of the instructions, their opinions of the design, and whether the layout was clear and attractive, as well as the key points listed within Table 4-11.

In summary, after all the participants had responded, the wording of questions and measurements scales for the background, strategy, and operational consideration sections were modified in order to make the questionnaire more easily understood by practical industrialists. Also, for the operational consideration section, taking into account the pilot participants suggestions, the author added the extra option “n/a” (not applicable) to allow participants to state the situation that the measurement item receives “no emphasis at all” in their business, since Likert “1” represents “very little emphasis” in the survey. In other words, the “n/a” in this research represents for an even lower emphasis level than “1”, which is “did not emphasis at all” or “no emphasis”. Therefore, it will be coded as 0 during the analysis. So, this “0” is a kind like extra Likert point in this study, rather than representing the missing value which is normally seen in other statistical analysis.

The decision above of taking this absolute “n/a” option and coding as “0” is a cogitative decision after multiple considerations and discussions with research professionals. Actually, the author could merge and code “n/a” (no emphasis) as

“1” (very little emphasis) in this study as some other research did. However, following the data collection principle of “respecting to practice”, coding as “0” could be more proper to respect the nature difference between “no emphasis” and “very little (tiny) emphasis”, even though the distance between them is not far away. In addition, this coding follows the agreement of using parametric statistics for Likert scale, supported by Lubke and Muthen (2004) and Krosnick and Presser (2010), to be able include extra “0” in Likert scale. Especially, in this research, the “0” has real meaning of “no emphasis” as one of the rating scale. It is entirely different from “don’t know” option in some Likert scale, which may produce a little bias when coding it “0” as argued by some literature (Krosnick and Presser, 2010). More important, the case samples with “0” are very small in the dataset of this study, and therefore it will not create a significant difference on the results no matter coding “n/a” as “1” or “0”. In addition, the EFA has been conducted separately for IVs and DV, with results of high validity, and the data has been standardized before regression analysis being conducted, which will further mitigate the difference of coding “n/a” as “1” or “0. Therefore, it can conclude that coding “n/a” as “0” is more proper following the business practices, and it will not have impacts on the final results. This can be further justified by the truth that the dataset in the study has passed all reliability and validity tests, as well as met all the assumptions and conditions of conducting regression analysis.

4.4.2.6 Data Analysis

The entire data analysis process has been summarised in the flowchart shown in Figure 4-10. Details of each analysis stage will be discussed in the following sub-sections.

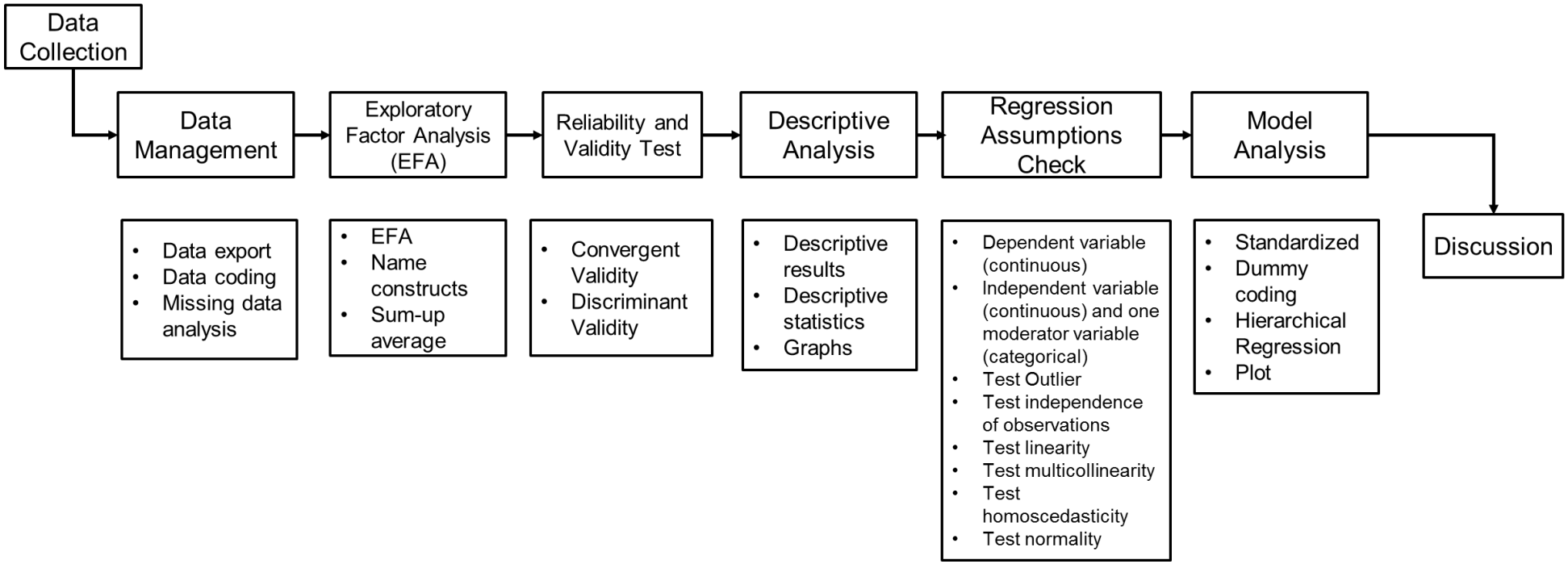


Figure 4-10 Entire Data Analysis Process

4.4.2.6.1 Data Analysis - General

Data analysis starts with data cleaning to make sure that no missing value or outlier is present. Excel was used to export and code the data, and screening was carried out to clean outliers through SPSS version 24. Then, hierarchical regression was conducted to validate the theoretical framework.

4.4.2.6.2 Data Coding

Data coding refers to the translation of a questionnaire into numbers. This process guides researchers when translating responses in order to record them. The author used Qualtrics to export the survey responses into Excel 2016 and later cleaned them manually through the Excel functions. Moreover, to avoid errors in these procedures, the researcher double-checked the coded and recorded data on the computer files before data cleaning.

4.4.2.6.3 Reliability and Validity

To ensure the items represented the constructs accurately, the author tested for convergent and discriminant validity.

Convergent validity focuses on the measurement level, by referring to the validity of measurements or scales consistent with the construct (latent variable). In other words, convergent validity is used to check whether the variance of the consistency of measurements is high enough to become a construct (latent variable) (Hair et al., 2006). There are two ways to justify convergent validity. One is through the calculation of Cronbach's coefficient alpha. Usually, the measurements under their relevant constructs are also shown to qualify convergent validity through Cronbach's coefficient alpha. Cronbach's coefficient alpha >0.8 means qualified convergent validity; if it is <0.8, then it is not qualified Nunnally (1978). The calculation of Cronbach's coefficient alpha can been completed through SPSS. Another way to justify convergent validation is through a comparison of CR (Composite Reliability). Similar principals, such as the alpha approach, if CR>0.8, this means qualified convergent validity; otherwise, it means not qualified. However, the CR value needs to be calculated manually in Excel.

This research adopts the alpha approach, details of which are shown in the next chapter.

Discriminant validity refers to a clear distinct and independent relations between constructs, through comparison of the square root of AVE, which is the variance shared between constructs and their measures, and the Pearson correlations between constructs (Ignatius et al., 2012). The square root of AVE values needs to be larger than any corresponding row or column Pearson correlation value, to support discriminant validity.

4.4.2.7 Data Analysis – Specifically for the Descriptive Analysis

After data management and testing for the validity and reliability of the constructs, the descriptive analysis is then conducted to reveal the current status of UK manufacturing reshoring. The descriptive analysis has been conducted by using Excel, especially the Pivot table functions together with the graphs functions. The data have been summarised, analysed and displayed in graphs, the details of which are shown and discussed in Chapter 5.

4.4.2.8 Data Analysis – Specifically for the Model Analysis

4.4.2.8.1 Hypothesis Testing

Hierarchical regression is a popular tool among researchers for testing hypotheses. Compared to multiple linear regression, hierarchical regression is more convenient to see the R^2 change difference when adding an extra variable every time. It can compare several models at the same time to identify the best model. In this study, the proposed hypotheses were examined by hierarchical regression. The hypotheses were tested in terms of standardised estimate, critical ratio (t-value), and critical value (p-value). SPSS 24 for Windows was employed to examine the hypothesised model.

4.4.2.8.2 Hierarchical Regression

Hierarchical multiple regression allows researchers to predict a dependent variable based on multiple independent variables, which can be conducted using SPSS Statistics. Compared to standard multiple regression, hierarchical regression enables researchers to enter the independent variables into the

regression equation in an order of their choosing, with the following advantages: (a) it controls for the effects of covariates on the results; and (b) takes into account the possible causal effects of independent variables when predicting a dependent variable (Brambor, Clark and Golder, 2006; Cohen et al., 2003; Dawson, 2014) In order to conduct hierarchical regression and obtain valid results, eight assumptions need to be meet up in advantage which including: test dependent variable (continuous), independent variable (continuous) and one moderator variable (categorical), independence of observations, test linearity, multicollinearity, outlier, homoscedasticity, and normality. In this study, the primary data have been checked to ensure they qualified all these assumptions.

4.4.3 Ethical Consideration

Ethical issues refer to the moral values and principles that form the basis of a code of conduct (Collis and Hussey, 2014). Ethical issues significantly affect research with human subjects; researchers must consider ethical issues, such as avoiding harm to participants, voluntary participation, confidentiality, and anonymity (Collis and Hussey, 2014). This study followed all these ethical requirements in all phases of the research. The necessary ethical approvals were sought prior to commencing data collection. The author informed all participants about the aims of the study and the need for their participation. Participation was voluntary and participants could withdraw at any time during the survey. Moreover, if the participants did not want to continue, or changed their mind, they could leave at any time during the survey. Additionally, confidentiality and anonymity of the participants was ensured. The code for conducting this study was guided by the Biomedical & Scientific Research Ethics Committee (BSREC) of the University of Warwick. The guidelines of this committee require submission of a research ethics form containing signatures of both students and supervisors to the academic programme office. The approval of ethics together with participant information leaflet is should in Appendix A.1

4.5 Chapter Summary

This chapter discussed the methodologies employed in this study. This study adopted the positivism paradigm and quantitative research methods, in addition to the probability sampling strategy. The author collected data from manufacturing firms with manufacturing activities conducted in the UK. Moreover, the author employed 255 samples. A total of seven constructs (manufacturing cost, SC cost, quality, delivery, flexibility, business performance, and shoring decision type) were formulated for the survey questionnaires, in addition to other questions which were combined to explore the current UK manufacturing reshoring status. The questionnaire was designed in English, and validated by the pre-test approach with four bilingual candidates. Thereafter, the Pivot and graphs functions in Excel and the hierarchical regression in SPSS were employed to explore the reshoring status and test the hypotheses.

5 Results and Analysis: Status of Shoring Decisions for UK Manufacturers

5.1 Chapter Introduction

This chapter presents the descriptive results of the study that was designed in the previous chapter. Various statistical techniques, including Excel 2016, PPT 2016 and Statistical Package for Social Sciences (SPSS) version 24, were employed to analyse the data. First, a preliminary examination of the data has been conducted through data management in section 5.1, which includes the data clear up in 5.2.1, and detects and removes the outliers in 5.2.2, followed by a description in depth to reveal the current status of manufacturing reshoring in the UK. In detail, section 5.3 is regarding the background information; section 5.4 reveals the overall view of the different shoring groups' status, and the features for offshoring and reshoring companies respectively. Section 5.5 looks at the business strategy perspective. Sections 5.6, 5.7 and 5.8 are relevant to operational considerations. Section 5.9 is about the impact of reshoring on the supply chain (SC) and section 5.10 gives the impact on business performance. Finally section 5.11 predicts the trend of reshoring in the future. The chapter closes with a short summary in section 5.12.

In the next chapter, the author discusses and assesses in detail the reliability and validity of the measurement scale. Subsequently, exploratory factor analysis (EFA) was performed. Finally, a hierarchical regression was employed to test the hypotheses for both main and moderated relationships.

5.2 Data Management

5.2.1 Missing Data

After the pilot test, the formal data collection was conducted starting in mid-October 2016 and ending in mid-December 2016. Through multiple approaches (the majority based on email dissemination) and 2-3 email reminders, finally, 652 participants started the survey, which means they open the survey link. Among

them, 298 companies have fully completed the survey, which means they fill in the survey till final page.

Missing data is one of the most pervasive problems occurring in data analysis. It is a fairly common occurrence that a respondent does not provide the answer to one or more of the survey questions. As a result, missing data can affect the results of research objectives (Hair et al. 2006). As Hair et al. (2006, p51-52) claimed, one key practical impact of missing data could be to reduce the sample size when excluded the cases with missing data, from an adequate sample to an inadequate sample. Another impact could be that the non-random missing data could sometimes affect the normal distribution further may cause bias in results (Hair et al. 2006, p51-52). To avoid missing data, this study set up the questions as compulsory questions in the online survey, therefore, without answering a question, the participants could not move on. In this way, if the participants complete the survey, it can guarantee that there is no data missing in the completed responses. In other words, the cases with missing data, in this study, are those uncompleted survey responses. In Qualtrics, there is a progress tracking function that showing how much percentage of a survey has been completed by the participant. Therefore, to find the cases with missing data, the researcher filtered the responses with the “100%” completed, which show 298 responses in total out of 652 recorded cases. Therefore, there are 354 responses that participants started the survey but did not completed, which are the cases with missing data in this study. For these uncompleted responses (the missing data cases), the researcher decides to exclude them from the sample for further analysis following the “complete case approach”, one of the popular methods to deal with missing data cases, rather than the “all available subsets approach” (Hair et al. 2006, p53). The reasons for following this complete case approach to remove all these uncompleted cases are discussed from both practical and statistical perspectives as below:

From the data practical perspective, looking into the details of uncompleted cases, it is not difficult to find that those uncompleted cases have a very high level of missing data. Majority of participants are just open the link of the survey and

then closed it without filling any answer to the survey questions. (This actually fits the current survey data collection practice that people tends to ignore the survey emails after they identified, due to their busy work.) As introduced in Chapter 4, the survey is consisted by seven sections, and the last two sections are about competitive priorities and business performance respectively, the IVs and DV in the moderation model. However, within those uncompleted cases above, 90% of them lack half or more than of the data, and 93% of uncompleted responses did not start answering the questions about competitive priorities yet, not even mentioned business performance. In other words, the 93% of uncompleted cases lack of the key data information of independent variables. The rest 7% of them answered up to questions about CPs (competitive priorities) but not start questions about BP (business performance), which also are not able to use for model analysis. Therefore, all of the uncompleted cases lack of the key data information, which were not able to be remedied due to the high missing level. Therefore, there is no value to keep the uncompleted responses other than exclude them.

In addition, during the data collection period, actually the researcher has tried to push the responses with completion progress of 90% or above by contact the participants directly to ask for information and encourage them to completed it. Therefore, the uncompleted cases left finally are those ones which are very bad quality and lack so much information. Therefore, from the reality of data perspective, the uncompleted cases should also be removed.

From the statistical perspective, removing these uncompleted responses could improve the reliability of data and analysis results. In detail:

1) Remove uncomplete cases is a fundamental way to avoid the impacts brought by the missing data. If keep the uncompleted cases for analysis, it requires to remedy the missing data, for example, by adding the value using mean value (Hair et al. 2006, p50-54). This remedy processes could increase risks of producing biased results. Therefore, the author believes it is better to keep original data for analysis.

2) Considering the sample size, even though removing the uncompleted samples, the research still has enough samples to conduct further analysis (minimum sample size requires 175 as discussed in section 4.4.2.3.4). Also, by observation, the miss data are randomly happened in this study. Thus, removing them will not affect the distribution of the dataset or create bias (further confirmed by the normality test in chapter 6). Therefore, it is free to remove the uncompleted responses, without worrying inadequate samples issue.

As claimed in Chapter 1, this research has two research objectives which are explore the current reshoring status and explore the moderation relationship. In order to reveal a full picture of the current reshoring status, and achieve both of the objectives, this research has to set a higher requirement of the completion level for the acceptable responses. Some people may argue, the responses which answered all the questions for first 5 sections of the survey could be included for descriptive analysis for research objective one, even though it lacks information regarding CPs and BP. However, the author believes it makes more sense to use the same set of data for both research objectives, rather than using different datasets with different sample size separately. Especially the first research objectives also need information of CPs and BP as a part of the reshoring status description. Therefore, it is better to take the completed cases for analysis and dropped all the uncompleted cases for this study. However, in the future research, as discussed above, those cases with missing data could able be used for other research purposes. For example, for the cases which complete all the questions other than CPs and BP sections could be used for a further exploration of a specific perspective of the reshoring status. The cases which completed up to questions about CPs could be used for some research regarding explorations of key CPs of reshoring or the relationships between CPs and location decision etc.

After excluding the uncompleted cases, within the 298 completed responses, there were eight duplicated responses which came from the same companies. Therefore, they were removed from 298, leaving 290 responses in total. The

author then furthered filter them based on the responders' awareness of company location strategy, to further remove the unqualified responses, leaving a total of 272. Within the 272, a double check of the reliability of the responses was conducted and identified an extra three cases. Therefore 269 is the finally sample size applied for the analysis of this research.

5.2.2 Detect Outliers – Assumption Test Part I

An outlier refers to an unusually high or low value in the dataset. It occurs with an extreme value placed on variables to deviate the statistics (Tabachnick and Fidell, 2007). In detail, the outliers can be further categorized as: normal outlier, leverage points, and influential cases (Lund and Lund, 2013; Hair et al., 2006).

There are two ways to detect normal outliers. One approach is through the Z-score. According to Hair et al. (2006), the Z-score of a case out of ±3.3 will be identified as outliers in the dataset with a sample size bigger than 80. This value will be visually shown in a boxplot by conducting the explore analysis in SPSS. The test of this study is shown in Figure 5-1. In the test, five out of six continuous constructs had potential outliers: manufacturing cost, quality, delivery time, flexibility, and business performance, as shown in Figure 5-1. However, in terms of how to deal with these outliers, based on the recommendation from Hair et al. (2006), this study applied a graphical method by boxplot for detecting and only removing the extreme univariate outliers. As shown in Figure 5-1, only two extreme univariate outliers appeared in the competitive priority of quality, which are marked with an asterisk. Therefore, cases 210 and 256 were removed from the dataset.

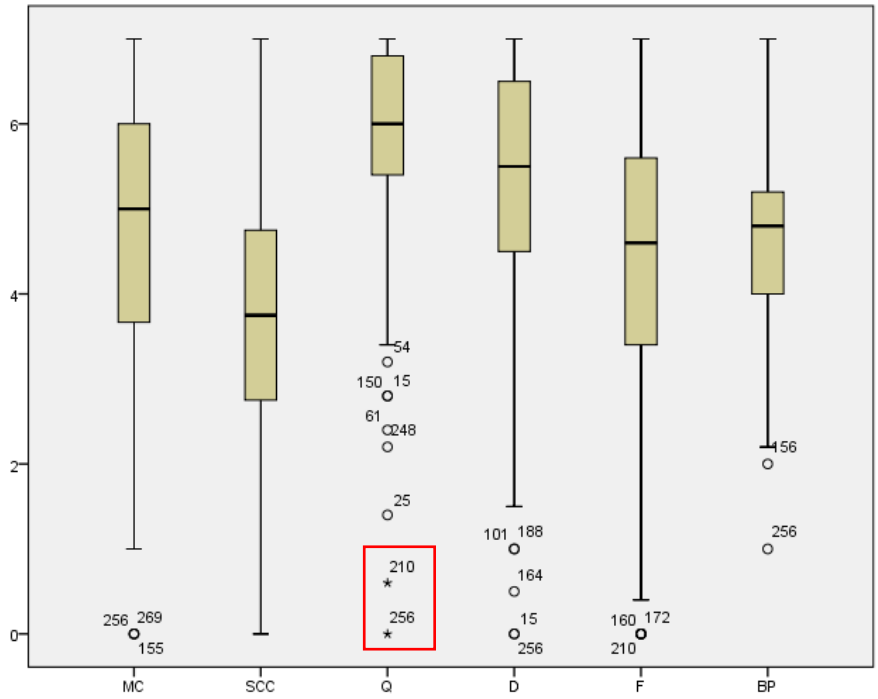


Figure 5-1 Boxplot Results

In order to identify all the outliers, and to reduce the error in further analysis, the study also adopted another approach to further detect outliers through the standardized deleted residuals (SDR) value which is presented in the data file under the column SDR after its calculation in SPSS. SDR represents the multivariate outliers, which means the outliers for the entire model rather than a single variable, which is more professional than univariate outlier detection. By examining whether these SDR values are greater than ±2 or ±3 standard deviations (for small and large sample sizes, respectively), the researcher can classify them as potential outliers (Cohen et al. 2003). Through this approach, another three potential outliers were identified, as shown in Table 5-1.

Table 5-1 SDR Outlier Results

Case No.	SDR Value	Principle
Case 5	-3.038	greater than ± 3
Case 43	3.03	greater than ± 3
Case 247	-3.439	greater than ± 3

Besides normal outliers, leverage points and influential cases also belong to outliers. Points with high leverage are those that have an unusual combination of

independent variables (i.e., are different in the x-axis for this moderator analysis), which are usually detected by leverage values (LEV). However, this is only suitable for a small sample sized dataset. For this study, with around 270 samples, it has not been necessary to identify the leverage points; however, there is a need to identify special influential cases (Lund and Lund, 2013).

Influential cases are those observations that could alter the regression line. SPSS Statistics offers a number of measures that can be applied to check the influence of observations, but the most common way is through Cook's distance (COO) value (Lund and Lund, 2013). There are no unequivocal guidelines on what constitutes a cut-off threshold for observations considered to be highly influential. However, a common threshold is that Cook's distance values above 0.1 in this study could be of concern, as suggested by Cook and Weisberg (1982) and updated by Bollen and Robert (1990). Based on the calculation results of COO value through SPSS, three special influential cases have been identified, as shown in Table 5-2.

Table 5-2 Influential Cases Results

Case No.	COO Value	Principle
Case 45	0.114	greater than 0.1
Case 49	0.111	greater than 0.1
Case 269	0.120	greater than 0.1

Therefore, in summary, eight outliers have been identified in total which are cases 5, 43, 45, 49, 210, 256, 247, 269, so they were moved from the dataset. Therefore, a total number of 261 sample cases have remained for the descriptive analysis given below.

The descriptive analysis and graphs generation has been conducted within Excel 2016 to clarify the current reshoring status within the UK.

5.3 Participant and Company Background

5.3.1 Participants

As shown in Figure 5-2, 91% of the participants are senior managers within the companies and most of them have worked in the companies for more than five years. The participants have had multiple functions within the businesses and 76% of them have a very high-level awareness of their companies' strategic and production location decision details. In summary, the questionnaire has been completed by senior managers across a broad range of functions with high awareness of company location decisions. This means that the actual participants are perfectly matched with the expected targeted participants' principles, which will help to guarantee the validity and reliability of this research.

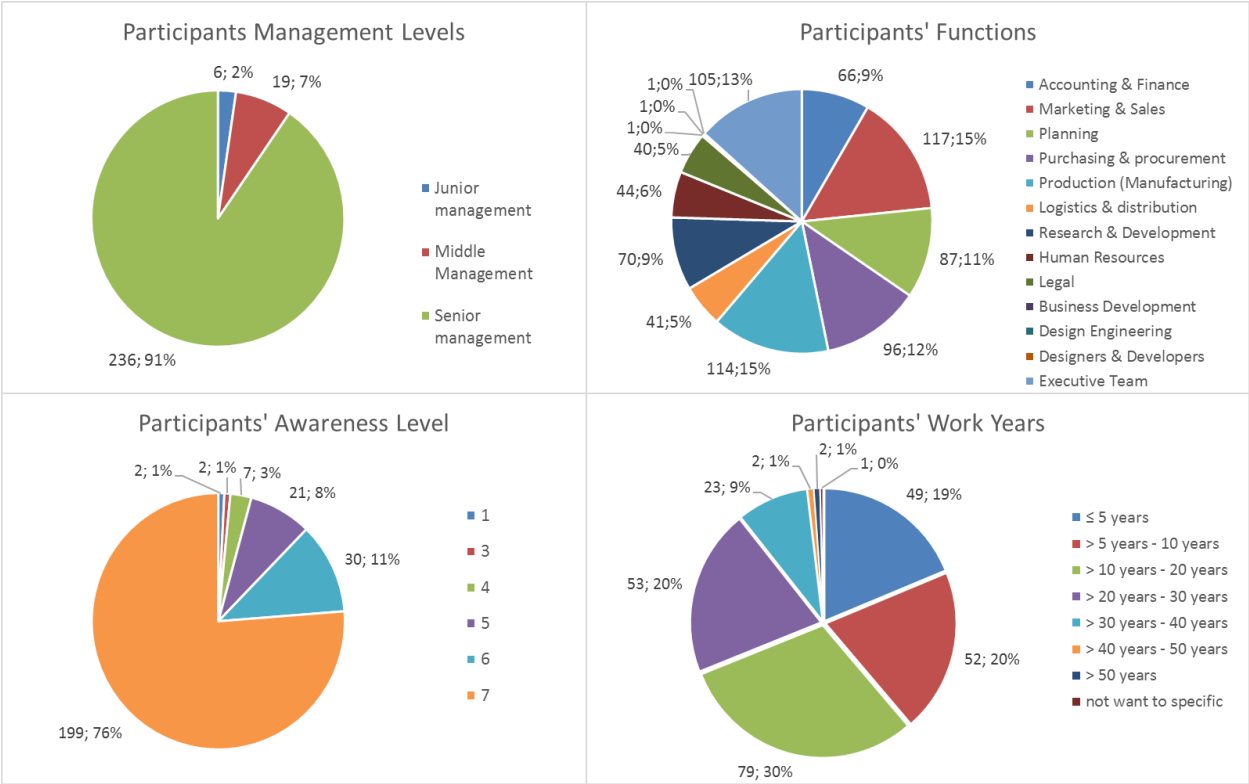


Figure 5-2 Participants' Information

5.3.2 Company Features

As shown in Figure 5-3, most participants' companies are UK owned companies (around 75%) and manufacture their own products (around 83%), with a good

coverage of industries based on SIC code 2007. The research focus is on UK manufacturing reshoring, therefore, the companies are either UK-owned or entirely foreign companies but having manufacturing plants in the UK. The research focus is on the generality of the reshoring phenomenon and shoring decisions at a firm level without specifying the industry. Therefore, based on the company features, it provided a good match between the collected data and the research nature of this study, which again will contribute to the good quality and reliability of this research.

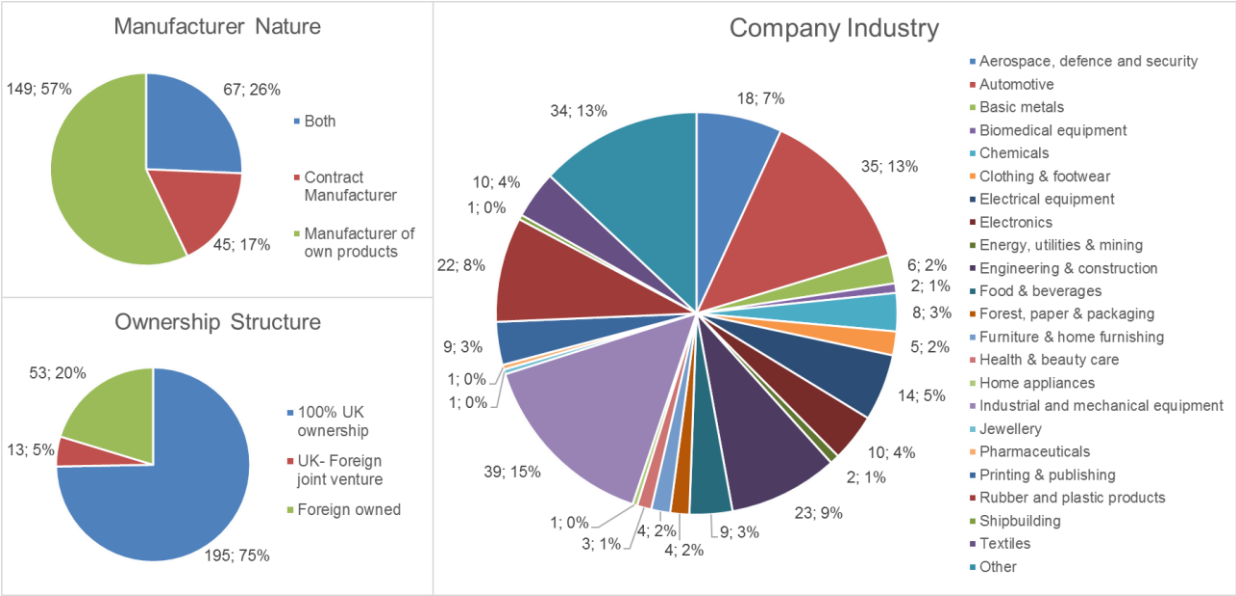


Figure 5-3 Company Features

5.3.3 Company Size

Based on the analysis results in Figure 5-4, it can be seen the survey has received a high response rate from SMEs, 80% of the responses come from SMEs, which have a company size equal to or below 250 employees and an annual turnover of less than £50 million. The dataset exactly matches the reality that more than 70% of manufacturing companies within the UK are SMEs. Also, based on the graphs shown in Figure 5-4, regarding company legal structure, it can been seen that 95% are Limited companies, and they predominantly focus on B2B business with other organizations or businesses.

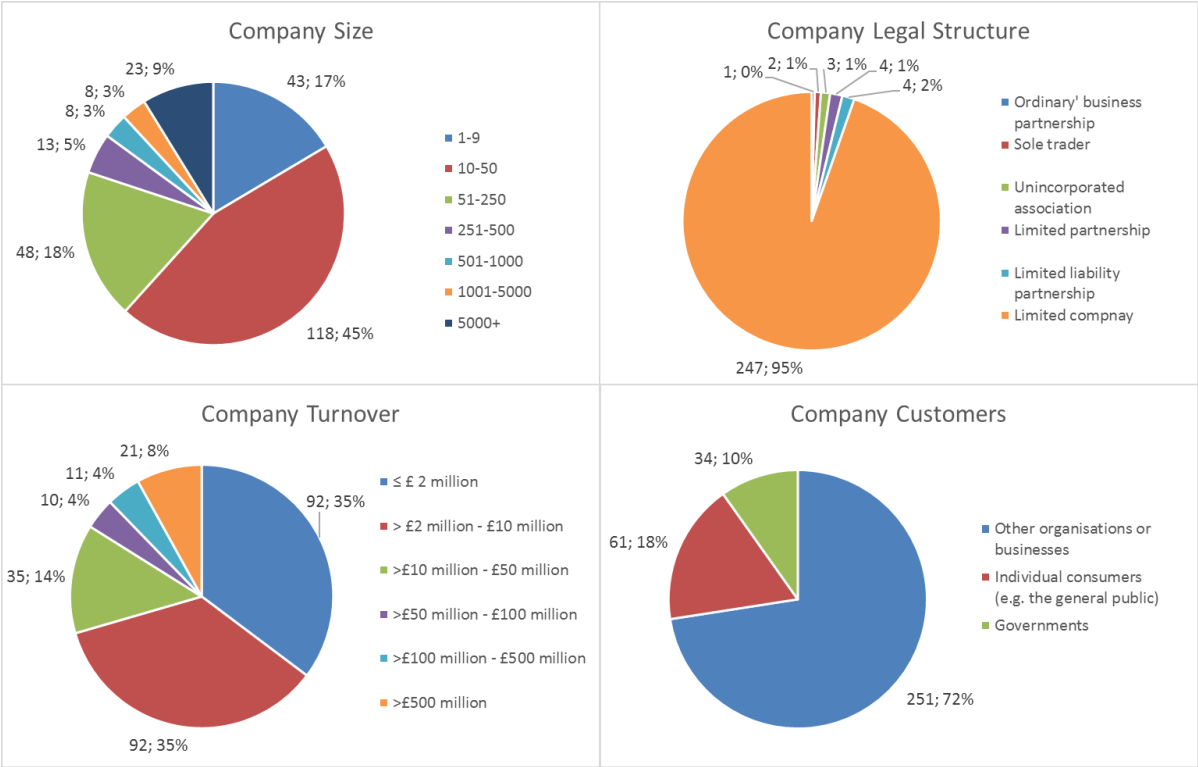


Figure 5-4 Company Size and Customer

5.4 Shoring Decision

5.4.1 Overview of Shoring Decision

In the survey, companies have been asked for their shoring decisions regarding offshoring, direct reshoring and indirect reshoring. Therefore, the companies finally have been categorized into six different groups based on all the possibilities of location decisions, as shown in section 4.4.4.2.5.2. From the analysis, the engagement status of each location decision of the six groups is shown in Figure 5-5. The results have been displayed in a Venn diagram in order to clearly show the relationship between each group. The grey coloured part represents the decision/situation that cannot possible to exist; this is because without first offshoring, it is not possible to have direct reshoring based on direct reshoring definitions, which is also confirmed by Gray et al. (2013).

From the Venn diagram, it can be seen that the 26 companies that engage in both direct and indirect reshoring activities account for 9.96% of the entire sample size. There are six companies that only engage in direct reshoring without indirect

reshoring, accounting for only 2.3% of the entire sample. This figure seems to be outside people's expectation, but after checking the news for direct reshoring, it shows similar results. This is different compared to the reshoring status in the US. But it makes sense to have different scenarios for different contexts. This also justifies the necessity to conduct research based on the UK perspective. However, surprisingly, the research has shown 33 companies have engaged in indirect reshoring with offshoring previously and 78 companies participated in indirect reshoring directly, which account for 12.64% and 29.89% respectively within the sample. Therefore 39 companies have engaged in pure offshoring which account for 14.94% and 79 companies (around 30%) remained within the home countries without undertaking or considering any shoring option.

In summary, only 13% of companies have directly reshored, but 52% companies have participated in indirect reshoring, and in total 55% companies in the UK have engaged in reshoring.

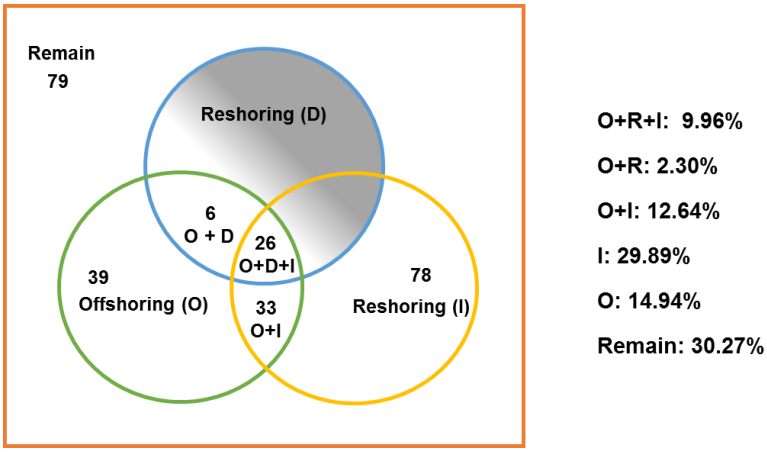


Figure 5-5 Shoring Decision Results

5.4.2 Features of Companies that have Offshored

After location decision questions, the survey further asks for details regarding offshoring and reshoring separately. In terms of offshoring, based on the analysis results shown in Figure 5-6, it can be seen that most UK companies tend to offshore to China, India, Poland and the US, which are the top four popular offshoring destinations.

Regarding the motivation for offshoring, the dominant driver is cost, based on the answers from the sample. This exactly matches the literature and the reasons for the emergence of reshoring Historically in. Besides, reasons such as access to a new market, being closer to customers and avoiding production bottlenecks are also very important factors to cause companies to make the decision to move overseas.

In terms of the governance approach, it can be seen that all the approaches that have been adopted frequently by businesses, by the company itself or through finding an independent supplier, are more popular than joint ventures.

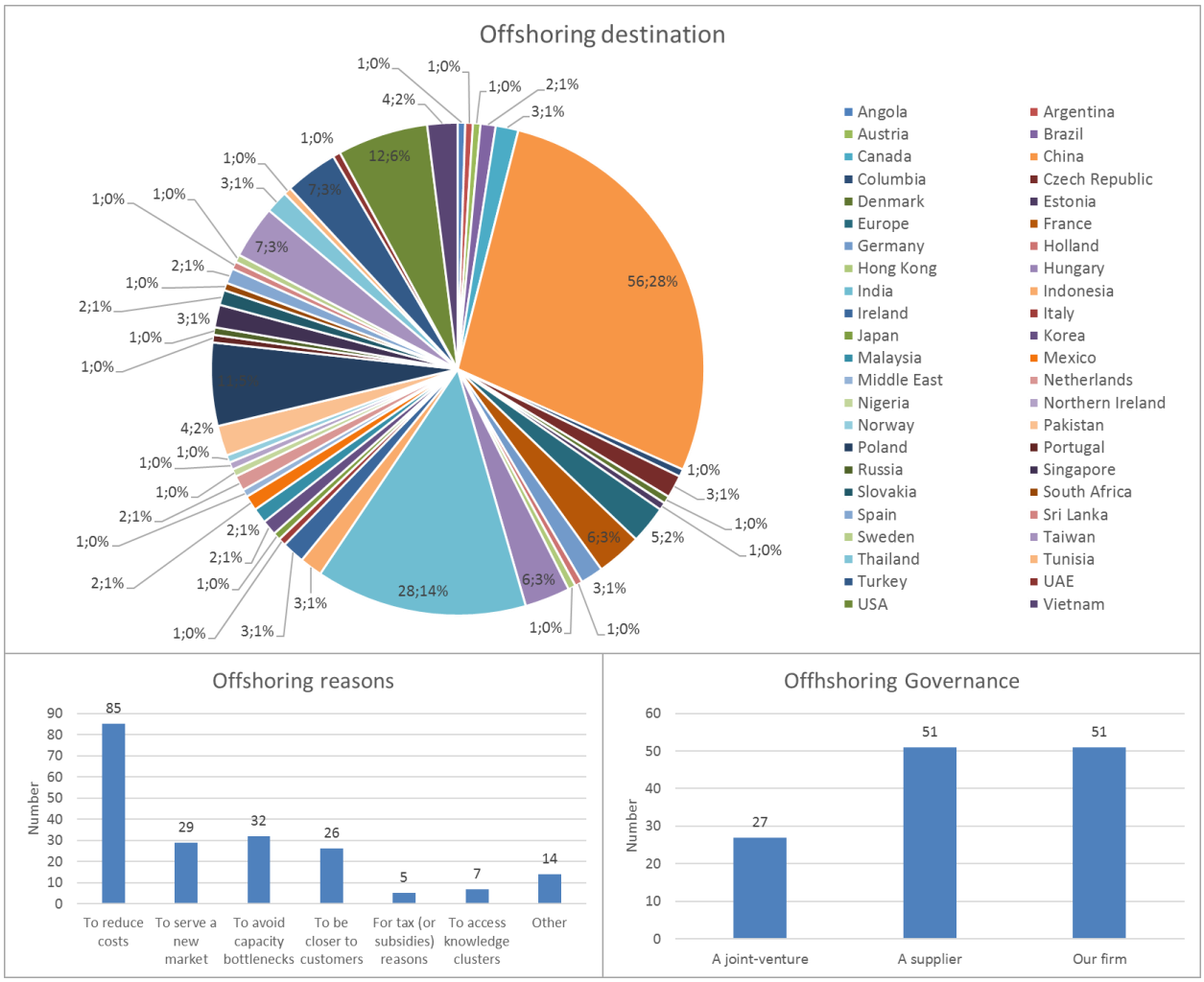


Figure 5-6 Offshoring Features

5.4.3 Features of Companies that have Reshored

In terms of reshoring, the survey has captured the information regarding the number of companies who conducted reshoring (direct or indirect) in each year. It can been seen from Figure 5-7, that direct reshoring has become popular since 2012, and was originally conducted by SMEs who are in the high technology industry. However, indirect reshoring has been popular since 2008 which is much earlier than direct reshoring, and has kept a stable increase, reaching a peak in 2014. Also, it has been found that the overall reshoring decisions are made mostly by companies themselves, although sometimes could be a joint decision between companies and customers, but it is very difficult to find a decision which is purely made through a request from a customer (only eight out of 261 samples).

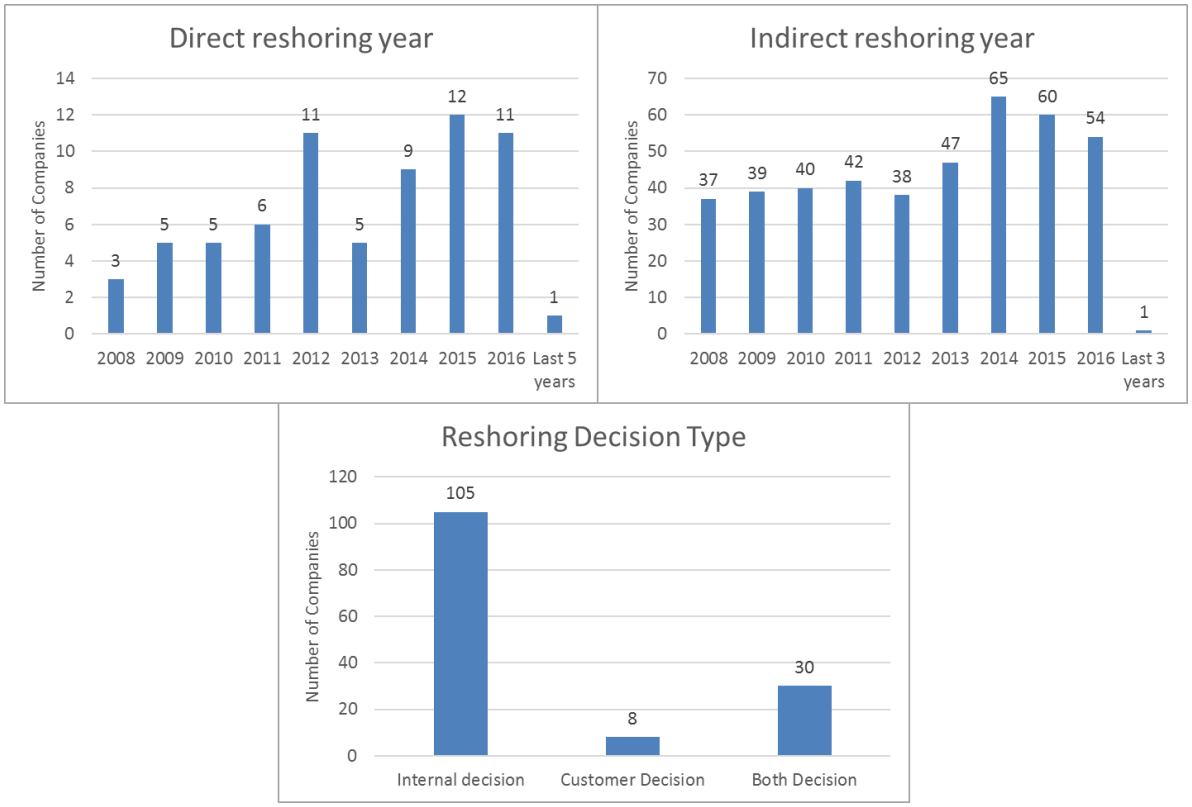


Figure 5-7 Reshoring Features

5.5 Strategy Comparisons

The survey also asks for the business strategy that companies followed. The measurements for Porter's generic strategy are adopted from previous literature.

However, for the companies to easily understand, another question regarding generic strategy has been designed to allow participants to claim their status as either cost-leadership or differentiation, or both directly. However, more interestingly, after data analysis, the results (Figure 5-8) for the two questions are very different. Based on what the companies claimed directly, 189 companies have differentiation, 27 are cost leadership and 45 focuses on both. However, based on what they stated regarding the measurement scales, the result is that 141 have differentiation, 50 companies are cost leadership and 71 claimed they are both.

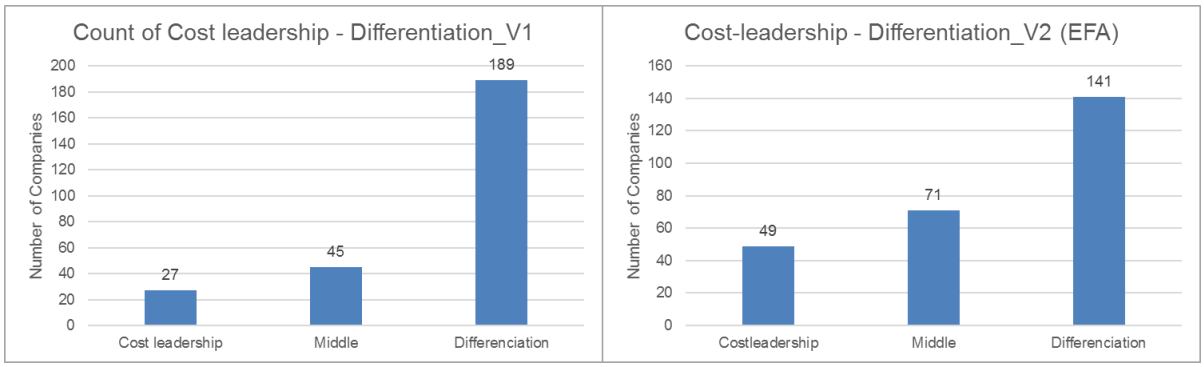


Figure 5-8 Strategy Comparisons

5.6 Competitive Priorities

5.6.1 Common Competitive Priorities

The research also asks for the competitive priorities that companies place on their operational dimensions regarding manufacturing cost, supply chain cost, quality, delivery time and flexibility. The results of these competitive priorities comparisons across groups are shown in Figure 5-9. The numbers refer to the mean value of each group sample. Overall, all companies pay more attention to quality and time than to cost and flexibility. However, offshoring companies place highest emphasis on manufacturing cost, whereas direct and indirect reshoring companies focus more on quality, time and flexibility, especially the indirect reshoring companies.

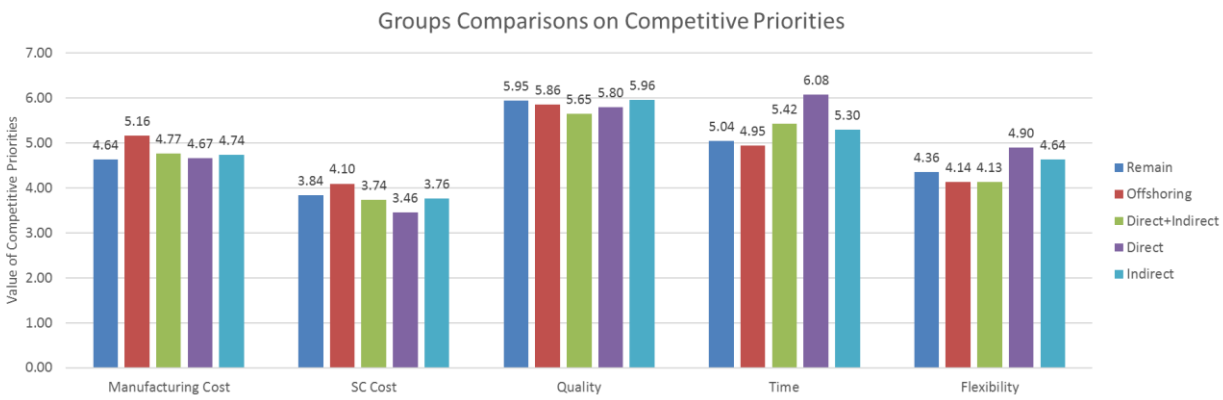


Figure 5-9 Competitive Priorities Comparisons

For the first research question which is to explore the current status of reshoring in the UK, the aim of it is to reveal the facts and reality, namely what happened at the moment for reshoring. Therefore, it is not compulsory to do significant tests for answering this research question. However, in this study, for the descriptive results of competitive priorities, it goes a further step to test its significance in order to answer the curiousness of whether differences shown in the Figure 5-9 above can achieve significant level across the different shoring groups or not. Therefore, one-way ANOVA has been conducted in SPSS and the results has shown as the Table 5-3 below. In this ANOVA analysis, the dependent variables are the five competitive priorities as stated above, and the factors variable is the shoring decision type (the 5 groups). As it claimed in following chapters that group of “Direct reshoring” is not suitable for statistical analysis due to its small sample size. However, in the ANOVA analysis, direct reshoring group has been included in the factors variable, in order to keep consistent with previous descriptive analysis results. The results, as shown in Table 5-3, display no significant differences existed among different shoring groups for each competitive priority. However, this does not mean a negative finding, and it has no business with the later moderation model analysis at all. It just shows the difference levels showed in Figure 5-9 does not be strong enough to achieve a significant distinction, but the differences still existed. It actually fit with the argument that reshoring is a decision based on multiple reasons as it has been claimed in the chapter 2, rather based on a single or few factors. In addition, this ANOVA results actually further demonstrated the “congruency” among competitive priorities and shoring

decision, rather than a causal relationship. In other words, it is not competitive priorities or shoring decisions directly affect the business performance. It is the congruence of them that associated with the business performance.

Table 5-3 ANOVA Results for Competitive Priorities

Competitive priorities	Sum of quares	df	Mean Square	F	Sig.
Manufacturing Cost	7.548	4	1.887	1.008	.404
SC Cost	4.341	4	1.085	0.479	.751
Quality	2.317	4	0.579	0.552	.698
Delivery	11.503	4	2.876	1.367	.246
Flexibility	12.181	4	3.045	1.206	.309

5.6.2 External Incentives and Risk Mitigation

Besides the common competitive priorities, this study also asked some individual factors regarding external incentives and risk mitigation, to see any different behaviour regarding different groups. From the Figure 5-10 below, it can be seen company that directly reshored pay more attentions on governmental incentives. Among risks, all the companies more care about supply chain risks and IP risks, especially for direct reshoring group, indirect reshoring group, and (direct+indirect) reshoring group. the biggest concern of companies offshored is the IP problems based out the results.

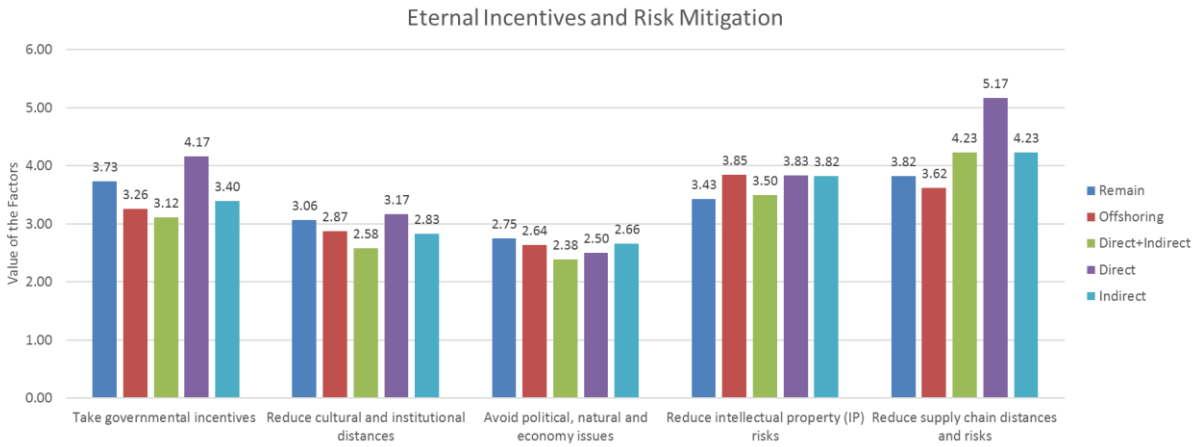


Figure 5-10 External Incentives and Risk Mitigation Comparisons

5.7 Directly Reshored Products

5.7.1 Products Overview

The research has also designed to further explore the products that are associated with reshoring (both direct and indirect). Based on the analysis, 32 companies have engaged in direct reshoring, and reshoring has been conducted 126 times. On average, each company conducts reshoring 3.8 times. In terms of product types, it can be seen from Figure 5-11, for direct reshoring, finished good is the main reshored product, which accounts for around 34% of all the direct reshored products. However, the other types of products such as sub-assembly, components and remanufacturing have also been covered by direct reshoring.

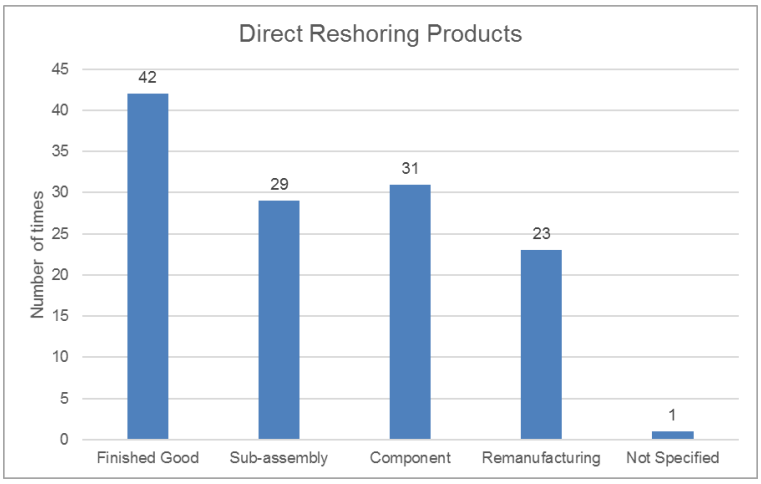


Figure 5-11 Direct Reshoring Products

5.7.2 Products Heritage

After taking a further exploration of the direct reshored products, from the heritage perspective, the researcher has categorized each type of product to three sub-categories: original product, new variant and new product, as shown in Figure 5-12. “Not specified” refers to the responses that claimed the company reshored a certain type of products but without specifying which sub-heritage clearly. From the graph, it can be seen that direct reshoring focuses more on original goods and brand-new goods rather than a new variant of the original product.

Figure 5-12 Direct reshoring product heritage

5.7.3 Governance

From the governance perspective, similarly, the researcher has categorized each type of product into four sub-groups of the routes taken: reshoring through the company itself, a joint-venture, an existing strategic supplier and a new strategic supplier, as shown in Figure 5-13. “Not specified” refers to the responses that claimed the company reshored a certain type of product but without specifying which sub-governance clearly. From the graph, it can be seen that direct reshoring has been conducted by the majority of companies themselves for almost all types of products, except components, since reshoring through a new strategic supplier is an equally welcome method compared to conducting by companies themselves for components.

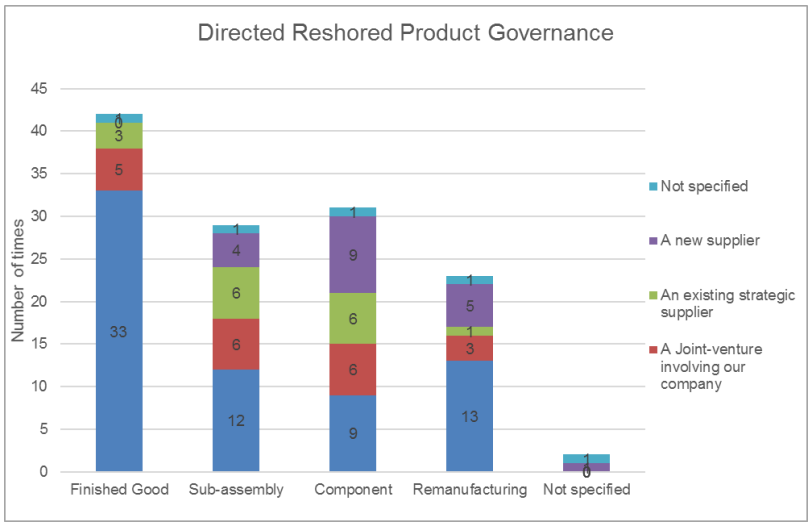


Figure 5-13 Direct reshoring product governance

5.7.4 Production Output and Proximity

Following the product details, a further exploration is needed regarding how these direct reshoring activities affect the total production output and also to try to understand what is fundamental to the proximity the reshoring aims to be close to. The results of these two questions are shown in Figure 5-14. It can be seen from the first graph that 19 out of 32 companies (59 % companies) that have directly reshored saw an increase in output. From the proximity perspective, this research has identified that 15 companies directly reshored to be closer to a main market. Being closer to an R&D centre or Head Office came equal second.

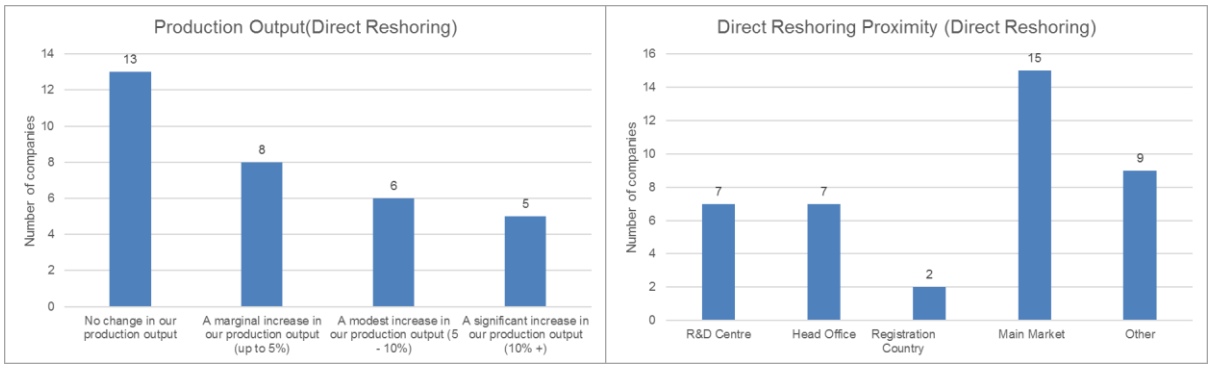


Figure 5-14 Production Output and Proximity (Direct)

5.8 Indirectly Reshored Products

5.8.1 Products Overview

From the indirect reshoring perspective, and based on the analysis, 137 companies have engaged in indirect reshoring and reshoring has been conducted 594 times. On average, each company conducts reshoring 4.3 times. In terms of product types, it can be seen from Figure 5-15, for indirect reshoring, finished good is also the dominant reshored product, which accounts for around 45% of all the indirect reshored products and higher rate than that of direct reshoring. However, the other types of products such as sub-assembly, component and remanufacturing have also been covered by indirect reshoring.

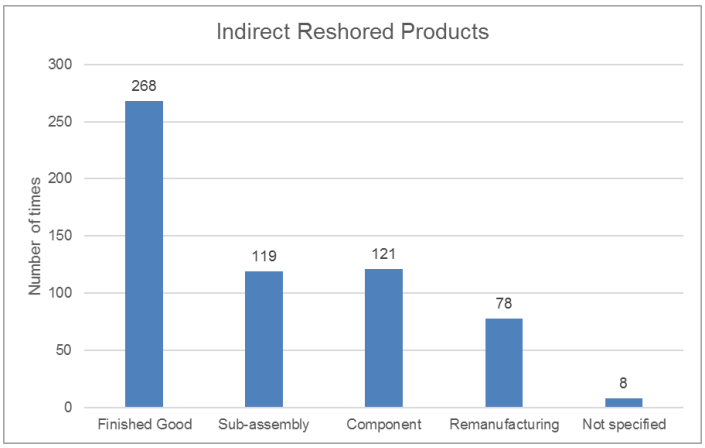


Figure 5-15 Indirect Reshoring Products

5.8.2 Products Heritage

In addition, the study also undertaking a further exploration of the indirect reshored products. From the heritage perspective, the researcher has categorized each type of product into three sub-categories: original product, new variant, new product, as shown in Figure 5-16. The “not specified” refer the responses that claimed the company indirectly reshored a certain type of product but without specifying which sub-heritage clearly. From the graph, it can be seen that indirect reshoring also covers multi-product heritage, but focuses more on original and brand new goods rather than a new variant of the original product, with an even higher rate than direct reshoring.

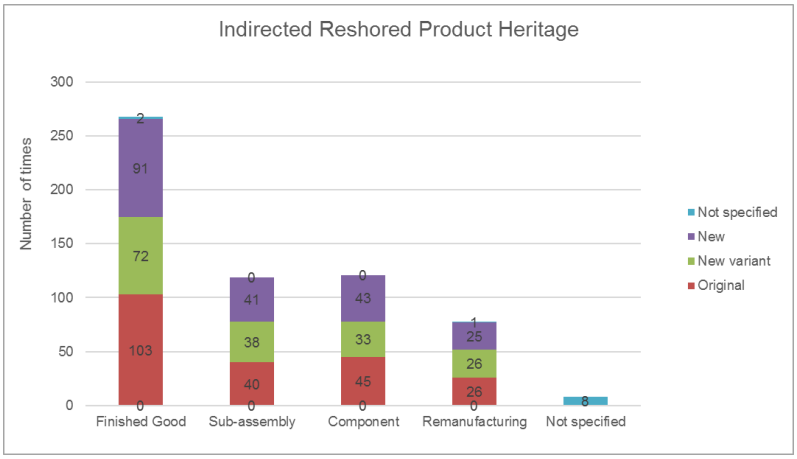


Figure 5-16 Indirect reshoring product heritage

5.8.3 Governance

From the governance perspective, for indirect reshoring, the researcher has also categorized each type of product into four sub-groups of the routes taken: indirect reshoring through the company itself, a joint-venture, an existing strategic supplier, and a new strategic supplier, as shown in Figure 5-17. “Not specified” refers to the responses that claimed the company indirectly reshored a certain type of product but without specifying which sub-governance clearly. From the graph, it can be seen that indirect reshoring has been conducted in the majority by the companies themselves for almost all the types of products, with a stronger trend as shown from direct samples.

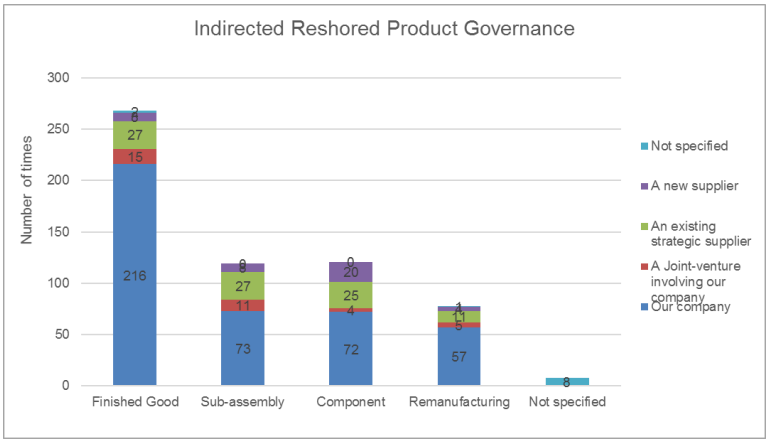


Figure 5-17 Indirect Reshoring Product Governance

5.8.4 Production Output and Proximity

Similarly to direct reshoring product, a further exploration regarding how these indirect reshoring activities affect the total production output and what is fundamental with regard to proximity the indirect reshoring aims to be close to has been conducted. The results of these two questions are shown in Figure 5-18 below. It can be seen that from the left-side graph in the figure below show that 75 % of companies that indirectly reshored saw an increase in output, which is much higher than the rate of direct reshoring samples. From the second graph (right-side in the figure), this research has identified that 84 companies (61 % of the total indirect reshored companies) indirectly reshored to be closer to a main market. Being closer to an R&D centre or Head Office come second, and again with equal account for percentage of the whole indirected reshoring sample.

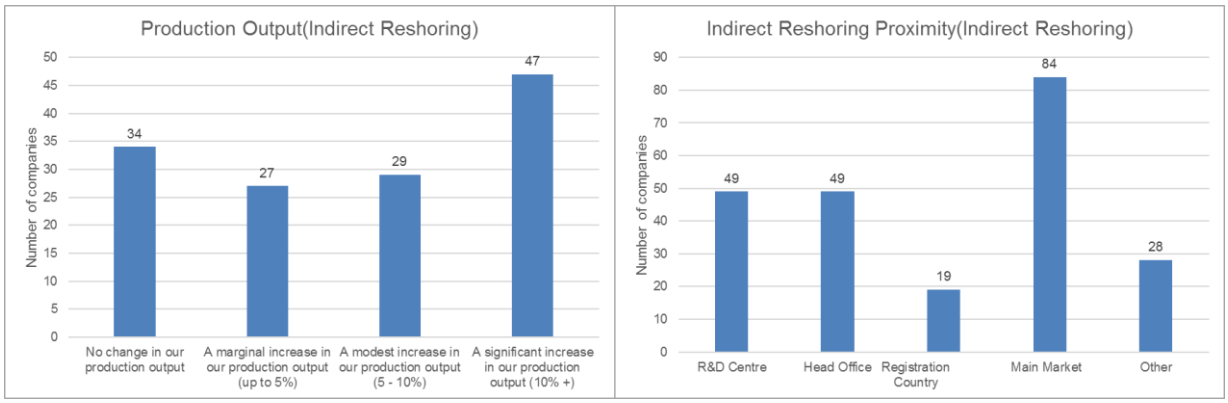


Figure 5-18 Production Output and Proximity (Indirect)

5.9 Impact on Supply Chain - Supplier Changes

Based on Figure 5-19 below, it can be seen that or most companies, their supplier number did not change. 24% of company increases their suppliers due to reshoring, and 10% reduced their suppliers.

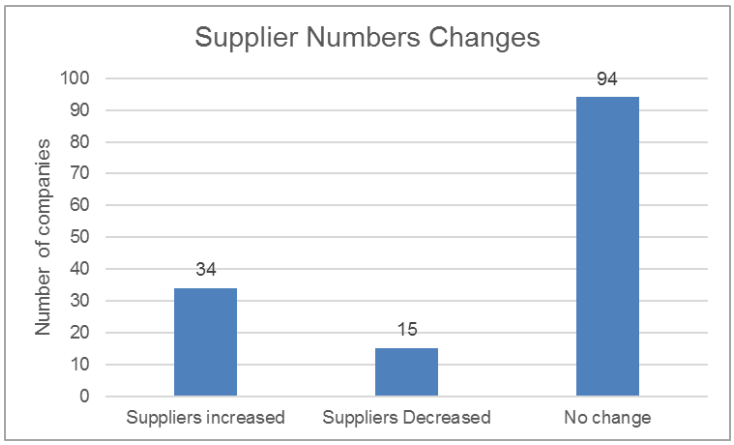


Figure 5-19 Impact on Supply Chain

5.10 Impact on Business Performance

Following the conceptual framework of this study, the last part to explore is the impact of reshoring on business performance, including other shoring decisions. The survey asked for their current business performance from the participating companies. The results of business performance are shown in Figure 5-18. It can be seen that the reshored companies have a better business performance than that of the remaining companies and much better than those that offshored; however, it is unexpected the pure direct reshoring group who have the lowest business performance among all the groups, which is an interesting finding and will be discussed in section 7.2.4.

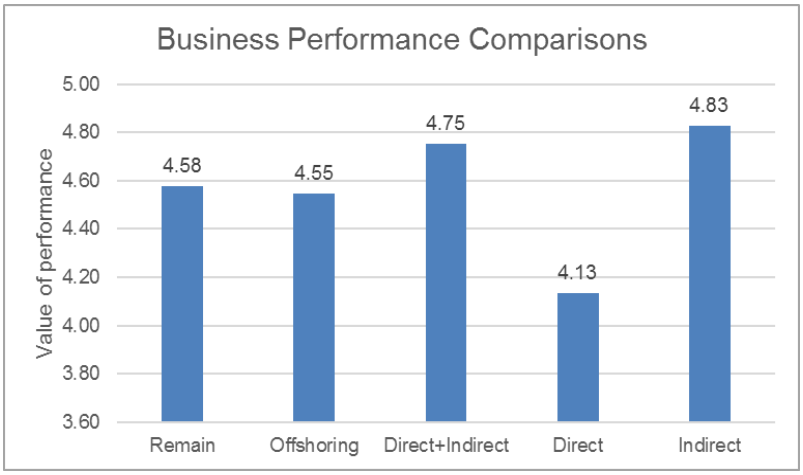


Figure 5-20 Business Performance Comparison

5.11 Future

5.11.1 Future Trend of Reshoring

In order to capture the whole picture of current reshoring status in the UK, the research has also looked forward to try to explore the future trend of reshoring. Therefore, the survey asked the participating companies to show how likely it is for them to engage in direct and/or indirect reshoring within the next five years. The results analysis is shown 52 companies select level 4 or above for their possibility to engage or continue engage in the direct reshoring, which account around 20% of the total sample as shown in Figure 5-21. For indirect reshoring 178 companies claimed they will consider it by choose 4 or higher possibility, which accounts around 70% of the sample size. Therefore, it can conclude that reshoring has a bright future.

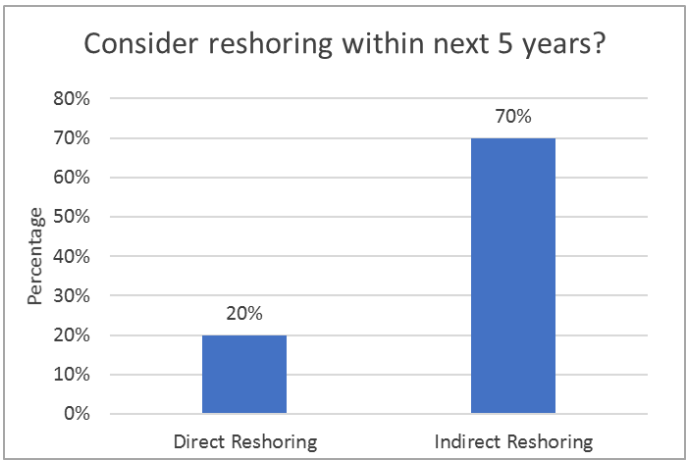


Figure 5-21 Reshoring Estimate Trend

5.11.2 Brexit vs. Reshoring

Due to the Brexit referendum, which happened in 2016, and this may also affect the future of the reshoring trend, and maybe tend more to negative effect, based on the researcher's expectation. Therefore, to keeping up with the contemporary environment, this study has also tried to discover how Brexit will affect direct and indirect reshoring, i.e. slow it down, accelerate it or remain neutral? The results are shown in Figure 5-20, with 46% of respondents believing that Brexit's effect on reshoring is neutral, 33% of respondents trust it will actually accelerate the

reshoring phenomenon, which is much higher the rate (21%) of believing there will be a slowing down in the trend.

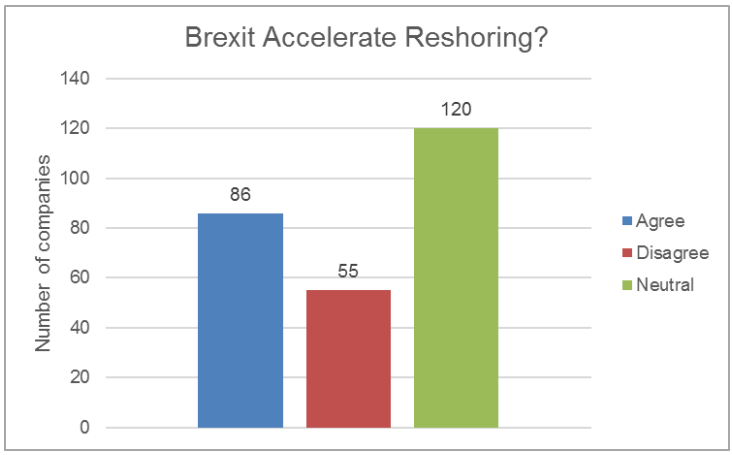


Figure 5-22 Brexit vs. Reshoring

5.12 Chapter Summary

In summary, this chapter has displayed the descriptive results which have been generated through analysis using the Excel Pivot function. Based on the results, a strong indirect reshoring phenomenon has been discovered and confirmed. The results have been shown in a summary form, either as tables or graphs for readers to understand more easily. The results, following the reshoring framework, reveal a comprehensive status of the UK's current manufacturing reshoring from overall decision, strategic, operational, and performance perspectives. The research also discovered a little more information regarding other shoring decision to have a parallel comparison as well. In addition, the position of the reshoring trend in the future and its relationship with Brexit have also been covered.

6 Results and analysis: Moderating Impact of Shoring Decision Types

6.1 Chapter Introduction

This chapter displays the statistical analysis results. It starts with the factor analysis in 6.2 followed by reliability and validity tests in 6.3. Then descriptive statistics for all the constructs are shown in 6.4. Before going on to the regression analysis, the pre-test for qualification of the regression is conducted in 6.5. Finally, hierarchical regression has been conducted to test for the hypotheses in 6.6 and plot have been drawn for further results interpretation in 6.7.

6.2 Factor Analysis

After data coding and cleaning, the first step of formal data analysis is factor analysis, which is almost the same for all survey based research. Factor analysis is an explorative analysis. Similar logic to cluster analysis is used to group similar samples, and factor analysis groups similar measurements into constructs (also called latent variables). This process is also called identifying latent variables. Factor analysis can also help to reduce the information within a model through reducing the dimensions of the observations. Some researchers also use factor analysis to test theory, to verify scale construction and operationalisations. In such cases, the scale is specified upfront and people know that a certain subset of the scale represents an independent dimension within this scale. Besides, factor analysis can also be used to construct indices.

This research has adopted EFA to validate whether the selected measurements from previous research can produce the certain constructs. Then based on these validated constructs, the assumption test, descriptive analysis and model analysis can be conducted (Fabrigar et al., 1999; Schmitt, 2011).

Two factor analyses were conducted to validate the measures of Competitive Priorities, including construct manufacturing cost, SC cost, quality, time and flexibility, and Business Performance.

According to Hair et al. (2006), there are some assumptions that need to be made before interpreting the EFA result. These assumptions include: the value of KMO (Kaiser-Meyer-Olkin) needs to be higher than 0.80; the anti-image correlation value of each measurement needs to be higher than 0.5; all factors have retained their unique constructs with at least a respective loading total of more than 50% variance; and, all factors need to have retained their unique components with at least a respective combined total of more than 50% variance. This means the extraction variance value in the communication table in SPSS needs to be equal to or higher than 0.5 (Hair et al., 2006; Wang, Li and Chang, 2016). If any factor is not qualified this principle, it means that item is not good enough to measure the relevant construct, and it needs to be dropped. In this study, as shown in Table 6-1 in red, for competitive priorities, items MC1, MC2, MC6, MC7 for manufacturing cost, SCC3 for supply chain cost, Quality5 for Quality, Time2 for delivery time, Flexibility4 and Flexibility5 for flexibility, have been dropped. In addition, all items loaded on the specific constructs they were intended to measure need to be equal to or greater than 0.50, which is the threshold value proposed by Wang, Li and Chang (2016) in a similar study. This means within the pattern table of SPSS factor analysis, the loading value of each item needs to be equal to or higher than 0.5, otherwise, the item should also be dropped. In this study, the minimum loading value is 0.504, therefore, no future item will be dropped. Finally, all the measurements consist of five constructs which have been named as manufacturing cost, supply chain cost, quality, delivery, and flexibility, based on their measurement nature.

Table 6-1 Factor Analysis Results for Competitive Priorities

Items	Extraction Variance	Factor Loading				
		Flexibility	Quality	Supply Chain Cost (SCC)	Manufacturing Cost (MC)	Delivery
MC1	Dropped					
MC2	Dropped					
MC3	0.500	0.042	0.031	0.024	**0.690**	-0.068
MC4	0.634	0.046	-0.057	0.159	**0.729**	-0.058
MC5	0.645	-0.093	0.031	-0.071	**0.790**	0.142
MC6	Dropped					
MC7	Dropped					
SCC1	0.552	-0.020	0.124	**0.585**	0.056	0.119
SCC2	0.518	-0.039	-0.091	**0.798**	-0.079	0.039
SCC3	Dropped					
SCC4	0.535	0.031	-0.041	**0.722**	0.087	-0.097
SCC5	0.545	0.024	0.066	**0.504**	0.283	-0.038
Quality1	0.510	-0.069	**0.737**	0.028	0.017	-0.051
Quality2	0.825	0.006	**0.917**	-0.139	0.092	-0.001
Quality3	0.636	-0.011	**0.806**	-0.146	0.100	0.006
Quality4	0.524	0.084	**0.741**	0.113	-0.138	-0.108
Quality5	Dropped					
Quality6	0.529	0.014	**0.522**	0.243	-0.130	0.205
Delivery1	0.692	-0.003	-0.015	-0.010	0.012	**0.840**
Delivery2	Dropped					
Delivery3	0.720	0.085	-0.061	0.008	0.010	**0.811**
Flexibility1	0.570	**0.604**	0.026	0.050	-0.127	0.224
Flexibility2	0.700	**0.750**	0.013	-0.099	0.098	0.132
Flexibility3	0.722	**0.772**	-0.041	-0.054	0.108	0.115
Flexibility4	Dropped					
Flexibility5	Dropped					
Flexibility6	0.661	**0.928**	0.014	-0.019	-0.047	-0.179
Flexibility7	0.648	**0.821**	-0.003	0.097	-0.031	-0.089

PS: the results table shown above is based on 269 cases, by using principal axis factor extraction.

In Table 6-2, for performance, items BP3, BP4, BP8 have been dropped due to the lower variance value. The rest of the measurements form the construct "business performance" from the factor analysis.

Table 6-2 Factor Analysis Results for Business Performance

Items	Extraction	Factor Loading
BP1	0.557	**0.746**
BP2	0.496	**0.704**
BP3	dropped	
BP4	dropped	
BP5	0.78	**0.883**
BP6	0.753	**0.868**
BP7	0.693	**0.833**
BP8	dropped	

PS: the results table shown above is based on 269 cases, by using principal axis factor extraction.

6.3 Reliability and Validity Assessment

6.3.1 Reliability and Convergent Validity

Reliability refers to the consistency of a measure of the concept and independence of the constructs (Bryman and Bell, 2015). Examining the convergent validity is an important step after ensuring the reliability of a construct (Hair et al. 2014). Convergent validity focuses on the measurement level, and refers to the validity of measurements or scales which make up the construct (latent variable). In other words, it is to an extent a scale or set of measures that accurately represent the concept of interest, namely whether or not an item that is devised to gauge a concept actually measures that concept (Collis and Hussey, 2014; Hair et al., 2014).

Convergent validity can be empirically tested by factor loadings, Cronbach's coefficient alpha or composite reliability (Hair et al. 2014). Cronbach's alpha is one of the most common techniques used for testing the internal reliability of multiple-indicator constructs when factor analysis is used (Bryman and Bell, 2011; Hair et al., 2014). Usually, the measurements under their relevant constructs are also shown to meet convergent validity through Cronbach's coefficient alpha. In general, Cronbach's coefficient alpha >0.8 means qualified convergent validity; if <0.8, it means not qualified (Hair et al., 2010). However, according to Nunnally and Bernstein (1994) Cronbach's alpha is sensitive to the number of items in a construct. For example, the value of Cronbach's alpha can be increased when the number of items is increased through measuring a

construct, even with the same degree of inter-correlation (Nunnally and Bernstein, 1994). Therefore, a Cronbach's alpha value of .60 (Hair et al. 2014) or .50 (Nunnally and Bernstein 1994) can be acceptable, especially in exploratory research or for constructs with a low number of indicators (Cortina 1993; Grafton et al. 2010; Hair et al. 2006). The calculation of Cronbach's coefficient alpha can be completed through SPSS.

Table 6-3 presents the results of Cronbach's alpha for all constructs of this study for both descriptive and model analysis. The results show that the alpha values range from 0.80 to 0.90, which are bigger than the minimum threshold of 0.70 suggested by Nunnally (1978). This means all the constructs pass the convergent validity test.

Table 6-3 Convergent Validity

Constructs	Number of items	Cronbach's alpha
Competitive Priorities		
Manufacturing Cost	3	0.801
Supply Chain Cost	4	0.802
Quality	5	0.859
Time	2	0.847
Flexibility	5	0.895
Performance		
Business Performance	5	0.903

6.3.2 Discriminant Validity

Discriminant validity refers to a clear distinct and independent existed between constructs (Hair et al. 2006). In this study, discriminant validity is applied through a comparison of the square root of AVE, which is the variance shared between constructs and their measures, and the Pearson correlations between constructs (Ignatius et al. 2012; Hair et al. 2006). The square root of AVE values needs to be larger than any corresponding row or column Pearson correlation value, to support discriminant validity.

The method to calculate AVE and Square Roots of AVE (SRAVE) has to be conducted manually. The steps are shown here:

Step 1: Calculate AVE = average of the measurements loading on each factor from the EFA results table (Patent table).

Step 2: Calculate Root Square of AVE = calculate the root square in Excel (=RQST()) of the AVE above.

Table 6-4 presents the descriptive statistics and correlations among the constructs. The values in parenthesis indicate the square root of AVE, which is the variance shared between constructs and their measures (Ignatius et al., 2012). Off (below) diagonals are the Pearson correlations between constructs. The square root of AVE values is larger than any corresponding row or column Pearson, so as to support discriminant validity.

Table 6-4 Correlation among Constructs and Square Root of AVE Scores (diagonal)

Construct	Mean	Std. Dev	MC	SCC	Q	DT	F	BP
Manufacturing Cost (MC)	4.74	1.43	**0.737**					
SC Cost (SCC)	3.80	1.55	.565***	**0.662**				
Quality (Q)	5.87	1.13	.435***	.439***	**0.756**			
Delivery Time(DT)	5.19	1.50	.367***	.396***	.375***	**0.826**		
Flexibility (F)	4.38	1.66	.322***	.417***	.376***	.574***	**0.782**	
Business Performance (BP)	4.67	0.97	.260***	.230***	.284***	.309***	.337***	**0.810**

*Significant at p< .10. **Significant at p< .05. ***Significant at p< .01.

PS: the results table shown above is based on 269 cases.

Therefore, in summary, the constructs devised from EFA passed all the reliability and validity requirements. They are therefore available to be used for the following descriptive and model analysis.

6.4 Descriptive Statistics

Based on the descriptive results shown in Chapter 5, section 5.4.1, it can be seen that the pure direct reshoring group only has six samples, which is not enough for further statistical and model analysis. Therefore, as shown in the theoretical

model within the LR chapter and section 4.6.5, the moderator only has four groups as shown in Table 6-5.

Table 6-5 Shoring Decision Types of Moderator

Shoring decision types	Shoring activities undertaken
Remain	Made no conscious shoring decisions
Offshored	Only offshored
Indirect reshore	Consciously chosen to retain or expand manufacturing activity in UK instead of overseas (could also have offshored)
Direct + indirect	Directly and indirectly reshored manufacturing activity to the UK

After removing the pure direct reshoring group (six samples), the data sample size has remained at 255 cases. Therefore, the following statistical and model analyses have been conducted based on 255 samples. Therefore, a statistical descriptive analysis is able to proceed. The results are shown in Table 6-6.

Table 6-6 Descriptive Statistics for Constructs

	N	Range	Minimum	Maximum	Sum	Mean		Std. Deviation
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic
MC	255	7.00	0.00	7.00	1218.00	4.777	0.086	1.375
SCC	255	7.00	0.00	7.00	978.25	3.836	0.095	1.513
Quality	255	5.60	1.40	7.00	1506.40	5.908	0.064	1.028
Delivery	255	7.00	0.00	7.00	1321.00	5.180	0.091	1.461
Flexibility	255	7.00	0.00	7.00	1127.80	4.423	0.100	1.600
BP	255	5.00	2.00	7.00	1198.60	4.700	0.058	0.919
Valid N (listwise)	255							

6.5 Assumptions Test – Part II

As discussed in the research design chapter, the conditions to adopt hierarchical regression for the moderator moderation test is confirm that the primary data are qualified for the eight assumptions test: test dependent variable (continuous), independent variable (continuous) and one moderator variable (categorical), independence of observations, test linearity, multicollinearity, outlier, homoscedasticity, and normality. The outlier detection has been completed in the

assumption test part I in section 5.2 of Chapter 5. The rest 7 assumption tests will be conducted and shown in this chapter.

6.5.1 Dependent variable

The dependent variable needs to be the continuous variable, which means it should be measured on a continuous scale. The data of the variable need to be metric data, such as interval or ratio data. Examples of variables that meet this criterion include revision time (measured in hours), intelligence (measured using an IQ score), exam performance (measured from 0 to 100), weight (measured in kg), and the variables measured by Likert scale (Allen and Seaman, 2007; Cooper and Schindler,1998, p.189-190; Forza, 2002; Lund and Lund, 2013; Norman, 2010).

As it is known, there are four types of scales in statistics including nominal, ordinal, interval and ratio (Cooper and Schindler, 1998, p.160-161; Hair et.al, 2006, p.5-8). Nominal and ordinal are classified as the nonmetric data, and interval and ratio are classified as metrics scale (Hair et.al, 2006, p.5-8). Most multivariate statistical analysis requests metrics data, namely continuous data. Likert scale is one of the most popular scales used for collecting data in operations management research (Allen and Seaman, 2007; Hensley, 1999). However, there are some arguments regarding the appropriateness of using Likert scale data for statistical analysis. Some people believe there is no issue to adopt Likert scale data since Likert scale produces interval data (Carifio and Perla, 2008; Cooper and Schindler, 1998, p.189-190; Forza, 2002; Harry and Boone, 2012; Karlsson, 2009, p.119) as shown in Table 6-7 below for example.

Table 6-7 Scales and Scaling Techniques

Table 4.9 Scales and scaling techniques

Basic scale type	*What it highlights*	*Scaling technique*
Nominal	Difference	Multiple choice items, adjective checklist, staple scale
Ordinal	Difference, order	Forced ranking scale, paired comparison scale
Interval	Difference, order, distance	Likert scale, verbal frequency scale, comparative scale, semantic differential scale
Ratio	Difference, order, distance with 0 as meaningful natural origin	Fixed sum scale

Source: Karlsson (2009, p.119)

However, some people argue that the data collected by Likert scale belong to ordinal which may have limitations in statistical analysis. But, this concern has been resolved by researchers through the "multiple measurements approach". In detail, the data collected by a single Likert-type question or item may be ordinal, however Likert scale, consisting of sums across many items/measurements, will be interval (Carifio and Perla, 2008; Harry and Boone, 2012; Jamieson, 2004; Norman, 2010). In other words, since Likert scale are generated by calculating a composite score (sum) from several Likert-type items; therefore, the composite score for Likert scale should be considered as the interval scale (Harry and Boone, 2012). As Norman (2010) claimed: "It is completely analogous to the everyday, and perfectly defensible, practice of treating the sum of correct answers on a multiple choice test, each of which is binary, as an interval scale." In this research, all the variables have been designed to be measured by multiple items, at least 4 items. Therefore, the variables in this research belong to interval data.

Another reason for people to reject using ordinal data is due to ordinal scale does not have the same distance between each two scales, which may cause the data has issue of non-normal distribution, and thus become an issue of data validity (Norman, 2010). However, this issue would not exist in Likert scale, since people

design Likert scale rating in levels as “theoretical distribution” which can be interpreted as the scales have the same distances from each other (Allen and Seaman, 2007; Norman, 2010). Even though some people still insist that the Likert scale data is a little subjective, respecting to the reality of the management research, there are so many “opinion variables” and “behavioural variables” which are subjective variables themselves and even not able to be captured by pure statistics (Norman, 2010). Therefore, Likert scale actually helps to reduce the “subjective” level and makes it possible to measure perception and attitudes from people (Saunders, Lewis and Thornhill, 2012). In addition, many researchers have justified empirically that the Pearson correlation is robust with respect to skewness and nonnormality by using theoretical distribution Likert data (Carifio and Perla, 2008; Dunlap, 1931; Havlicek and Peterson, 1976; Norman, 2010; Pearson, 1931a, 1931b, 1932). Therefore, Likert scale data can be used for all parametric statistics (e.g. t-test, ANOVA, multiple regression, factor analysis etc.) without fear, same as interval data (Allen and Seaman, 2007; Carifio and Perla, 2008; Forza, 2002; Jamieson, 2004; Harry and Boone 2012; Norman 2010).

In this research, the dependent variable in the theoretical model is business performance which has been measured by five items after EFA and each item has been measured by a 7-point Likert scale. Therefore, the business performance is a continuous variable.

6.5.2 Independent Variable and Moderator

Similar to the dependent variable, the independent variable is also required to be continuous. In the research, it has five independent variables in total. As explained in section 4.4.2.4.1, all the scale items under each construct have been designed to be answered by a 7-point Likert scale. Therefore, all the IVs in this research are continuous variables.

As discussed in the literature, there are two types of moderation due to the variable type of moderator: continuous and categorical. In this research, the theoretical model is a categorical moderation. Therefore, the moderator needs to

be a categorical variable, which means the variable consists of different categories, and they are not able to be replaced with a “value”. In this research, the moderator “shoring decision” is a nominal variable which is one type of categorical variable that has two or more categories, but does not have an intrinsic order (Hair et al., 2006, p. 5-8; laerd.com, 2017), neither ordinal nor dichotomous. As discussed in section 4.4.2.4.5, the shoring decision has four different groups. Therefore, the categorical moderator requirement has been matched.

6.5.3 Independence of Observation

Independence of observation (i.e., independence of residuals) can be checked through the Durbin-Watson statistic value. Durbin-Watson can be obtained from the regression model summary table in SPSS. In this study, the Durbin-Watson value is 1.840. The Durbin-Watson value needs to be between 1.5 and 2.5 to qualify for independence of observation (Hair et al. 2006). Therefore, the dataset of this study qualifies for independent observation.

6.5.4 Normality

In statistics, a normality test is considered a fundamental assumption in measuring the variation of variables (Hair et al., 2006). Usually, for the univariate variable and model, Kolmogorov and Shapiro values are used to test for normality, and these values can be obtained from the explore analysis within SPSS. However, this method is very sensitive to a sample size above 200 (Hair et al. 2014), which means when a sample size is bigger than 250, the Kolmogorov and Shapiro test may be not be accurate (Field 2009). Therefore, in order to ensure the data are normally distributed, skewness and kurtosis were also used for checking normality, which can be obtained from the descriptive analysis within SPSS. Normally, all factors and indicators have skewness and kurtosis values less than 2.58, as recommended by Hair et al. (2006).

However, the above two methods to test normality are available for univariate data and models; in this research, the moderation model is a multivariate type, which does not fit with the test methods discussed above. According to Hair et al.

(2006, p.253), for a multivariate model, the normality of the error item needs to be tested, rather than the normality for each single variable. Hair et al. suggest using a P-P plot to test the multivariate normality, which can be obtained from the results of regression analysis (2006, p.253). All the points within a P-P plot need to stay together along the line, to meet the normality. Figure 6-1 shows a P-P plot for this study. It can be seen that all the points are staying together and closely adhere to the diagonal line. Therefore, the dataset in this study qualified for the normality assumption.

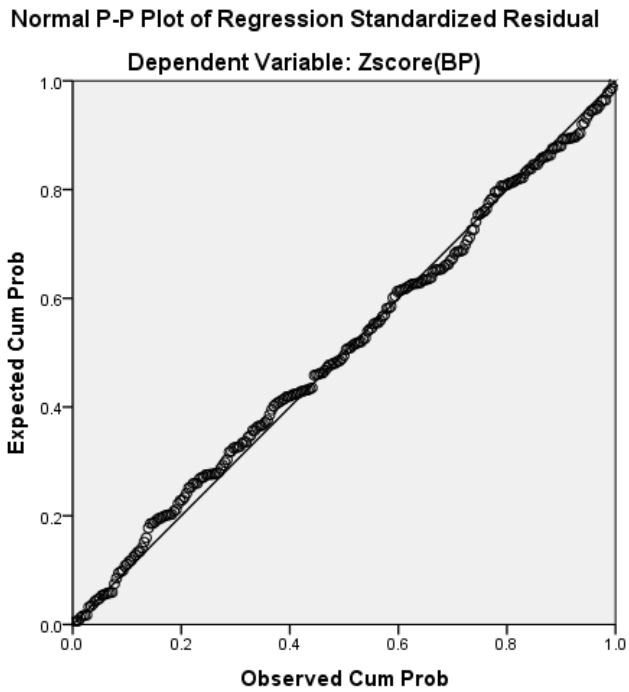


Figure 6-1 Test of Normality (P-P Plot)

6.5.5 Homoscedasticity

Homoscedasticity estimates the variance of dependent variables with independent variables (Hair et al., 2006). It refers an assumption of linear regression that variances around the line between the dependent and independent variables not substantially change for all values of the independent variable (Tabachnick and Fidell, 2007; Cohen et al., 2003).

An important assumption of a moderator analysis is that the dataset requires homoscedasticity. If the sample sizes for each group are roughly equal, then

homoscedasticity can be omitted. However, if group sizes are (sharply) different, which is the case in this research, then it is necessary to make sure that the homogeneity of variances is met by the dataset. One way to justify homoscedasticity is through Levene's test, which is part of One-way ANOVA. If the sig. of Levene's value is >0.05 (means not achieving significance), it indicates the dataset has homoscedasticity. Also, similarly to the Kolmogorov and Shapiro test, Levene's test is also sensitive with respect to a sample size above 200 (Hair et al. 2014). However, this test method is usually used to test for univariate analysis rather than a multivariate model, even though Hair et al. claim that if all the constructs have met the test for univariate variables, then it is highly likely they will meet the requirement for multivariate analysis as well (Hair et al.,2006). However, it needs to be admitted that differences may still exist. Therefore, it is better to have multivariate data to use the multivariate test method for homoscedasticity.

According the suggestion from Hair (2006, p.252), multivariate data should use a scatterplot which represents the correlation between standard residual value (SRE) and the standard predicted value (PRE). These two values and the scatterplot can be obtained from SPSS by running a regression. If homoscedasticity exists, the value of SRE will be the as same as the PRE value. This means the points within the graph in Figure 6-2 will exhibit no pattern and will be approximately constantly spread (in the y-axis) across the predicted values (x-axis) for different groups. In other words, the spread of points should be similar in the y-axis for all different groups. Namely, the point within the scatterplot needs to be sprayed randomly, in a random distribution, in order to be qualified.

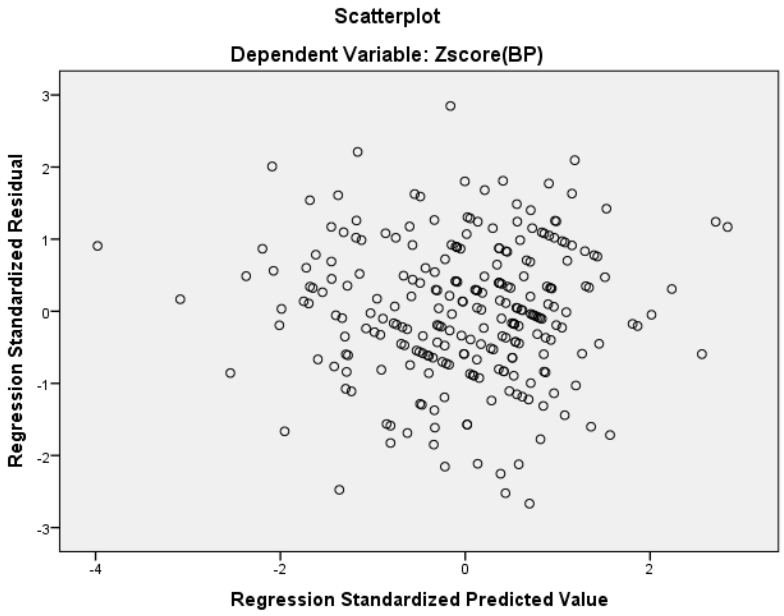


Figure 6-2 Test of Homoscedasticity

Figure 6-2 displays the scatterplot of this research. It can be seen that the SRE values appear randomly scattered and with an approximately constant spread in a random distribution. Therefore, the dataset in this study has met the assumption of homoscedasticity.

6.5.6 Linearity

Linearity refers to the correlation between variables, which is represented by a straight line (Hair et al., 2006). It is important in data analysis to know the level of relationship of variables to identify any departure that may impact on the correlation (Tabachnick and Fidell 2007). Usually, it is expected that there is not strong related among IVs, but looking for a strong related between IV (independent variable) and DV (dependent variable).

One condition to conduct hierarchical regression analysis is to make sure the dataset meets linearity assumptions among variables. There are many techniques based on correlation measures of association, including multiple regression, logistic regression, factor analysis, and structural equation modelling (Hair et al., 2006). There are also several methods to test the linearity of variables, including plots, linearity test through means comparison, and also

Pearson's correlation. Usually, for univariate data, Pearson's correlation method, is adopted; according to Field (2009), linearity can be calculated by analysing the Pearson correlation, because linearity issues (non-linearity) occur when the independent variables are strongly correlated (i.e. r (Pearson correlation coefficient) = 0.9 and above) (Hair et al., 2006).

For the multivariate data test of linearity, again, it is necessary to use a scatterplot, as stated in section 7.5.5 (Hair et al. 2006, p.251). The principle is the same as above, i.e. the points within the scatterplot need to be distributed randomly. Therefore, by reviewing Figure 6-3, the dataset in this study qualifies for linearity assumption.

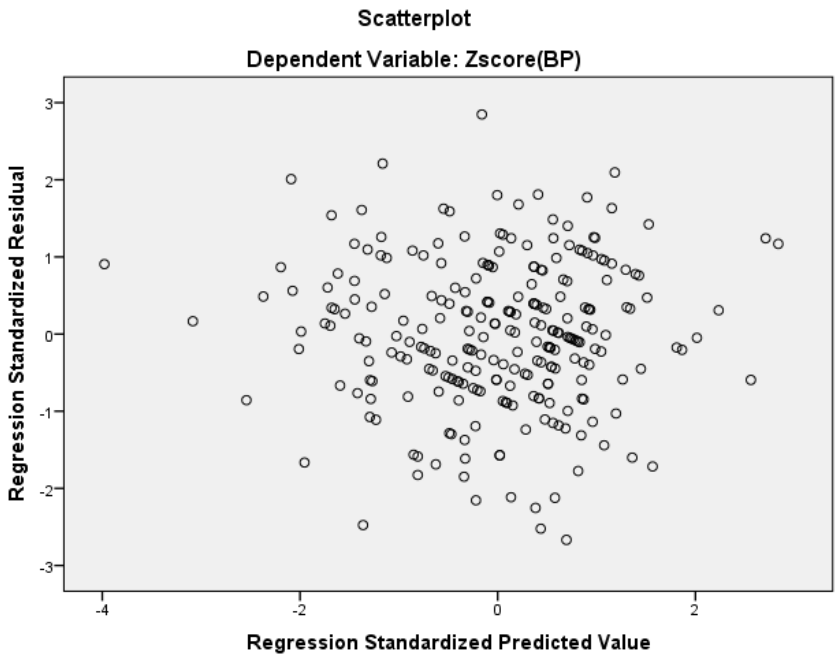


Figure 6-3 Test of Linearity

6.5.7 Multicollinearity

Multicollinearity occurs when the independent and moderator variables are highly correlated with each other. This leads to problems in understanding which variable contributes to the variance explained and technical issues in calculating a multiple regression mode. Therefore, the dataset needs to avoid multicollinearity.

It is often recommended that the continuous independent variable needs to be "mean-centred" when performing a moderator analysis for interpretation reasons (West et al. 1991; Cohen et al. 2003), but needs to be done to avoid the multicollinearity that usually causes problems (e.g., Cohen et al. 2003; Zhu and Sarkis 2007; Hayes 2013). However, although mean-centring can be automatically applied or based on interpretability, a decision is still made based on the presence of multicollinearity. Multicollinearity can be detected by using either the measure of tolerance or the variation inflation factor (VIF), as found in the "Tolerance" or "VIF" columns, respectively, of Table 6-8 (within the red lines). The two measures of Tolerance and VIF are related, with VIF being the reciprocal of Tolerance (i.e., 1 divided by Tolerance). Therefore, it is only necessary to consider one of these measures. If the Tolerance value is less than 0.1 or the VIF is greater than 10, the dataset will be considered to have a collinearity problem (Cohen et al. 2003; O'Brien 2007). In this study, all the Tolerance values are greater than 0.1 (the lowest is 0.342), for all the reference groups, therefore, there was no problem of multicollinearity in this dataset.

Table 6-8 Tolerance and VIF value results

Contructs	Tolerance	VIF
Company Industry	0.939	1.066
Company Size	0.879	1.138
Zscore(MC)	0.638	1.568
Zscore(SCC)	0.597	1.675
Zscore(Q)	0.735	1.360
Zscore(D)	0.608	1.643
Zscore(F)	0.623	1.605
Dummy1_(O+D)+I	0.790	1.266
Dummy2_Indirect	0.711	1.406
Dummy3_Offshoring	0.717	1.395

6.5.8 Assumptions Test Results

In summary, all eight assumptions that need to be met are all achieved as Table 6-9 shows. Therefore, the dataset in this study is suitable for future hierarchical regression.

Table 6-9 Assumptions Test Results

Assumpation	Dependent variable	Independent variable and Moderator	Outliers	Independence of observation	normality	Homoscedasticity	Linearity	Multicollinearity
Priciple	Continus	Continus and Moderator	Remove	√	√	√	√	X
This study	Qualified	Qualified	Qualified	Qualified	Qualified	Qualified	Qualified	Qualified

6.6 Hierarchical Regression

6.6.1 Standardized

As discussed above, in order avoid multicollinearity, it is often recommended that the continuous independent variable needs to be “mean-centred”, which is when performing a moderator analysis for interpretation reasons (Aiken and West, 1991; Cohen et al., 2003). In SPSS, the “mean-centred” is conducted through standardized within the descriptive function. However, due to the moderator of this study being a categorical moderator, there is no need to standardize the moderator. The IVs and DV have been conducted mean-centred and the descriptive results are shown in Table 6-10.

Table 6-10 Descriptive results for constructs after standardized

Constructs	Mean	Std. Deviation	N
Zscore(MCC)	0	1	255
Zscore(SC)	0	1	255
Zscore(Quality)	0	1	255
Zscore(Delivery)	0	1	255
Zscore(Flexibility)	0	1	255
Zscore(BP)	0	1	255

6.6.2 Dummy Coding

As discussed above, the theoretical model of this study is a categorical moderator moderation. Therefore, the analysis and interpretation will be very different from a continuous moderator moderation. For the regression analysis, it allows a categorical variable, but only a binary categorical variable. However, in reality, there are many variables whose nature has multiple categories, such as the “shoring decision” within this study. Therefore, dummy coding can be used to

recode nominal variables to dummy variables in order to proceed with the analysis.

Therefore, dummy coding is a way of incorporating nominal variables into regression analysis. After dummy coding, the nominal variables will convert and be represented by several dummy variables together. A dummy variable is a dichotomous variable which only has values of “0” and “1”. Therefore, dummy coding uses only ones and zeros to convey all of the necessary information in each category group.

If a nominal variable has *k* dimensions/groups, then after full dummy coding, there should be *k* dummy variables. In this study, the “shoring decision” has four categories. It uses numbers 1-4 to represent each group, as shown in Table 6-11.

Table 6-11 Moderator Groups

Shoring Decision	Group Coding
Direct+Indirect	1
Indirect	2
Offshoring	3
Remain	4

However, the numbers from 1 to 4 just represent each group. They do not have any statistical meaning, e.g. 4 is bigger or at a higher level than 1. Therefore, the shoring decision is not able to use the 1-4 input for analysis. After dummy coding, the moderator will be displayed by using four dummy variables, as shown in Table 6-12. Therefore, in the dataset, if a case has Dummy Variable 1 (D1) value with 1, and other dummy variables values are 0, then, this case should be both a direct and indirect reshoring engaged company. Therefore, D1 represents the direct + indirect group. Using the same logic, D2 refers to the Indirect group, D3 refers to the offshoring group, and D4 refers to the Remain group.

Table 6-12 Dummy Coding Results

Shoring Decision	D1	D2	D3	D4
Direct+Indirect	**1**	0	0	0
Indirect	0	**1**	0	0
Offshoring	0	0	**1**	0
Remain	0	0	0	**1**

The analysis will be based on dummy variables instead of the original nominal variables. When performing regression analysis, it is necessary to select a reference group first, which will not be put into the analysis. The results refer the companies between other no-reference groups to this reference group. For example, if taking D1 as reference, it needs to be left out when inputting the moderator in step 3 of hierarchical regression conducted in SPSS. The results are the comparison results compared to D1, which means D2, D3 or D4 is better or worse than D1.

Dummy coding allows categories to be turned into something a regression can treat as having a high (1) and low (0) score. Any binary variable can be thought of as having directionality, because if it is higher, it is category 1, but if it is lower, it is category 0. This allows the regression to look at directionality by comparing two sides, rather than expecting each unit to correspond with increase.

6.6.3 Hypotheses Testing

Hierarchical moderated regression was used to test this study's hypotheses. Hierarchical multiple regression allows researchers to predict a dependent variable based on multiple independent variables, which can be conducted using SPSS Statistics. Compared to standard multiple regression, hierarchical regression enables researchers to enter the independent variables into the regression equation in an order of their choosing, with the following advantages: (a) controls for the effects of covariates on the results; and (b) takes into account the possible causal effects of independent variables when predicting a dependent variable (Cohen et al. 2003; Brambor et al. 2006; Dawson 2014). This research adapts the variance partitioning procedures proposed by Jaccard et al. (2003),

and which were employed in prior empirical operations management research (Zhu and Sarkis 2007; Wang et al. 2012). The variance partitioning procedures includes four steps:

A 4-step hierarchical regression model was used only for the Business Performance as DV; the manufacturing performance is not included in this analysis since it does not belong to the theoretical model. In the four steps, sets of variables were entered consecutively, where variables in the first step are the control variables of company size and industry (high/low technology); the second step consists of all five competitive priorities dimensions; in the third step of the analysis, shoring decisions (moderator) were input into the model. However, due to the categorical moderator, it will be replaced by the four dummy variables which have been developed in section 6.6.2. Also, it is necessary to keep one group (dummy variable) out as the reference group. The fourth step includes the interaction items: the three inputted dummy variables multiplied by the five IVs (manufacturing cost, SC cost, quality, time, and flexibility). For example, when using the remain group (D4) as the reference group, then the interaction terms will be: Direct + Indirect x CPs, Indirect group x CPs, and offshoring group x CPs.

In step 3, every time of running the hierarchical regression only one reference group is allowed, due to the categorical moderator having four sub categories. Therefore, in order to compare all the groups with each other, four regressions need to be conducted. However, half of the results from these four regressions will be duplicates of each other, since under the same IV and DV, D2 compared to D1 is as same as D1 compared to D2.

The full results of these four times hierarchical regressions are shown in Table 6-13.

Table 6-13 Hierarchical Regression Results

Independent Variables	Dependent Variables (Business Performance)									
	Model 1	Model 2	Remain		Offshoring		Indirect		Direct+Indirect	
			Model 3	Model 4	Model 3	Model 4	Model 3	Model 4	Model 3	Model 4
Company Industry	.227*	.128	.139	.089	.139	.089	.139	.089	.139	.089
Company Size	-.204	-.155	-.160	-.142	-.160	-.142	-.160	-.142	-.160	-.142
Manufacturing Cost		.119*	.126*	.177	.126*	.201	.126*	.060	.126*	.457**
SC Cost		-.021	-.007	-.071	-.007	.072	-.007	.089	-.007	-.682**
Quality		.080	.079	.121	.079	.286	.079	.002	.079	.061
Delivery		.135*	.120	.299*	.120	-.209	.120	.015	.120	.447**
Flexibility		.202**	.193***	.009	.193***	.644***	.193***	.235**	.193***	-.081
Direct+Indirect			.184	.018	.282	.118	.002	-.164		
Indirect			.181	.181	.279	.282			-.002	.164
Offshoring			-.098	-.101			-.279	-.282	-.282	-.118
Remain					.098	0.101	-.181	-.181	-.184	-.018
Manufacturing Cost x Direct+Indirect				.280		.257		.398		
SC Cost x Direct+Indirect				-.611**		-.754**		-.771**		
Quality x Direct+Indirect				-.060		-.225		.059		
Delivery x Direct+Indirect				.148		.656**		.432*		
Flexibility x Direct+Indirect				-.090		-.724**		-.315		
Manufacturing Cost x Indirect				-.117		-.141				-.398
SC Cost x Indirect				.160		.017				.771**
Quality x Indirect				-.119		-.284				-.059
Delivery x Indirect				-.284		.224				-.432*
Flexibility x Indirect				.225		-.409				.315
Manufacturing Cost x Offshoring				.024				0.141		-.257
SC Cost x Offshoring				.143				-.017		.754**
Quality x Offshoring				.165				.284		.225
Delivery x Offshoring				-.507**				-.224		-.656**
Flexibility x Offshoring				.634**				.409		.724**
Manufacturing Cost x Remain						-.024		.117		-.280
SC Cost x Remain						-.143		-.160		.611**
Quality x Remain						-.165		.119		.060
Delivery x Remain						.507**		.284		-.148
Flexibility x Remain						-.634**		-.225		.090
Adj R^2	.013	.145	.147	.177	.147	.177	.147	.177	.147	.177
ΔR^2	.021	.147	.012	.078	.012	.078	.012	.078	.012	.078
F change	2.727*	8.727***	1.919	1.596*	1.919	1.596*	1.919	1.596*	1.919	1.596*

Items in parenthesis indicate their corresponding hypothesis.

*Significant at p< .10. **Significant at p< .05. ***Significant at p< .01.

Due to the categorical moderator, 4 hierarchical regressions have been run in order to complete the analysis for all the reference groups; the results for models 3 and 4 associate moderator and interactions have been shown together in this table for different reference groups as marked in the front row in red.

Table 6-133 presents the regression results by using four models (matched with the four steps above respectively). In this research, it accepts the significant level including 0.01, 0.05 and up to 0.1. Usually, the significant level statistical research used is 0.05 or 0.01 level, however, this is not a compulsory standard (Cohen, 1992a; 1992b). Researchers are free to choose the most suitable significant level (could even be at 0.2 level) due to the research context (Cohen, 1992b). The choice of significant level is not an independent decision. It is related to the statistical power which is usually required to achieve equal or higher than 0.8 for quantitative research (Hair et al. 2006; Cohen, 1988 ch.9; 1992a; 1992b). In order to understand the relationship between significant level and statistical power, it is necessary to start the discussion with Type I and Type II errors. As defined by Hair et al. (2006, p.3), Type I error, termed alpha (α), refers to "probability of incorrectly rejecting the null hypothesis—in most cases, it means saying a difference or correlation exists when it actually does not." The levels for Type I error could be, for example, 10, 5 or 1 percent, termed the .10, .05 or .01 level. Type II error, termed beta (β), refers "probability of incorrectly failing to reject the null hypothesis—in simple terms, the chance of not finding a correlation or mean difference when it does exist." (Hair et al., 2006, p.3) Also, the Type II error is inversely related to Type I error as per Hair et al. (2006, p.3), "the value of 1 minus the Type II error (1-β) is defined as power." Therefore, the statistical power is "the probability of correctly rejecting the null hypothesis when it should be rejected" (Hair et al., 2006, p.10). The concepts and their relationships could be summarized as Figure 6-4 below.

		Reality	
		No Difference	*Difference*
Statistical Decision	H_0: *No Difference*	1 – α	β **Type II error**
	H_a: *Difference*	α **Type I error**	1 – β **Power**

Figure 6-4 Type I and Type II Errors

Source: Hair et al. (2006, p.10)

Therefore, based on the definitions above, it can be seen that “although specifying alpha establishes the level of acceptable statistical significance, it is the level of power that dictates the probability of success in finding the differences if they actually exist” (Hair et al., 2006, p.10). Then, people may say just set both alpha and beta at acceptable levels. However, unfortunately, the “Type I and Type II errors are inversely related” (Hair et al., 2006, p.10). Thus, when Type I error becomes more restrictive (moves closer to zero), the probability of a Type II error increases meanwhile the statistical power decreases (Hair et al., 2006, p.10). In conclusion, “reducing Type I error reduces the power of the statistical test” (Hair et al., 2006, p.10). Therefore, researchers must have a good balance between the level of alpha (significant level) and the statistical power.

In fact, the statistical power will be affected by three factors together which are effect size, significant level and sample size (Hair et al., 2006, p.10-11). Therefore, the choice of significance level is a balance with the other two factors to guarantee the final statistical power equal or higher than 0.8. As claimed by Hair et al. (2006, p11), the higher effect size will result in a higher statistical power, and bigger sample size will also produce a higher statistical power. However, the more restrictive on the significant level will reduce the statistical power as discussed above (Hair et al., 2006, p11). According to the Cohen (1992a), the effect size could be measured by different index as shown in following Table 6-14, and for regression analysis, it usually use f^2 as the index, and has been categorized to small, medium and large effect size, following the guidance in the Table 6-14 (Cohen, 1992a; Hair et al.,2006, p.11).

Table 6-14 Effect Size Index and their Values for Small, Medium and Large Category

ES Indexes and Their Values for Small, Medium, and Large Effects

Test	ES index	Effect size		
		Small	Medium	Large
1. m_A vs. m_B for independent means	$d = \frac{m_A - m_B}{\sigma}$	.20	.50	.80
2. Significance of product–moment r	r	.10	.30	.50
3. r_A vs. r_B for independent rs	$q = z_A - z_B$ where z = Fisher's z	.10	.30	.50
4. $P = .5$ and the sign test	$g = P - .50$	.05	.15	.25
5. P_A vs. P_B for independent proportions	$h = \phi_A - \phi_B$ where ϕ = arcsine transformation	.20	.50	.80
6. Chi-square for goodness of fit and contingency	$w = \sqrt{\sum_{i=1}^{k} \frac{(P_{1i} - P_{0i})^2}{P_{0i}}}$	.10	.30	.50
7. One-way analysis of variance	$f = \frac{\sigma_m}{\sigma}$	.10	.25	.40
8. Multiple and multiple partial correlation	$f^2 = \frac{R^2}{1 - R^2}$	.02	.15	.35

Note. ES = population effect size.

Source: Cohen (1992a)

In addition, Cohen (1992a) also provide another table as shown in the Table 6-15 to indicate the balance relationship among different levels of sample size, statistical power, significant level and effect size. As per to the Table 6-15, it could be seen, when there are five IVs, under the medium effect size, to achieve statistical power at 0.8, it requires sample size minimum at 126 when significance at 0.01 level; and minimum 91 when significance at 0.05 level. According the principle of the more restrictive on the significant level will reduce the statistical power (Hair et al., 2006, p11), therefore, it can conclude the minimum sample size must below 91 when significance at 0.1 level. This is why Hair et al. (2006, p.11) suggested "the researchers, if anticipating the effect sizes to be small, must design the study with much larger sample sizes and/or less restrictive alpha levels (e.g., .10)." In this study, the effect size fall between medium and large range (f^2=0.347 for model 4 interaction effect and f^2=0.201 for model 2 main effect) and sample size for hierarchical regression is 255, which is much higher than 91. Therefore, based on Table 6-15, it can be concluded this study can choose any

significant level as the author's preference, without worrying the issue of statistical power (Cohen, 1992a; Cohen, 1992b).

The researcher finally decided to accept up to 0.1 significant finally, due to the following 5 reasons. The researcher wants to explore as many as significant effects to providing for practitioner as a full consideration options. Also, the researcher wants to further boost the statistical power for main effect due its lower effect size (0.201) compared to the interaction effects (0.347). Further, considering the categorical moderator, the sub-groups samples for each shoring decision type could be smaller than the total sample size, therefore less restrictive on the significant level can help to further enhance the power of results relating those sub-groups. In facts, based on the analysis results including both main effects and interaction effects, there are only 3 significances are at 0.1 level, others are all below 0.05. Therefore, accepting 0.1 level will not affect the reliability of the results. Finally, this choice of 0.1 significant level is actually following the up-to-date trend of operations management research work. Considering management research is different to pure statistical research, therefore, it may not necessary to be too restrict on the significant level, and that why the best journals like IJOPM and JOM in operations management both encourage researchers to use 0.1 level which can be seen as popular trend from the publications after 2010 (Oltra and Flor 2010; Malhotra 2014; Ignatius et al. 2012; Cao and Zhang-2011; Amoako-Gyampah 2008; Salvador et al. 2014).

Table 6-15 Balance Table

N for Small, Medium, and Large ES at Power = .80 for α = .01, .05, and .10

	α								
	.01			.05			.10		
Test	Sm	Med	Lg	Sm	Med	Lg	Sm	Med	Lg
1. Mean dif	586	95	38	393	64	26	310	50	20
2. Sig *r*	1,163	125	41	783	85	28	617	68	22
3. *r* dif	2,339	263	96	1,573	177	66	1,240	140	52
4. *P* = .5	1,165	127	44	783	85	30	616	67	23
5. *P* dif	584	93	36	392	63	25	309	49	19
6. χ^2									
1*df*	1,168	130	38	785	87	26	618	69	25
2*df*	1,388	154	56	964	107	39	771	86	31
3*df*	1,546	172	62	1,090	121	44	880	98	35
4*df*	1,675	186	67	1,194	133	48	968	108	39
5*df*	1,787	199	71	1,293	143	51	1,045	116	42
6*df*	1,887	210	75	1,362	151	54	1,113	124	45
7. ANOVA									
2*g*[a]	586	95	38	393	64	26	310	50	20
3*g*[a]	464	76	30	322	52	21	258	41	17
4*g*[a]	388	63	25	274	45	18	221	36	15
5*g*[a]	336	55	22	240	39	16	193	32	13
6*g*[a]	299	49	20	215	35	14	174	28	12
7*g*[a]	271	44	18	195	32	13	159	26	11
8. Mult *R*									
2*k*[b]	698	97	45	481	67	30			
3*k*[b]	780	108	50	547	76	34			
4*k*[b]	841	118	55	599	84	38			
5*k*[b]	901	126	59	645	91	42			
6*k*[b]	953	134	63	686	97	45			
7*k*[b]	998	141	66	726	102	48			
8*k*[b]	1,039	147	69	757	107	50			

Note. ES = population effect size, Sm = small, Med = medium, Lg = large, diff = difference, ANOVA = analysis of variance. Tests numbered as in Table 1.
[a] Number of groups. [b] Number of independent variables.

Source: Cohen (1992a)

Model 1 shows the control variables accounted for less than 5% of the variance in business performance. The type of industry (high/low technology) had a significant, positive effect (.268, p<.005) on business performance. In model 2, by adding IVs, R^2 increased by .145, and it was discovered that all the independent variables except SC cost and Quality exhibited a significant association with Business Performance, which supports H1, H4, and H5. The results Table 6-133 has merged the four times regression results of models 3 and 4 together by indicating at the front which group is the reference group. Through the analysis of model 3, it was found that Direct+Indirect, and Indirect groups have positive effects on BP; however, the offshoring and remain groups have negative effects on BP, even though the effects are not significant. The interaction effects in model 4 suggest that they would have more relevant roles in explaining

non-linear Business Performance relationships. As shown in the model 4 columns, there are 16 significant interactions in total that exist. They appear among different groups between SC cost and BP, time and BP, and flexibility and BP. For example, when using the remain group as reference, Direct+Indirect reshored companies have a significant difference in terms of how SC cost affects BP compared to the Remain companies, and Offshored companies have significant differences in how Delivery Time or Flexibility affects BP, compared to the Remain companies.

In order to better analyse and interpret, the interaction results within Table 6-13 have been further summarised in Table 6-16.

Table 6-16 Interaction Results Summary

Baseline (Compare to)	Remain	Offshoring	Indirect	Direct+Indirect
Remain	**N/A**	√√	X	√
Offshoring	√√	**N/A**	X	√√√
Indirect	X	X	**N/A**	√√
Direct+Indirect	√	√√√	√√	**N/A**

Note: SC cost vs BP - √ Time vs BP - √ Flexibility vs BP - √

From Table 6-16, it can be seen clearly that there are 16 significants that exist. But they are duplicated along the diagnostic. Therefore, eight moderated interactions exist. The remain, offshoring and indirect groups have significant differences compared to the direct+indirect group in terms of SC cost and BP, which supports H7. The offshoring and indirect groups have significant differences compared to the direct+indirect reshored group, in terms of Time and BP, which supports H9. Finally, the offshoring group has significant differences compared to the direct+indirect and remain groups separately, in terms of the relationship between Flexibility and BP, which supports H10.

In summary, six hypotheses have been supported out of the total of 10. The summary is shown in Table 6-17.

Table 6-17 Hypotheses Results

Hypotheses Summary		Results
Main Effect	H1: Emphasis on the competitive priority of **manufacturing cost** has a positive association with business performance	Supported
	H2: Emphasis on the competitive priority of **SC cost** has a positive association with business performance	Not Supported
	H3: Emphasis on the competitive priority of **quality** has a positive association with business performance	Not Supported
	H4: Emphasis on the competitive priority of **delivery** has a positive association with business performance	Supported
	H5: Emphasis on the competitive priority of **flexibility** has a positive association with business performance	Supported
Interaction Effect	H6: Shoring decision type moderates the relationship between the emphasis on the competitive priority of **manufacturing cost** and business performance	Not Supported
	H7: Shoring decision type moderates the relationship between the emphasis on the competitive priority of **SC cost** and business performance	Supported
	H8: Shoring decision type moderates the relationship between the emphasis on the competitive priority of **quality** and business performance	Not Supported
	H9: Shoring decision type moderates the relationship between the emphasis on the competitive priority of **delivery** and business performance	Supported
	H10: Shoring decision type moderates the relationship between the emphasis on the competitive priority of **flexibility** and business performance	Supported

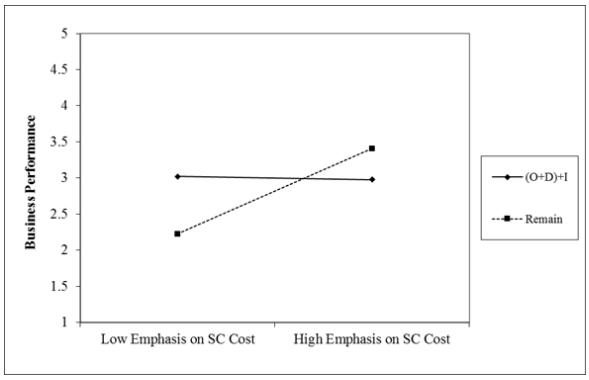
6.7 Plot – Moderation Interpretation

To provide an in-depth discussion of the significant interactions, a plot is required. According to Dawson (2014), the coefficient of the interaction term suggests that it becomes more positive/negative as autonomy increases/decreases; however, the size and precise nature of this effect is not easy or accurate to determine from examination of the coefficients alone. Therefore, it is necessary to plot the predicted relationship among IVs, DV and Moderator by calculating the predicted values, to allow interpretation visually and to overcome the errors. As the moderator in this research is categorical, a 2-way binary moderator template has been adopted for plotting (Dawson, 2014, 2017).

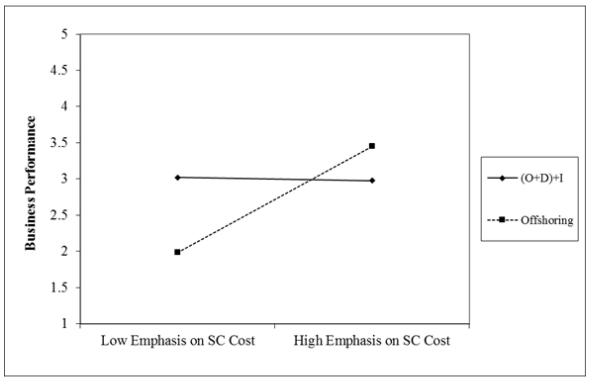
The value for the plot is taken from Table 6-13 for IVs, moderator and interactions. As already discussed, even though 16 are significant, they actually represent eight moderation interactions. Therefore, in total, eight plots will be developed.

6.7.1 Moderation Effect between SC cost and BP

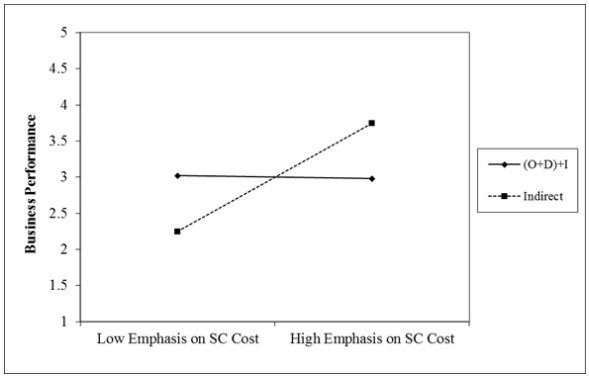
There are three interactions between supply chain cost and business performance, among remain compared to direct+indirect, offshoring compared to direct+indirect, and indirect compared to direct+indirect. The three plots are shown in Figure 6-5.



Panel A



Panel B



Panel C

Figure 6-5 Plot Results for SC Cost and Business Performance

As discussed previously, the result is a comparison result due to the categorical moderator. Therefore, after plot, when interpreting the results, it is necessary to compare the two lines (the two groups) to interpret the comparative relationship positions of the two lines on the graph (Aiken and West, 1991; Dawson, 2014; Petty et al., 1996). Therefore, as shown in Figure 6-5 Panel A, with a low emphasis on SC cost, companies that took no shoring decisions exhibited a lower Business Performance than companies who directly and indirectly reshored. With a high emphasis on SC cost, companies that took no shoring decisions exhibited a higher Business Performance than companies who directly and indirectly reshored. In other words, the effect of placing greater emphasis on SC cost on Business Performance is stronger for companies that have remained in their home country than for companies that have directly and indirectly reshored.

Panel B shows that with a low emphasis on SC cost, companies that offshored overseas exhibited a lower BP than companies who directly and indirectly reshored. With a high emphasis on SC cost, companies that offshored overseas exhibited a higher BP than companies who directly and indirectly reshored. In other words, the effect of placing greater emphasis on SC cost on Business Performance is stronger for companies that have offshored than for companies that have directly and indirectly reshored.

Panel C shows that with a low emphasis on SC cost, companies that indirectly reshored exhibited a lower BP than companies who directly and indirectly reshored. With a high emphasis on SC cost, companies that indirectly reshored exhibited a higher BP than companies who directly and indirectly reshored. In other words, the effect of placing greater emphasis on SC cost on Business Performance is stronger for companies that have indirectly reshored than for companies that have directly and indirectly reshored.

6.7.2 Moderation Effect between Delivery and BP

There are three interactions between Delivery and Business Performance, which happened among remain compared to offshoring, direct+indirect compared to

offshoring, and direct+indirect compared to indirect. The three plots are shown in Figure 6-6.

Panel A

Panel B

Panel C

Figure 6-6 Plot Results for Delivery and Business Performance

Therefore, as shown in Figure 6-6 Panel A, with a low emphasis on Delivery, companies that took no shoring decisions exhibited a lower Business Performance than companies who offshored overseas. With a high emphasis on Delivery, companies that took no shoring decisions exhibited a higher Business Performance than companies who offshored overseas. In other words, the effect

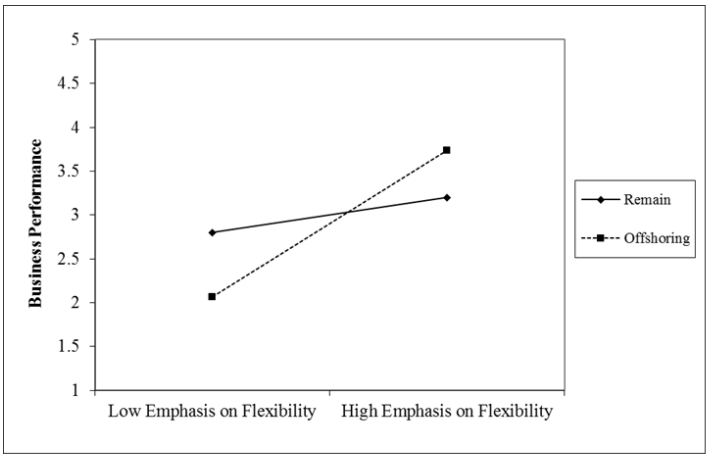
of placing greater emphasis on Delivery on Business Performance is stronger for companies that have remained in home country than for companies that have offshored.

Panel B display that with a low emphasis on Delivery, companies that offshored overseas exhibited a lower BP than companies who directly and indirectly reshored. With a high emphasis on Delivery, companies that offshored overseas exhibited a higher BP than companies who directly and indirectly reshored. In other words, the effect of placing greater emphasis on Delivery on Business Performance is stronger for companies that have directly and indirectly reshored than for companies that have offshored.

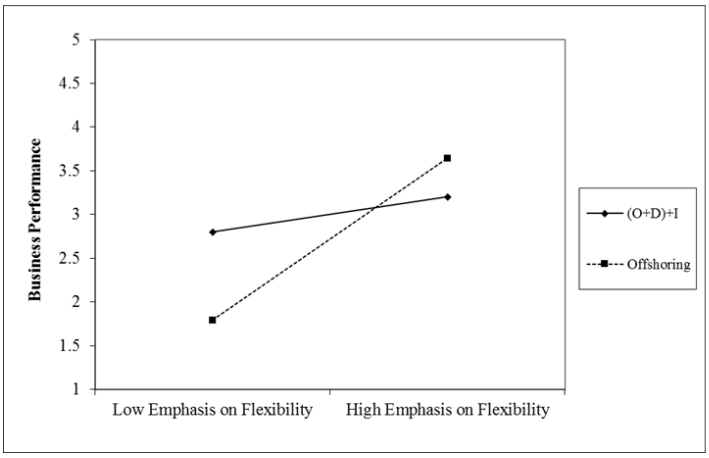
Panel C shows that with a low emphasis on Delivery, companies that directly and indirectly reshored exhibited a lower Business Performance than companies who offshored overseas. With a high emphasis on Delivery, companies that directly and indirectly reshored exhibited a higher Business Performance than companies who offshored overseas. In other words, the effect of placing greater emphasis on Delivery on Business Performance is stronger for companies that have directly and indirectly reshored than for companies that have indirectly reshored.

6.7.3 Moderation Effect between Flexibility and BP

There are two interactions between Flexibility and Business Performance, which happened among remain compared to offshoring, and direct+indirect compared to offshoring. The two plots are shown in Figure 6-7.



Panel A



Panel B

Figure 6-7 Plot Results for Flexibility and Business Performance

Therefore, as shown in Figure 6-7 Panel A, with a low emphasis on Flexibility, companies that offshored overseas exhibited a lower Business Performance than companies who took no shoring decisions. With a high emphasis on Flexibility, companies that offshored overseas exhibited a higher Business Performance than companies who took no shoring decisions. In other words, the effect of placing greater emphasis on Flexibility on Business Performance is stronger for companies that have offshored to overseas countries than for companies that have undertaken no shoring activities.

Panel B shows that with a low emphasis on Flexibility, companies that offshored overseas exhibited a lower Business Performance than companies who directly and indirectly reshored. With a high emphasis on Flexibility, companies that offshored overseas exhibited a higher Business Performance than companies who directly and indirectly reshored. In other words, the effect of placing greater

emphasis on Flexibility on Business Performance is stronger for companies that have offshored to overseas countries than for companies that have directly and indirectly reshored.

6.8 Chapter Summary

In summary, this chapter has displayed the statistical data analysis results step by step, covering the factor analysis and validity and reliability tests, also the assumptions tests prior to hierarchical regression. Then the regression results table shows all the analysis results by using all the reference groups. Based on the results, three significant main effects support three main hypotheses, and eight significant interactions have been identified that support three moderation hypotheses. In order to interpret the results, a plot has been conducted to show the result in graphs. Further discussion of results will be conducted in Chapter 7.

7 Discussion

7.1 Chapter Introduction

This chapter discusses the empirical results obtained from Chapters 5 and 6. It starts with the introduction in section 7.1. Section 7.2 will focus on the discussion of descriptive results which reveals the current UK manufacturing reshoring status. Section 7.3 will discuss the statistical results linked to the theoretical models and hypotheses, with 7.3.1 focused on the main effects and 7.3.2 on the interaction effects. Finally, the chapter will close with a short chapter summary in section 7.4.

7.2 Discussion on Descriptive Results

7.2.1 Reshoring Decision Status

As shown in the descriptive analysis, 55% of companies have engaged in reshoring either directly or indirectly, which is a very high involvement rate, especially considering that 70% of the UK manufacturing companies are SEMs, which may prevent the initial offshoring and consequently reshoring. This rate shows a very positive engagement. Also, when linked to the reshoring future trend that has been predicted in section 5.11, 70% of companies have claimed to have a high possibility to engage in indirect reshoring and 20% claimed to engage in direct reshoring, so it is not difficult to conclude that the reshoring era will come or has already arrived. Besides the drivers and operational considerations, the government also plays an extremely important role in driving reshoring rates, as discussed in section 1.3. On the gov.co.uk website, the concept of reshoring has already been stressed with a separate webpage to display the concept and relevant reports. As can be seen, the government has already introduced some political incentives to support companies in conducting reshoring, which has been included in the summary budget plan in 2015 (HM Treasury, 2015) and has been in effect since 2016. This could be part of the motivation for companies' decision to reshore. If more broadcasting is undertaken of these incentives and there is more support from the UK government, the trend of UK manufacturing reshoring will be even more positive in the future. In addition, another key reason to explain

why the reshoring has become so popular could be the production technology in the UK. The UK is one of the countries that implemented industry 4.0 in the first place. From industry 3.0 to industry 4.0, the technology has been accumulated and prepared for this moving back, due to the advanced technology allowing companies to produce good quality items and at a lower cost in the UK. This mitigates the cost advantage of offshoring based on the economies of scale theory, and supported by the statement that economies of scale has lost its edge (Christopher, 2011). Therefore, with technology as the foundation, UK companies have had confidence in coming back.

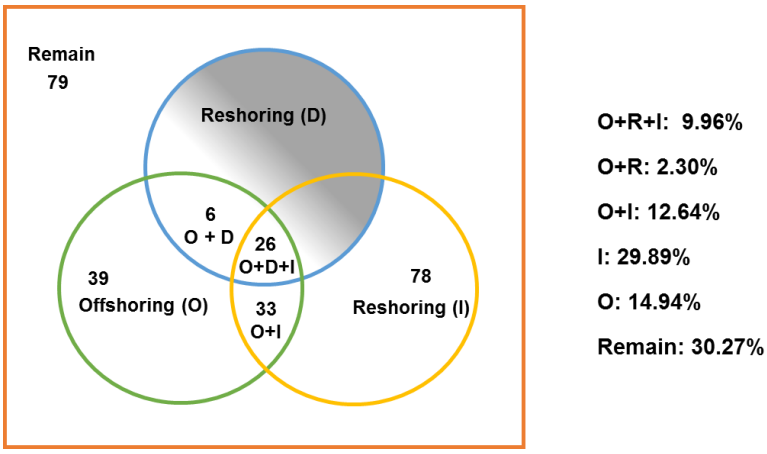


Figure 7-1 Shoring Decision Results

However, within the sample, as shown in Figure 7-1, the numbers within the Venn diagram above represent the numbers of companies within each shoring decision group; and the percentage at the right side represent the how much each shoring decision group samples account within the total samples. Therefore, only 13% have engaged in direct reshoring; the pure direct reshoring engagement rate is only 2.3%. This number is outside the author's expectation, especially having reviewed the reshoring practice in the US. But having checked the news for direct reshoring of UK companies, it shows similar results to those this study has identified. This is very different when compared to the reshoring status in the US, but it makes sense to have different scenarios for different contexts. This also justifies the necessity to conduct research based on the UK perspective. As discussed above, the majority of UK manufacturers are SMEs, which could be a reason for this low direct reshoring rate, since those companies may not have

engaged in offshoring previously due to the constraints of their size. As Gray et al. (2013) have mentioned, without offshoring, there is no reshoring. Therefore, many SEMs could not qualify by definition, but they still actively engage in indirect reshoring. This also answers why so many companies in the UK have engaged in indirect reshoring. Based on the analysis results, 53% of companies are engaged in indirect reshoring, which is a new and unique finding. This finding justifies the existence of indirect reshoring, and further confirms the necessity to enrich the reshoring concept by adding the indirect reshoring element. This also shows that, in the UK context, indirect seems play a more active role than direct reshoring. Also, considering 190 companies were involved in the offshoring within the sample size, among them 143 companies engaged in reshoring, which equates to 75%, and is a much higher rate than Kinkel's findings for Germany, i.e. that every four offshorings will be countered by one reshoring. Therefore, this further reveals reshoring is a positive trend for the UK.

7.2.2 Business Strategy Status

In terms of business strategies, companies' state regarding their strategies has been collected. It can be seen from the results that most companies claim to have a differentiation strategy. However, the two answers to the two questions, both regarding same generic strategies, are different from each other, as shown in Figure 7-2. Comparing the graphs, it can be seen at the right side of the graph, which companies answer the strategic question through completing the Likert scale, 194 companies have claimed to have differentiation. However, in the left side graph, the number of differentiations changed to 141 when companies were asked to directly indicate their strategy based on cost-leadership and differentiation definitions. These differences mean there are around 53 companies, which accounts for about 20% of the whole sample, that did not give a consistent answer regarding their business strategy. This may be due to the shortage of the design of the question. But it could also reveal a fact that these companies may not have a good understanding of their business strategy. This may explain why some literature argues that companies do not make the location decision to stick to alignment with their strategy, and just follow the industry trend

to choose their manufacturing places, without first conducting a systematic review of the decision (Amoako-Gyampah and Acquaah, 2008). Therefore, it is very important to identify the relevant parameters of reshoring decisions, as shown in the framework for reshoring in Chapter 2.3.6. And it is even more important to match the competitive priorities with location decisions, in order to guide companies in making appropriate choices.

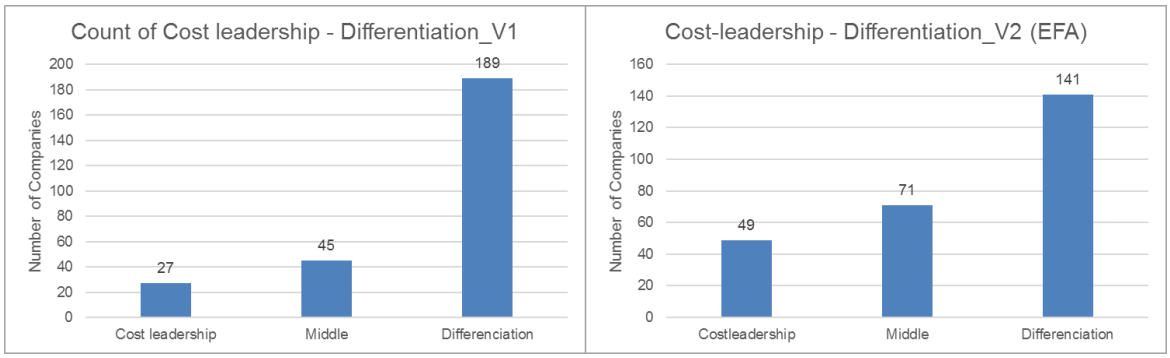


Figure 7-2 Strategic Comparisons

7.2.3 Operations Status

The survey has collected the information regarding companies' operational state, which will be discussed below following three streams: competitive priorities, products, and proximity.

As shown in Figure 7-3, regarding competitive priorities, it can be seen that quality is the priority to which all the companies pay the most attention. This matches the literature that argues quality is the basis of manufacturing activities, which should be the first item to pay attention to (Ferdows and De Meyer 1990; Noble 1995; Ward and Duray 2000). Based on the data, the five groups did not have obvious distinct on the emphasis on quality. This justifies the author's argument that quality has gradually transferred from an order winner to an order qualifier. Comparing the manufacturing cost to quality, no companies put more emphasis on manufacturing cost than quality, which conflicts with the companies' business strategy in which it was claimed they are cost leadership. Therefore, the data regarding strategy are not going to be used for further analysis. This also justified the viewpoint that firm performance is determined by operational priorities

directly, rather than strategy (Amoako-Gyampah and Acquaah, 2008). Compared to other companies, it seems the offshoring group has the highest emphasis score on manufacturing cost and lowest score on delivery and flexibility, which confirms some research findings, i.e. that offshoring companies usually focus more on cost as the dominant drivers. However, based on Boyer and Lewis's (2002) view, a good international standard manufacturer needs to balance all the factors rather than have a dominant one in order to achieve good performance in the current business environment. This also matches the lean theory. The pure cost leadership era seems to have past already (Christopher, 2011), which can be seen from the strategy data as well. The reshoring companies involved in both direct and indirect reshoring seem focused more on delivery and flexibility, which is not surprised, since extant research regarding drivers have reveals the same results. The remain group, who taking no shoring decisions, seem in the middle of every priority without a specific one being given more attention. But it still appears as distinct from the other groups.

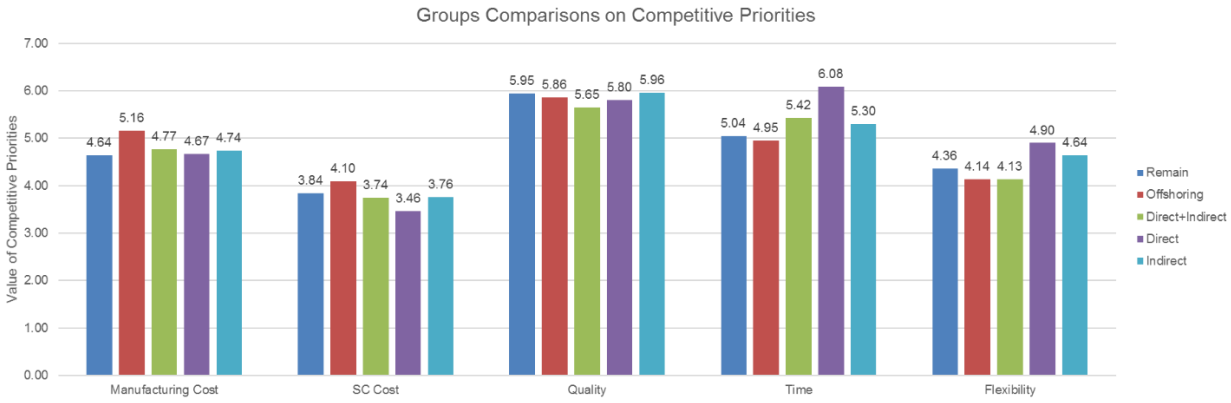


Figure 7-3 Competitive Priorities Comparisons

In terms of products, the survey has collected product information regarding type, heritage and governance for both indirect and direct reshoring. It can be seen (Figure 7-4) that the most common products to have been moved back are finished products for both indirect and direct reshoring, with showing even stronger state in indirect reshoring. The reason behind this could be due to the market. When companies move products back, it is to seek a new production place for the whole product, rather than simply changing a supplier. The reason

behind this is to gain more market share. One approach is to be closer to their customers, to provide a more responsive service. This point has also been justified by the findings from proximity. In terms of product heritage, most of them are original products, but they also cover others. It is known that the original product usually plays a significant role in companies and is viewed as a foundation for the design of other products. These data reveal that companies are moving their most significant products back to the home country. This could be caused by the IP problems overseas, but also because companies are attracted by the knowledge and technologically advanced levels of the UK. In this way, the knowledge will be accumulated in the UK and produce a positive circle. Besides, the majority of the reshoring activities have been conducted by the companies themselves. This could be explained as reshoring being an action to take back ownership by the companies. Also, it may be due to the complexity level of reshoring, which requires companies to implement themselves in order to control the whole process and any risk. In summary, the original finished goods are the most welcome reshoring products, the majority of which are conducted by the companies themselves.

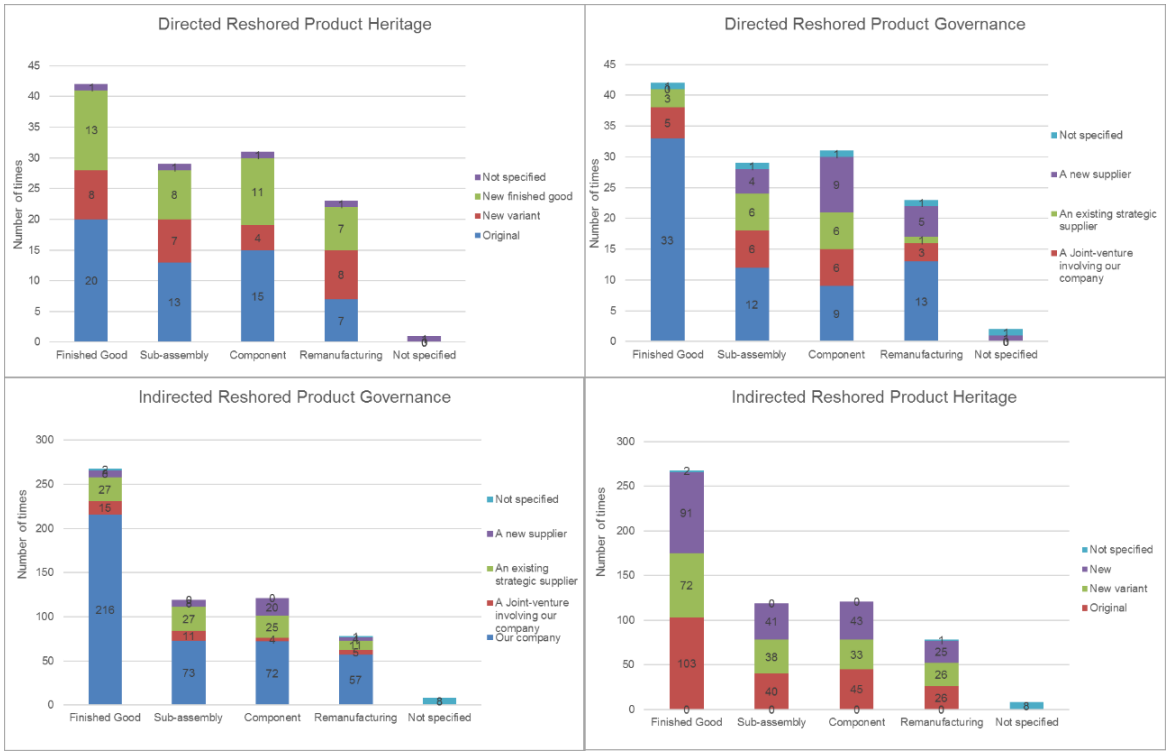


Figure 7-4 Reshoring Products

Finally, regarding the proximity, some extant reshoring research has claimed that proximity means to be close to an R&D centre to allow a flexible product life cycle from design to final sale to customers. However, in the dataset of this research, the dominant proximity is the main market (shown in Figure 7-5). Companies are actually driven by the market and it seems that this main market refers to the home market even for those companies that have a global business. The author assumes companies have gradually realized the key roles of the home market plan to their business, no matter how big the global market. A strong home market is the foundation, not only to support companies' income, but also to build the brand and enhance basic capabilities. For example, China is the biggest market for Apple; however, Apple never forgot their home market by only focusing on China. If Apple had only designed for Chinese customers, the culture and value of the brand would have been damaged. This may also have caused markets in other countries not to feel good about the brand. Then, Apple will lose business in other countries and its home market, which would in turn result in losing the Chinese market as well. Therefore, the home market plays a significant role in a companies' expansion.

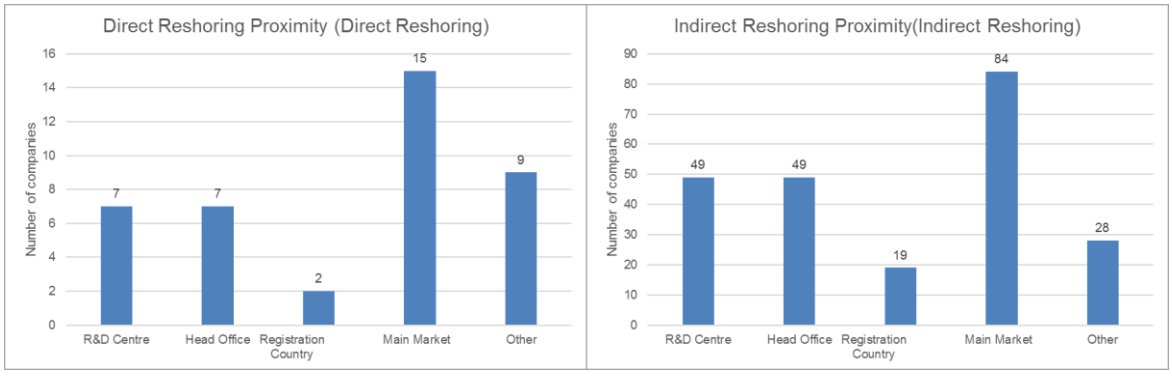


Figure 7-5 Reshoring Proximity

7.2.4 Impact and Performance Status

The impact of reshoring has been investigated in the survey from the production, supply chain and performance perspectives.

Based on the output volume information in Figure 7-6 for both direct and indirect reshoring, it can be seen that reshoring will help to increase production in home

countries, rather than offshoring which reduces home countries' production. The production is a very important element for a country's economy, including the UK, the country which started with manufacturing advantages. This explains why reshoring has been afforded so much attention in the US since Obama's government until now. The US claims it is necessary to move manufacturing back to the home country to boost GDP and provide job opportunities. The UK is now at the stage of revitalizing its manufacturing and economics, which requires reshoring even more. Therefore, reshoring is also a country level strategy which relates positively to society and its economy. It has become even more important during this post-Brexit period. Therefore, the UK government should support reshoring more, which could increase future prosperity.

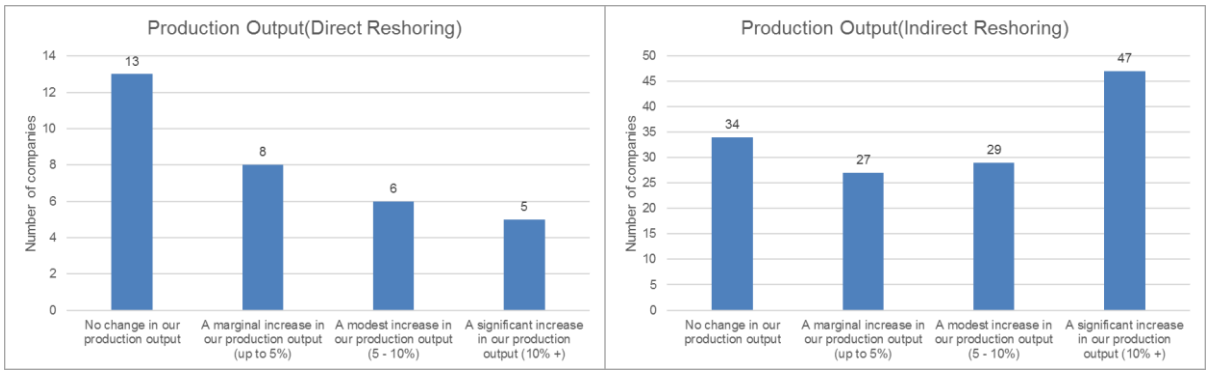


Figure 7-6 Reshoring Production Output

Regarding the SC impact, this research is mainly focused on the changes of number of suppliers (shown in Figure 7-7). It can be seen that majority of companies did not change their number of suppliers; 24% increased their supplier numbers and 10% decreased the number. This is aligned with the author's view on reshoring regarding "taking ownership" back. Therefore, companies do not want to give more authority to a third party, especially if the reshored products are core products within those companies. Also, because the initial stage after conducting reshoring needs to be stable, companies tend to use the same suppliers rather than change everything at once.

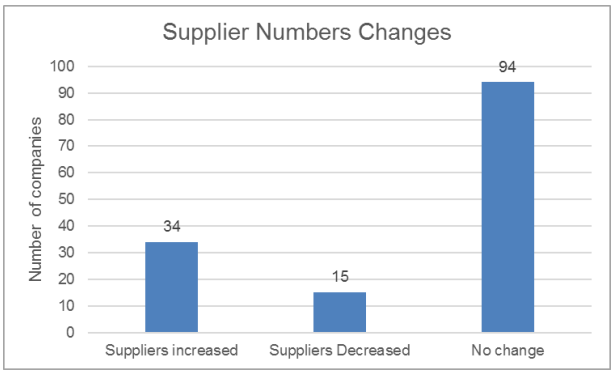


Figure 7-7 Reshoring Impact on Supply Chain

Finally, regarding business performance impacted on by reshoring, which is a most important criterion, the comparisons are shown in Figure 7-8. It can be seen that the indirect reshoring group has the highest business performance among all the groups and direct+indirect ranks second. The remain group stays in the middle which is not surprising and the offshoring group is 2nd from the bottom. Unexpectedly, the direct reshoring group performance ranks the last. Based on the performance of direct+indirect reshoring and indirect reshoring, the author believes the value for the pure direct reshoring group is not trustable. This is due to the sample size of pure direct reshoring is six, which is not able to describe a true phenomenon statistically; that is why the research has decided to remove this group in the statistical analysis. Therefore, if ignoring the data for the direct reshoring group, the offshoring performance ranks lowest. This can further justify that the pure pursuit of cost advantages is no longer able to win the market (Christopher, 2011). Regarding differentiation, services become more important in the current market environment. However, all the above discussion which is based on descriptive analysis is an initial attempt to interpret the data and understand the phenomenon. A more robust statistical analysis could reveal more information and deliver more suggestions for companies' operations.

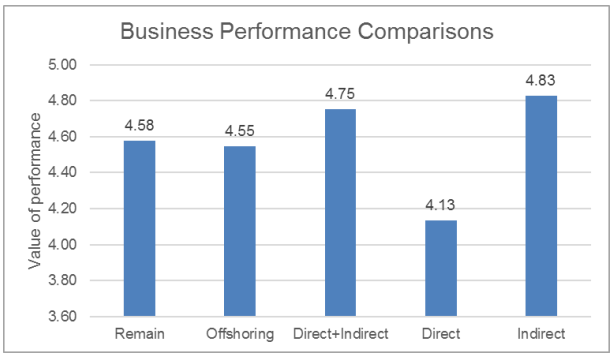


Figure 7-8 Reshoring Impact on Business Performance

7.3 Discussion on Model Results

7.3.1 Main Effect

7.3.1.1 Manufacturing Cost

Hypothesis H1 has claimed that emphasis on the competitive priority of manufacturing cost reduction has a positive association with business performance. Based on the regression results of model 2 in Table 6-13 (marked in a red box), it shows a significant p value at 0.1 with a positive β=0.119. Therefore, H1 is supported. In other words, reducing manufacturing cost will positively and significantly contribute to business performance.

The results obtained from the analysis are aligned with the economies of scale theory or TCE theory, to minimize manufacturing cost through extending production or transaction. As discussed in previous literature, Philips et al. (1983) identified this relationship at the beginning and it was further enriched by Porter (1985) as cost leadership strategy. Not surprisingly, the results of this research are in agreement with them. By reducing cost, the product profit margin can be increased and the price reduced, which may attract more sales, as has also been argued by Amoako-Gyampah and Acquaah (2008), even though their data did not justify it statistically. When the regression analysis was conducted, it explored the impact of manufacturing cost reduction on the business performance with controlling other factors. Therefore, the results from this study remind companies that they always need to consider the importance of manufacturing cost, no matter what strategy they follow. However, from the results, the significant level

is 0.1, so this may refer to the role of manufacturing cost is not as important as other priorities which is significant at 0.05 level or even 0.01 level. This may a kind support Christopher's idea on challenges of the economic scale theory.

7.3.1.2 SC Cost

Hypothesis H2 has claimed that emphasis on the competitive priority of SC cost reduction has a positive association with business performance. Based on the regression results of model 2 in Table 6-13 (marked in a red box), it shows that $p>0.1$ with a negative $\beta=-0.021$. Therefore, H2 has not been supported. In other words, reducing SC cost will not significantly affect business performance. Even though the β value is negative, due to the result of non-significant, it is not going to interpret the β value according to the statistical principle.

In hypotheses, the author involves SC cost due to the practical increasing emphasis on management cost and total cost of ownership (Ellram 2013). The author also assumes it plays a similar role to manufacturing cost in terms of contribution to business performance. However, the results did not show a significant value, which may mean that people may overestimate the role and value of SC cost, in terms of affecting overall business performance or they may not have a good understanding of total cost of ownership (TCO) and SC cost. TCO is not a new concept in academia; however, it is a relatively new concept that has recently been applied in industry, in which SC cost is key component. However, in terms of the calculation of either SC cost or TCO, there is no clear equation to guide companies. Therefore, industries have not had a good understanding of either SC cost or TCO. Therefore, even with the rising interest from industries, the role TCO plays may not be as important as people previously imagined. In addition, if considering resources allocation theory, allocating proper resources to maintain operations is the key to gaining competitive advantage. If companies are overly stressed on reducing SC cost, it may shrink the allocation of all the other resources, which could break up the balance and thus limit daily business operations. If this happens, the business performance will even be reduced. Another possible reason, for this non-significant result could be due to participants' limited understanding of the measurements of supply SC costs, e.g.

overhead cost, coordination cost, etc., since these items are closely linked to companies' context and their locations. Therefore, it may difficult to see a significant effect overall. The participants in this research are senior managers within the companies, who have a clear awareness of their strategy and location decisions. But it is possible that some of them do not have the entire details and accurate knowledge of the cost details. This type of statistical error exists in all empirical research.

The results may remind companies to re-evaluate their understanding and estimates of SC cost.

7.3.1.3 Quality

Hypothesis H3 has claimed that emphasis on the competitive priority of product quality has a positive association with business performance. Based on the regression results of model 2 in Table 6-13 (marked in a red box), it shows that $p>0.1$ with a positive $\beta=0.08$. Therefore, H2 has not been supported. In other words, improving product quality will not significantly affect business performance.

This result is in contrast to the prediction. It is opposite to some of the previous literature, which has empirically justified that quality will result in a good brand name therefore increase market share and finally boost business performance (Philips et al. 1983; Ward and Duray 2000; Amoako-Gyampah and Acquaah 2008). However, in linking reality to the time period, the result could be explainable. Among the common competitive priorities, quality is the first to attract people's attention and also where their research starts. At that time, this research discovered that improving product quality could help companies gain additional product margin because customers are willing to pay higher prices for good quality. Some research has even claimed that quality is the foundation of manufacturing companies, which should be built up prior to other capabilities (Ferdows and De Meyer, 1990; Noble, 1995; Boyer and Lewis, 2002). Since then, manufacturers have continued to pay attention to quality improvement. Meanwhile, the awareness of improving product quality has been significantly implanted into manufacturers' minds. Therefore, it is clear that, if manufacturers

have also continued to pay attention to product quality, the distinctions of product quality from different manufacturers will continue to shrink. The benefits to the business performance due to quality advantage will be reduced. Therefore, the correlation between product quality and business performance will be weakened. Therefore, even though a positive correlation existed in the 20th century, it may no longer exist after 30 years, i.e. into the 21st. This argument has actually been raised in the 20th century by Roth and Miller (1990), who say that quality will positively affect firm performance when a plant transfers from a weak state to the middle state, and over achievement of quality will not provide the expected return in reality. Within the last 30 years, it is known that customers have transferred from presuming low price to being more focused on product quality and security, along with producers follow the same route to keep improving product quality. For example, just 10 years ago, when Apple developed the 1st generation iPhone, it succeeded in its technology but also quality even though with a threaten price. Now after 10 years, if the product quality is compared with its competitors, such as Samsung, Microsoft and Huawei, the indexes of the product are very similar. During this process, the product quality has been transferred from an order winner to an order qualifier in most cases. Therefore, the significant correlation may be changed. This transaction is certainly due to manufacturer awareness, but it is also due to the development of production technology. Within the last 30 years, production has changed from human based to semi-automatic and to full automation within industry 3.0. Now industry 4.0 is already advancing manufacturing. With the development of technology and expanding automation, the quality of a product tends to achieve a certain standard easily. The manufacturers who used to be unable to achieve can easily achieve the same quality now. That is why companies are now more able to compete on innovation or service rather than pure quality. Therefore, it can be understood that quality will not significantly affect business performance based on the author's dataset.

7.3.1.4 Delivery

Hypothesis H4 has claimed that emphasis on the delivery has a positive association with business performance. Based on the regression results of model 2 in Table 6-13 (marked in a red box), it shows a significant p value at 0.1 with a

positive β=0.135. Therefore, H4 is supported. In other words, improving delivery will positively and significantly contribute to business performance.

The results from the statistical analysis remain consistent with the author's expectation. Also, they align with the previous research that found delivery capabilities with good dependability and fast speed could help with customer satisfaction and thus increase firms' overall business performance through increased sales, market share, profitability, etc. (Avlonitis et al. 2001; Amoako-Gyampah and Acquaah 2008; Chen et al. 2009). As Thompson et al. (1985) revealed, delivery is closely linked with service. As discussed in the quality section, customers have transferred from initial low price presuming stage to quality focus, and now to prefer on service and customization. Therefore, service has become more important within competition in the market, which also results in delivery becoming more important. With a good delivery capability, companies can guarantee the availability of their products, which could prevent losing orders/sales. Besides, due to the development of the e-commerce market and its successful expansion into people's lives, delivery has gained a more important role since it provides the product door-to-door for customers. As a function, which directly touches customers, a good delivery dependability and fast speed will enhance customer loyalty and gain more of the market. Therefore, delivery is clearly positively related to business performance even with a higher β value than for manufacturing cost.

The results have further justified the importance of delivery within operations, business and service.

7.3.1.5 Flexibility

Hypothesis H5 has claimed that emphasis on the flexibility of manufacturing cost reduction has a positive association with business performance. Based on the regression results of model 2 in Table 6-13 (marked in a red box), it shows a significant p value at 0.01 level with a positive β=0.202. Therefore, H5 is supported. In other words, improving flexibility will positively and significantly contribute to business performance.

The statistical results justified the hypotheses and previous literature, which is not surprising. In 1987, Swamidass and Newell empirically justified that the greater the flexibility the better the performance, and that flexibility can help significantly to deal with uncertainty. With the development of global business, the competition within markets has become more intense and the environment has changed more quickly than before. Therefore, flexibility has become the key. A company with greater flexibility can respond to changes faster, which allows a company to have more opportunities to increase business. Besides, compared to other competitive priorities, flexibility is a more independent function since it could positively affect cost reduction and delivery; however, other factors are not able to impact on flexibility based on the research output from White (1996). Therefore, with these indirect correlations, companies could benefit more in terms of profitability and customer service through improved flexibility, which could also help to build a more stable supplier and customer relationship. Therefore, business performance will be raised by enhancing the flexibility capability. This result reveals the key competitive capability companies need to focus on, which is no matter with what strategy it follows and in which industry.

7.3.2 Interaction Effect

7.3.2.1 Moderation on Manufacturing Cost

Hypothesis H6 has claimed that the shoring decision type moderates the relationship between the emphasis on the competitive priority of manufacturing cost and business performance. Based on the regression results (Table 6-13) and as stated in sections 6.6.3 and 6.7.1, there are no significant interactions existing between manufacturing cost and the shoring decision group, no matter which group is used as reference. Therefore, H6 has not been supported. This means the effect of manufacturing cost on business performance will be not significantly different for different groups with different location experience.

Based on Porter's (1985) generic strategy, in which the cost leadership view claims that companies will pursue all the possibilities to reduce their costs, it means a very high emphasis is placed on the competitive priority of manufacturing cost. The location decision/strategy which is most response to this

cost leadership strategy is offshoring (Kinkel and Maloca, 2009; Ellram, 2013). In this research, there are four different shoring decision groups. Taking the offshoring and remain groups as examples, the companies who offshored have a lower manufacturing cost (due the cheap labour costs in far east countries) than the remain companies based on Porter's (1985) theory. This means companies that offshored may achieve a better business performance without placing much emphasis on cost, due to the nature of the cost advantages from their location. Therefore, it is assumed that with every unit increase in manufacturing cost, the companies that taking no shoring decisions should gain more benefits than the companies who have offshored overseas.

However, the results tell us the above assumption is not true. The benefits brought by each unit reduction of manufacturing cost have no significant difference for the companies that offshored overseas and companies who take no shoring decisions.

This can be explained in from the following two perspectives. One is due to the development of technology.

Based on the descriptive data in Figure 7-3, it can be seen that the emphasis people have applied to manufacturing cost reduction is similar across different groups, which means even for the remained manufacturers, they have increased their awareness of reducing manufacturing cost. Therefore, companies who took no shoring decisions started to seek advanced technology skills to help them reduce production costs. It is known that the age of labour based production has been replaced by industry 3.0 automation and more recently by industry 4.0 advanced manufacturing, such as 3D printing technology. Even with the help of machines, the labour costs in the developed countries are still higher than in far east countries; however, the companies who took no shoring decisions can reduce the unit cost by using these machines. This results in companies who took no shoring decisions being able to achieve a lower manufacturing cost more easily and without a high emphasis. Another reason is due to the increasing labour cost in far east countries, which reduce the cost advantage of offshored locations. As shown before, take of example of china, based on the work from

Pearce (2014), shown in Figure 7-9, it can see the labour cost in China has tripled within 5 years since 2003 till 2008, however the wage in US kept stable or even decrease compared to 2003. while labour costs have kept increasing in the far east countries, the labour costs in western countries have decreased., the manufacturing cost advantages based on locations has been shanked and get similar. Pulse technology support, Therefore, both the offshored and remain groups may achieve the same business performance with similar levels of emphasis on manufacturing cost.

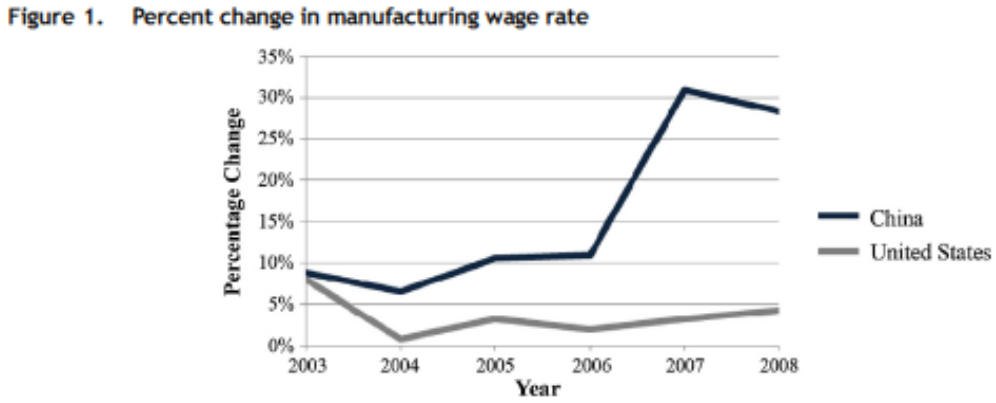


Figure 7-9 Manufacturing Wage Change in China and US

Source: Pearce (2014)

7.3.2.2 Moderation on SC cost and BP

Hypothesis H7 has claimed that the shoring decision type moderates the relationship between the emphasis on the competitive priority of SC cost and business performance. Based on the regression results (Table 6-13) and as stated in sections 6.6.3 and 6.7.1, it shows there are three non-duplicated significant interactions existing between SC cost and shoring decision groups, after testing all the reference possibilities. Therefore, H7 has been supported. This means, the effect of SC cost on business performance will be significantly different for different groups with different location experience. Based on the results, it can be seen the difference happened between the Remain and Direct+Indirect group in Panel A of Figure 6-5 ($\beta=0.771$, $p<0.05$), Offshoring and Direct+Indirect group, as shown in Panel B of Figure 6-5 ($\beta=0.754$, $p<0.05$), and

Indirect and Direct+Indirect group, as shown in Panel C of Figure 6-5 (β=0.611 $p<0.05$).

These significant results support the hypotheses that follow the congruence theory. In terms of Panel A, regarding the interaction between companies who took no shoring decisions and the companies who took both direct and indirect reshoring decisions, it can be seen that for every unit the emphasis increased on SC cost; the companies who took no shoring decisions benefit more than the companies who engaged in both direct and indirect reshoring, since with a low emphasis on SC cost, companies that took no shoring decisions exhibited a lower Business Performance than companies who directly and indirectly reshored. With a high emphasis on SC cost, companies that took no shoring decisions exhibited a higher BP than companies who directly and indirectly reshored.

As is known, those companies who have directly and indirectly reshored have more shoring experience than companies who have never taken any shoring decisions. Meanwhile, they will have a higher awareness of the SC cost as one of the key drivers of reshoring is reducing SC cost. Therefore, those companies with multiple shoring experience have more advantages on SC cost practice due to its moving. Therefore, with the same low level of emphasis on SC cost, the Direct+Indirect will expect a better performance due to its other competitive capabilities. However, when increasing the emphasis on SC cost, the benefits will be greater for those companies with a lower awareness of SC cost, which explains the content of Panel A. Obviously, companies who took no shoring decisions could catch up with the performance with O+D+I if they keep increasing the emphasis on SC cost, even though it can only have happened at a very high emphasis level. Therefore, based on the results, the O+D+I group can more easily arrive at a better performance level without it being necessary to issue their additional resources to SC cost. However, if the remain companies want to compete with the direct+indirect group, they need to pay more attention to SC cost reduction.

In terms of Panel B, a similar logic to Panel A is used. The companies who offshored overseas have a slightly worst awareness of SC cost (otherwise, they

would not decide to offshore) with the worst practice on SC cost caused by long distance, who supposed have put more emphasis on it, than the remain companies. However, they could not compete with the direct+indirect group which has multiple shoring experience. Therefore, for every unit increase emphasis on SC cost, offshored companies will benefit more than direct+indirect companies, and even more than the remain companies.

In terms of Panel C, the same logic will be applied. The awareness of SC cost is greater in the indirect group than the offshoring group but much less than the direct+indirect group. Therefore, the indirect reshoring group will benefit more than the direct+indirect group when increasing one unit emphasis on SC cost, but less than the offshored group. However, the indirect reshoring group's starting point is a little higher and easier to reach the same level business performance as the reshored group.

Therefore, in summary, based on Panels A, B, C, the O+D+I group can more easily arrive at a better performance without the necessity to issue resources to SC cost. However, the remain, offshored and indirect reshored groups need to focus on SC cost in order to compete with the direct+indirect group.

7.3.2.3 Moderation on Quality and BP

Hypothesis H8 has claimed that shoring decision type moderates the relationship between the emphasis on the competitive priority of quality and business performance. Based on the regression results (Table 6-13) and as stated in sections 6.6.3, it shows that no significant interactions exist between quality and the shoring decision group, no matter which group is used as a reference. Therefore, H8 has not been supported. This means the effect of manufacturing cost on business performance will not be significantly different for different groups with different location experience.

As discussed in section 7.3.1.3, for the main effect between quality and business performance, due to the awareness of the importance of product quality by manufacturers, quality has gradually transferred from being an order winner to order qualifier. This transfer will not be affected by a different location strategy,

which means that for different shoring decisions the quality of products will not have a significant difference. Again, this is due to the development of manufacturing technology and adoption of machinery. For example, 10 years ago, “Made in China” represented poor quality. However, that age has past now and “Made in China” is no longer regarded as meaning poor quality. The product made in China has the same standard quality as the product made in the UK, due to the application of advanced machines. Therefore, the companies with different shoring decisions will not have a distinct business performance if they place similar emphasis on quality, which explains why H7 has not been supported.

7.3.2.4 Moderation on Delivery and BP

Hypothesis H9 has claimed that shoring decision type moderates the relationship between the emphasis on the competitive priorities of delivery time and business performance. Based on the regression results (Table 6-13) and as stated in sections 6.6.3 and 6.7.2, it shows there are three non-duplicated significant interactions existing between delivery and shoring decision groups, after trying all the reference possibilities. Therefore, H9 has been supported. This means the effect of delivery on business performance will be significantly different for different groups with different location experience. Based on the results, it can be seen that the differences happened between the remain and offshoring groups in Panel A of Figure 6-6 ($\beta=0.507$, $p<0.05$), direct+indirect and offshoring group, as shown in Panel B of Figure 6-6 ($\beta=0.656$, $p<0.05$), and the direct+indirect and indirect groups, as shown in Panel C of Figure 6-6 ($\beta=0.432$ $p<0.1$).

These significant results support the hypotheses which follows the congruence theory. However, the details of what the plot reveals is in contrast to what the author expected but still explicable after deeper consideration. In terms of Panel A regarding the interaction between companies who took no shoring decisions and the companies who offshored overseas, it can be seen that every unit emphasis increased on delivery, the companies who took no shoring decisions benefit more than the companies who offshored overseas, since with a low emphasis on delivery, companies that took no shoring decisions exhibited a lower BP than companies who offshored overseas. With a high emphasis on delivery,

companies that took no shoring decisions exhibited a higher BP than companies who offshored overseas.

Similarly, as discussed above, offshored companies are far away from home country, with a long and complicated SC network, and also a long time-cycle, which results in delivery time capabilities being poor. Therefore, the offshored groups who lack more of delivery capability should gain greater business performance increase than the companies who took no shoring decisions. However, the results show the opposite trend. The remain group had better rewards, which may due to the far away location practice actually putting a limitation on the maximum delivery time they (offshored companies) can achieve. For example, the companies who offshored overseas may reduce their delivery time from five to three days. But three days is the minimum, which means it is not possible to reduce to fewer or shorter than three days any more. Therefore, even though they (offshored companies) did pay a lot of attention to time, and it did help them to increase BP, but it was still difficult to arrive at the same level that the remain company can be increased by. Also, as argued previously, delivery is a special competitive priority since it can connect to the customer directly, and customers are more sensitive to delivery period. This means a five day delivery reduced to three days may not affect customer much. However, three days reduced to a same day delivery will strongly affect customer satisfaction and further improve business performance. Therefore, even though offshoring may be lacking most on delivery, with the increased emphasis on delivery, the remain group will still gain a greater increase in business performance than the offshoring group.

In terms of Panel B, again, the same logic used in panel A can be adopted. direct+indirect will behave similarly as remain group due their final production location being the same. However, the difference between remain and offshoring will be further enhanced between direct+indirect and offshoring due the entire opposite position of these two strategies. Therefore, direct+indirect groups will gain more when increasing emphasis on delivery, even more than the remain

group gained, and finally will exceed even further compared to the offshored group.

In Panel C, again the same logic is used as in Panel A. The features of indirect reshoring are a little closer to direct + indirect reshoring than offshored; however, they are more like offshoring companies who may have previous offshore experience. Therefore, the increase in business performance gained by the direct+indirect group will be more than the indirect reshoring group, and could exceed it as well, with a little migration of the difference between direct+indirect and offshoring.

In summary, based on this result, it is suggested that the direct+indirect group should focus on improving their delivery capabilities which are the key capabilities for this group.

7.3.2.5 Moderation on Flexibility and BP

Hypothesis H10 has claimed that the shoring decision type moderates the relationship between the emphasis on the competitive priority of flexibility and business performance. Based on the regression results (Table 6-13) and as stated in sections 6.6.3 and 6.7.3, it shows there are two non-duplicated significant interactions existing between flexibility and shoring decision groups, after trying all the reference possibilities. Therefore, H10 has been supported. This means, the effect of flexibility on business performance will be significantly different for different groups with different location experience. Based on the results, it can be seen the difference happened between the remain and offshoring groups as shown in Panel A of Figure 6-7 ($\beta=0.634$, $p<0.05$), and the direct+indirect and offshoring groups as shown in Panel B of Figure 6-7 ($\beta=0.724$, $p<0.05$).

These significant results support the hypothesis which follows the congruence theory. Also, the plots reveal the detailed practices which are in line with the author's expectations. In terms of Panel A, regarding the interaction between companies that took no shoring decisions and those that offshored overseas, it can be seen that for every unit emphasis increase on flexibility, the companies

that offshored overseas benefit more than those that took no shoring decisions, since with a low emphasis on flexibility, companies that offshored overseas exhibited a lower BP than companies that took no shoring decisions. With a high emphasis on flexibility, companies that offshored overseas exhibited a higher BP than companies that took no shoring decisions.

As discussed above, compared to the companies that took no shoring decisions, the companies that offshored overseas usually focused more on manufacturing cost reduction and lack of flexibility most (Kinkel 2009; Ellram 2013; Tate 2014; Fratocchi 2015). This could be due to the trade-off theory among multiple competitive priorities, but it is more related to the nature of the SC network of offshoring companies. Usually, the offshored company is far away from the home country, with a longer and complicated SC network with more suppliers based around the globe. Due the distance and complicated network problems, offshored companies usually have very poor flexibility. Therefore, when increasing one unit emphasis on flexibility, the offshored company will gain an greater increase in business performance. However, also due to the location nature of the offshored group, when both the offshoring and remain groups place the same low-level emphasis on flexibility, the companies that took no shoring decisions will have higher flexibility capabilities and faster logistics, therefore, the business performance of the remain group is better than the offshored group at the start point in Panel A. However, with a faster increase in business performance, along with the increased emphasis on flexibility, the offshored companies could exceed the remain group with a better business performance.

In Panel B, the logic is similar to what is explained in Panel A. The direct+indirect group could be behaviour similar as remained group since both of them are finally operated in the UK. In reality, the correlation will be even more intense or obvious between the direct+indirect group compared to the offshoring group, than Panel A, since they are totally opposite location decisions. Direct+indirect is naturally good in terms of flexibility. So, every argument claimed above for the remain group will be enhanced for the direct+indirect reshoring group. The offshored groups will gain business performance increases even more, compared to the

Direct + Indirect group when increasing one unit of flexibility. However, the start point of the offshored group will be even lower in terms of business performance and more difficult to obtain the same performance as the direct+indirect group has.

Therefore, it is suggested that in aiming to improve BP, offshored companies should focus more on improving flexibility, but direct+Indirect reshoring group did not need to waste energy on improving flexibility anymore.

7.4 Chapter Summary

This chapter has discussed both descriptive and statistical analysis results, by referring back to the literature and theory. The summary for descriptive shows that indirect reshoring plays a more active role than direct reshoring, but overall reshoring has a strong trend in the UK, original products commonly come back, as well as, they achieve a business performance better than industrial average. The summary for model results are the companies who took no shoring decisions is suggested to focus on SC cost and delivery in order to win the competition but not need to flexibility. It is suggested that the companies that directly and indirectly reshored should focus on delivery, rather than over sources to SC cost and flexibility. The companies that are indirect reshored are recommended to take delivery and SC cost as the key competitive priorities; and finally, the companies who offshored overseas are recommended to take flexibility and SC cost as the key capabilities to develop.

8 Conclusion

8.1 Chapter introduction

This chapter concludes the entire research. Section 8.2 reviews the results and findings of this study against the two sub-research questions, which were raised in Chapter 1, respectively in 8.2.1 and 8.2.2. Then section 8.3 states the significant contributions from a theoretical perspective in 8.3.1 and a practical perspective in 8.3.2. The discussion regarding the limitations of this study follows and the future work is commented on by the author in section 8.4. Finally, this chapter ends with a short summary in 8.5.

8.2 Review of Research Questions with Findings Summary and Implementation

This research has been conducted on the exploration of the reshoring phenomenon and shoring decisions. It starts with reshoring, but also covers multiple shoring decisions by reviewing the literature on reshoring, offshoring, location decision, business strategy, manufacturing strategy, competitive priorities, and performance. Two clear gaps have been identified: a lack of clarification in the current status of reshoring in the UK; and the role shoring decisions play in operations and performance. Therefore, a reshoring framework has been developed to address the first gap and a moderation model has been devised to fill the second.

8.2.1 Review for Research Question 1

As stated in the section 1.5, the first research question of this study is:

"What is the current status of manufacturing reshoring in the UK?"

In order to answer this question, the study has developed a framework of reshoring (Figure 2-17) as a guidance to capture the information about reshoring status from multi-perspectives systematically. Based the successful data collection and the data analysis results. It can justify the perspectives and factors that have been pointed out by this reshoring framework are all relative to the

reshoring phenomenon. Therefore, it further justifies that even though the reshoring framework in this research is not a decision tree that company can directly adopt to decide on location decisions, the framework can be used as a “factor pool” or “consideration matrix” for companies’ decision as it proposed a wide empirical-testes aspects and factors that need to be considered during the companies’ shoring decision making. Based on the findings from the results of descriptive analysis in chapter 5 and the interactions with industrial practitioners during the data collection, the framework has been updated to a revised version shown as Figure 8-1. As marked in bright blue colour within the figure, the author added the new factor “decision type” in the overall strategic perspective due to the new finding of “indirect reshoring”. Also, the “production volume” has been moved from operational consideration perspective to supply chain perspective, since it is more belong to the impacts of reshoring rather than what to move back. What is more, the remanufacturing has been merged to the factor of “product type” as one option of the activities that could be moved back. In addition, the key practices of current reshoring status, found from descriptive results, have been indicated specifically in the revised framework as well, showing in the bold italic words, which represent the popular options under each consideration factor that has been chosen by the companies who already engaged in reshoring.

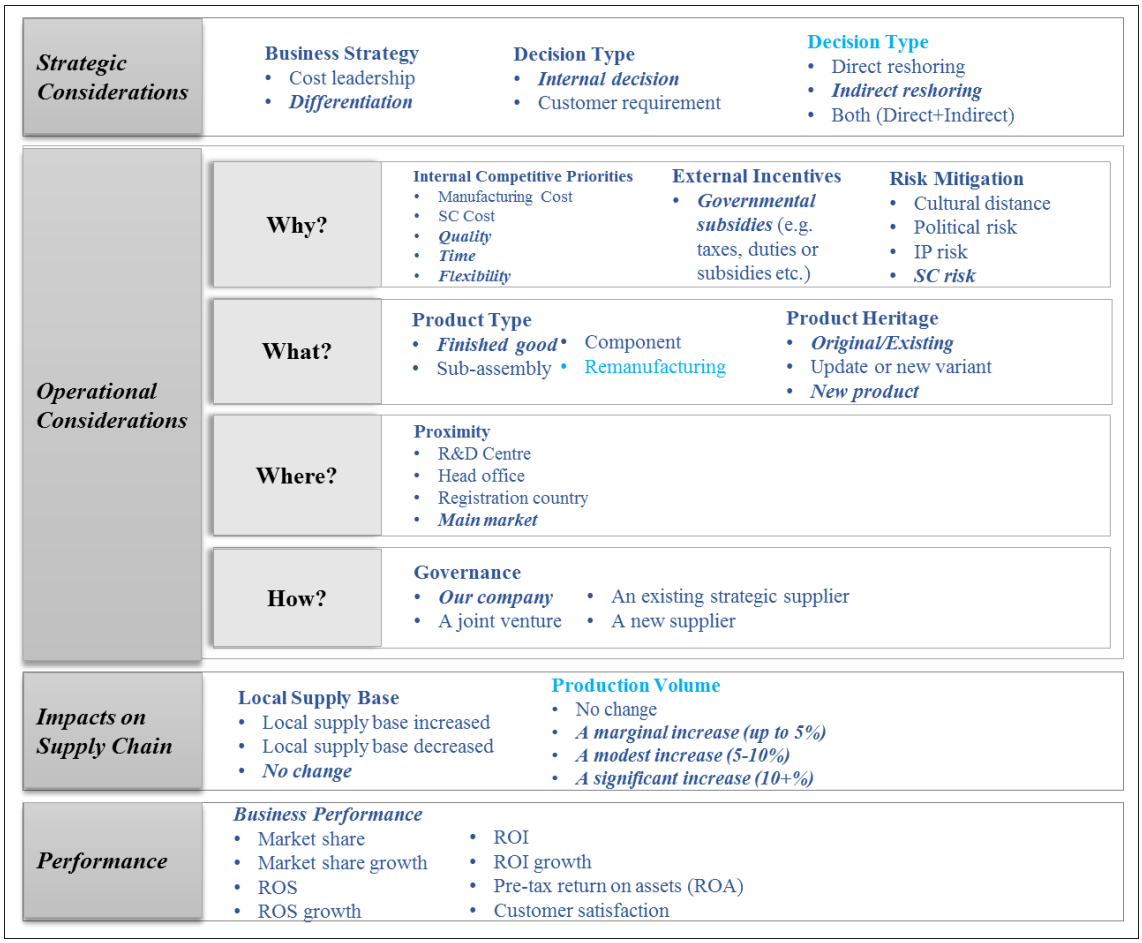


Figure 8-1 Revised Framework for Reshoring

If shaping and tweaking the framework above a little bit to display the list of considerations in a systematic logic for practitioners to easily follow, a new implementation framework has been developed, as shown in Figure 8-2. Basically, when practitioners making decision of their shoring locations, there are four key aspects to think. The start point could be from the strategic perspective, to understand their business strategy (e.g. cost leadership oriented or differentiation oriented), the decision type (e.g. internal or external), and decision options (e.g. direct reshoring, indirect reshoring or both). Then the second perspective they need to look into is operations, which further included fours sub-aspects to guide practitioners to investigate on: why they want to reshore; what will be moved back; where they want their factory to close to through the moving; and how to conduct this movement. In addition, the companies also need to consider what could be changed regarding their supply chain structure after

reshoring, in terms of numbers of suppliers and production output volume. Finally, they need to estimate, if they do reshore, what could be to the impact to their business performance (financial). The key findings of the current reshoring status have been filled in to each related block in the framework above, which could further provide information for practitioners to refer when doing their shoring decision.

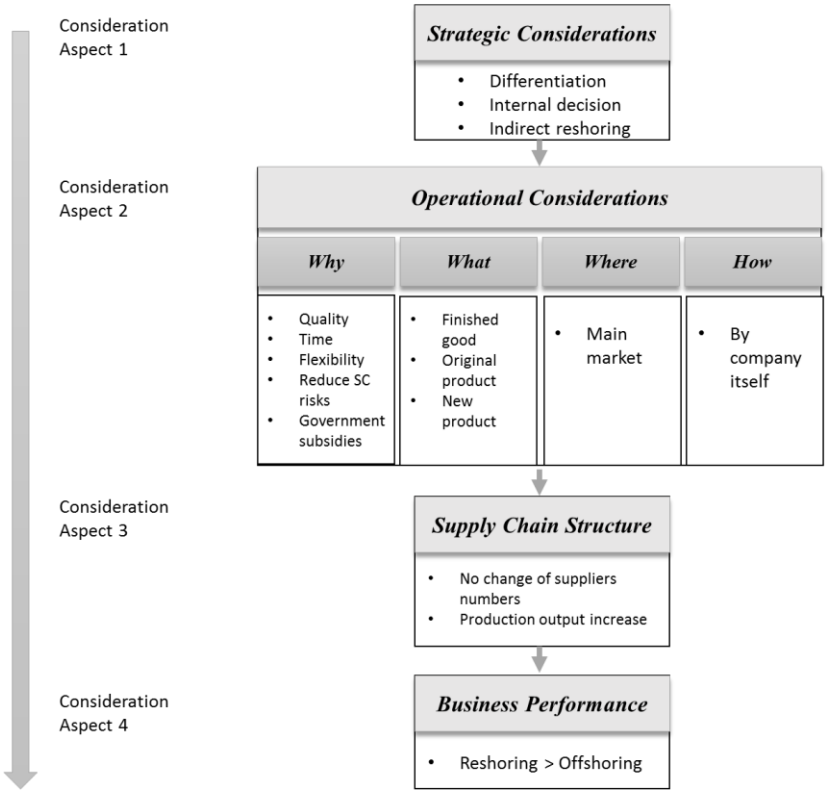


Figure 8-2 Implementation Framework

In addition to the framework, the descriptive results have revealed a clear picture of the current reshoring status about what is happening in the UK from strategic, operational, impact and performance perspectives. The key findings can be summarised as the following bullet points:

- Reshoring is very popular in the UK, with 55% companies have engaged in it.
- Reshoring is not only directly moving back, it could have different types including direct reshoring, indirect reshoring and direct+indirect reshoring. Indirect reshoring is especially popular in the UK.

- Direct reshoring has become popular since 2012, and indirect reshoring has been popular since 2008 which is much earlier than direct reshoring.
- Most reshoring company followed differentiation business strategy.
- Most reshoring decisions are the independent decision made by the company internally.
- The companies who reshored usually pay more emphasis on their competitive priorities of quality, delivery, flexibility, reduce supply chain risks and presume governmental subsidies.
- Most products that has been reshored are the finished goods and the original version. And the movement usually has been conducted by the company itself.
- Main market is the top 1 destination the reshoring tried to be close to.
- 57% of companies that directly reshored saw an increase in output and 75% of companies that indirectly reshored saw an increase in output.
- Companies that reshored claimed there is no impact on their supply base as a result, regarding supplier numbers.
- Companies who reshored have a better business performance than then companies who offshored.
- 70% of companies would consider indirect reshoring in the next five years, and 20% would consider direct reshoring.

In addition, the job opportunities and country's economy could be positively affected by reshoring, especially in this post-Brexit period. Therefore, it makes sense for the government to boost the opportunities for reshoring by providing more support, as the US has done. The research also justified the importance of the role of the home market to the businesses.

8.2.2 Review for Research Question 2

As stated in the section 1.5, the second research question of this study is:

"What is the relationship between the shoring decision types, competitive priorities, and business performance?"

In addition to providing a descriptive view of the reshoring phenomenon, the research has gone deeper into the shoring decision level to view the role shoring decisions play within the relationships between competitive priorities and business performance. The aim of this is to identify the best match between competitive priorities and each shoring decision type, to significantly improve the business performance. Through the analysis, it has been identified that the different shoring decision types will moderate the relationship between SC cost and business performance, delivery and business performance, and flexibility and business performance. In order to understand these three significant moderations, the plots have been drawn in Chapter 6. And they have been interpreted and discussed in Chapter 7. Based on the discussion, it can be summarized to the key points below as shown in Table 8-1 as the implemental suggestion for industrial practitioners to use. In the table, it reveals for each type decision group, what competitive priorities they should focus on more in order to achieve a significant improvement of business performance (the symbol "√" in Table 8-1 indicates the key competitive priorities need to focus on).

Following the table below, basically, it is suggested that:

- Companies that directly and indirectly reshored should focus more on delivery, not necessary to place more resources to SC cost and flexibility;
- Companies that indirectly reshored are suggested to regard delivery and SC cost as the key competitive priorities;
- Companies that offshored overseas are recommended to regard flexibility and SC cost as the key capabilities to be developed;
- Companies that took no shoring decisions should focus more on SC cost and delivery rather than flexibility, in order to win the competition in the market.

Table 8-1 Implementation Suggestion for Practitioners

	Manufacturing Cost	SC Cost	Quality	Delivery	Flexibility
Direct + Indirect				√	
Indirect		√		√	
Offshoring		√			√
Remain		√		√	

8.3 Contributions

Based on the review, finding summary and implementation discussed above, it can be concluded that this research has three main contributions:

- Framework for reshoring
- Understanding the current status of reshoring in the UK
- Empirically tested the moderating effect of shoring decisions on the impact of competitive priorities on business performance

Each of the contributions above has the impacts on both academic perspective and practical perspective, which will be discussed one by one for both sides in the following two sections.

8.3.1 Contributions to theory

The framework for reshoring is developed by synthesizing multiple fields of the literature, and is designed to guide the exploration of the current UK manufacturing reshoring status. But it is also a contribution by indicating the relevant parameters that need to be considered during a reshoring decision covering the 360-degree, which enriches the extant literature on reshoring research.

The descriptive analysis of the data has revealed a full picture of the UK manufacturing reshoring status following the framework above, and identified the key aspects of shoring decisions (indirect reshoring has been strongly demonstrated), including reshored products, production governance and proximity, operational priorities and performance impact, which has never been conducted by any prior research.

Another unique contribution of this study is the empirically tested moderation effect on shoring decisions on the correlation between competitive priorities (CPs) and BP. The key CPs for each shoring decision type have been identified, which can be adopted by companies directly to make sure their business target aligns with their operations. Meanwhile, this model also covers the research gap within shoring decisions, CPs (manufacturing strategy) and firm performance. While, It also further enhanced and enriched the congruence theory, with the evidence of the significant interactions been found.

In summary, from a theoretical standpoint, this work contributes to the reshoring literature by enriching the definition of reshoring, identify the reshoring considerations and synthesize them in a systematic logic, mapping the current status of reshoring in the UK, and justifying the moderation relationships among CPs, BP and location strategies.

8.3.2 Contributions to Practice

Practically, as stated in section 8.2.1, the framework of this research provides industry practitioners an “factor pool” with the key aspects and factors they need to consider when make a reshoring or shoring decision, which are also organized in a systematic logic for practitioners easy to follow. By using this framework, the practitioner can have a clear thinking-flow of the factors that need to be considered and will able to start the decision making easily with a good balance of different perspectives.

The research also reveals a clear and full picture of the current reshoring status to industrial practitioners. This provides a rich information and evidence for companies to refer when they want to make their decisions. By understanding what happens now for reshoring, they can enhance the accuracy of their decisions they make, and implement their decisions following the industrial trend.

In addition, the moderation effects justify an optimal match between competitive priorities and shoring decisions. Therefore, by knowing the match, companies will know what capabilities they should focus on more based on the type of shoring decision they involved, in order to maintain competitive advantage. They could

further improve and optimize their usage of resources (e.g. HR, cash, facilities etc.) to the improve the business performance efficiently.

In addition to industrial practitioners, this research even provides policy makers with information regarding the reshoring phenomenon in the UK, which can clearly tell the benefits of reshoring to the UK from a country level perspective. This could help policy makers to devise suitable policies to further enhance this reshoring trend and revitalize the manufacturing and economy of the UK's leading position, especially during the post-Brexit stage.

8.4 Limitations and Further Work

One limitation of this research is its sample size. Even though 269 is a good sample number, in statistics, the principle is always the more, the better. If a greater sample were obtained, the O+D group could arrive to the minimum standard for model analysis. Then more interesting findings may be identified.

In addition to this, another limitation, that may need to be considered, could be small samples for some sub-groups of the categorical moderator. As discussed in Chapter 3, the model of this research is a moderation with categorical moderator. Therefore, unlike the continuous moderator which just need to divide the whole samples to two groups (high and low) based on the moderator's value, however in this study, the categorical moderator is classed by the reality of the shoring decision including four sub-groups. Therefore, some sub-groups may have smaller sample sizes, around 40 based on the nature of the reality. As it has been discussed in the section 6.6.3, the small sample size may result the significances found not stable, due to a low statistical power. However, fortunately, in this study, it has a large effect size for interaction model, therefore the analysis results should able to still achieve 0.8 statistical power with the small samples, especially when adopting significant level at 0.1. Therefore, the results of this study is proper to be interpreted for sure as justified by that all of the assumption tests have achieved and should be stable enough as well. However, if the sub-group sample size could become bigger, the concern regarding the results stability above could be even minimized or removed. However, this

limitation is difficult to fully sort out at the moment, due to the nature that reshoring happened just in recent years and the reality of the numbers of companies who has engaged is limited. However, after several years when reshoring become more popular, with bigger samples, the stability of the results could be further enhanced as the power increases. Therefore, it is recommended to recollect the data in the future, and aim achieve a bigger sample size for those sub-groups to double test whether the significant results found in this study will remain the same or with some changes.

Another limitation, or an idea that could be developed in the future, is regarding innovation as a competitive priority. Even though historically innovation has not been considered as a common competitive priority, it has become more important in the modern competitive environment. Reshoring is linked to technology; therefore, it could be interesting to explore this innovation as competitive priorities are affected by shoring decisions. In addition, through the research it can be seen that industry type (high/low technology) has a significant effect on business performance itself. Therefore, it may be that the shoring decision will also be sensitive to industry type, which could be another research area that can be explored in the future.

8.5 Chapter Summary

This concluding chapter has summarised the entire study by reviewing the research questions, summarizing finding and indicating practical implementation, stating the contributions, and providing the limitations and suggestion for future work. Clearly, the two sub research questions have been answered adequately. The study has revealed a clear and full image of the UK manufacturing reshoring status from multiple perspectives. Besides, the moderation effects have been identified for the independent variables of SC cost, delivery time and flexibility (six hypotheses have been supported out of a total of 10). The research has made three clear contributions to theory through the development of a framework for reshoring, delivering a better understanding of the current status of reshoring in the UK and filling in the gap of correlation among competitive priorities, business performance and shoring decisions. It also contributes to practice for both

industrial specialists (the Figure 8-2 and Table 8-1 are the outcomes that practitioners can directly take away to use), and government policy makers (through providing clear references, evidence, and information from the country's perspective). Finally, the study has identified the limitations of sample size and low sample number for some reshoring groups. It has also suggested further research for a greater sample size, focusing on industry and research on innovation as an IV.

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APPENDICES

Appendix A Ethics

A.1 Ethics Approval with Information Leaflet

PARTICIPANT INFORMATION LEAFLET

Study Title:	How do UK manufacturers make reshoring decisions and what are the impacts?
Investigator(s):	Di Li, Professor Janet Godsell, Dr. Antony Karatzas

Introduction

You are invited to take part in a study. Before you decide, you need to understand why the study is being done and what it would involve for you. Please take the time to read the following information carefully. Talk to others about the study if you wish.

(Part 1 tells you the purpose of the study and what will happen to you if you take part. Part 2 gives you more detailed information about the conduct of the study)

Please ask us if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part.

PART 1

What is the study about?

Reshoring refers to moving previous offshored manufacturing activities back to their home country. This trend has been popular for several years especially in US, EU and UK. However, in terms of the understanding of reshoring, there are still a lack of clarity, insufficient primary data and poor diversity research directions. Therefore, this research argues it is necessary to clarify the reshoring definition, its current status, its drivers and potential consequences, and to devise a holistic decision framework

taking into consideration all relevant parameters.

Do I have to take part?

It is entirely up to you to decide. If you choose to participate, and before you provide answers to our questions, you will need to tick a box on the website indicating your agreement to take part in this study. Since this study is based on your input to an online questionnaire, by answering the stated questions you are giving your consent for the information that you have supplied to be used in this study, and formal signed consent will not be collected. You will be free to withdraw at any time, without giving a reason and this will not affect you or your circumstances in any way.

What will happen to me if I take part?

All you are expected to do is to interact with the online questionnaire we have developed. It is supposed to take about 15 mins. The first page of the online questionnaire will deliver a brief introduction to you. The questionnaire consists of several sections. You can continue the questionnaire by press the “next” button and go back to review or change your answer by click the “back” button. But you need to answer each question or you cannot continue the questionnaire. Finally, please provide your contact information if you wish to receive the final research report.

What are the possible disadvantages, side effects, risks, and/or discomforts of taking part in this study?

There are no disadvantages, discomforts or side effects of taking part in this study. There is a potential loss of confidentiality of the data you supply. Yet, we store all data on secure servers and this risk is minimal. You will not be asked to provide your name, address, or any other sensitive information as a part of this study. Should you decide to receive the final report of this study, you may opt to provide us with your email address so this can be sent to you. Your email information will not be shared with any third parties and will be used only for sending you the report. Once the questionnaire has been submitted, the data cannot be retrieved unless you opted to provide us with your email address, so we can retrieve and delete the record upon your request if you decide to do this.

What are the possible benefits of taking part in this study?

By participating in this study you will increase your understanding of UK manufacturing reshoring which may helpful for your daily work. Additionally, your contribution, in conjunction with the contribution of others, may lead to a clearer picture of UK manufacturing reshoring and a strategic decision model, which will improve the UK manufacturing supply chain strategy and lead to more appropriate government policy.

Expenses and payments

No payments will be made for participants and no expenses will be covered.

What will happen when the study ends?

The data collected through the online questionnaire will be stored in a server and will

be analysed by the research team. The data will be kept securely for ten years as per University of Warwick regulations.

Will my taking part be kept confidential?

Yes. We will follow strict ethical and legal practice and all information about you will be handled in confidence. Further details are included in Part 2.

What if there is a problem?

Any complaint about the way you have been dealt with during the study or any possible harm that you might suffer will be addressed. Detailed information is given in Part 2.

This concludes Part 1.

If the information in Part 1 has interested you and you are considering participation, please read the additional information in Part 2 before making any decision.

PART 2

Who is organising and funding the study?

This study is part of Di Li's PhD research at the University of Warwick. It is supervised by Professor Janet Godsell who is the head of the Supply Chain Research Group at WMG, University of Warwick and performed with Dr. Antony Karatzas, Research Fellow at WMG. It is not funded by an external body.

What will happen if I don't want to carry on being part of the study?

Participation in this study is entirely voluntary. Refusal to participate will not affect you in any way. If you decide to take part in the study, tick a box on the website indicating that you have given your consent to participate. If you agree to participate, you may nevertheless withdraw from the study at any time without affecting you in any way. You have the right to withdraw from the study completely and decline any further contact by study staff after you withdraw.

What if there is a problem?

This study is covered by the University of Warwick's insurance and indemnity cover. If you have an issue, please contact the main investigator of the study: Di.Li@warwick.ac.uk

Who should I contact if I wish to make a complaint?

Any complaint about the way you have been dealt with during the study or any possible harm you might have suffered will be addressed. Please address your complaint to

the person below, who is a senior University of Warwick official entirely independent of this study:

Director of Delivery Assurance
Registrar's Office
University House
University of Warwick
Coventry
CV4 8UW
Complaints@Warwick.ac.uk
024 7657 4774

Will my taking part be kept confidential?

We will not ask you for your name, address or any other sensitive information as a part of this study. The information you provide through the online questionnaire will be anonymized and kept confidential. All data will be securely stored on the servers and hard drive of a computer within Warwick Manufacturing Group. We will not share the raw data with anyone.

What will happen to the results of the study?

The results will contribute to Di Li's PhD thesis. Besides this, academic papers based on the results will be published. The results will be discussed within SCRG at WMG, the University of Warwick and the co-authors from other Universities, if it is necessary. As stated above, those participants who have expressed an interest in receiving the final results by providing their contact details at the end of the online questionnaire will be sent the final report.

Who has reviewed the study?

This study has been reviewed and given favourable opinion by the University of Warwick's Biomedical and Scientific Research Ethics Committee (BSREC): **REGO-2016-1809 23rd June 2016.**

What if I want more information about the study?

If you have any questions about any aspect of the study, or your participation in it, not answered by this participant information leaflet, please contact:

Di Li, PhD Researcher, Di.Li@warwick.ac.uk;

Professor Janet Godsell, Professor of Operations and Supply Chain Strategy, J.Godsell@warwick.ac.uk;

Dr. Antony Karatzas, Research Fellow, A.Karatzas@warwick.ac.uk

Thank you for taking the time to read this participant information leaflet.

A.2 Consent Form (Online)

ONLINE CONSENT FORM

Study: How do UK manufacturers make reshoring decisions and what are the impacts?

Research Group Contacts:

Di Li, PhD Researcher, International Institute for Product and Service Innovation, WMG, The University of Warwick, Coventry CV4 7AL UK, e-mail: Di.Li@warwick.ac.uk, tel: +44 (0)24 7657 2919

Professor Janet Godsell, Professor of Operations and Supply Chain Strategy, International Institute for Product and Service Innovation, WMG, The University of Warwick, Coventry CV4 7AL UK, e-mail: j.godsell@warwick.ac.uk, tel: +44 (0)24 7657 3482

Dr. Antony Karatzas, Research Fellow, International Institute for Product and Service Innovation, WMG, The University of Warwick, Coventry CV4 7AL, e-mail: A.Karatzas@warwick.ac.uk,
tel: +44 (0)24 765 50297

1. I confirm that I am 18 years of age or older.

2. I confirm that I have read and understood the Electronic Participant Information Leaflet for this project.

3. I agree to take part in the above study and am willing to follow study instructions and procedures and complete all tasks.

4. I understand that my information will be held and processed for the purposes of publication in academic journals and presentation on academic conferences.

5. I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason and without being penalised or disadvantaged in any way.

I understand that by clicking the PROCEED button below I agree with all of the above statements.

<PROCEED BUTTON>

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WMG
THE UNIVERSITY OF WARWICK

A.3 Consent Form (Offline)

CONSENT FORM

Study: How do UK manufacturers make reshoring decisions and what are the impacts?

Research Group Contacts:

Di Li, PhD Researcher, International Institute for Product and Service Innovation, WMG, The University of Warwick, Coventry CV4 7AL UK, e-mail: Di.Li@warwick.ac.uk, tel: +44 (0)24 7657 2919

Professor Janet Godsell, Professor of Operations and Supply Chain Strategy, International Institute for Product and Service Innovation, WMG, The University of Warwick, Coventry CV4 7AL UK, e-mail: j.godsell@warwick.ac.uk, tel: +44 (0)24 7657 3482

Dr. Antony Karatzas, Research Fellow, International Institute for Product and Service Innovation, WMG, The University of Warwick, Coventry CV4 7AL, e-mail: A.Karatzas@warwick.ac.uk,
tel: +44 (0)24 765 50297

1. I confirm that I am 18 years of age or older.
2. I confirm that I have read and understood the Electronic Participant Information Leaflet for this project.
3. I agree to take part in the above study and am willing to follow study instructions and procedures and complete all tasks.
4. I understand that my information will be held and processed for the purposes of publication in academic journals and presentation on academic conferences.
5. I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason and without being penalised or disadvantaged in any way.

☐ I agree with all of the above statements.

WARWICK
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WMG
THE UNIVERSITY OF WARWICK

Appendix B Questionnaire Design

B.1 Cover Letter

B.1.1 Cover letter Full version

Moving back or increasing manufacturing activities in the UK: smart or stupid?

It is estimated that moving manufacturing back to the UK could create up to 20,000 jobs and boost UK GDP by 0.8% in the next decade. And more important, keeping manufacturing in the UK can actually save you money from total cost of ownership (TCO) perspective!

Align with your business strategy, optional priority, marketing etc., where are the exact right locations to place your manufacturing activities or to supply from, globally, regionally or locally? Is moving back or increasing production in the UK a smart decision?

We are inviting those involved in making decisions on the location of manufacturing activity to participate in our special survey, which **aims to discover the best fit between strategy and locations, in order to achieve the best performance**.

The project is led by Professor Jan Godsell, Head of the Supply Chain Research Group at WMG, and the takes about 15 minutes to complete. To thank you for your time, we will provide a copy of the final research report, a chance to attend the SCiP networking event for free and you will be entered into a prize draw to win a ticket, worth £125, to our Global Supply Chain Debate 2017 (GSCD).

The survey can be completed here until the end of November 2016.

Please note that in order to get as many accurate responses as possible, please forward this email to the right person within your company. Please feel free to pass this email to members of your professional network to enable them to participate too.

Thank you very much for your time,

N.B. The data will be managed by the members of the Supply Chain Research Group, University of Warwick and will be kept confidential. The findings will be presented in a generalized form for the purposes of academic and policy publications. However, if you wish to have access to the research report, you can choose to submit your e-mail at the end of the questionnaire.

B.1.2 Cover letter Website version

Moving back or increasing manufacturing activities in the UK: smart or stupid?

It is estimated that moving manufacturing back to the UK could create up to 20,000 jobs and boost UK GDP by 0.8% in the next decade. And more important, keeping manufacturing in the UK can actually save you money from total cost of ownership (TCO) perspective.

Where is the best location for your manufacturing activities? Should you supply globally, regionally or locally? Is moving back or increasing production in the UK a smart decision?

We are inviting those involved in making decisions on the location of manufacturing activity to participate in our special survey, which aims to discover the best fit between strategy and locations, in order to achieve the best performance.

The project is led by Professor Jan Godsell, Head of the Supply Chain Research Group at WMG, and takes about 15 minutes to complete. To thank you for your time, we will provide a copy of the final research report, a chance to attend the SCiP networking event for free and you will be entered into a prize draw to win a ticket, worth £125, to our Global Supply Chain Debate 2017 (GSCD).

The survey can be completed here until the end of November 2016.

B.2 Questionnaire

Manufacturing Reshoring Questionnaire (UK)

Introduction Block (Qualtrics version):

Thank you for taking part of this study of "Manufacturing Reshoring to the UK".

It takes on about **15 minutes** to complete.

The study is conducted by Supply Chain Research Group (SCRG), WMG, the University of Warwick.

The aim of this study is to clarify the current state of the manufacturing reshoring trend in the UK, to devise a holistic reshoring decision framework taking into consideration all relevant parameters, and to explore the impacts brought by reshoring.

To thank you to your time, we will provide a copy the final research report and entry you into a draw for a free ticket to Global Supply Chain Debate 2017 (GSCD)! Please let us know whether you are interested in them:

Do you want to receive the final report of this study?

A. Yes ☐
B. No ☐

(If tick yes, will ask for their email address)

Do you want to join the draw to get a free ticket of the Global Supply Chain Debate 2017 (GSCD), which hold by SCRG, WMG, the University of Warwick? (More details about previous year event, please refer https://www2.warwick.ac.uk/fac/sci/wmg/research/scip/gscd/)

A. Yes ☐
B. No ☐

(If tick yes, will ask for their email address)

This part is optional:

Do you want to read the detail ethical information sheet for this study?

A. Yes ☐
B. No ☐

(If tick Yes, it will show the entire information sheet)

Followed will be the consent form, which is compulsory to read.

Section A. General Information

1. Please provide the full name of your company:

   _____

2. Please indicate the ownership structure of your company:
   A. 100% UK ownership ☐
   B. UK- Foreign Joint venture ☐
   C. Foreign ownership ☐

3. Your company is a:
   A. Contract Manufacturer ☐
   B. Manufacturer of own products ☐
   C. Both ☐

4. Please indicate the primary industry in which your company operates:

Electronics		Home appliances		Chemicals		Pharmaceuticals	
Clothing & footwear		Electrical equipment		Aerospace, defence and security		Shipbuilding	
Industrial and mechanical equipment		Biomedical equipment		Health & beauty care		Textiles	
Furniture & home furnishing		Toys		Basic metals		Forest, paper & packaging	
Automotive		Food & beverages		Jewellery		Printing & publishing	
Capital projects & infrastructure		Energy, utilities & mining		Engineering & construction		Coke and refined petroleum products	
Rubber and plastic products		Other					

If tick other above, please specify your industry _____

5. Please indicate the number of employees in your company:
   1-9 ☐
   10-50 ☐
   51-250 ☐
   251-500 ☐
   501-1000 ☐
   1001-5000 ☐
   5000+ ☐

6. Please indicate the legal structure of the company:
   A. Sole trader ☐
   B. 'Ordinary' business partnership ☐
   C. Limited partnership ☐
   D. Limited liability partnership ☐
   E. Limited company ☐
   F. Unincorporated association ☐

7. Please describe the total turnover of your UK-based company/organisation in the last financial year:
   A. ≤ £ 2 million ☐

B. > £2 million – £10 million ☐
C. >£10 million – £50 million ☐
D. >£50 million - £100 million ☐
E. >£100 million - £500 million ☐
F. >£500 million ☐

8. (tick all that apply) Please describe the nature of your "customers":
   A. Other organisations or businesses ☐
   B. Individual consumers (e.g. the general public) ☐
   C. Governments ☐

9. Please indicate the management level of your current position:
   A. Senior management ☐
   B. Middle management ☐
   C. Junior management ☐

10. (tick all that apply) Please indicate your current function:

Accounting & Finance ☐
Marketing & Sales ☐
Planning ☐
Purchasing & procurement ☐
Production/Manufacturing ☐
Logistics & distribution ☐
Research & Development ☐
Human Resources ☐
Legal ☐
Other ☐

If tick other above, please specify your function _____

11. Please indicate how many years you have worked for this company:

    _____

12. Are you aware of your company's manufacturing location decisions?
    A. Yes (Please continue Q13)
    B. No (End the questionnaire)

13. Please indicate your level of awareness of your company's manufacturing location decisions (1 refers to extremely low, 7 refers to extremely high)

1	2	3	4	5	6	7

Section B.

Part A

14. Has your company moved any manufacturing activities (related to finished goods, sub-assemblies, components, remanufacturing) that were based in the UK to a non-UK location (off-shored)?

Yes ☐ (Please continue Part B) No ☐ (Please skip to Q19)

Part B

15. Where did you move it/them? (Please list all destination countries)

_____

16. (tick all that apply)Why did you move it/them there?
    A. To reduce costs ☐
    B. To serve a new market ☐
    C. To avoid capacity bottlenecks ☐
    D. To be closer to customers ☐
    E. For tax (or subsidy) reasons ☐
    F. To access knowledge clusters ☐
    G. Other ☐ _____

If you wish to explain more, please indicate below in the text box:

_____

17. (tick all that apply) The off-shored manufacturing activities (related to finished goods, sub-assembly, components, remanufacturing) are/were undertaken by:

A. Our company ☐
B. A joint venture ☐
C. A supplier ☐

18. **Since 2008, h**ave you moved any manufacturing activity **back to the UK**?

Yes ☐ No ☐

If tick Yes above, please specify in which year you moved back (If you did more than once, please list all the years) _____

19. **Since 2008, h**ave you increased your manufacturing activities in the UK **instead of moving them to another country?**

Yes ☐ No ☐

If tick Yes above, please specify in which year you did it (If you did more than once, please list all the years)

_____

If tick "Yes" for Q18 and "Yes" for Q19, please continue Section C, D, E, F, G
If tick "Yes" for Q18 and "No" for Q19, please continue Section C, E, F, G
If tick "No" for Q18 and "Yes" for Q19, then continue Section D, E, F, G
If tick "No" for Q18 and "No" for Q19, then continue Section E, F, G
If tick "No" for Q14 and "Yes" for Q19, then continue Section D, E, F, G
If tick "No" for Q14 and "No" for Q19, then continue Section E, F, G

PS: The pathway guidance above will not been seen by participants when they answer the survey online. The Qualtrics can do this automatically for participants. I put the above pathway in this document to just show the logic of the survey.

Section C. Reshoring Description (for direct reshoring)

20. Please tick the types of manufacturing activities that your company has ***brought back to the UK since 2008***:
    A. Activities related to a finished good ☐
    B. Activities related to a sub-assembly ☐
    C. Activities related to a component ☐
    D. Remanufacturing of a finished good, sub-assembly or component ☐

If you selected **A** above, please specify the nature of **the re-shored finished good (FG)** and who undertakes the activities:

	Our company	A Joint-venture involving our company	An existing strategic supplier	A new supplier
Original finished good				
New variant (updated version of a finished good originally made in UK)				
New finished good (a finished good not previously made in UK)				

If you selected **B** above, please specify the nature of **the re-shored sub-assembly (SA)** and who undertakes the activities:

	Our company	A Joint-venture involving our company	An existing strategic supplier	A new supplier
Original sub-assembly				
New variant (updated version of a sub-assembly originally made in UK)				
New sub-assembly (a sub-assembly not previously made in UK)				

If you selected **C** above, please specify the nature of **the re-shored component** and who undertakes the activities:

	Our company	A Joint-venture involving our company	An existing strategic supplier	A new supplier
Original component				
New variant (updated version of a component originally made in UK)				
New component (a component not previously made in UK)				

If you selected **D** above, please specify the re-shored **remanufacturing** activities and who undertakes the activities:

	Our company	A Joint-venture involving our company	An existing strategic supplier	A new supplier
Finished goods				
Sub-assemblies				
Components				

21. The re-shored activities have translated into:

A. No change in our output ☐
B. A marginal increase in our output (up to 5%) ☐
C. A modest increase in our output (5 - 10%) ☐
D. A significant increase in our output (10% +) ☐

22. (Click all that apply) You have re-shored these manufacturing activities to be closer to:

A. R&D Centre ☐
B. Head Office ☐
C. Registration Country ☐
D. Main Market ☐
E. Other ☐tick other, please specify _____

Section D. Reshoring Description (for indirect reshoring)

23. Please tick the types of manufacturing activities that your company has ***proactively decided to keep in the UK instead of moving them abroad since 2008***:
    A. Activities related to a finished good ☐
    B. Activities related to a sub-assembly ☐
    C. Activities related to a component ☐
    D. Remanufacturing of finished good, sub-assembly, component ☐

If you selected **A** above, please specify the nature of **the retained finished good (at the time of the decision)** and who undertakes the activities:

	Our company	A Joint-venture involving our company	An existing strategic supplier	A new supplier
An existing finished good				
An update or new variant of a finished good				
A new finished good				

If you selected B above, please specify the nature of **the retained sub-assembly (at the time of the decision)** and who undertakes the activities:

	Our company	A Joint-venture involving our company	An existing strategic supplier	A new supplier
An existing sub-assembly				
An update or new variant of a sub-assembly				
A new sub-assembly				

If you selected **C** above, please specify the nature of **the retained component** (**at the time of the decision)** and who undertakes the activities:

	Our company	A Joint-venture involving our company	An existing strategic supplier	A new supplier
An existing component				
An update or new variant of a component				
A new component				

If you selected **D** above, please specify the types of **the retained remanufacturing activities** and who undertakes them:

	Our company	A Joint-venture involving our company	An existing strategic supplier	A new supplier
Finished goods				
Sub-assemblies				
Components				

24. Keeping these activities in the UK instead of moving them abroad has translated into:
    A. No change in our production output ☐
    B. A marginal increase in our production output (up to 5%) ☐
    C. A modest increase in our production output (5 - 10%) ☐
    D. A significant increase in our production output (10% +) ☐

25. (Click all that apply) You have kept these activities in the UK to be closer to:

A. R&D Centre ☐
B. Head Office ☐
C. Registration Country ☐
D. Market ☐
E. Other ☐tick other, please specify _____

Section E. Strategic Considerations

During this time period, please indicate the degree of emphasis your company has attached to the following: (1: very little emphasis, 7: very high emphasis)	1	2	3	4	5	6	7
26. operating efficiency of the business unit							
27. continuing concern for cost reduction in terms of products							
28. continuing concern for cost reduction in terms of processes							
29. new product development							
30. enforcement of strict product quality control procedures							
31. quality of the products							
32. extensive service capabilities							
33. specific efforts to insure a pool of highly trained experienced personnel							

34. Please read the provided definitions of cost-leadership and differentiation strategies and indicate the position of your company during this time period in the continuum below:

Definition of Cost leadership: a company sets out to become the low cost producer in its industry
Definition of Differentiation: a company seeks to be unique in its industry along some dimensions that are widely valued by buyers.

100%	75-100%	50-75%	50%	50% -75%	75%-100%	100%

During this time period, please indicate the degree of emphasis your company attached to the following: (1: very little emphasis, 7: very high emphasis)	1	2	3	4	5	6	7
35. Improving current products							
36. Developing new products							
37. Exploiting existing markets							
38. Entering new markets							

Please indicate to what extent you agree with the following statements: (1: Strongly disagree, 4: Neutral, 7: strongly agree) ***(PS: This question will not appear in online survey for the respondents who only did offshoring or those who did nothing)***	1	2	3	4	5	6	7
39. The company's decision(s) to re-shore and/or keep manufacturing activities in the UK instead of moving abroad has been our own strategic decision							
40. The company's decision(s) to re-shore and/or keep manufacturing activities in the UK instead of moving abroad was to support a customer's requirement							

(Please Continue Section F)

Section F. Operational Considerations

During this time period, please indicate the degree of emphasis that your company has placed on the following activities: (1: very little emphasis, 7: very high emphasis, n/a: no emphasis at all)	1	2	3	4	5	6	7	n/a
Manufacturing Cost:								
41. Increase capacity utilization								
42. Reduce total landed cost								
43. Reduce production costs								
44. Reduce labour costs								
45. Increase labour productivity								
46. Reduce material costs								
47. Reduce Inventory level								
SC Cost:								
48. Reduce coordination of operation cost								
49. Reduce taxes and tariff								
50. Reduce currency changes risk								
51. Reduce transportation/logistics costs								
52. Reduce overhead costs								
Quality:								
53. Ensure conformance to product specifications								
54. Ensure accuracy in manufacturing								
55. Offer consistently low defect rates								
56. Provide reliable/durable products								
57. Design high-performance products								
58. Improve supplier quality assurance								
Delivery:								
59. Increase delivery speed								
60. Meet delivery promises								
61. Reduce production lead time								
Flexibility:								
62. Make rapid design changes								
63. Adjust capacity quickly								
64. Make rapid volume changes								
65. Offer a large number of product variety								
66. Introduce new-product quickly								
67. Make rapid product mix changes								
68. Make rapid timing of delivery changes								
Other:								
69. Take governmental incentives (taxes, duties and subsidies etc.)								
70. Reduce cultural and institutional distances								
71. Avoid political (e.g. government control over the industry), natural and economy issues								
72. Reduce intellectual property (IP) risks								
73. Seek the availability of qualified personnel								
74. Seek new skills, knowledge, technology and innovation								
75. Seek the ”made-in” effect								

76. Improve customer services (pre-sales & after-sales service, support, customization etc.)								
77. Reduce the management control complexity								
78. Reduce supply chain distances and risks								
79. Improve sustainability								

Please indicate below if you believe any factor missed in the above table:

_____

(Please Continue Section G)

Section G. Impacts

80. Has there been a change in the number of **your** company's suppliers due to your decision(s) to re-shore and/or keep manufacturing activities in the UK instead of moving them abroad? ***(PS: This question will not appear in online survey for the respondents who only did offshoring or those who did nothing)***

A. Suppliers increased ☐
B. Suppliers Decreased ☐
C. No change ☐

Please indicate your company's **current performance** relative to your competitors for each of the following: (1:"worst in industry", 7:"best in industry")	1	2	3	4	5	6	7
Business Performance:							
81. Return on sales (ROS)							
82. ROS growth							
83. Market Share							
84. Market share growth							
85. Return on investment (ROI)							
86. ROI growth							
87. Pre-tax return on assets (ROA)							
88. Customer Satisfaction							
Manufacturing Performance:							
89. Manufacturing cost;							
90. Total Landed Cost							
91. Quality							
92. Product flexibility (the operations' ability to introduce new or modified products and services);							
93. Volume flexibility (the operation's ability to change its level of output or activity to produce different quantities or volumes of products and services over time)							
94. Mix Flexibility (The operation's ability to produce a wide range or mix of products and services)							
95. Dependability - On time in full (OTIF);							
96. Delivery Speed							
97. Production lead time							
98. Productivity							
99. New product development and introduction capability;							
100. Production improvement capability							

Please indicate below if you believe any performance missed in the above table:

_____

Only for direct reshoring, the following questions will be asked and appears in the Qualtrics:

Please indicate to what degree your company (plants) had benefitted from your decision(s) to move manufacturing activities back to the UK for each of the following: (1:"strongly disagree", 7:"strongly agree")	1	2	3	4	5	6	7
101. Manufacturing cost							
102. Total Landed Cost							

103. Quality							
104. Product flexibility (the operations' ability to introduce new or modified products and services);							
105. Volume flexibility (the operation's ability to change its level of output or activity to produce different quantities or volumes of products and services over time)							
106. Mix Flexibility (The operation's ability to produce a wide range or mix of products and services)							
107. Dependability - On time in full (OTIF);							
108. Delivery Speed							
109. Production lead time							
110. Productivity							
111. New product development and introduction capability;							
112. Production improvement capability							

For the groups who only did offshoring:

113. Please indicate how likely your company is to move offshored manufacturing activities back to the UK in the **next 5 years**.

Very unlikely — Very likely

1	2	3	4	5	6	7

114. Please indicate how likely your company is to strategically increase your manufacturing activities in the UK *instead* of moving them overseas in the **next 5 years**.

Very unlikely — Very likely

1	2	3	4	5	6	7

For the groups who never engage in offshoring or reshoring:

115. Please indicate how likely your company is to strategically maintain or increase your manufacturing activities in the UK *instead* of moving them overseas **in the next 5 years**.

Very unlikely — Very likely

1	2	3	4	5	6	7

For the groups who has offshored & directly reshored & indirect reshored:

116. Please indicate how likely your company is to continue moving offshored manufacturing activities back to the UK in the **next 5 years**.

Very unlikely — Very likely

1	2	3	4	5	6	7

117. Please indicate how likely your company is to continue strategically increase your manufacturing activities in the UK *instead* of moving them overseas in the **next 5 years.**

Very unlikely Very Likely

1	2	3	4	5	6	7

For the groups who offshored & only directed reshored：

118. Please indicate how likely your company is to continue moving offshored manufacturing activities back to the l

Very unlikely Very Likely

1	2	3	4	5	6	7

119. Please indicate how likely your company is to strategically increase your manufacturing activities in the UK *instead* of moving them overseas in the **next 5 years**.

Very unlikely Very Likely

1	2	3	4	5	6	7

For the groups who offshored & only indirected reshored：

120. Please indicate how likely your company is to move offshored manufacturing activities back to the UK in the **next 5 years**.

Very unlikely Very likely

1	2	3	4	5	6	7

121. Please indicate how likely your company is to continue strategically increase your manufacturing activities in the UK *instead* of moving them overseas in the **next 5 years**.

Very unlikely Very Likely

1	2	3	4	5	6	7

For the groups who not offshored & only indirected reshored：

122. Please indicate how likely your company is to continue strategically increase your manufacturing activities in the UK *instead* of moving them overseas in the **next 5 years**.

Very unlikely Very Likely

1	2	3	4	5	6	7

123. Please indicate your opinion of that the Brexit result will accelerate the UK companies' engagements in manufacturing reshoring.

A. Agree ☐
B. Neutral ☐
C. Disagree ☐

If you have more options about UK manufacturing reshoring VS Brexit, please state in the text box below:

_____

(This is the end of the Questionnaire, Thank you for your time and cooperation!)

Appendix C Lists of Weblink Reshoring Resources

Reshoring Institutive Resources:

https://docs.google.com/document/d/1kY3ktwIn6HMJx47MBQs_uRssvaD2v8mvoxUTcEoxYvQ/edit

http://reshorenow.org/blog/reshoring-initiative-2016-data-report-the-tide-has-turned/

http://www.reshorenow.org/companies-reshoring/

Government Reshoring Resources:

https://www.gov.uk/government/publications/businesses-are-coming-back/businesses-are-coming-back

https://www.google.com/maps/d/viewer?mid=1ONvAzsb0HHJE1LhGpsFvPfjoj_g&ll=54.296103918317044%2C1.2959267968749373&z=6;
https://www.gov.uk/search?q=reshoring&show_organisations_filter=true