SERVICE INNOVATION AND SERVICE RESPONSIVENESS: MODERATING EFFECT OF INFORMATION TECHNOLOGY CAPABILITY

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ABSTRACT

Economic growth of a country highly depends on the development of its service sector. The logistic or transportation industry in Malaysia has significantly contributed towards the national economy and has also provided the employment opportunities. The industry has undergone a radical change due to the rapid evolution of information technology. The need to have efficient services is undeniable because of the increase in e-commerce applications which demands for service companies to innovate. Nevertheless, unlike the manufacturing sector, the innovation models in the service sector are still under developed. Hence, this requires further investigation in understanding the service innovation, especially in the area of transportation industry. This study aims to develop a model that links four main variables which are relevant to the industry, namely the determinants of service innovation, service innovation, information technology capability, and service responsiveness. A survey has been conducted on postal, courier, and freight forwarding companies. Data from respondents were analyzed by using PLS-SEM. The result of the study provides a meaningful insight on the service innovation and ultimately, contributes towards enhancing the responsiveness of the postal services, courier, and freight forwarding companies. The study limits its scope only on selected transportation service. Hence, it is recommended for the future studies to investigate further on a broader scope of transportation service or even on other industries.

Keywords: service responsiveness, service innovation, information technology capability

ABSTRAK

Pertumbuhan ekonomi negara amat bergantung kepada perkembangan sektor perkhidmatan. Industri logistik atau pengangkutan di Malayia telah memberikan sumbangan yang signifikan kepada ekonomi negara dan telah menyediakan peluang pekerjaan. Industri ini telah mengalami perubahan yang radikal berikutan evolusi pesat yang berlaku dalam bidang teknologi maklumat. Tidak dinafikan keperluan untuk mempunyai perkhidmatan yang cekap amat diperlukan memandangkan terdapat peningkatan dalam aplikasi e-dagang yang menuntut syarikat-syarikat perkhidmatan untuk berinovasi. Walau bagaimanapun, tidak seperti sektor pembuatan, model inovasi dalam sektor perkhidmatan masih kurang dibangunkan. Oleh itu, kajian lanjut diperlukan dalam memahami inovasi perkhidmatan, terutamanya dalam industri pengangkutan. Kajian ini bertujuan untuk membangunkan sebuah model yang mengandungi pautan empat pembolehubah utama yang berkaitan dengan industri, iaitu penentu inovasi perkhidmatan, inovasi perkhidmatan, keupayaan teknologi maklumat, dan tindak balas perkhidmatan. Kajian ini telah dijalankan ke atas syarikat-syarikat pos, kurier dan penghantaran barang. Data daripada responden telah dianalisis dengan menggunakan PLS-SEM. Hasil kajian memberikan perspektif yang bermakna kepada inovasi perkhidmatan dan seterusnya boleh menyumbang ke arah peningkatan tindak balas atau responsif daripada syarikat-syarikat perkhidmatan pos, kurier, dan penghantaran barang. Kajian ini menghadkan skop kepada perkhidmatan pengangkutan yang terpilih sahaja. Oleh yang demikian, adalah dicadangkan supaya penyelidikan pada masa akan datang mengkaji tentang bidang perkhidmatan dengan lebih lanjut dalam skop yang lebih luas, ataupun dalam industri yang lain.

Kata kunci: tindak balas perkhidmatan, inovasi perkhidmatan, keupayaan teknologi maklumat

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LIST OF ABBREVIATIONS

BI	Business Intelligence
FMFF	Federation of Malaysian Freight Forwarders
GDP	Gross Domestics Product
ITC	Information Technology Capability
MI	Market Intelligence
OECD	Organisation for Economic Co-operation Development
PLS	Partial Least Squares
R&D	Research and Development
SEM	Structural Equation Modeling
SI	Service Innovation
SR	Service Responsiveness

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Service industry plays a significant role as one of the important sources for the gross national product (GNP) and total employment of a country. The service industries has accounted for over 70 percent of the global GNP in 2010 and has been progressing at faster rate than agricultural and manufacturing sectors (Wirtz, Tuzovic, & Ehret, 2015). The employment rate also has significantly shifted from agricultural and manufacturing-based sectors to the service-based industries (WTO, 2012).

Due to the growth of the service industry, the market has become highly competitive. Hence, the service companies should search for the vital factors that enable them to deliver a value-added service. The key to become successfully competitive is to determine what customers want and then directing efforts toward meeting or even exceeding the customer expectation. In other words, service companies should be able to provide service responsiveness as their key for competitive advantage.

Service responsiveness refers to the capability of an organization to respond to their customers' needs (Razalli, 2008). Service responsiveness can only be achieved through gaining more knowledge of the customers and having consistent engagement with them. A responsive company may use the combination of its marketing, production and

technology initiatives in order to better capture its customers' needs and further develop its resources to fulfill those needs.

The dynamic structure and characteristics of service industries have led to tremendous challenges to these organizations to be fully responsive to their customers. The common challenges faced by the service companies are firstly, coping with an ever-increasing competition in their business sector (Coutelle-Brillet, Riviere, & Garets, 2014) and secondly, determining the benefit from the increasing consumption of services (Korhonen & Kaarela, 2011; Lapierre, 2000). In response, many service-oriented companies adopt and adapt service innovation in order to be unique in their service offerings.

Service innovation has received an increasing awareness and acknowledgement on its role in contributing towards the company's competitiveness. This has been reflected in extensive literatures in service management, service marketing, service innovation, and also in the service dominant-logic perspective (Lusch, Vargo, & O'Brien, 2007; Michel, Stephen,& Gallen, 2008; Vargo & Lusch, 2004).

The study on innovation in service has emerged as an important research field (Droege, Hildebrand, & Forcada, 2009). Service innovation has been found very important in both manufacturing and service firms (Xu, 2009) and is essential for today's organization (Kessler, 2000). Furthermore, many past researches focus on new product development (NPD) (Drazin & Schoonhoven, 1996; Droege et al., 2009; Kessler, 2000; Shenhar, Dvir, & Shulman, 1995) more than new service development (NSD). This could be due to the

argument that 'new services happen' rather than formally developed (Martin Jr & Horne, 1993). As a result the concept of new service development or service innovation is still not well understood (Menor, Tatikonda, & Sampson, 2002).

Logistics as part of service industries is a crucial component of modern economy, facilitating and managing the flow of goods, human, and fund efficiently. It functions to strategically boost productivity and competitiveness across industries (Droege et al., 2009). For logistic provider companies, the need to be responsive and innovative has been driven by the increased competitive pressures, intensified service demands, and government deregulation (Fisher, Hammond, Obermeyer, & Raman, 1994). Being crucial to the supply chain effectiveness, the logistic provider companies need to have closer coordination of activities among companies and extensive sharing of information in regards to their planning activities, particularly on the delivery schedules, product mix, market, and packaging (Stank, Daugherty, & Ellinger, 1999). This information enhance the capability of the logistic companies to respond efficiently on the changing delivery points, product mixes, volumes and other abnormalities that emerge from the operating environment.

In addition to service innovation, information technology or IT plays a critical role for the service-oriented industry. New technologies can enhance and provide new opportunities as it could drive organizations' success. Information technology serves as a powerful strategic and tactical tool for organizations (Pot, 2011). It will give a great advantage in promoting and strengthening the firm's competitiveness if it is being applied and used

properly. Therefore, logistics service providers should employ new information technologies to raise its service capability (Nixon, 2001) and enhancing their services (Lin, 2007).

In summary, this study aimed to investigate these issues in the logistic provider companies, particularly in the postal and courier services and freight forwarder companies in Malaysia. The study clarifies further on service innovation variables that were expected to be associated with service responsiveness. Rooted in service responsiveness as the focus of the study, innovation factors were believed to help the company to create a more responsive service. In addition, the information technology capability was considered as a moderating factor in the relationship between service responsiveness and service innovation.

This study was conducted on postal and courier services and freight forwarder companies in Malaysia. Both are logistics service providers that have common practices in the industry which provide service delivery from one point to another.

1.1.1 Malaysia Innovation-led Service Industry and Logistics Service Providers

Developing countries such as Malaysia experienced a substantial economic transformation, which started from a resource-based economy to a production and services-oriented economy which requires huge investment in infrastructure, labor, and capital (MOSTI, 2007). Malaysia had moved from an agriculture-based economy from

1957 to late 1970s, to a resource-led economy from 1980s to mid-1990s, and from now onwards towards an innovation-led economy. All these have been a plan in achieving Malaysia's mission (Figure 1.1). In addition to that, MOSTI (2010) reported that Malaysia was ranked at number 20 in Innovation Competitiveness and at number 26 in the Global Competitiveness Index in year 2010-2011.

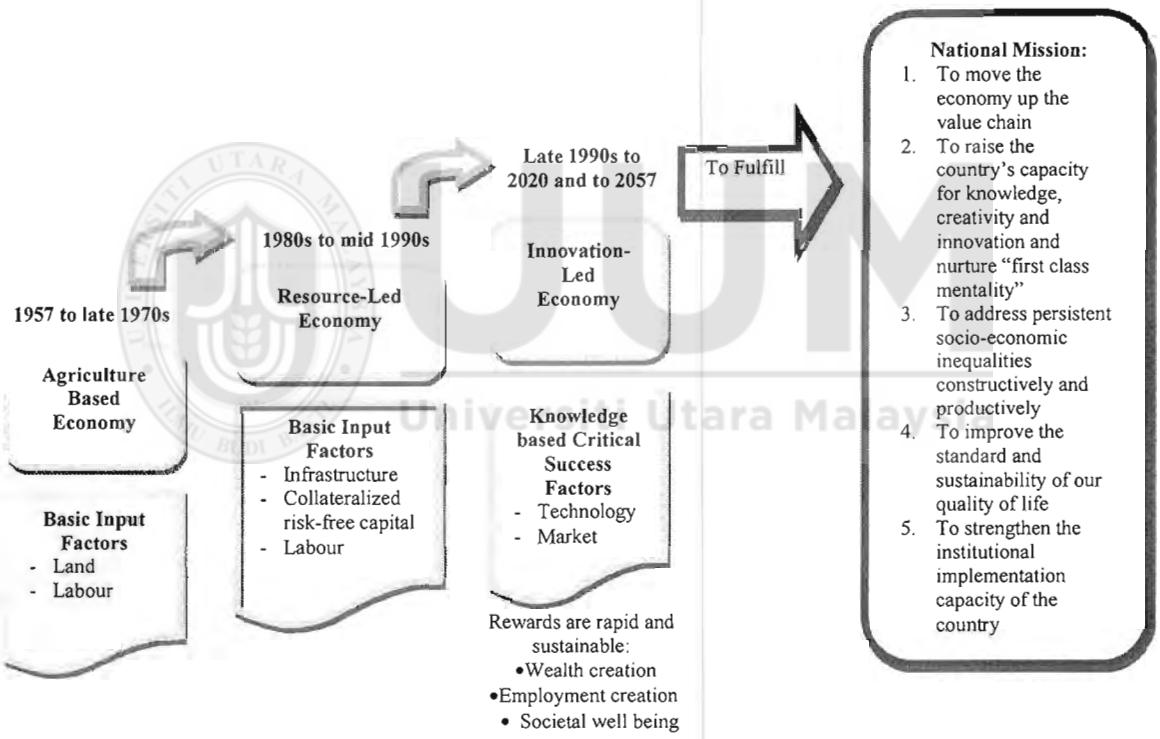

Figure 1.1
Malaysia Economic Transformation
Source: MOSTI, 2007

In 2014, the services sector has contributed 54.9 percent to the national GDP (Economic Report 2014/2015). Because of its significant role to the national economy, the government has introduced a comprehensive plan called the "Service Sector Blueprint 2014" to strengthen its competitiveness. The blueprint has outlined 60 percent achievement of GDP from the service sector by the year 2020. In general, the major contribution of the service sectors came from finance, insurance, real estate and business services, wholesale and retail trade, accommodation and restaurants as well as the transport and communications subsectors (EPU, 2010).

Malaysia has to be a more service-oriented economy in achieving its mission to become a developed country by the year 2020. Major contributions for economic growth are expected to come from the service sector. This sector has gained its importance after the government decided to move from a production-based economy to a service-based or knowledge-based economy (Bank Negara Malaysia, 2002). Furthermore, service is believed to be a new engine of growth for Malaysia's economy (Mohamed, 2011).

In addition, service sector is also important for the smooth running of the economy. Specifically, this sector acts as a facilitator that enables efficient production and delivery of goods and other services. The emphasis of service sector as an engine of growth is spelled out in the Third Industrial Master Plan (IMP3) for the year 2006 to 2020. Specifically, the contribution of the service sector to the GDP is expected to increase by 8.4 percent to 66.5 percent, while the manufacturing sector to decrease by 2.9 percent to 28.5 percent (Huat, 2009).

The logistics industry is one of the service major contributions. As a matter of fact, the logistic industry represents almost 12 percent of the domestic economy. The importance of logistics has been laid out by the government in IMP3 through special attention on improvement in the transportation infrastructure and services.

1.1.1.1 Postal and Courier Services

As part of logistics, the postal and courier sector contributes significantly to the national economy and developing the country. For instance, the parcel service has achieved an impressive growth in the last few years due to electronic commerce and online shopping worldwide (MOSTI, 2010). The continued growth of demand for the online shopping will ensure the postal and courier services to prosper and sustain in the long run.

The steady growth of the postal and courier sector in Malaysia can be seen over the period of 2001 to 2009. According to National Postal Strategy 2010-2014, Pos Malaysia Berhad as a giant company in the postal service provider in Malaysia, for instance, has achieved an annual average revenue growth of 5.2 percent, while the courier sector has recorded annual average revenue growth of 10 percent over the 8 year periods. Meanwhile, the number of companies in the industry has also been increasing from year to year. In the early 1970s, international companies such as DHL and OCS have begun to operate in Malaysia. City-Link Express (M) Sdn. Bhd. was the first local courier company operated in Malaysia in year 1979 followed by other companies such as ABX

Express (1984), Nationwide Express (1985), Pos Laju and UPS (1988), FedEx (1991), and GD Express (1997).

Meanwhile, Malaysian Communications and Multimedia Commission (MCMC) has given license to more than 100 courier operators in Malaysia. These courier operators are internationally grown such as FedEx, UPS, DHL and TNT, and homegrown domestic players such as Nationwide, City-Link, ABX, Skynet and GD Express. The number of these operators changed between 105 and 117 over the last eight years (National Postal Strategy 2010-2014).

The postal and courier service sector is expected to continuously grow in parallel to the growth of the online shopping or internet business. As long as more and more people are buying over the Internet, this sector will always continue to grow. The Internet transaction requires the articles and goods to be efficiently transferred from one place to another. However, this sector has great challenges in the future influenced by dynamic market factors such as changing customer demand, globalization, and rapid change of technology. Hence, a study on service responsiveness and innovation for the postal and courier sector is deemed timely as digital and physical movement of goods and services are complementary to each other.

1.1.1.2 Freight Forwarder

Freight transportation is one of the backbones of any economy for transporting commodities and raw materials. Freight forwarders are those companies that offer all services related to transport to anyone that places an order, everywhere in the world, whenever that is requested, using whatever means of transport, aiming at making profit (Bell, 2000). Bergmann and Rawlings (1998) had distinguish between carriers that manage means of transport and the freight forwarders.

The international organization known as Federation Internationale des Associations de Transitaires et Assimiles (FIATA) defines freight forwarder as "*a company which provides services of freight forwarding on behalf of a customer. These include transport, regrouping, storage, management, packaging and the distribution of cargos as well as auxiliary and advisory services regarding issuing and managing documents, customs facilitations, declaring cargos to the authorities, the insurance of merchandise, collecting and paying freights*" (European Commission, 2001). Freight forwarders also commonly known as forwarders or forwarding agents. They are responsible for collecting, shipping and delivering of goods by air or sea. Freight forwarders act as middlemen between customers and the multitude of transportation services. In most cases, a freight forwarder only acts as an agent, whereby he or she will make arrangements or bookings for shipments. This basically means that the agent oversees and organizes the transportation of goods from its point of origin until it reaches its final destination.

Freight forwarder become one of the important links in supply chain (Ramberg, 1998). Duties of freight forwarder may include:

- preparing the goods to be transported from origin to final destination
- providing estimates and advice to clients
- handling additional services required for international shipping such as preparing and transmitting insurance and customs paperwork
- ensuring prompt delivery of customers' goods
- liaising with numerous carriers including ocean liners, air freighters, trucking companies and rail freighters
- providing risk assessment and warehousing services.

1.2 Problem Statement

Nowadays, postal, courier, and freight forwarder services are facing numerous challenges due to stiff competition, new technologies, and demanding customers. Additionally, with the rapid development of Internet, these companies are now looking ahead to pay attention on their sustainability (Wang, Jie, & Abareshi, 2015). Even though the industry of postal and courier services is expected to grow significantly as a result of the emerging trend of business to business (B2B) and business to consumer (B2C) commerce, their survival is not guaranteed in the current global business environment. Price is no longer the only determinant for customer preference (Gouvea, Toledo, & Filho, 2001). For customers, particularly in service business, they care more on service quality. Although

service responsiveness is only a part of service quality, service responsiveness able to boost up the customer services (Meehan & Dawson, 2002).

Service responsiveness refers to capability of the service providers in being responsive to customers in terms of time, quality, and flexibility (Razalli, 2008). Due to global competition, being responsive will enable companies to fulfill customers who request quick response, lower cost, and greater customization (Zerenler, 2007). Furthermore, the ability to respond quickly and effectively, and satisfying customer need is crucial, especially in the time-based competition.

Companies need to be innovative through research and development (R&D) activities to become more responsive towards their customers and eventually enhance their service performance (Qiang, Chongfeng, Zhiyong, & Guoyun, 2010). In fact, innovation is a must for every organization, either manufacturing or service. Based on Global Innovation Index survey in 2014, there is some weaknesses in Malaysia's innovation system. Therefore, innovation should be main concern for service provider to survive and excel in the industry.

A study has found that 85 percent of companies pointed out that innovation is extremely important for their organizational success (Dobni, 2010). However, the findings of research in these areas remain inconclusive. Although a widespread deliberation on the comprehensive service science (Ostrom et al., 2010), the framework for the performance of service is still remains scarce (Sundbo, 1996; Frei, 2008; Moller et al., 2008).

The service-oriented companies adapt innovation for improving their service quality particularly service responsiveness (Qiang et al., 2010). Nevertheless, service innovation has not been thoroughly investigated in the current innovation research (Aixiong, 2011; DTI, 2007; Grawe, Chen, & Daugherty, 2009; Maruyama, Kohda, & Katsuyama, 2007; Nijssen, Hillebrand, Vermeulen, & Kemp, 2006; Preston, Kerr, & Cawley, 2009; Rubalcaba, 2006). Thus, research contributions in the field of service innovation comes gradually and still largely fragmented (Lievens & Moenaert, 2001). The development of new service or to innovate in service itself is risky because the new service failure rate is very high (Su, Hu, & Jin, 2007).

Service innovation is still a fairly broad concept (Grawe et al., 2009) and the results of innovations in services are less visible than the results of product innovations (Rubalcaba, 2006). Due to the diversity of services, the early 'one size fits all' theories of innovation in services is no longer deemed appropriate (Tether, 2003). Therefore, the study examined the service innovation in the postal and courier service industry and further defined the concept of service innovation by four dimensions, namely: 1) service technology, 2) service concept, 3) service delivery system, and 4) customer service interface as proposed by Hertog and Bilderbeek (1999).

In addition, service innovation is found to be determined by the human factor which can be grouped into internal and external stakeholders (Chen, 2011; Zainal Abidin, Mokhtar & Yusoff, 2011). Nevertheless, studies that focus explicitly on the determinants of

service innovation is still limited. A study that explores the determinants of service innovation namely business intelligence (internal knowledge) and market intelligence (external knowledge) is necessary in order to understand how significant these knowledge able to shape the innovation towards enhancing the service responsiveness. The term "knowledge" here refers to the knowledge gained from those stakeholders who are involved in the service process which consists of employees, managers, and customers.

In addition, information technology capability is perceived to influence the relationship between service innovation and service responsiveness. A study has found information technology capability influences logistics competencies (Closs, Goldsby, Clinton, 1997). However, studies on information technology for courier services has not drawn much research attention and deserve future investigation. (Lai, Li, Wang, & Zhao, 2008; Thapliyal & Kautish, 2011).

Moreover, most research on service innovation have adapted a qualitative method, which utilized case studies to seek the role, form, and type of innovations in specific companies (Preston et al., 2009). Hence, this study attempt to use quantitative method for better generalization of the findings in the service, particularly in the postal and courier service industry.

In sum, the study argued that service responsiveness explained by service innovation. In addition, the relationship expected to be enhanced by a moderator named information

technology capability. The service innovation was further determined by the extent of human knowledge on the market and business known as market intelligence and business intelligence. A comprehensive model of service responsiveness hoped to be developed by examining those links.

1.3 Research Questions

With the previously presented research background and problem statement, the foremost interest of this research is on the importance on service innovation for a greater service responsiveness. Based on that, this study addressed the following research questions:

- How does business intelligence relate to the service innovation?
- How does market intelligence relate to the service innovation?
- How does the service innovation relate to the service responsiveness?
- Does information technology capability moderate the relationship between service innovation and service responsiveness?

The researcher was interested in statistically testing the relationship among the variables and consequently able to answer all the preceding research questions.

1.4 Research Objectives

Service responsiveness is critical in a highly competitive market. This study aimed to examine the relationship of four main variables: determinants of service innovation,

service innovation, information technology capability and service responsiveness. Thus, the research objectives derived from the above research questions are as follows:

- To determine the relationship between business intelligence and service innovation.
- To determine the relationship between market intelligence and service innovation.
- To examine the relationship between service innovation and service responsiveness.
- To investigate the moderating role of information technology capability in the relationship between service innovation and service responsiveness.

1.5 Significance of the Study

Finding of this research attempts to explain the relationship of service innovation and service responsiveness. Generally, two contributions; theoretical and practical contributions of the study are discussed in the following sub-sections.

1.5.1 Theoretical Contributions

Theoretically, this study has contributed to the body of knowledge by introducing a comprehensive model of service innovation and service responsiveness. It has extended the service innovation research through offering insights into the understanding of service responsiveness and innovation. Besides, two determinants (business intelligence and market intelligence) of service innovation were also explored in determining the extent of their contribution to the service innovation.

In addition to that, this study extend the existing body of knowledge by enhancing the understanding of service innovation and operational performance in terms of service responsiveness in the postal, courier, and freight forwarding companies. Previous researches on service innovation are qualitative in nature, where generalization of the findings was confined to the particular cases.

Finally, the research that has been carried out on innovation within service industry is still limited (Menor et al., 2002). Hence, this research provide additional insight to the current knowledge on service innovation in the context of Malaysia's postal, courier, and freight forwarder.

1.5.2 Practical Contributions

Postal companies around the world have been seeking methods to support their operational practices in order to keep or increase their market share (Borenstein, Becker, & Prado, 2004). Practically, the findings of the study can be used by the service sectors as their guidelines for development of new services. By identifying these factors, the money spent on investment of new service may not be wasted as a result of new service failure.

Delivery services have significant role in the development as a leading commercial and financial region, providing communications between individuals, business and government. Although delivery service has been used for decades, but for courier

services is relatively still young. Therefore, this study contributes toward identification of factors that will ensure the best service innovation practices and thus will give a greater service performance in terms of operational performance, particularly on the aspect of service responsiveness.

For policy makers, this study provides evidence concerning the importance of being responsive in delivering service, particularly in Malaysia postal, courier, and freight forwarding companies. The outcome of this study should be able to aid policy makers in establishing the foundation for the implementation and progression of service innovation that supports and making service more responsive.

1.6 Scope of Study

This research is contextualized in Malaysia and focuses on the service sector that have a great impact on the nation's economy. The targeted group for the service provider involved in this study includes postal, courier, and freight forwarding companies. The chosen service provider are based on their similarity in their service process which is delivering goods from a place to another.

1.7. Definition of Key Terms

The following section provides definition of the key terms used in this study.

1.7.1 Service Innovation Determinants

Service innovation is determined by the human factors from inside and outside the service company that would give an impact on the innovation efforts by the company. These human factors are categorized into: (1) Business Intelligence and (2) Market Intelligence.

i. **Business Intelligence** refers to extent of knowledge gained from human who are internally worked in the company that have impact to any innovation efforts for the company. Workers/employees are the subject.

ii. **Market Intelligence** refers to the extent of knowledge gained from human who are external to the company that give impact to any innovation efforts for the company. Customers and suppliers are the subject.

1.7.2 Service Innovation

Service innovation is defined as a degree of new thing or change introduced in the service itself. Basically this study further explores the service innovation based on the following four main perspectives:

i. **Service Technology** which refers to the degree of new technology used in the service innovation.

ii. **Service Concept** refers to the degree of new idea in finding solution to a problem that occurs in the service.

iii. **Service Delivery System** refers to the degree of new internal organizational arrangements or processes that have to be managed to allow service workers to perform their job properly, and to develop and offer innovative service.

iv. **Customer Service Interface** refers to the degree of new way or method of interaction between service provider and customer. In service, customers are part and parcel of the production. The way they interact can be a source of innovation.

1.7.3 Service Responsiveness

Service responsiveness is an operational performance for this study (as a dependent variable). It refers to the extent of organizational capability of the postal, courier, and freight forwarder services in responding to their customers in terms of time, quality and flexibility.

1.7.4 Information Technology Capability

Information technology capability refers to the extent of firm's ability to mobilize and deploy information technology based resources in combination with other resources and capabilities. Information technology capability has two dimensions namely:

i. **Information Technology Knowledge** refers to the extent to which a firm possesses a body of technical knowledge about information technology related.

ii. **Information Technology Operations** refers to the extent to which an organizational ability in utilizing IT to manage its operations.

1.8 Organization of the Thesis

Overall, this thesis has five chapters. The first chapter provides the overall description of the study where sub-sections such as the background of the study, problem statement, research questions, research objectives, definition of terms used in the study, and significance of the study can be found.

The next chapter, chapter two, reviews the past literature pertaining to the main variables namely determinants of service innovation, service innovation, information technology capability and service responsiveness. Furthermore, past research has been studied and analyzed to seek for more facts and figure in supporting this research. In addition to that, the research framework for this study also presented in this chapter. The relationships among key variables and proposed hypotheses for the study are presented as well.

Chapter three shows the methodology employed to achieve the objectives of this study. It consists of the philosophical justification, research design, measurement of variables, data collection process, sampling design, method of data analysis, and analyzing measurement model process.

Chapter four shows and analyzes the findings of the study. It presents the specific outcome of the study, which includes information obtained from the respondents as input for statistical analysis, and finally the results of the hypothesis testing.

The final chapter, chapter five, summarizes the study by providing conclusion and recommendation. The summary of the study is highlighted in this chapter along with the concluding findings that leads to the achievement of the research objectives. Detailed contributions to academia and its implication on industry practitioners are also explained. The limitation that exists throughout the study is included together with some recommendations for further research.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter provides literatures that contribute to the understanding of each variable in this research. The literature review will help to establish historical, theoretical, contextual, and methodological perspectives for the independent and dependent variables. The focus of this review is on service responsiveness, determinant of service innovation, service innovation, and information technology capability. It will draw a foundation for a discussion of prior and current research on the research topic. This is then followed by the theory related with this study. Concluding this chapter, the research framework and hypotheses for this study are then established.

2.2 Service Definition

Services have become the dominant sector in the economies of most industrialized nations (Song, Song, & Benedetto, 2009) and are requiring special relevance in developing countries (Zarco, Ruiz, & Yusta, 2011). However, but services are least studied and most poorly understood part of the economy (Metters & Marucheck, 2007). In a simple explanation, service is something that deal with processes and must be experienced by people who pay for it. A service encompasses any activity done by one

party (service provider) for the benefit of another party (service requester) (Ludwig, 1998). It is a combination of outcomes and experiences delivered to and received by customer (Johnston & Clark, 2005). People may experience the service through direct experience and interaction between customer and provider. The experience may occur in many ways. They are:

a. the extent of personalisation of the process
b. the responsiveness of the service organisation
c. the flexibility of customer-facing staff
d. the ease of access to service personnel or information systems
e. the extent to which the customer feels valued by organisation
f. the courtesy and competence of customer-facing staff
g. interactions with other customers.

2.2.1 Service Cycle

Direct interactions will occur between two parties engaging in service activities and became a service cycle. Figure 2.1 illustrated the interaction between both parties. As presented in the figure, there are three phases in a service cycle:

i. Initiating phase: partners exchange information about themselves and the service offerings of the provider.
ii. Contracting phase: if successful, results in the agreement of both parties that a service will be performed at a specific quality and price.

iii. Fulfilment phase: both organisations fulfil their obligations as defined in the contract. At this phase, the service provider will perform the service and the requester pays the price (Ludwig, 1998).

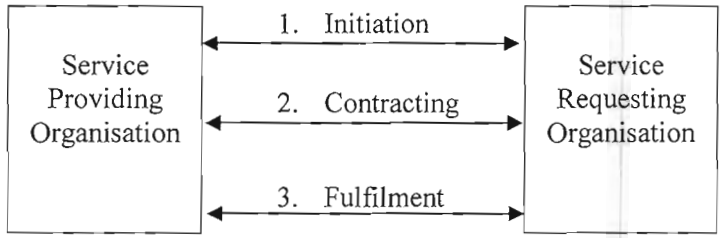

Figure 2.1
Phases of Interaction between Service Requesting and Providing Activities
Source: Ludwig, 1998

2.3 Service Responsiveness

The concept of responsiveness has gain attention in supply chain research across various sectors. Responsiveness is one of the characteristic that measure service outcome which become the result of service delivery to customer. The term responsiveness has been discussed from the service marketing and operations management areas. Responsiveness become a key element of performance (Hoyt, Huq, & Kreiser, 2007; Liang, Chang, & Wang, 2011), for example, an athlete responding to the moves of an opponent, or a sports car responding to its driver (Mott & Howell, 2005).

Responsiveness is one of the five dimensions of service quality. The other four dimensions are reliability, assurance, tangibility, and empathy (Parasuraman, Zeithaml, &

Berry, 1988). In the operations management area, the time element in responsiveness has been given more focus for achieving higher performance. The term responsiveness, flexibility and agility were used interchangeably (Bernandes & Hanna, 2009). Barclay and Dann (1996) equate responsiveness to agility due to their investigation of the role played by virtual enterprise and information technology in the improvement of overall responsiveness. It was supported with the argument from Zhang and Sharifi (2000) that firm's current level of agility can be assessed through general factors such as how responsive the company is to changes in its business environment and how effective the company is in proactively capturing the market needs.

Definitions of responsiveness may vary depending on its nature (Reichhart & Holweg, 2007). The responsiveness of a manufacturing or supply chain system is defined by the speed with which the system can adjust its output within the available range of the four external flexibility types: product, mix, volume and delivery, in response to an external stimulus, for example, a customer order. In addition, responsiveness can differ due to changes that may be due to product mix (mix responsiveness), the volumes required (volume responsiveness), or the delivery sequence or timing (delivery responsiveness) (Reichhart & Holweg, 2007). Responsiveness also defined as the ability to react purposely, and within the stipulated time, to significant events, opportunities or threats in order to achieve or maintain competitive advantage (Barclay & Dann, 1996).

Grounded on previous studies and literature, it can be conclude that responsiveness refers to the actions or behavior of a system using a series of capabilities to address changes

triggered by stimuli (Bernandes & Hanna, 2009). In particular, responsiveness enables companies to develop competitive advantage and adopt new product and process technologies ahead of their competition (Hoyt, Huq, & Kreiser, 2007). Therefore, it is critical to determine the various enablers of responsiveness which this study had highlighted within the relationship of innovation and information technology capability and service responsiveness.

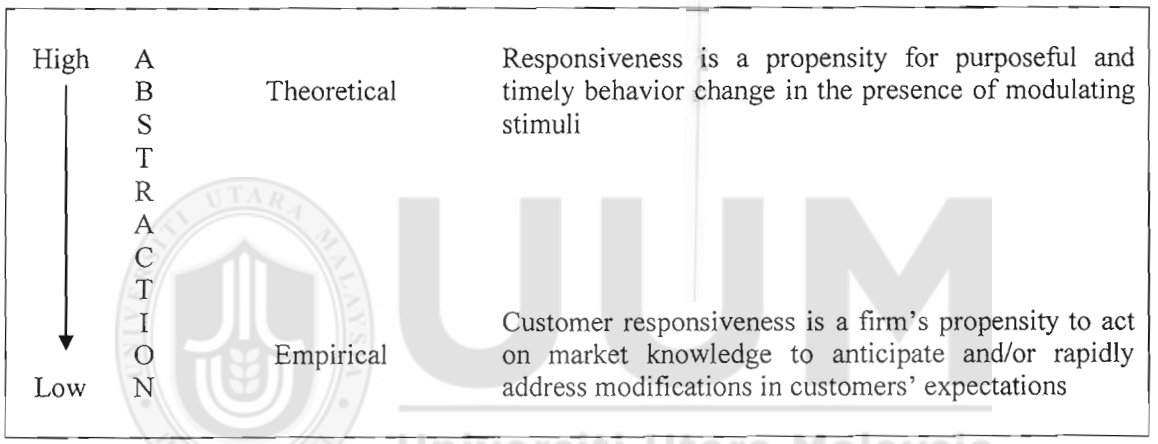

Figure 2.2
The Ladder of Abstraction for the Responsiveness Construct in Operations Management
Source: Bernandes & Hanna, 2009

Based on Figure 2.2, Bernandes and Hanna (2009) concluded that the breadth of the more universal concept of responsiveness was reduced to a firm's customer responsiveness. All the while, its connotation was increased by indicating the characteristics a firm must possesses to be deemed responsive to its customers.

2.3.1 Service Responsiveness in Logistics

As the competition increases and the need for rapid, responsive and efficient service rises, companies need to develop effective strategies and manage resources in competitive way. Increasing numbers of postal and courier companies means that more choices can be made by consumer. However, only the best company which gives the best service will remain in the industry. Therefore, the intense competition among logistics companies may influence performance of the companies.

Efficiency and effectiveness of a system could be determined by a set of performance measures or indicators (Rafele, 2004). Service responsiveness is one of the indicators and a key element that can be used to measure the performance of a service. This study defines service responsiveness as the extent of capability of a firm in providing speedy services, variety of services, and willingness to help customers within the service delivery system (Razalli, 2008). In other words, responsiveness is the operational performance that measure capability of the service providers in terms of time, quality and flexibility in relation to their customers.

Prior studies have found that customer responsiveness is substantially important in the logistic companies especially the postal and courier services. For example, studies found that the level of responsiveness (in terms of speed) is influenced by the service delivery performance (Jayaram, Vickery, & Droge, 2000; Sheu, McHaney, & Babbar, 2003).

Specifically, the use of technology in the service delivery has been found to influence responsiveness (Poria & Oppewal, 2003).

A recent study on responsiveness also found that service delivery influences responsiveness (Kritchanchai, 2004). Besides that, Arias-Aranda (2003) discovered that service delivery is significantly related to service flexibility. Other studies have shown that the competence to innovate (Menor et al., 2002) and the firm's new service development process (Sundbo, 1997b) could lead to a greater organizational performance. A study by Chen and Tsou (2006) also supported that a firm's decision to develop service innovation for firm performance depends upon the innovation. Therefore, it is concluded that service innovation should lead to responsiveness (Lee, 2002)

Responsiveness depends on the length of time the customers have to wait for assistance, answer to the questions, or attention to the problems (Razalli, 2008). In addition, it also became an objective performance dimension of the service delivery system, which may apply in this study. Responsiveness in this study refers to the extent the postal and courier companies and freight forwarding companies provide services that meet customer expectation and companies' objective. Meanwhile, Kohli and Jaworski (1993) refer responsiveness to the action taken in response to company's intelligence that is generated and disseminated.

Table 2.1
Summary of Selected Studies on Responsiveness

Author/s (Year)	Industry/ Organization	Objectives	Findings
Razalli (2008)	Hotel	Responsiveness as a moderator in service operations and hotel performance in Malaysia's hotel	Responsiveness level of hotels in Malaysia participating in the study was high.
Tiedemann, Birgele, and Semeijn (2009)	Hotel	Investigate customer responsiveness in hotel and role of market orientation.	Market orientation seems to be an important basis for cross-functional and inter-organizational information sharing. The exchange leads to fifty percent of customer responsiveness, as perceived by hotel managers.
Liang, Chang, and Wang (2011)	Convenience store and financial insurance industries	Examining the relationships among service responsiveness, social emotions and service outcomes.	Service responsiveness are positively related with positive employee social emotions, service outcomes.

Source: Developed for this study

Service responsiveness in this study indicates an organization's quickness of response to satisfy customer service needs, based on measurement adapted from Tiedemann, Birgele, and Semeijn (2009) which covers programs, activities, and action in ensuring the best service that could be offered to customers.

2.4 Innovation

Malaysia government seriously concerns in developing more innovative future. Generally innovation is about people creating values and ideas. Traditionally, the concept of innovation has been related to the industrial sector (Vergori, 2014) and it has become a driving force and a key driver of competitiveness for a large number of organizations around the world (Dervitsiotis, 2010; Van Riel, Lemmink, & Ouwersloot, 2004). How small the innovation be, it will give a cumulative strength that is capable of creating the new one (Kandampully, 2002). For example, Nissan primarily relied on innovative products and technological solutions to improve the responsiveness of their supply chain (Gunasekaran, Lai, & Cheng, 2008).

As marketplaces become ever more dynamic, there is a widespread recognition of the increasing importance of innovation to organizations and economies (Oke, 2007; Rowley, Baregheh, & Sambrook, 2011). It is about an organization's ability to provide the creative space and the resources to explore those ideas knowing that new does not always mean successful. Taking risks is an integral part of innovation and people can learn as much from what did not work as what turns out to be successful.

There is a good reason why innovation is needed. It is one of the most important strategies of competition (Kaufmann & Todtling, 2002) and plays a critical role in the increasingly competitive business environment in which firms operate (Grawe et al., 2009. In addition, it will improve the value of products, processes, and services (Aouad,

Ozorhon, & Abbott, 2010). Dobni (2010) stressed that innovative firms will succeed over the long term since they are more creative and have desire to succeed. From the 1970s onwards, both the public and private sectors had begun to focus on the use of innovation management strategies to gain economic advantage in the global market (Roberts, 2005).

Innovation is often associated with manufacturing industry. However, it is increasingly become relevant in service industries such as communications, financial, and technical business services (Gellatly & Peters, 1999). It has become an important source of competitive advantage in markets where customer preferences are changing rapidly, competition become intense, product lifecycles are shortening and maturing, and differentiation has become limited (Gray, Matear, & Matheson, 2002). For instance, logistics companies may also increase their performance by involving innovations in logistics service which can be implemented through technology (Chapman, Soosay, & Kandampully, 2003).

Early models of types of innovation suggested that there were four different types of innovation (Rowley et al., 2011):

- Product or service innovation which concerned with the organization's new product or service offerings.
- Production-process innovation, referring to the changes in organizational operations and production, which also initiated by technological enhancement.
- Organizational structure innovation, concerned with the organization's authority relation, communication systems, or formal reward systems.

- People innovation, relating to changes to the people within an organization, including changing in staffing levels, personnel, job roles, cultures, and behaviours.

Meanwhile, OECD (2005) defines four sub-components of innovation:

- **Product innovation** which involves the introduction of a good or service that is new or substantially improved. This includes significant improvements in technical specifications, components and materials, incorporated software, user friendliness or other functional characteristics.
- **Process innovation** where there is the introduction of a new or significantly improved production or delivery method. This includes significant changes in techniques, equipment and/or software. The customer does not usually pay directly for process, but the process is required to deliver a product or service and to manage the relationship with the various stakeholders.
- **Marketing innovation** which involves the implementation of a new marketing method involving significant changes in product design or packaging, product promotion, or pricing.
- **Organizational innovation** where there is a creation or alteration of business practices, workplace organization, or external relations.

Basically, an innovation is an idea, practice, or object that is perceived to be new by a person or adopting entity (Okunoye, Bada, & Frolick, 2007). Most definitions of innovation can be related to one or more of six dimensions: 1) newness, 2) innovation

object, 3) stages in the innovation process, 4) systemic effect, 5) level of analysis, and 6) outcomes (Dolan, Metcalfe, Powdthavee, Beale, & Pritchard, 2008). Schumpeter as stated in Roberts (2005) described innovation as a three part process: invention, commercial development and diffusion into the market place. Clearly, innovation is only relevant to the company if it only creates economic advantage. Thus, the work of Schumpeter, Porter and many others has firmly places innovation management as a priority in gaining economic advantage (Roberts, 2005).

Innovation defined by Little (2007) was based on customers' point of view. An innovation exists if the customer gains value added from new products or services, which is the case when a new function (or a new combination of existing functions) is provided and/or existing functions are provided at significantly lower cost. This may involve innovations whether in products, services, processes or in business models.

A study by Lin and Chen (2007) found that 80 percent of the companies innovate either through incremental or radical innovation. In line with that, Dobni (2010) stated that 85 percent of the successful organization have considered innovation as an important element in ensuring their success. Kandampully (2002) stated that innovation is a core competency of a service organizations. Therefore, it can be said that innovation in service is a must.

2.4.1 Types of Innovation

Different types of innovations require different resources and core competencies. Several authors name it as radical and incremental innovation categories. The authors distinguish radical and incremental innovation from one another. Most innovations are incremental which involve product line extensions or modifications of existing products (Dosi, 1988). They are usually classified as market-pull innovations, where the ideas are received from the marketplace.

Incremental innovation does not require significant departure from existing business practices and are therefore likely to enhance existing internal competencies by providing the opportunity to build on existing know-how. They are more likely to flow from market where firms gather, disseminate and respond to the marketplace (Kohli & Jaworski, 1990). As incremental innovations do not require a significant move from existing business practices, firms are likely to enhance existing internal competencies by providing the opportunity for organizational members to build on existing know-how (Tushman & Anderson, 1986).

Radical innovations are likely to destroy competence and often make the existing skills and knowledge redundant (Tushman & Anderson, 1986). Radical innovations often put the business at risk because they are more difficult to commercialize. Radical innovations are considered crucial to long-term success as they involve development and application of new technology, some of which may change existing market structures. Companies

that facilitate both radical and incremental innovation are more successful than organizations that focus on one or the other.

Radical innovations often require different management practices (O'Connor, 1998). These innovations are more likely to originate from scientists and are classified as technology-push innovations (Dosi, 1988; O'Connor, 1998). Radical innovations often put the business at risk because they are more difficult to be successfully commercialized. However, this type of innovations is significant for long-term achievement as they involve development and application of new technology, which might change the existing market structures (Veryzer, 1998).

2.4.2 New Product Development (NPD) vs New Service Development (NSD)

Products and services are different in a number of ways, such as the tangibility of outputs, perceptions of performance, and the lag between production and consumption (Bessant & Tidd, 2007). New product development (NPD) is a manufacturing-oriented concept, while new service development (NSD) is a service-oriented concept.

Chen (2011) stated that there are three ways to differentiate service innovation and product innovation. They are:

i. The actual providers and the service delivery staff are part of the innovation and the customer experience in labor intensive and interactive service.

ii. It is necessary for services to require the physical presence of the customer during the service delivery.

iii. Service innovators usually do not carry a brand name with a tangible product.

Manufacturing and service are different. Reid and Sanders (2002) stated that there are two primary distinctions between manufacturing and service organization. First, the production of the product and second the level of customer contact. Innovation in manufacturing companies is more structured, rigid, and formalized (Gloet & Samson, 2012). Thus, the process of innovation in service will be different from the way innovation is implemented in the manufacturing companies. Therefore, this study emphasized the service innovation particularly in logistics service, which could contribute toward additional input in the study of service innovation.

Avlonitis, Papastathopoulou, and Gounaris (2001) distinguish innovation in service by classifying them into six criteria. They are:

i. new-to-the-market service including new-to-the-world services;

ii. new-to-the-company service which refers to service that are new to the firm but not new to the market;

iii. new delivery process consisting of lines new to a firm, but not new to the world;

iv. service modifications which is major improvement or modifications of an existing service;

v. service line extension, additions to a firm's existing lines; and

vi. service repositioning, for example repositioning of an existing service.

Based on aforementioned criteria, innovation in service somewhat may similar to product innovation (Alam, 2006), but the process of both new service development and new product development are still different.

2.4.3 The Service Sector and Distribution Logistics

The services sector is also known as the tertiary sector. It is a very strong and important in the nation's economy. As stated in MOSTI (2010), Malaysia's service sector was the largest contributor to the GDP in 2009 (57.6 percent) compared to the year 2008 (55.2 percent). This shows that there will be a promising figure that the service sector is becoming important to the country development.

Generally, service seems to be relatively low in productivity and apparently low innovative capacity (Rubalcaba, 2006). Even to a certain extent, a study has found that service firms rarely have research and development departments and innovation generally is an unsystematic search-and-learn process (Sundbo, 1997b). However, prior studies also confirm that innovation does take place in service firms such as in banks (cited from Sundbo, 1997a) and hotels (Tiedemann, Birgele, & Semeijn, 2009). Therefore, it is a good start for this study in looking from another type of service perspective which is innovation and responsiveness.

Services are unique in many ways because their basic characteristics including intangibility and perishability. The tertiary sector of economy involves the provision of

services to businesses as well as final consumers. It has been internationally accepted that an adequate measure of the service sector contribution to the economy is 20 percent of total exports. In Malaysia, the figures for 2007 and 2008, at Ringgit Malaysia 100.9 billion and Ringgit Malaysia 102 billion respectively, came up to 17 percent (Mohamed, 2011).

The nature of work performed in services is quite heterogeneous (Hull, 2004). Compared to manufacturing, service businesses typically involve relatively more transformation of data and people than things. Dimensions of service include the degree of intangibility, extent of contact, and duration of exchange. As product complexity and diversity had increased, it can take more time and consume more resources to search for, obtain, install, maintain, upgrade and dispose of products than production itself. This will offer great opportunities for service innovation including both incremental and radical changes to service systems.

The growth of service activity across industries is widely recognized. Economy could only function with the infrastructure that services provide in the form of transportation, communications, education and also health care (Fitzsimmons & Fitzsimmons, 2001). Figure 2.3 clearly shows that service industries are diverse in its own way. None of the industries can stand and develop with the absent of service. However, the scale and the complexity of service have changed from time to time.

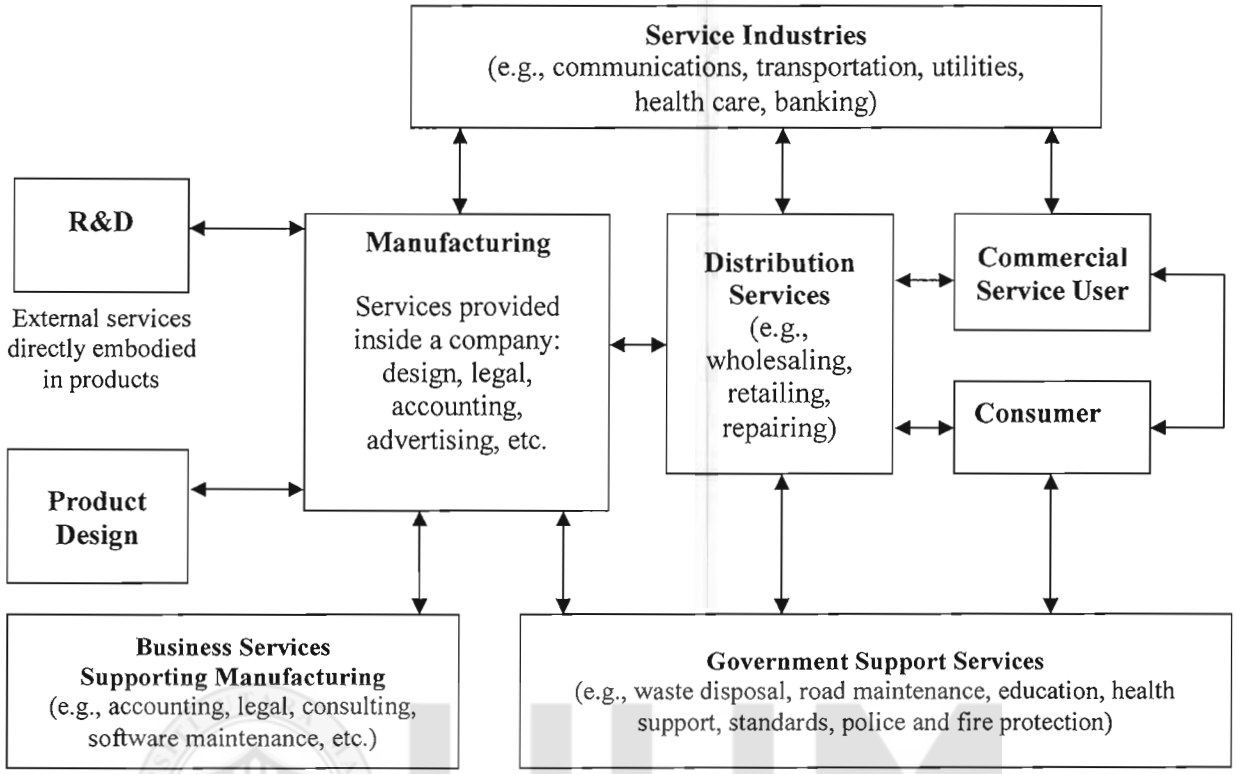

Figure 2.3
The Diversity of the Service Sector
Source: Fitzsimmons and Fitzsimmons, 2001

Pure manufacturing organizations produce a tangible product that can be stored in inventory, while pure service organizations produce an intangible product that cannot be stored. Additionally, pure manufacturing organizations have less direct contact with customers, while pure service organizations have a high direct contact with service provider (Reid & Sanders, 2002). Because of these distinctions, application of manufacturing concept to service must be made with caution. In addition, due to nature of service discussed above, innovations in service or NSD are rapidly implemented and can be easily copied by competitors (Voss, Johnston, Silvestro, Fitzgerald, & Brignall, 1992).

In other words, new service development is easily imitated by its competitors because service or process is often more difficult to be patented.

Successful service firms compete through innovation because how a service is designed and delivered is in a large part not protected by patent and copyright (Riddle, 2008a). Thus, it can be said that without innovation, the service company will be left behind due to the fast changing environment and competitive nature of the industry.

Logistic service provider as player in service industries also plays an important role in supporting Malaysia's economic. An efficient logistics system will facilitate the smooth flow of goods and services within and beyond national boundaries. This sector plays a strategic role in boosting productivity and competitiveness across countries. Recognizing its importance, the government is formulating a logistics sector master plan, which aims to improve competitiveness of the sector and position Malaysia as a regional hub for logistics. The master plan will also emphasize regulatory and institutional reforms as well as facilitate trade.

Logistics service refers to a supply chain management process that plans, implements and controls the efficient and effective flow and storage of goods, services and related information between the point of origin and the point of consumption in order to meet customers' requirements (MIDA, 2012). Problems that normally arise in logistics include delayed and inaccurate information, incomplete services, slow and inefficient operations, and a high product damage rate. The possible consequences are an inability to provide

inter-linked services, high operating costs, a rate of high inaccuracy, and a lack of flexibility in responding to changing demand requirements (Gunasekaran & Ngai, 2003).

The main services in logistics are:

i. Warehousing, storage and inventory management services
ii. Transportation services
iii. Freight forwarding/customs clearance and shipping services
iv. Integrated Logistic Services
v. International Integrated Logistic Services
vi. Cold Chain Facilities.

This study focused on two types of logistics service that related to transporting goods from one point to another, namely freight forwarding and postal and courier. Freight forwarding companies involves in arranging services such as loading and unloading of goods, obtaining payment on behalf of customers, booking of space, and custom clearance for air cargo, sea cargo, land transportation, rail freight, custom agency services, multimodalism, door to door pick-up and delivery services. Meanwhile, postal and courier service is a part of logistics service industry which also considered as third party logistic (3PL). It has become an important infrastructure which carries on the responsibilities in the movement of products from one party to another (Hongyu, 2010).

Generally, postal and courier service is about delivery of parcels, packages, documents, letters, and printed materials. The scope of postal and courier defined and illustrated in

Table 2.2. Basically, the postal transportation process consists of mail collection, input sorting, organize the movement of mail (global area transportation), output sorting, and distribute mail (Grunert & Sebastian, 2000). The complexity of the process therefore needs to be assist by modern software or technology to ensure that the mail can be received by the customer.

Table 2.2
Definitions for Postal and Courier Services

Postal Service	
Postal services related to letters	Services consisting of pick-up, transport and delivery services of letters, newspapers, journals, periodicals, brochures, leaflets and similar printed matters, whether for domestic or foreign destinations, as rendered by the national postal administration.
Postal services related to parcels	Services consisting of pick-up, transport and delivery services of parcels and packages, whether for domestic or foreign destinations, as rendered by the national postal administration.
Post office counter services	Services rendered at post office counters, e.g. sales of postage stamps, handling of certified or registered letters and packets, and other post office counter services.
Other postal services	Mailbox rental services, "poste restante" services, and public postal services not elsewhere classified.

Table 2.2 (Continued)

Courier Service	
Multi modal courier services	Services consisting of pick-up, transport and delivery services, whether for domestic or foreign destinations of letters, parcels and packages, rendered by courier and using one or more modes of transport, other than by the national postal administration. These services can be provided by using either self-owned or public transport media.
Other courier services	Other courier services for goods, not elsewhere classified, e.g./trucking or transfer services without storage, for freight.

Source: WTO (2010)

In the past, the postal industry used to involve physical transportation of physical communication, like package and mail delivery (Grunert & Sebastian, 2000). However, the industry has evolved to include traditional post, courier services, freight services and e-services in recent years.

Courier service delivers consignment of any size and shape. Moreover, it will assure their deliveries and insured on shipments which are costly parcels. Courier users always expecting for quick and reliable service whenever they at the same time willing to pay more. Courier service also offers special deliveries of packages, money, documents or information. Faster delivery time is one of the common services by courier and many other service and business rely on the service. The timeliness factors always took into account and it was regarded as having the highest level of influence on customer's

satisfaction (Ho, Teik, Tiffany, Kok, & Teh, 2012). Orders must be delivered on time as promised and customer expectation must be fulfilled.

For example, innovation effort at PosMel has successfully conducted operations in the area of innovation projects working towards level and ACM (Automatic Canceling Machine). This innovative project combines face detection level and also ACM by introducing a system of gravity roller conveyor. The system has replaced manual labor transfer letter that they are having previously. These activities may also eliminate some waste elements in operation mail processing such as excessive workloads, shorten the distance between the processes, and reduce waste movements by officer.

Pos Malaysia innovation project's objective was to increase productivity by reducing mail processing time, job reduction and elimination of movement of workloads. This process involves the review and analysis of work processes at the table level oblique. In addition, the observation of the movement of waste and workloads accepted while at work. Furthermore, there was an introduction of new equipment and using "gravity roller conveyor" to connect the two processes (level face and ACM) where all of this is done in-house by the postman. From innovations made by Pos Malaysia, productivity are increased and the income from the increased productivity on average is RM 360,000 per annum and lowering the cost of labor is about RM 18,000 per year.

Same goes to the freight forwarder companies. They have to innovate and offer more to their customers, otherwise, they would not compete with the competitors that remain in

the market or a new company that must become with a greater and fresh ideas. Executive Secretary of FMFF stated that "companies have to innovate or they will die". This shows that how important for forwarder to be creative and finding ways to make their service unique from others due to the fast and challenging market.

2.4.4 Innovation in Service/Service Innovation

Services have been largely overlooked by innovation researchers and largely neglected by innovation and technology policymakers (Preissl, Metcalfe, & Miles, 2000). Despite their diversity, the treatment of services in analyses of economic and technological change has, until recently, been very one dimensional. Services' roles in technological change, in particular, were largely seen as so insubstantial as to be barely worth examination. They were, and still generally are, assumed to be innovative laggards- 'supplier-driven' industries. The point that R&D and technology management activities are themselves services was rarely noted. It is something that is much more difficult today as specialized service firms carrying out such activities have become more prominent. Given the unarguable growth in the importance of service sectors, increasing numbers of researchers and policymakers have taken a fresh look at service activities (Drejer, 2004).

Service is intangible in nature. It is not easy for service companies to identify their activities of deliberate promotion of innovation as R&D. Furthermore, the results of innovation in services are less visible because of their nature. Service innovation not so

much dealing with the end product but rather with the support, development and delivery of services (Paton & McLaughlin, 2008). Service innovation aims to improve existing service systems, create new value propositions or create new service systems (Yuan & Qi, 2010).

Definition of service innovation may vary, but an established definition which emphasis the interactive element and based on multidimensional model is from Ark, Broersma, and Hertog (2003). The definition of service innovation is "*a new or considerably changed service concept, client interaction channel, service delivery system or technological concept that individually, but most likely in combination, leads to one or more (re)new(ed) service functions that are new to the firm and do change the services or goods offered on the market and do require structurally new technological, human or organizational capabilities of the service organization*". From the definition above, service may be highly innovative with the right approach.

Finland's Research Agency as cited in Jana (2007) defined service innovation as a new or significantly improved service concept. Any service innovation always can be replicate and reproduce to other cases, customer or environment. Service innovation also can be a new solution in the customer interface, new distribution method or new forms of operations. Meanwhile, Schumpeterian perspective on service innovation concepts covers five areas: (1) product innovation, (2) process innovation, (3) market innovation, (4) input innovation, and (5) organization innovation (Robert, 2005).

However, from business practices, there are broader definitions of service innovation in term of purposes (Xu, 2009). There are three types: (1) technology innovation in service, (2) service innovation in manufacturing firms, and (3) innovation in service industry. Technology innovation in service referred to as the innovation in technology and process associated with service such as information technology. Service innovation in manufacturing firms is the innovation associated with service in manufacturing firms such as after sale service, and customer relationship management. While innovation in service industry referred to as the innovation in firms offering service, such as logistics, information technology support, and financial consultancy (Xu, 2009).

Innovation is rarely being related to services prior to 1980s. Since then, international research and policy analyses have focused on service industries as significant sites of innovation (Preston et al., 2009). Furthermore, service innovation is considered as R&D activities for service-oriented enterprise (Qiang et al., 2010). It will give a value added to the service and enhance the performance of the service (Cainelli, Evangelista, & Savona, 2004).

As for the logistics service which also apply to freight forwarder and postal and courier service, types of innovation might be different. Qiang et al.(2010) suggest that there are four types of innovation can be applied in service, particularly in logistics service.

a) Service Technology Innovation

Service technology innovation helps to better and faster create time and space utility, and improving the operational efficiency of logistics services. For example, competitive advantage of logistics services can greatly enhanced by the application of advanced logistics technologies, such as ERP systems, EDI technology, network technology, decision support systems, time tracking systems, automated warehouses, and advanced loading and unloading equipment.

b) Service Concept Innovation

Service concept innovation contains the innovation of supply chain operation and management. The main parts of supply chain operation and management innovation are organization net innovation, relationship net innovation, information net innovation. The goal organization net innovation is to achieve value of the customer centered supply chain, collaborate and integrate the customers and related enterprise, such as choosing member innovation.

c) Service Delivery System Innovation

Service delivery system is the emphasis on the existing organizational structure and knowledge networks which should be adapted to the needs of the development of new services. Therefore, project management ideas should be introduced into logistics service provider, which sets up an intra-departmental and intra-organizational virtual team, through organizing, coordinating the

supply chain to meet customer demand for all resources to complete supply chain solutions. Secondly, logistics service should build up a learning organization, through enhancing the learning capacity of enterprise and staffs, encouraging innovations, and improving the capacity of staff. In addition, the organizational culture should be strengthened to improve corporate brand image.

d) Customer Service Interface Innovation

The logistics service companies can obtain long-term profitability and development by understanding customers' needs through customer surveys or third-party investigation, developing business strategies that match with the customers' supply chain and logistics solutions. This is to enhance the customer value and service satisfaction, and enhancing mutual trust between customers and integrated logistics service providers.

Moreover, service innovation has been defined in many different ways by various scholars. Basically, innovation can be seen as something new or differ than before. Riddle (2008b) stated that service firms innovate in three ways. Basically, innovation happens when there are any changes in:

- The service or what being offered, that did not exist before. It is the most obvious changes that happen in service.
- The delivery process or how the service being provided to customer. This would include new or improved production, delivery, or distribution methods. This is where the new technologies incorporate.

- The organizational or managerial structure or how service provision is supported. These include new or improve managerial technique, revised organizational structure, or changes in corporate strategy.

Based on the above definition, it is clear that innovation in service could only occur when there is something to go along with the innovation process, which is the adoption of information technology (Riddle, 2008b).

Tether and Howells (2007) describe innovation in service in four perspectives between the 1980s to present day: neglect, assimilation, distinction, and synthesis. The first perspective is where very little attention, or even acknowledgment, is paid to innovation in services. The dominant view is that innovation is about technical advances in machinery, equipment and other goods, and the processes involved with their development and commercialization. As such, services and low technology sectors, which are predominantly users rather than producers of new technologies, are seen as uninteresting, adopters of technology, rather than as 'real innovators'.

Assimilation phase can be seen as an attempt to (at best) assimilate or (at worst) subordinate services into the wider fold of innovation research. The continued growth of services in advanced economies meant that services were increasingly hard to ignore, and a number of innovation researchers set out to explore this part of the economy. The third phase (distinction) which emerged in 1990s is more radical in its approach and sought to reject the centrality of 'technological innovation' that had been the focus of most

innovation studies. Instead it focused on organizational innovation, and innovation in knowledge-based services, where the role of formal research and development, and 'hard' technologies is less prominent than in the technology-producing manufacturing sectors. The approach therefore drew on and highlighted the 'peculiarities of services' and how services, and their innovation activities, differ from manufacturing (Tether & Howells, 2007).

The last stage (synthesis) started with understanding that the study of innovation ought to consolidate examination of both mechanical and non-innovative types of progress, additionally that this more extensive vision of development has as much significance for assembling and different segments as it has for services. Basically, researchers receiving this approach perceive the significance of both technological and non-technological (and particularly organizational) types of innovation, and in fact the collaborations and complementarities between these two structures. As being what is indicated, they try to create experiences that are applicable to the entire economy, not simply services. Those four point of view have demonstrated that service innovation moderately change every once in a while (Tether & Howells, 2007).

Gallouj and Savona (2009) reclassified the above four perspective into three main approaches. Firstly, the technologist or assimilation approach which equates or reduces innovation in services to the adoption and use of technology. This approach attempts to assimilate services within the consolidated framework used for manufacturing sectors and manufactured products. Second approach is service-oriented or differentiation is in its

mature phase, seeks to identify any possible particularity in the nature and organization of innovation in services. The last approach which is integrative or synthesizing approach, is in the emerging and expanding phase. It attempts to develop a common conceptual framework which able to account for an enlarged view of innovation which is applicable to any tangible or intangible product.

Chen (2011) stressed that service innovation requires different organization and principles than product innovation. In other way, Tether (2005) found that there are both similarities and differences between the way that manufacturing and service firms innovate. Innovation in service and manufacturing firms is similar in that innovation is often treated the same in both sectors. Service innovation requires different steps than product innovation, and it also requires a different type of company culture and organization. This is due to the characteristics or specific attributes of services that were mentioned earlier such as intangibility and can be imitate.

Service innovations are generally more incremental, whereas product innovations can be more radical (Tether, 2005). This is on the grounds that it is common for service firms to incrementally enhance their services based on the idea made by client, and so forth. Product innovations are likewise made progressive and incremental structures, however they are additionally prone to be radical. For example, by introducing something brand new to the firm or its business sector. Service can be considered as considerably more customary than new product development, on the grounds that it depends on inner resources, for example, individuals, rather than outer ones.

Despite the fact that individuals are important in the new product development process, they are apparently more critical in new service development. This is on the basis that individuals are the ones who produce new service ideas. New service ideas originate from a close interaction between customers and employees, while new product ideas can originate from outside sources, for example, new technology. Subsequently, despite the fact that service and product innovation are regularly considered as "the same", they are very diverse and require distinctive techniques (Tether, 2005).

The ability to have a continual innovation process is crucial for service firms success (Sundbo, 1997a). Nevertheless, empirical studies on new service development is still scarce which result in little understanding on the matter (Menor et al., 2002). Like manufacturing firms, service firms invest a huge amount of money for innovation and the risk of their return on investment could be high if little knowledge is known on how to be successful for new service development.

Furthermore, in order to be competitive in today's business environment, new service development must be managed efficiently. The management of innovation or in this case new service development has been defined as "*a comprehensive approach to managerial problem solving and action based on an integrative problem-solving framework, and an understanding of the linkages among innovation streams, organizational teams, and organizational evolution*" (White & Bruton, 2007). In other words, managing innovation requires integration from various organizational entities.

OECD (2005) as stated in a report by Department of Trade and Industry of UK list several policies to promote innovation in services:

- **Developing an ICT-related business environment**, for instance through supporting e-exchange to enhance the structure for productive use of ICT in organizations.
- **Supporting software industries**, due to the important link that these industries provide to the overall competitiveness of the general economy.
- **Developing human resources**, in particular ICT training, as a skilled professional ICT labor force is essential for more efficient use of ICT in business.
- **Clustering and networking** has been a key focus in some countries due to the importance in helping to increase the efficiency of knowledge acquisition for innovation.
- **Investing in R&D**. The OECD suggests establishing R&D programmes focussed on the needs of the R&D-intensive segments of the service sector such as computing and telecommunications services.
- **Fostering SMEs and start-ups**. This has been a focus innovation policy in many states, with some even targeting support to the service sector.
- **Standards**. There is empirical evidence that efficiently framed standards promote innovation. In that respect are various programs to develop service standards underway in the OECD, including the European Committee for Standardization, which has a work program to develop inspection and repair standards that cover maintenance, shipping logistics and services.

- **Intellectual property rights.** The OECD argues that attention is needed for policy makers to ensure that the patent system continues to strike the right balance between the appropriation of the fruits of innovation by patent holders and the diffusion of technology for society as a whole.

In addition, Oke (2007) stressed that service innovation can be described as new developments in activities undertaken to deliver core service products for various reasons, for example to make those core service products more attractive to consumers. Thus, anything that is new or added to the service process shows that innovation has occurred.

A model by Hertog and Bilderbeek (1999) as shown in Figure 2.4, stated that there are four dimensions in service innovation.

i. **Dimension 1: New Service Concept**

It is about knowledge of the characteristics of existing and competing services. A service concept may already be familiar within a particular market, but there was a problem concerning when a product, function or concept is really new. Judgment may vary according to whether and when it is new to the providing firm, new to the client, to the regional, or market.

ii. **Dimension 2: New Client Interface**

The dimension focus on characteristics of actual and potential clients. Clients are often part and parcel of the production of service product, therefore the

way the service provider interacts with the client can itself be a source of innovation.

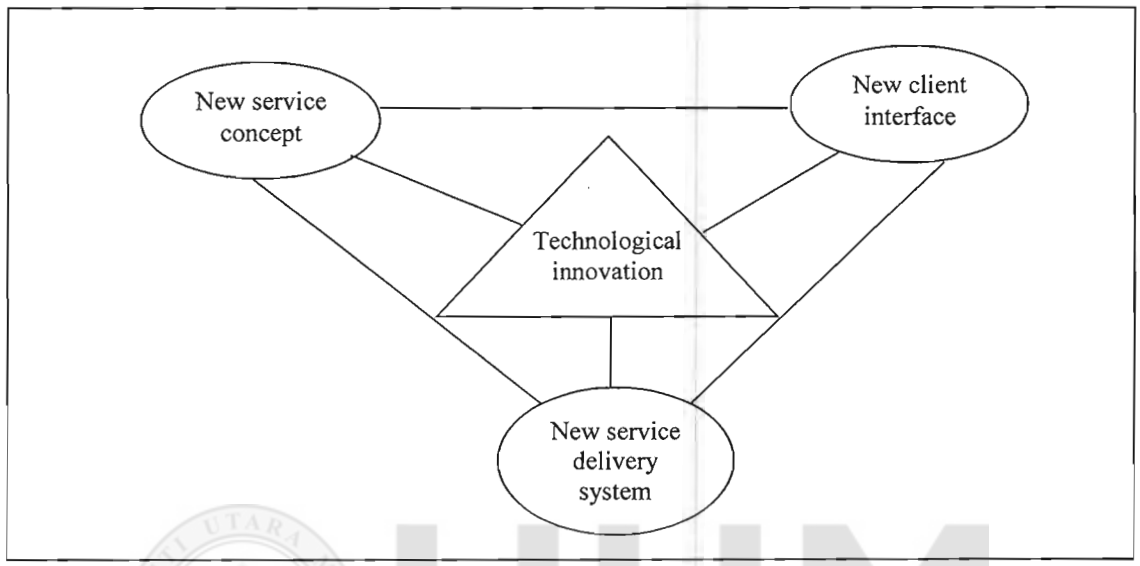

Figure 2.4
Dimensions in Service Innovation
Source: Hertog and Bilderbeek, 1999

iii. Dimension 3: New Service Delivery System

This dimension involving capacities, skills and attitude of existing and competing service workers. It is closely related to the question of how to empower employees, to facilitate them so that they can perform their jobs and deliver service products adequately.

iv. Dimension 4: Technological Options

Technology works as an enabler of the service system, but somehow it is not always a dimension because service innovation is still possible without technological innovation (Hertog, 2000; Preston et al., 2009). However, in

more advanced firm, there is an extremely active process of technology development going on.

A service firm may involve in all of the four dimensions or part of them. This is because the weight of the individual dimensions and the importance of the various linkages between them may vary across individual services, innovations, and firms (Hertog, 2000).

A study by Chen (2011) builds an integrated service innovation model (Figure 2.5). The model clearly shows the process of service innovation through his study on investment banking.

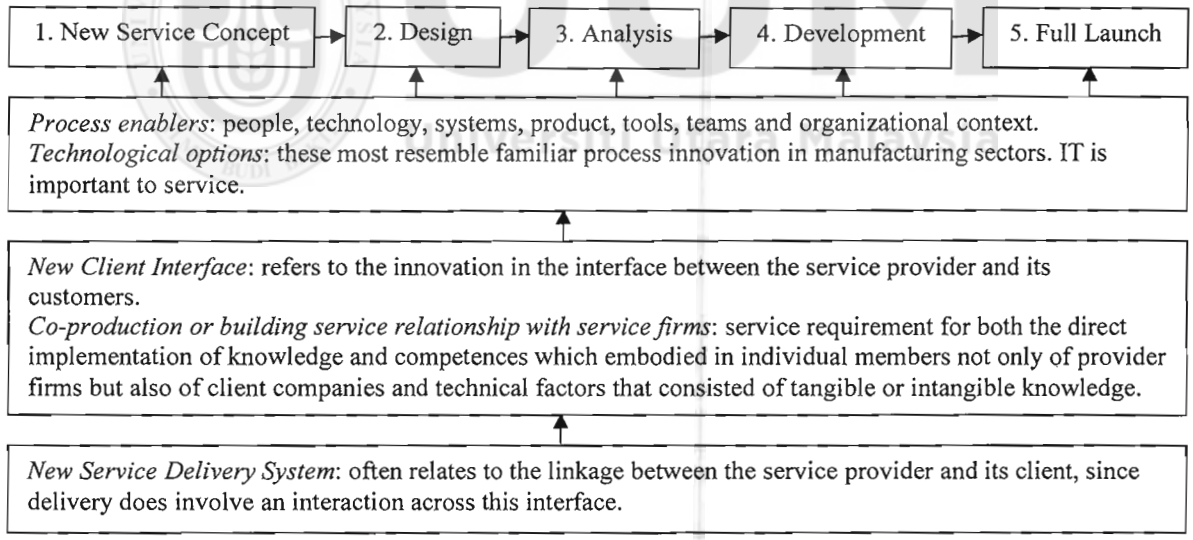

Figure 2.5
An Integrated Service Innovation Model
Source: Chen, 2011

Service innovation has an obvious difference compared to manufacturing innovation. LinLei and Guisheng Wu (2005) as cited in Zhou, Wang, Liao, Peng, and Xie (2010) found several differences between innovation in manufacturing and in service. Those distinctions are as follows:

- The connotation of service innovation is **more abundant** than manufacturing innovation, on that point is a bigger difference from the form to the substance.
- Service innovation process is a **more complicated** process than technology innovation, as customers actively take part in the service innovation process.
- Service innovation process contains **quite rich interaction** that included internal and external interaction.
- Product introduction and process innovation are **more difficult to tell apart** in service than in manufacturing.
- Service innovation follows a **various track**.
- Service innovation has a **diversity production mode**.
- Service innovation has a **short development cycle** and no special R&D department.

In addition, Zhou et al., (2010) present a contradistinction between logistic services and general service. In general, it is regarding the customer participation, production line, the degree of information, technical degree, integration, and network. The differences are shown in Table 2.3.

Table 2.3
Logistics Services vs General Services

Type	Logistics Services	General Services
Customer participation	Highly participatory service process	Customer participates in the service process
Production line	Highly flexible	No fixed production line
The degree of information	Information is very high	High degree of information
Technical degree	Highly technical	Not high-tech
Integration	High integration	More than a single or a few individuals
Network	Network system involves many nodes	Few of the network structure

Source: Zhou et al. (2010)

Based on the above discussion, this study defines service innovation as a new or changed that exist in the service delivery. Despite the various service innovation configurations proposed by scholars, this study will employ four dimensions of service innovation by Hertog and Bilderbeek (1999) and Qiang et al. (2010); 1) service technology, 2) service delivery system, 3) service concept, and 4) customer service interface.

2.4.4.1 Service Technology

Service technology concerns with the degree of technology used in the service innovation. Technology may play a role as a facilitating or enabling factor in the innovation. For example, tracking and tracing systems enable transport service providers to monitor the progress of their fleet and hence to fetch off their transport services more closely.

2.4.4.2 Service Delivery System

The service delivery system refers to the internal organizational arrangements that have to be handled to allow service workers to do their task decently, and to acquire and provide advanced service. It is nearly connected to the question of how to empower employees, to help them so that they can do their jobs and deliver service products adequately.

2.4.4.3 Service Concept

Service concept is a new idea on how to prepare a solution to a problem. For instance, the idea of having call center services, which installing, organizing and recruiting for their clients' call center. This mind has emerged from temporary staffing positions on the footing of their initial involvement with providing temporary labor for call service.

2.4.4.4 Customer Service Interface

The interfaces between service provider and customer are the focus of a dependable deal of service innovations. In service, customers are part and parcel of the production. The manner they interact can be a source of invention.

The advantages of service innovation are obvious. Nevertheless, it is still not clear on which outcomes of the innovations that the company what to achieve (Victorino, Verma, Plaschka, & Dev, 2005). For instance, some companies have implemented the service innovation just to maintain their current market share. This phenomenon suggests that some innovations may merely raise the cost of doing business without a significant economic benefit, other than to preserve current business and without providing a competitive edge (Reid & Sandler, 1992).

On the other hand, most of the companies regarded innovations as the mean to enhance service differentiation and induce financial gains (Victorino et al., 2005). Hence, it is necessary to explore further on this issue in order to understand the impact of service innovation on the service offerings particularly on the service responsiveness which are not only desired by the customers but will benefit economically to the company.

2.5 Determinants of Service Innovation

Service innovation will not happen when there are no issues or competition in the industry. Factors influencing innovation in service may be similar to manufacturing, but the roles are different. Soosay and Hyland (2004) summarized that there are generic groupings of factors that drive innovation which called as push and pull factors and internal and external factors (Figure 2.6). The push factors are something that causes or initiate the innovation, such as employee orientation and competition. The pull factors are the desired outputs that the company wishes to achieve, for example to be a leader in the industry or for financial reason. The internal conditions relate to people, systems, processes and strategies within the organization, and the external refer to the environment or industry they are operating in.

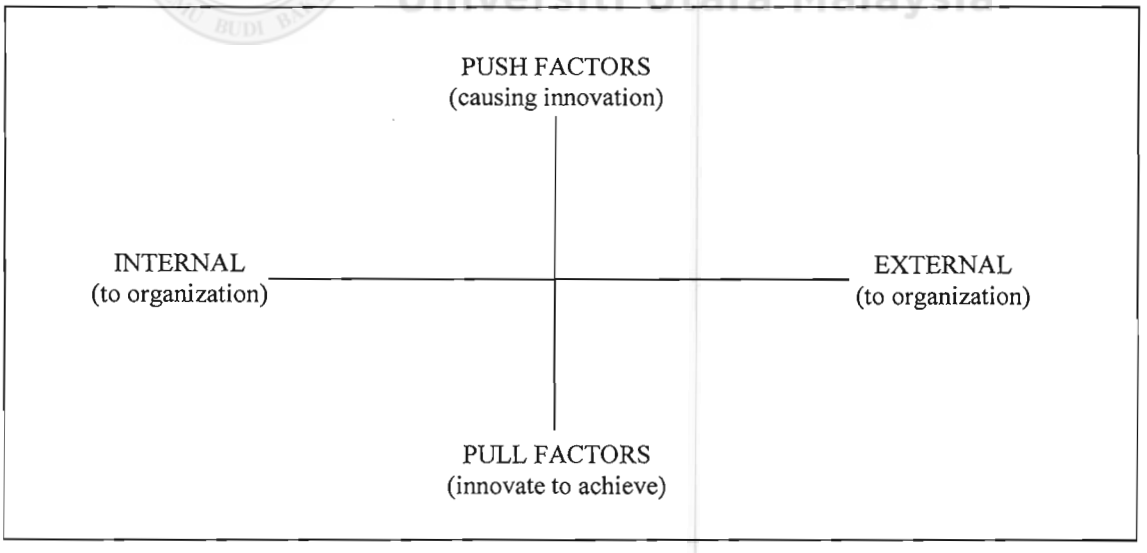

Figure 2.6
Drivers of Innovation
Source: Soosay and Hyland, 2004

Furthermore, study by Soosay and Hyland (2004) also revealed seven drivers of innovation from their case study of Australia and Singapore distribution centers. They are 1) financial reasons, 2) customer orientation, 3) employee orientation, 4) to have a leading edge in industry, 5) operational performance, 6) competition, and 7) shareholder orientation. Overall, customer orientation has been the most selected causes of innovation by the firms studied.

In contrast to traditional research and development model, innovation in service firms usually comes from customers, customer contact staff, non-contact (back office) staff, and senior management (Riddle, 2008a). Customers can have direct participation in idea generation, concept assessment, and implementation in innovation process. In addition, innovative ideas in designing the actual service innovation also may come from staff who get contact with customers. Furthermore, senior management must have a good justification on the innovation process and allocate the resources to test and implement innovative ideas.

Innovation can be keyed out as innovation input and innovation output. Innovation output refers to new product success, time to market, and the amount of new service. Innovation input refers to research and development investments and efforts in innovation (Jaw, Lo, & Lin, 2010). However, in service innovation studies, most research seem to have focused mainly on the innovation output (Marinova, 2004) instead of innovation input. Logically, there will be no output if there is no input. Therefore, this study will look into

the innovation input side which is further discussed by using the term 'business intelligence'.

Despite, there are companies that chose to work together with their suppliers, customers and also competitors. It is known as a collaborative supply chain environment where they are sharing by exchanges real-time supply chain information using electronic data interchange (EDI) and business to business (B2B) portal (Chong, Chan, Ooi, & Sim, 2011). These external determinant are further discussed in the next part by using the term 'market intelligence'.

2.5.1 Business Intelligence

Business intelligence in this study refers to the internal factors or knowledge that is within the organization that drives service innovation. For example, knowledge of the employee that will benefit the management which will support the service innovation practices in the company (Elche, 2011). As stated by Chen (2011), innovations in service will only happen in the presence of those involve in the process, which also refers to the employee. This is supported by Abidin et al. (2011) and Gebauer, Krempl, Fleish and Friedli (2008) that any type of innovation can be driven by internal driver such as new processes that rely on available knowledge and resources.

Clients are not normally believed to play a role in the initial generation of new product ideas, however, initial generation normally reserved for the professional designers that

hired by company (Magnusson, 2003). This is where the knowledge and expertise from the internal organization became a determinant for service innovation. It will refers to the managers' know how as well as the competencies, talent, and skills of the workers.

Employees play a part in service because they can be considered as the service itself, they are the organization in the customer's eyes, and they are the brand and also the marketers (Riddle, 2008a). Employees in a non R&D position may have innovative ideas and knowledge that related to their immediate task, the working process, or the organization in general (Axtell et al., 2000). Their ideas and knowledge may become useful for company's innovation effort that will lead to greater service (Hu, Horng, & Sun, 2009). Therefore, employees can be considered as a determinant for generating service innovation in their workplace.

Usually, managers are free to innovate within the organization where innovation can be done through obstacles or resistance from employees who fear of change. However, workers who have a strong bargaining power would be able to prevent the innovation effort (Barth, Bryson, & Dale-Olsen, 2011). Ideally, staff need to be involved in innovation activities. Therefore, by giving responsibility and authority to workers become a strategy to keep them motivated and support any steps taken for the betterment of the organization (Bowen & Schneider, 2014; Pot, 2011; Riddle, 2008a).

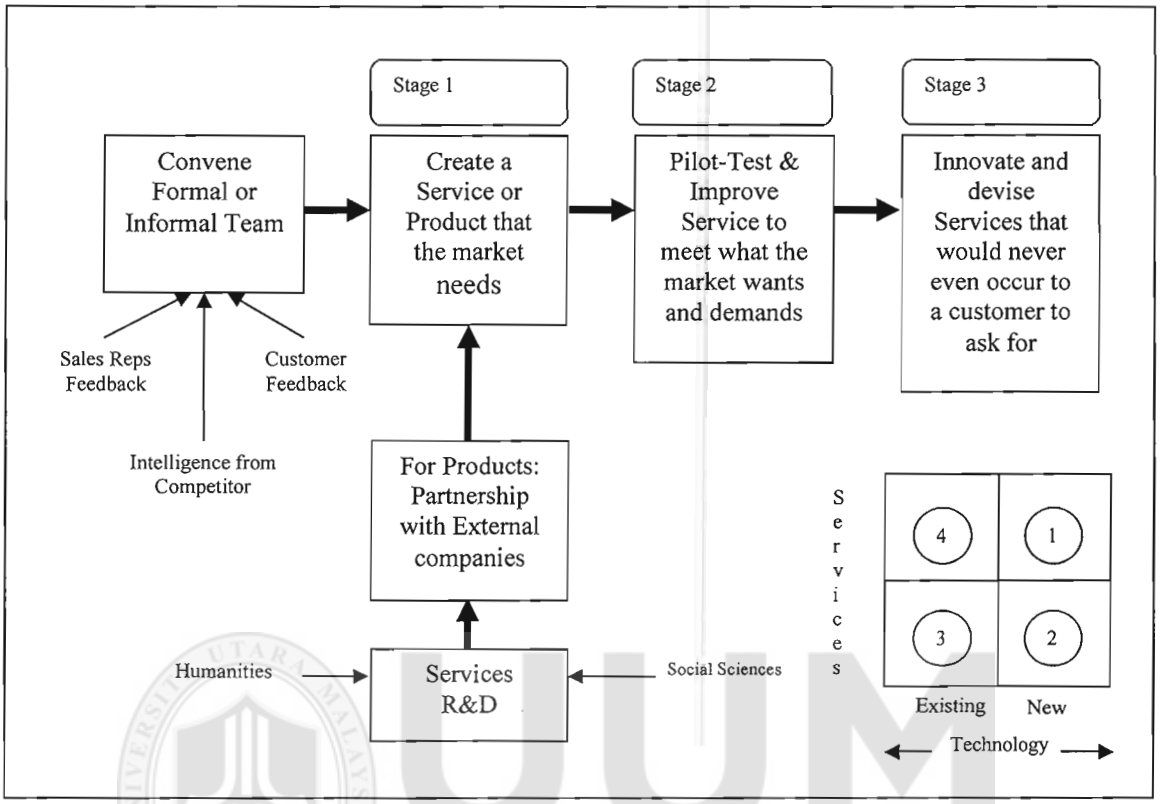

Figure 2.7
Service Organizations Innovation Model
Source: Barth et al., 2011

Based on Figure 2.7, clearly seen that human factors (sales representative, customer, and competitor) so called intelligence in this study contributed so much in innovation effort that made by any service organizations. Furthermore, it was supported by previous research by Berry et al., (2006) which stated that employees are one of the drivers of successful service innovations. Innovators should invest in their employees' willingness and capability to perform at consistently high levels to succeed.

2.5.2 Market Intelligence

This study used market intelligence as a determinant for service innovation. The term 'market' normally related to the area of marketing. Kohli and Jaworski (1993) define market intelligence as the collection and assessment of both customer needs or preferences and the forces that influence the development and refinement of those needs. Market intelligence in this study addressed the external factors which related to the knowledge of customers that become the determinants of service innovation.

Kotler (1983) argues that innovation emerges not only form inside of the organization, but also from outside of the organization, which refers to customers. Therefore, incorporating customer's input in service development is crucial (Magnusson, Matthing, & Kristensson, 2003) since they are enablers for service innovation (Thakur & Hale, 2012). In addition, the role of customers changes over the course of the innovation process (Dorner, Gassmann, & Gebauer, 2011). This can be seen through the Figure 2.8 which illustrated that customers provide ideas in definition phase, describe their social reality, and formulate their requirements. Furthermore, they plays their role as co-developer, and also become the purchaser and give feedback if necessary.

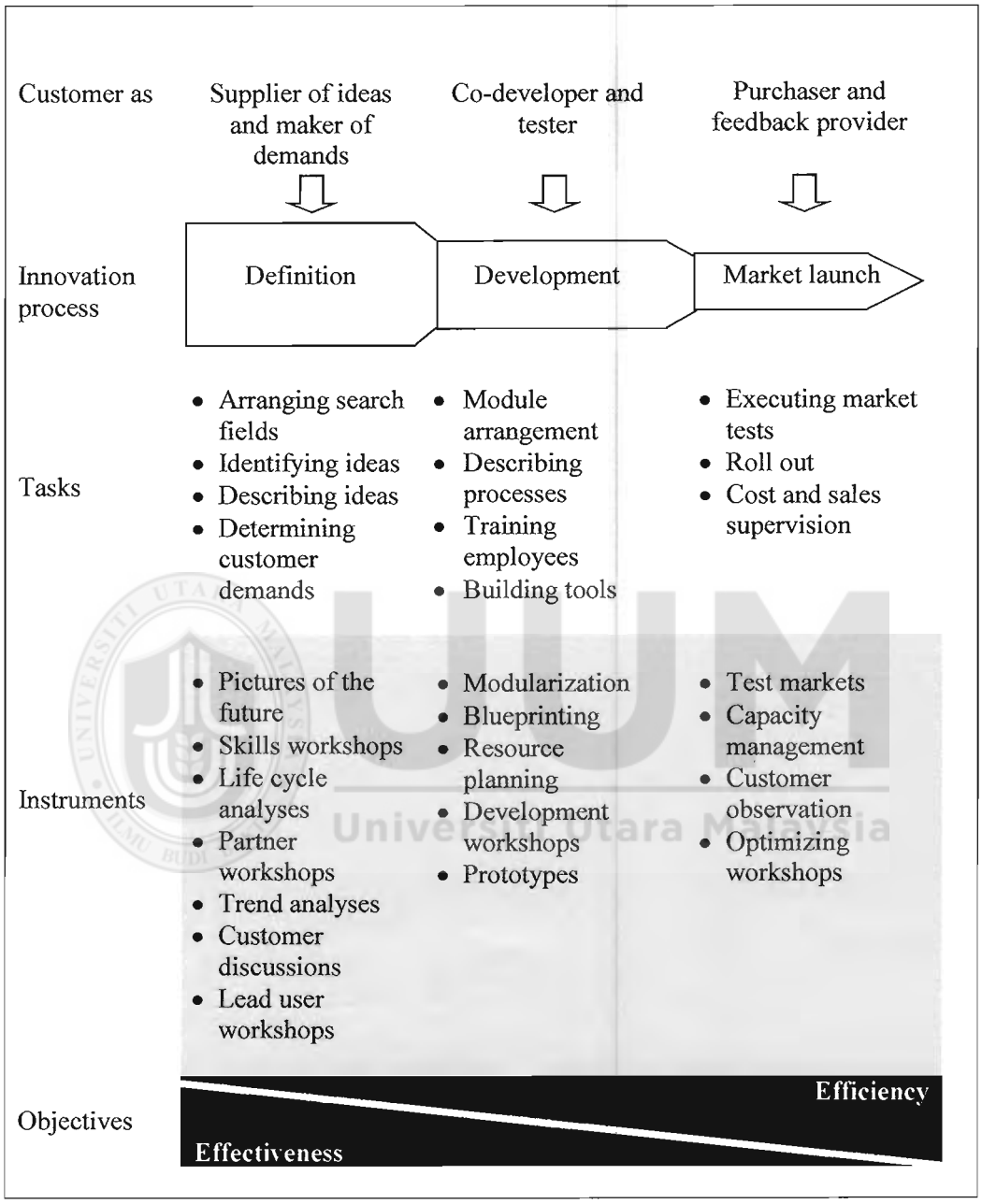

Figure 2.8
Innovation Process for Services
Source: Dorner et al., 2011

Service components are a combination of processes, people skills, and materials that must be appropriately integrated for a well-planned designed service (Goldstein, Johnston, Duffy, & Rao, 2002). This is in line with the service concept itself whereby, customers will always came into attention, as Johnston and Clark (2001) define service concept as four main dimensions.

i. Service operation: the way in which the service is delivered.
ii. Service experience: the customer's direct experience of the service
iii. Service outcome: the benefits and results of the service for the customer.
iv. Value of the service: the benefits the customer perceives as inherent in the service weighed against the cost of the service.

Based on the four dimensions above, it was clearly proven that customers will always engaged in the service before, during, and after the service encounter. The role of customers cannot be underestimated since their expectations play a vital role in evaluating quality and performance of service (Thapliyal & Kautish, 2011).

Service is all about the people, and if the people do not have a mindset embedded with notions of innovation, innovation is not going to happen (Chen, 2011). Human factors play crucial role in providing service. According to Zarco et al. (2011), the success of new services usually depends on customer acceptance. Therefore, customer have to be involved in co-creating the new service and service firms need to put more effort in researching customer preferences (Alam & Perry, 2002; Jaw et al., 2010; Zolfaghharian & Paswan, 2008). When customer being heard by the service provider, it will allow the

firm to collect feedbacks that will provide informations that might be useful to the new service developments.

Service organization always have to set customers' expectations before, during and after service delivery (Goldstein et al., 2002). It was related to the nature of service package as well as to the nature, duration, and customer flexibility during the service encounter. Therefore, engaging customers in new product and service development processes was something common for service provider (Verleye, 2015; Jaakkola, Helkkula, & Stenroos, 2015). They are the subject that must be involved in the service delivery process and at the end of the process, customers will always be the ultimate judges of service (Ooi, Lin, Tan, & Chong, 2011). Customers need to be satisfied, thus, they must be involved in the critical stage in service design and development (Edvardsson & Olsson, 1996). They stressed two main question on what to be done for the customer, and how to be achieved. By understanding the needs of customers in the market, it was possible that service provider will meet their objectives.

In today's competitive market, companies are increasingly recognizing the need to innovate with the engagement with their customers (Desouza et al. 2008). Customers play a role as co-producers or unpaid staff in order to receive service provided (Riddle, 2008a). Therefore, the importance of customers in the innovation process are undeniable (Gallouj & Djellal, 2001) because of their involvement in any changes made in the service firm somehow reflect their role as co-producer and their ideas are normally creative than the idea of experts (Magnusson, 2003).

2.6 Information Technology

In fulfilling National Mission, Malaysia has continuously become an innovation-led economy (MOSTI, 2007). It was stated that technology will be one of the factors that will ensure the accomplishment of National Mission as a whole (MOSTI, 2010). Therefore, there is a need to continuously explore and enhance the capability of information technology.

The meaning of information technology is quite dubious and confusing in literature. The terms IT, ICT, e-commerce, Internet, and e-business were used interchangeably by authors (Southern & Tilley, 2000). Information technology also can be viewed from different perspectives (Barba-Sanchez, Martinez-Ruiz, & Zarco, 2007). From economic and management viewpoint, information technology has been regarded as 1) a social construction, 2) an information provider, 3) an infrastructure (hardware and software), and 4) a business process and system. From a marketing point of view, information technology is considered as 1) a variety of separate applications (internet, databases), 2) a marketing channel, 3) a medium for communication or promotion, 4) a marketing technique, and 5) a tool for relationship marketing. For this study, focus on information technology is more through economic and management viewpoint.

A study explained that information technology is related to a wide array of technology, ranging from database programs to local area networks (Matlay & Addis, 2003). Small firms can use information and communication technology for both efficiency (cost and

time saving; doing things right) and commercial advantage (providing superior value; doing the right things). Information technology can affect the company throughout the value chain of the company, starting from procurement and link with suppliers, transformation processes, marketing, and culminating in distribution, including linking with customers (Regan, Ghobadian, & Gallear, 2006).

Information technology is important for services. The use of information technology will offer greater efficiency and effectiveness in the information processing elements that are prevalent to a great extent in services sectors. Furthermore, the use of information technology has been shown to provide a positive impact for service performance and to promote coordination on organizational performance (Sanders, 2008), as well as become a tool in building relationship with customers and employees (Thapliyal & Kautish, 2011).

Almost all organizations, either public or private, manufacturing, agriculture, or services companies use various types of information technologies to support their operations (Turban, McLean, Wetherbe, Bolloju, & Davison, 2002). According to Bessant and Tidd (2007) any services are heavily dependent and/or knowledge-based upon information technology. Improvements in computers and software for storing and sharing information have increased the capabilities for managing development and delivery process as well as conceiving of new kinds of services (Bessant & Tidd, 2007).

Adopting technologies may employ five stages; awareness, interest, evaluation, trial and adoption (Weber & Kauffman, 2011). Awareness stage is when someone starts to learn the existence of a new technology. The next stage happens when they start to gather information about the new technology. The third and fourth step is where they analyze and tries out the new technology. Finally, after the decision being made, they will adopt the technology. This process may go to any organization that tries to adopt technology in their companies (Weber & Kauffman, 2011).

Information technology has revolutionized the entire business world (Buhalis, 2004). Investments in information technology keeps growing (Weber & Kauffman, 2011) just to ensure the survival of the companies. Operations can be enhanced with the well-used of information technology which can improve productivity, management effectiveness and quality of services (Bayo-Moriones & Lera-Lopez, 2007; Gichoya, 2005).

Generally, there are four main types of information technology applications those were available for logistics and freight transportation companies (Perego, Perotti, & Mangiaracina, 2011), which including courier service. They can be classified as shown in Table 2.4.

Table 2.4
IT Applications in Logistics and Freight Transportation

Applications	Description
Transportation management (TM)	A decision support tools in transportation planning, optimization and execution. For example, in scheduling, tracking and tracing, payment and auditing.
Supply chain execution (SCE)	Manage and automate information exchange and real time management during the actual execution of distribution schedule.
Field force automation	Support the integration between remote workforce and corporate business process which enabled by mobile technology
Fleet and freight management	Reporting tools by logistics managers to monitor service times, travel times, delivery points visited, etc. a real time input to efficiently manage a fleet of vehicles during distribution.

Source: Perego et al. (2011)

A study by Hardaker, Trick, and Sabki (1994) investigate the key areas on how information technology has affected the patterns of competition within freight forwarding. They found that:

i. Customer awareness were increased due to information technology development.
ii. The cost of moving goods through electronic data interchange (EDI), tracking systems, invoicing, and others were reduced with the efficient computerization.
iii. Information technology speeds up analysis.
iv. Many manufacturers will only deal with agents who are computerized to their level.

v. Operating costs are reduced with the use of information technology.

vi. Information technology increases the demands on the industry, for example small transporters find it is difficult to satisfy clients' information needs.

vii. There is greater product and market awareness resulting in improved reactivity to market.

viii. Information technology gives a competitive edge.

As for the postal, courier and freight forwarder players, they need to invest in new technologies to improve efficiencies and effectiveness of the products. For example, the use of technologies like radio frequency identification (RFID) systems has further increased the importance and efficiency of their services. RFID technology can be regarded as an innovative process for a logistics company (Lin & Ho, 2009) and it has broad applicability and facilitate global commerce and spur innovation and competitiveness (Park & Park, 2006).

In addition, information technology also enabled many changes and developments in courier business (Tan & Neo, 1994). It has become an operational tool to achieve organizational goal. For example, the customer service as a focal point of service provider need to adopt a customer driven approach with regards its information technology and information technology applications related to customer service. Furthermore, innovative exploitation of information technology and advance in information technology is a critical success factor over the market challenges (Tan & Neo, 1994).

By looking at the studies done specifically on effect of information technology to organization performance, the results are mixed. One study by Johannessen, Olaisen, and Olsen (1999), suggests that information technology by itself does not encourage or discourage innovation. It is the people working in the organization that create innovation. Information technology is more or less like a tool to be used for innovation, since new technology can help companies to do things in a new or better way. Another study reflected that information technology use has a positive relation to innovation and performance, which is due to learning and adjustment, boosted by the maturity in using ICT by IT companies (Johannessen, Olaisen, & Olsen, 1999).

2.6.1 The Importance of Information Technology

Information technology is very useful and became a necessity for most of people around the world. It enables firms to change the way they interact and coordinate practices to improve performance (Bayo-Moriones & Lera-Lopez, 2007). For service-based companies, there are reasons why adopting information technology is crucial for improving their business. There have been demonstrably large performance gains in all major service industries using information technology and it has come to constitute the basis of economic development both at micro and macro levels (Spanos, Prastacos, & Poulymenakou, 2002). For example, the service sector in the United States received high performance payoffs by adopting information technology even during the period when it was most criticized (Quinn, Baily, Herbert, Meltzer, & Willett, 1994). To some extent,

they are willing to invest millions of dollars in developing something new to the market without knowing that it will benefit them or not (Malhotra & Galletta, 2004).

Information technology more typically causes an effect on the service dimensions, unless the technology itself is the essence of the product or service offering, for example the online auction service (Ritchie & Brindley, 2005). Moreover, it could provide a new or substantially improved benefit to consumers as well as improve firm' profitability (Riddle, 2008b).

A study in the UK carried out by Walker and Cheung (1998) list eleven importance of information technology in terms of intangible benefits. They include 1) job enhancement for employees, 2) improved external communication, 3) change through innovation, 4) improved internal communication, 5) improved product quality, 6) improving management information, 7) avoiding competitive disadvantage, 8) supporting core business functions, 9) more timely management information, 10) gaining competitive advantage, and 11) improved customer service. Out of the eleven listed, the use of information technology to support innovation and to improve the service are among the most important intangible benefits identified (Walker & Cheung, 1998).

Another example of the importance of information technology was by Founou (2002). He stated that internet related technologies have enabled rapid developments in three areas, namely e-commerce, e-global logistics, and intranet and employee services. Furthermore, information technology have a role in coordinating activities in logistics companies'

value chain and the development of information technology enabled the change in industry structure (Founou, 2002). For most companies, the emergence of technology and the support of large software firms such as Microsoft may further enhance the responsiveness of a supply chain network as suppliers and business partners can interchange information in a more diverse way (Lau & Lee, 2000).

The growth and importance of services have been directly influenced by advances in technology (Kandampully, 2002). However, information technology is like many other technologies which often takes years to decades for aggregated industry data to show positive payoffs (Quinn et al., 1994). As for postal and courier service, and logistics services as a whole, technology plays a crucial role especially in dealing with critical packages. Starting from receiving an order till the end of the process, companies should ensure that they could handle the delivery process as effective as possible to ensure customer satisfaction in terms of speed. Thus, customer will receive their package on time, as expected. Therefore, the role of information technology has been widely recognized in terms of the efficiency and effectiveness of the whole supply chain management (Wang & Yuen, 2010).

Information technology can be a tool for innovation. Service innovation occurs when information technology provides a greater and improved benefit to consumers as well as improve firm' profitability (Riddle, 2008b), improve efficiency, provide better quality of service delivery, and cost reduction (Gichoya, 2005). Thus, without information technology, service innovation hardly can be implemented.

As for the logistics industry, which postal, courier, and freight forwarder services are in, information technology has become the main enablers for improvements in efficiency (Kohler, 2005; Lai, Ngai, & Cheng, 2005). It offers a better and fast service, especially when the organization and customers are dealing with time (the need for quick response).

A qualitative study by Auramo, Kauremaa, and Tanskanen (2005) also support that information technology could streamline logistics flows, reduce inventory and improve customer service. Furthermore, it also became an important factor in providing good customer service that normally will affect delivery punctuality, timeliness, accuracy and the ability to offer tracking information (Perego et al., 2011).

In supply chain, information technology enhanced competitiveness in many ways. As shown in Table 2.5, the supply chain must be able to have a better transaction, communication and relationship management (Closs, 2007). For that, the applications of information technology would help in various ways and offer a great contribution to the organizations and the industry as a whole. For example, the use of Advance Planning and Scheduling System will help the organization to be more responsive to customers demand.

Table 2.5
Supply Chain Information Technology Applications

	Typical Applications	Application Focus	Contribution to Competitiveness
Transaction	- Enterprise Resource Planning (ERP) - Warehouse Management Systems (WMS) - Transportation Management Systems (TMS)	- Accuracy - Consistency - Economies of scale - Efficiency	Required to support business operations today
Communication	- Supply Chain Event Management (SCEM) - Radio-Frequency Identification (RFID) - Collaborative Planning, Forecasting and Replenishment (CPFR)	- Accuracy - Coordination - Speed of communication - Visibility	May maintain position relative to competitors but will not be a sustainable competitive advantage
Relationship management	- Customer Relationship Management (CRM) - Advanced Planning and Scheduling (APS)	- Customer relevance - Resource utilization - Responsiveness	Can provide extended competitive advantage by achieving more precise customer service capability and better resource utilization

Source: Closs (2007)

In addition, there are numbers of new applications or technologies that have an impact on the productivity of logistics services (as shown in Table 2.6).

Table 2.6
Technologies in Logistics

Technology	Description
RFID (Radio Frequency Identification Devices)	Electronic tags attached to consignments which allow real time tracking of movements and reduce the time needed to move, load and unload products
EIDO (Electronic Import Delivery Orders) EEDO (Electronic Export Delivery Orders) ESCM (Electronic Supply Chain Manifests)	Replacement of paper documents with electronic versions transmitted in real time

Table 2.6 (Continued)

Technology	Description
Optimization tools • Fuel optimisation • Route optimisation	Software that calculates the optimal route given fuel price, traffic, loads and destinations. Systems can also monitor the subsequent performance of vehicles and drivers.
Electronic Credentialing	In-vehicle transponders communicate with weigh stations and check points to pre-screen trucks for proper credentials.
Middleware	• A piece of software that functions as a conversion or translation allowing two separate software packages to integrate. • Allows multiple technology platforms to interact. • Can be rolled out to smaller players who cannot afford custom software.
Internet connectivity and portals	• Access to a common interface and marketplace to facilitate more efficient movement of freight. • Internet is ubiquitous allowing universal access. • Facilitates freight matching and other electronic transactions such as EIDO and payment mechanisms.

Source: SAHA (2008)

National Postal Strategy (2010) reported that there were numbers of scenario that will have a direct impact on Malaysia postal and courier service. One of them is technology and it has been said that technology continuously provide both positive and negative impacts to the sector. However, Gloet and Samson (2012) found that by investing heavily in information technology, it will give a promising influence to the performance.

Manufacturing industries that have invested heavily in information technology believed that it will be a key to a better restructuring process (Ark & Piatkowski, 2004). Information technology may therefore have been an important source of growth and in the long run, the impact of information technology on growth will have to come primarily from its productive use in services. Therefore, investment in information technology is proving to be a good indicator for a greater performance (Cainelli, Evangelista, & Savona, 2006; Walker & Cheung, 1998).

2.6.2 Information Technology Capability

Information technology capability defined as the firm's ability to resemble, mobilize, integrate and deploy information technology based resources in combination with other resources and capabilities (Bharadwaj, 2000; Chen & Tsou, 2012; Ross, Beath, & Goodhue, 1996). The measurement of information technology capability covers the relationship of the information technology department with the rest of the business (Heijden, 2000). Furthermore, Bharadwaj (2000) broadened the explanation of the accepted views of information technology capabilities to an organization's information technology function.

According to Lai et al. (2008), information technology capability is a top three factor in the performance of third party logistic providers and one of the three main ongoing problems with third party logistics providers reported by logistic users. Information technology has the greatest impact for logistics service provider with the increasing

demand for logistics since they are shifting from low-value basic services to high value-added services. For example, web-based technology is playing an increasingly important role in accommodating the business needs of logistics users (Langley, 2007).

For this study, information technology capability defined as the ability to deploy information technology resources to the relationship between service innovation and service responsiveness (Bhatt & Grover, 2005). This study used two dimensions of information technology capability that adopted from Tippins and Sohi (2003) known as information technology knowledge and information technology operations. Information technology knowledge concern with the extent to which a firm possesses a body of technical knowledge about objects, such as computer-based system. It encompasses professional qualification, expertise and skills. Knowledge in programming, system analysis and design are crucial to be competence in emerging technologies. Meanwhile, information technology operations include information technology functions, coordination and interaction with the user community. It was conceptualized as the extent to which an organization utilizes information technology to manage market and customer information.

2.7 Moderating Effect of Information Technology Capability

The role of information technology capabilities in enhancing performance is well established in the literature. Various studies suggest that information technology capabilities provide a basis of gaining competitive advantage and enhancing

organizational performance (for example Bhatt & Grover, 2005; Santhanam & Hartono, 2003; Yongmei, Hongjian, & Junhua, 2008). An extensive body of information technology capabilities literatures agrees that information technology capabilities are resources to facilitate an effective collection and utilization of information (Bharadwaj, 2000). Floyd and Wooldridge (1990) contend information technology capabilities enhance service reliability, reduce transaction errors and increase consistency in performance.

Information technology capabilities by themselves are ineffective at providing a basis for sustainable competitive advantage because capabilities can be duplicated (Huang & Liu, 2005; Tippins & Sohi, 2003). There was an evidence that information technology capabilities result in world class performance, and there were also numerous examples where information technology extensions have wasted firm resources (Closs, Goldsby, & Clinton, 1997). Thus the impact of information technology on firm's performance cannot be measured directly, but can only be quantified by examining the indirect effect. Therefore, this study used information technology capability as a moderator between service innovation and service responsiveness.

2.8 Underpinning Theory: Resource-based View (RBV)

The resource-based view focuses on what firms can do to compete based on its internal sources (Hitt, Ireland, & Hoskisson, 2001). Resources are input into a firm's production process. Most researchers have made a categorization of resources to improve

comprehensiveness of the resource identified. Mills, Platts and Bourne (2003) used the categories:

- tangible resources,
- knowledge resources, skills, and experience,
- system and procedural resources,
- cultural resources and values,
- network resources, and
- resources with potential dynamic capability.

Meanwhile Fahy (2000) identified three types of resources: tangible, intangible, and capabilities. The tangible resources include financial, organizational, physical, and technological resources. Intangible resources are such as human, innovation, and reputational resources. Capabilities are the firm's capacity to deploy resources that have been purposely integrated to achieve a desired target. They are often developed in specific functional areas such as management, manufacturing, marketing, and research and development (Hitt et al., 2001).

According to Barney (1991), RBV suggests that the possession and development of a set of heterogeneous resources leads a firm to establish a competitive advantage over its competitors in the marketplace. Firms can achieve a competitive advantage based on resources that are firm-specific, valuable, rare, imperfectly imitable and not strategically substitutable by other resources. Employee skills, capital equipment, and patents are

examples of resources into a business process that will contribute to the firms' competitive advantage.

As mentioned earlier, there are three types of resources: tangible, intangible, and capabilities. This study focused on the intangible resource because it will rely on the human factors (for example, individual that involve in the service delivery and salesperson) and innovation which is needed in new service development. This research examined the relationship of service innovation determinants, service innovation and information technology capability (which can be classified as resources) for operational performance (service responsiveness which is the outcome).

2.9 Research Framework

The research framework of the study was derived based on the previous research as discussed before. The main aim of the study was to investigate the relationship of the service innovation determinants, service innovation and service responsiveness (operational performance). In addition to that, information technology capability has been used as a moderating variable. Figure 2.9 shows the overall framework for this study which illustrates the relationship between each variable.

The independent variables for this study were the determinants of service innovation which refers to business and market intelligence. The service innovation consisted of four main items: (1) service technology, (2) service concept, (3) service delivery system, and

(4) customer service interface. The dependent variable was the operational performance, which refers to the service responsiveness. It will be based on how the organization being responsive to the customer during the service delivery. Information technology capability serves as a moderator for this study.

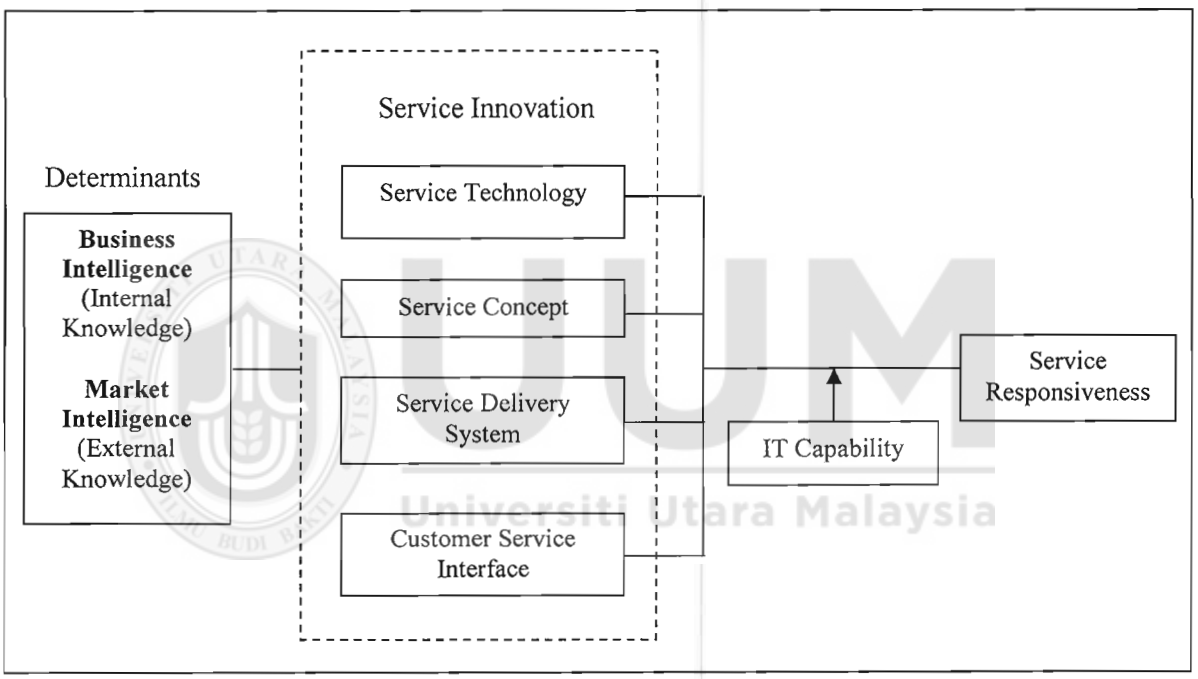

Figure 2.9
Theoretical Framework of the Study

2.10 Postulated Hypothesis

This section explains the relationship between the variables of the study. The explanation will end up with hypotheses postulated to answer the research question in this study.

2.10.1 The Determinants and Service Innovation

In the labor-intensive and interactive service, the actual service providers and the service staff are playing critical role in determining the innovation level and customer experience (Chen, 2011). The adjustment of human capital skills is roughly equal to efforts in successful innovation implementation (Bharadwaj, 2000; Chen, 2011). In addition, the presence of customers is necessary for services during the service delivery. The way service companies interact with customers and work toward satisfying customer would offer a great opportunity in improving performance (O'Cass & Ngo, 2011).

The interaction in the service delivery system helps the companies to gather information from the multiple sources either from internal or external (mainly supplied by the customers) and analyze it in order to make all strategic decisions. This is known as business intelligence. Business intelligence helps to improve business by providing actionable information for decision making. Therefore, this study utilized business intelligence as one of the important determinants in the innovation process.

Market intelligence for this study refers to the customers and suppliers. Customers were directly involved in co-creating the new service (Jaw et al., 2010), therefore they have an impact to the service innovation that happens in the companies or service firms (Verhees & Meulenberg, 2004). Based on the above statements, the following hypotheses were proposed for this study.

H_1: Business intelligence is positively related to service innovation

H_2: Market intelligence is positively related to service innovation

2.10.2 Service Innovation and Service Responsiveness

Prior studies on service innovation has shown that the service innovation (Menor et al., 2002) and the firm's new service development process (Sundbo, 1997b) would achieve greater organizational performance. A study by Chen and Tsou (2006) also supported that the service innovation of a firm would be influenced by the innovation of its process, product, and market.

A longitudinal study by Cainelli, Evangelista, and Savaona (2006) has explored the relationship between innovation and economic performance in services. The results of the study showed that innovation has a positive relationship with past economic performance. The innovation activities have a positive impact on the growth and productivity as well (Blumberg, 1994; Tajeddini, 2011). In addition, the economic performance was found

better due to productivity and innovation, which acted as a self-reinforcing mechanism. These findings showed the endogenous nature of innovation in services.

A well-functioning service is critically important for organizational performance. According to Dorner et al. (2011), service innovation is also a decisive competitive factor. Service innovations were found to have significant influence on the firm's performance, thus, the next research hypothesis was proposed as below:

H_3: Service innovation relates positively to service responsiveness

2.10.3 Moderating Effect of Information Technology Capability

Innovation often demands substantial investment and there will naturally be reluctant to commit finances or investment to something that offers no firm guarantees. Therefore, this study examines the effect whether information technology is needed to be adopted since adopting something new may cost such a big investment. In addition, Lopez-Nicolas and Soto-Acosta (2010) stated that inappropriate use of information technology cannot improve organizational performance. By having information technology in an organization is not sufficient if it is not managed efficiently.

A higher expenditure on research and development is associated with a greater performance (Oke, 2007; Ting, Hsu, Wang, & Wang, 2011). Information technology also has been said to have generated an increased levels of uncertainty (Ritchie & Brindley,

2005). Thus information technology capability also can give an impact to the organizational performance (Sirirak, Islam, & Khang, 2011; Zhang, Donk, & Vaart, 2011). Hence, the following hypothesis was formulated:

H_4: Information technology capability moderates the relationship between service innovation and service responsiveness.

2.11 Chapter Summary

This chapter has reviewed the literature related to the variables for this study. Gaps within the literature and studied variables have also been identified. The underlying theory that explained the criterion variables in this study have been taken into account and properly discussed. Based on the literatures and theory, research framework for this study were formulated and presented. Finally, hypotheses have been postulated, based on the literature review and derivation of relationships among the variables.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This study aims to examine the relationship among determinants of service innovation (business intelligence and market intelligence), service innovation (service technology, service concept, service delivery systems, and customer service interface) and the service responsiveness (operational performance). In addition to that, the effect of information technology capability was tested as a moderator between service innovation and service responsiveness. Hence, this study applied quantitative approach in testing the hypotheses of the study and further measured these relationships through statistical techniques using SPSS for descriptive analysis and PLS-SEM for establishing the measurement and structural model.

The current chapter describes the flow of the research procedure, and then explains the research methodology in details through providing insights to the research design and the measurement of variables. This chapter has been segmented into the following sections:

- philosophical justification
- research design,
- measurement of variables/instrumentation,
- data collection,
- sampling and procedures, and
- data analysis.

Furthermore, steps in analyzing measurement model are presented, and concluded with chapter summary.

3.2 Philosophical Justification

Decisions in a research should be based on the knowledge claims or philosophical justifications or paradigms that underpin overall decisions at every stage of research. The worldviews represent the belief of researches that guide inquiries (Cresswell, 2009). In relation to this study, it used post-positivist ontology to drive the entire decisions within the quantitative method applied. Adapted from Cresswell and Plano Clark (2011) and Cresswell (2009), Table 3.1 addressed the features of post-positivist worldview guiding the quantitative phase for this study.

First, post-positivist hold a deterministic paradigm which is cause and effect oriented. Relevant to this study, it was needed to assess the determinants that influencing service innovation and service innovation that influencing service responsiveness. Meanwhile, the second feature is reductionism intends to reduce a big idea into a number of small ideas to test, such as a variable containing several dimensions. This is because post positivist assured that the problems as a whole are better understood if they are reduced into the simplest possible elements. In relation to this study, it attempts to examine the relationships between constructs and all of the constructs consisted of small dimensions. For instance, service innovation itself may have many other perspectives or dimensions,

but for this study, it has been reduced and focused to only four dimensions that suits the service innovation nature.

Table 3.1
Features of Post-positivist Ontology

Features	Based on this study
Determinism (cause and effect oriented, and based on pre-determined theory)	• concern to the impact of determinants on service innovation • concern to the impact of service innovation on service responsiveness • use of theory to construct and relate the variables
Reductionism	Focused on four dimensions in service innovation.
Measurement	Emphasized on empirical data collection. Survey was used for this study.
Theory Verification	Tested the framework generated from theory.

Source: Developed for this study and adapted from Cresswell and Plano Clark (2011) and Cresswell (2009).

The knowledge gained from the post-positivist worldview is based on objective measurement and observations. In relation to this study, researcher advanced the relationship between variables and posed it in term of hypotheses. Subsequently, the objective was assessed by using a set of questionnaire. Finally, collected data were tested and necessary revision and suggestions were made. Based on the features of post-positivist and its suitability with the features of the current study, the application of post-positivist was appropriate.

3.3 Research Design

Research design explains the main scientific guideline for conducting research. It specifies the necessary procedures to get all the required information to achieve the research objectives. In the process of choosing the suitable research design, a few concerns were considered. They included the type of study, type of data the researcher needed, population background, and sampling techniques that will reflect the credibility of the data, and a suitable scientific research approach towards answering the research question correctly.

The current study tested the link between determinants of service innovation, service innovation, and service responsiveness as operational performance. Additionally, information technology capability was also tested as a moderator between those two main variables. Data for this study were gathered by using the survey method. A survey method is ideal because it can generalize the population within a shorter period and at the same time allow researcher to cover a wider geographic area. Survey method also allows researchers to collect data from numbers of respondents at lower cost and less time consuming than other method.

Studies can be categorized into three types: exploratory study, descriptive study, and hypothesis testing (Sekaran, 2000). This study was a descriptive study and hypothesis testing type where the aim of this study was to investigate the relationship between the four variables. Descriptive study identifies the characteristics of the population of

respondents and organization, while hypothesis testing and path analysis approach explains the relationship between the variables and the variance of the dependent variables.

3.4 Measurement of Variables/Instrumentation

The questionnaire was designed based on information gathered from an extensive review of literature on the determinants of service innovation, service innovation, information technology capability and service responsiveness. Surveys and questionnaires are powerful research tools to create meaningful data through correct construction, implementation, and management of research tools (Slattery et al., 2011). Questionnaires refers to a specific tool, also known as an instrument for gathering information through series of questions and are usually self-administered.

This study employed a self-administered questionnaire as data collection instrument. The number of items or statements in the questionnaires were anchored using a seven-point scale ranging from 1 which indicates 'strongly disagree' to 7 which indicates 'strongly agree'. The scales were intended to be used as a measurement of a variety of latent constructs, especially for the social science research. In this study, the respondents' perception of the current processes and practices in the organization was captured.

The design of questionnaires for this study was divided into five sections. A cover letter attached as an introduction or an overview of the study. In addition, it was stated that data

gained from respondents are strictly confidential, in order to convince respondent to participate (refer Appendix 2). Five sections of the questionnaire are as follows:

a. Section A is for general information of company and respondent's profile.
b. Section B meant for the measurements for service innovation determinants (business intelligence and market intelligence).
c. Section C is to measure service innovation variables which consist of service technology, service concept, service delivery system, and customer service interface.
d. Section D measures the moderating factors which is information technology capability which consist of two dimensions: IT knowledge and IT operations.
e. Section E measures the dependent variable, service responsiveness.

Background information of the respondents were asked at the first section to help respondents to get started comfortably. For Section B onwards, respondents were asked to circle the response from among the list provided that best reflects their perceptions. The questionnaire used for this study attached in Appendix 3.

3.4.1 Measures of Service Innovation Determinants

Measures for business intelligence variables were based on knowledge of employees, managers, and other internal sources of the companies that drives service innovation (Chen, 2011). The items includes:

- Employees are valuable to the company.
- Employees have sufficient knowledge of the organizations' operation.
- Companies have space/medium for employees to point out their opinion.
- Managers are able to consider the lower level employees' opinions for the benefit of companies.

Measures for market intelligence were based on the information/knowledge gained from customer's feedback and suppliers which became the input for service innovation (Chen, 2011). The items includes:

- Meets customers regularly.
- Conducts related market research.
- Detect changes in consumers' preferences.
- Polls customers at least once a year.
- Detect fundamental shifts in industry.
- Frequently review the effect of changes in the business environment on customers.
- Customer feedbacks are taken into account for the company's innovation plan.
- Suppliers have an influence in the company's decision making.

3.4.2 Service Innovation Measures

Items for service innovation variables were based on the combination of four dimensions of service innovation as suggested by Hertog and Bilderbeek (1999) as well as the

integrated service innovation model proposed by Qiang et al. (2010). Those items includes:

i. Service Technology Innovation

- The service requires the installation of new software to the company.
- The service requires the installation of new hardware to the company.
- The service was supported by innovative technology.

ii. Service Concept Innovation

- The service was totally new to the market.
- The service offered new features.
- The service requires a change in customer buying behavior.
- The service was totally new to the company.
- The service allowed the company to enter a new market.
- The service supplemented on existing product line.
- The service created a new product line for the company.

iii. Service Delivery System Innovation

- Employees were well trained to deal with customers.
- Employees are able to handle the operations excellently.
- Companies offer door to door service.

iv. Customer Service Interface Innovation

- Customers are able to know where their parcel/goods are (track and trace).
- Customers are provided with medium for them to check their parcel's status either through online or help desk.
- Repeating customer will have an extra advantage (membership or offering additional service at no cost).

3.4.3 Information Technology Capability Measures

Information technology capability measured by using two dimensions by Tippins and Sohi (2003): IT operations and IT knowledge. IT operations items were:

- The company are linked to their network through WAN.
- The company technology based links via LAN is efficient 24/7.
- The company computer link system down time is minimal.
- The company has computerized all its operations.
- The company IT policy is in line with regulatory guidelines.

Meanwhile, dimension of IT knowledge was measured by:

- The operations staff is knowledgeable about ICT operations.
- The staff of IT department are qualified for the job.
- The IT networking engineers are professionally qualified.
- The staff are proactive in innovation effort in the company.
- The staff attend training courses regularly.

3.4.4 Service Responsiveness Measure

Items for service responsiveness were adapted from Tiedemann, Birgele, and Semeijn (2009). They includes:

1. Needs of different customer groups drive new service development activities in the firm.
2. When the company finds out that customers are unhappy with the quality of products/services, company will take corrective actions immediately.
3. The frequency company makes use of a formal program where company meet with customers to determine their service needs.
4. The frequency company makes use of a formal program in which company asks customers for feedback on practices or policies.
5. The frequency company involved in a formal internal process in which company examines service and quality levels.
6. Ability to provide speedy service.
7. Delivering service on time.

Table 3.2
Summary of Variables and Measurement of Instruments

Construct	Dimensions	Source	No. of items	Definition
Determinants of Service Innovation	Market Intelligence	Chen (2011)	8	The degrees of activities that focus on obtaining information on customer needs and their knowledge that drives innovation.
	Business Intelligence	Chen (2011)	4	The degrees of activities that focus on obtaining information within organization that drives innovation.
Service Innovation	Service Technology Innovation	Hertog and Bilderbeek (1999)	3	The degree of activities that focus on the technological part of the innovation in service
	Service Delivery System Innovation	Hertog and Bilderbeek (1999)	3	The degree of innovation activities that took part in service delivery
	Service Concept Innovation	Hertog and Bilderbeek (1999)	7	The degree of activities that related to the service concept innovation
	Customer Service Interface	Hertog and Bilderbeek (1999)	3	The degree of activities related to customer service interface
IT Capability	IT Operations	Tippins and Sohi (2003)	5	The degree of operations using IT
	IT Knowledge	Tippins and Sohi (2003)	5	The degree of knowledge on IT
Service Responsiveness		Tiedemann et al. (2009)	7	The degree of actions taken by the service company to response to customer

Source: Develop for this research

3.4.5 Validity and Reliability of Instrument Measures

A pilot study was performed before the main study in order to ensure validity and reliability of the instrument. The feedback was mainly used to adjust and improve the content of the questionnaire. Specifically, the pilot study was carried out to:

i. determine the reliability and content validity of the questionnaire,

ii. familiarise the researchers to the environment of the research before collecting data for the main research,

iii. project any challenges during the data collection.

The questionnaire was subjected for improvement of its validity and reliability. Validity concerns with whether or not the measurement of the study measured its intended concept. In other words, validity was tested to ensure that the instrument measure what it was supposed to measure. This study employed two methods of validity; content validity and construct validity. Content validity is the representatives of the instrument in measuring the variables and the content measured instrument (Sekaran, 2003). The choice of measurement instruments used in this study was derived based on an extensive literature of the past research. Thus, the high degree of content validity for the instrument was granted.

To further ensuring the validity of the construct, a series of discussion with experts was also carried out during the development of the questionnaire. The questionnaire was also assessed with three managers of courier companies for the purpose of questionnaire

validation. Appointments were set with the managers for the interview session. All companies were from the northern region of Malaysia. During the interview session, those managers evaluated and provided specific comment on the clarity, understanding, bias and ambiguous questions, as well as the wordings, sequencing and time taken to answer the questions. The pre-test result indicated that some wordings need to be clarified for better understanding of the content. Hence, based on the feedback from the managers, the changes were made accordingly to improve the content of the instrument.

On the other hand, construct validity is the degree to which the measured construct confirm the relationship of hypothesis generated from the theory based on the concept (Zikmund, 2000). In ensuring a high degree of construct validity, the entire construct for this study was defined in the conceptual stage. Then, these constructs were operationalized and hypotheses were developed to examine the relationship among variables.

Reliability is defining the consistency of the measurement and the degree of the instrument reproduces the similar result if the same conditions apply over the time. (Sekaran, 2003; Zikmund, 2000). Generally, there are three types of reliability test (Zikmund, 2000).

i. Test-retest method: needs the exact instrument to be tested to the same respondent at two different points in time.

ii. Equivalent forms or alternate form method: requires two different, but close to equal forms of administering to the same respondent around the same time.

iii. Split half method: measures the internal consistency of the instrument by dividing into two halves and checked the consistency of the result.

The test-retest method had been criticized because respondents may be influenced by the first test when answering the second test (Zikmund, 2000). Furthermore, there will be a change in attitude of the respondents if the period of time in administering the first and second test is too long. Meanwhile, the equivalent methods also been criticized because it is time consuming and costly since the researchers need to prepare two equivalent forms of instruments which need to have the same measurement of content and the number of items and also almost similar size mean and standard error.

For this study, the Cronbach's alpha was tested to measure the internal consistency reliability. The scores of Cronbach's alpha around 0.60 was considered to have an average reliability standard. Meanwhile, the score of alpha above 0.70 indicated that high reliability standard of the measured instrument (Sekaran, 2003).

3.5 Data Collection

3.5.1 Unit of Analysis

Unit of analysis is related to the type of unit used in data measurement and type of analysis carried out in the study. Based on the objective of this study, the unit of analysis of this study is the organization whereby a survey method was used for data collection from the respondents at various management levels. The target respondents were derived

from various managers who are knowledgeable and have vast experience in the operations of the company at various levels.

Specifically, the questionnaires were intended for managers who involved directly with the operations in postal and courier and freight forwarder companies. The rational for choosing these respondents as the source of data collection was based on the earlier work by Phillips (1981), who stressed for reliable source of information from higher ranking informants than their lower ranking counterparts. For the purpose of this research, the respondents were chosen because they were considered to be key employees in the operations and thus would be familiar with the core elements of the service provided.

3.5.2 Sampling

The sampling process of this study had started with the identification of target population. Population is defined as those interest group of people or organization that is to be studied (Sekaran, 2003). Due to time and cost constraints, sampling was done in quantitative research such as the current study, to closely represent characteristics in a larger population (Neuman, 2009). The target population for this research comprised of the postal and courier service and freight forwarder companies in Malaysia.

It was a challenge to the researcher to have a reliable sampling frame for this study because there was no official directory of companies that involved in the postal courier and forwarder industry. As a solution, the sampling frame for this study was derived from

multiple sources, namely the companies listed by Malaysian Communications and Multimedia Commission, Companies Commission of Malaysia (CCM), and Federation of Malaysia Freight Forwarder (FMFF).

3.5.3 Data Collection Procedures

As mentioned earlier, a pilot test was carried out through interview with experts to ensure the understanding of the questionnaire by the respondents as well as to increase the content validity of the measurements in the questionnaire. The interview was an initial step to understand better the current situation from the practitioners in the industry.

Next, the revised self-administered questionnaire that resulted from the pilot test was used to collect the needed data for the study. In addition, electronic survey and email were also used for data collection. For this study, both electronic and mail surveys used to encourage participation from the respondents. Respondent received both electronic and mail surveys, and then it is their option to reply by using mail or electronic survey to give the feedback.

Initially, the printed booklets were mailed to the respondents accompanied by a cover letter indicating the objectives of the study and the assurance of the confidentiality of the survey. After three weeks, follow-up calls were made asking for their participation in the survey.

3.6 Techniques of Data Analysis

This study used the structural equation modeling (SEM) for data analysis. The SEM approach is useful in the behavioral and social sciences when many constructs are unobservable (Sharma, 1996). SEM enables for assessment of the uni-dimensionality, reliability and validity of constructs of the study. In addition, another advantage of SEM is that it offers a simultaneous of overall test of model fit and individual parameter estimation (Hair, Anderson, Tatham & Black, 1998; Kline, 2005). SEM has recently becoming a more common statistical method for analysis in the academic research. Moreover, the past literature has also acknowledged the role of SEM as the best statistical method for multivariate data analysis (Hershberger, 2003). SEM allows for a simultaneous testing and investigation of the hypothesized relationships between variables (Byrne, 2001).

3.6.1 Descriptive Statistics

Descriptive statistics measures such as mean, standard deviation, and percentage of all the variables, were carried out to obtain data for major variables of the study. Descriptive statistics quantitatively describes the main features of the data. Unlike inferential statistics or inductive statistics, descriptive statistics summarize a sample, rather than use the data for learning and gaining knowledge of the targeted population. In other words, the probability theory was not the basis for descriptive statistics development. Moreover,

descriptive statistics are always used with inferential statistics to draw conclusions in the research.

Descriptive statistics can also be viewed as a set of brief descriptive coefficients that sum up a given data set that characterized the entire population or a sample. The measures such as measures of central tendency and measures of variability or dispersion are common examples of descriptive statistics used in the research. Measures such as mean, median and mode are measures of central tendency, while measures such as the standard deviation (or variance), the minimum and maximum variables, Kurtosis and Skewness are examples of measures of variability.

3.6.2 Factor and Reliability Analysis

Factor analysis was carried out for the purpose of data reduction and validity testing. It explores and investigates the underlying structure of the interrelationships among the variables into a set of common underlying dimensions. Thus, separate dimensions can be determined and each variable can be identified associating with a particular dimension. In addition, factor analysis can be used to describe variability among observed correlated variables in terms of lower number of unobserved variables called factors. In other words, there is a possibility that variations in three or four observed variables, mainly replicate the variations in fewer unobserved variables.

Factor analysis looks for the possibility of combining related variations in response to unobserved latent variables. The observed variables are grouped into linear combinations of the potential factors, in addition to the "error". The result of the analysis on the interdependencies between observed variables is later used for data reduction. This data reduction technique is similar to a low rank approximation of the matrix of observed variables. Factor analysis has been widely used in the areas of the behavioral sciences, social sciences, marketing, product management, operations research, and other applied sciences that deal with large quantities of data.

Further, reliability test was performed to measure the consistencies of the construct. The reliability refers to the extent of consistency of the measures across time and the various items in the questionnaire (Sekaran, 2000). Some of the variables which distort the validity of the variables will be removed to increase its consistencies and reliability of the findings.

3.6.3 Data Analysis using SEM

Data collected from the surveys, as mentioned earlier, were analyzed using SEM. SEM is used to model the causal relationship between variables by including all the variables that are known to have some involvement in a study (Byrne, 2010). SEM is a confirmatory multivariate analysis technique that involves hypothesis testing, when most multivariate analysis is for descriptive or exploratory research.

Moreover, the variables involved are termed differently in SEM. In such manner, the independent variables are referred as exogenous, whereas the dependent variable are known as endogenous variables. The SEM terminology used in the context of this study is shown in Table 3.3 below.

Table 3.3
SEM Terminology for Studied Variables

Variable	Variable Measured	Dimensions/ *Latent constructs*
DV *endogenous*	Service Responsiveness	
IV *exogenous*	Service Innovation Determinants	Business Intelligence Market Intelligence
IV *exogenous*	Service Innovation	Service Technology Service Concept Service Delivery System Customer Service Interface
MV *exogenous*	IT Capability	IT Knowledge IT Operations

Source: Developed for this study.

3.6.4 Hypotheses Testing

The study analyzed collected data to investigate the relationships between endogenous and exogenous variables for structural model development. This study used the partial least square-structural equation modeling (PLS-SEM) which was deemed as the most suitable tool to achieve the research objectives and most appropriate to the research data

conditions. As a matter of fact, the PLS-SEM is equivalent to multiple regression analysis (Marcoulides, Chin, & Saunders, 2009) in terms of their objective which seeks for maximization of the explained variance in the dependent construct.

According to the guidelines provided by Hair, Hult, Ringle, and Sarstedt (2014), there are certain criteria that must be addressed by the researcher prior to the selection of the PLS-SEM as the chosen method of analysis. The first criterion is related to research goals. If the research goals are to target key predicting construct or identify key drivers, the PLS-SEM is suitable. For example, this study identified the determinants as a key driver for service innovation. Thus, PLS-SEM was the most appropriate technique to analyze the data.

The next criterion for using PLS-SEM depends on the nature of the research. It is either exploratory in nature, an extension of the existing structural theory, or confirming the theory. PLS-SEM was the appropriate way to do the analysis for exploratory research and theoretical extension. If the goal is to confirm the theory, the covariance based (CB) SEM is a better method.

The third criterion that require attention before deciding on using PLS-SEM is to check the measurement model specification. PLS-SEM works best on a reflective model, even though the formative model is also applicable. Theoretically, the variables involved in the study were reflective constructs, making the study suitable for the PLS-SEM techniques. The fourth criterion is mainly related to the model complexity. Hair et al. (2014)

indicated that the complexity of a model also influences the method of analyzing the data, which in this case, PLS-SEM is more suitable approach.

3.7 Analyzing Measurement Model

Validity test was required in this study for the purpose of validating the instrument used to ensure the instrument really measure what it had to measure. Basically, validity is defined as to what extend an instrument being studied is accurate, and the result from the analysis can be used (Hair, Black, Babin, & Anderson, 2010). Validity also used to assess if a 'measure' or 'scale' has measured the concept accurately (Zikmund, 2003). In this research, three types of validity were tested: content validity, discriminant validity, and convergent validity.

3.7.1 Content Validity

The validity of the content is a method of validation used to determine to what extent the instrument measures the concept under study. Apart from referring the past relevant literatures, the content validity of the instrument was assessed through the face validity in the hope to see whether or not the used instrument measured what it supposed to measure. Face validity was conducted by means of asking for comments and opinions from experts in the field of logistics.

Additionally, this research has undergone face validity by referring to academic members and industrial practitioners. Academicians commented more on the suitability of the construct, sentence structure, and to what extent the concept measure the concept. For the practitioners, they have provided feedback with respect to the suitability of the concept from the industry perspective.

3.7.2 Discriminant Validity

Discriminant validity refers to the degree to which constructs used in the instrument did not have any high correlation with other constructs of the study. In the process of assessing the discriminant validity, factor loadings obtained from each item were summarized into pattern that explained the correlation from smallest to largest value between instruments that measures a construct. The factor loading values also reflect the strength of the relationship between items in a particular construct.

3.7.3 Convergent Validity

Convergent validity is another type of validity methods where multiple items are used to measure a concept to be confirmed. As suggested by Hair et al. (2010), convergent validity was assessed by analyzing the value of factor loadings, composite reliability, and average variance extracted (Dolan et al., 2008) on certain thresholds. To confirm the convergent validity of the research instrument, the value of

factor loading for each item must exceed 0.50, composite reliability value above 0.70, and AVE value must also exceed 0.50 (Hair et al., 2010).

3.7.4 Construct Validity

In the context of current study, a confirmatory factor analysis was utilized to determine the significance of the observed items related to each of the latent variables. This relationship was described by the loading factor of a construct. The value of factor loadings, representing by the validity coefficient from CFA, provides indication of the construct validity of the latent variables. The huge benefit of using CFA was due to its ability to measure the validity of the constructs of the proposed measurement model. Therefore, construct validity is, in fact, made up of convergent validity (factor loading, variance extracted and reliability) and discriminant validity. Table 3.4 summarizes the acceptable results from aforementioned analysis.

Table 3.4
Acceptable Level for SEM Analysis

Analyses	Reference	Acceptable level
Average Variance Extracted	Bagozzi & Yi (1988)	Should be more than 0.5 for adequate convergent validity.
Composite Reliability	Gefen, Straub & Boudreau (2000)	Should be more than 0.70 to indicate adequate convergence of internal consistency.

Table 3.4 (Continued)

Cronbach's alpha	Nunnally (1978)	Should be 0.7 or higher to show convergent adequacy or internal consistency of measures.
	Sekaran (2010)	Minimum acceptable level was set at 0.60.
	Larcker (1981) Ary *et al.* (1996) Blaikie (2003)	Could have lower value of 0.50 which is acceptable for factors that contain only two or three items but is theoretically meaningful with the conceptualization of the construct under study.
Discriminant Validity	Chin (2010) Chin (1998) Fornell & Larcker (1981)	Square root of the AVE should exceed the inter correlations of the construct with the other constructs in the model.

3.8 Chapter Summary

Chapter 3 discussed the methodology applied in the research and the justification of methods. It generally overviewed the suitable research methodology aligned with the research objectives of the study. In addition, the methodology chapter also includes specific sections on the research design, sampling method, data collection method, questionnaire measurement and development and methods of data analysis.

CHAPTER FOUR

ANALYSIS AND RESULTS

4.1 Introduction

This chapter provides the detail outcome of the study, which includes the background information of the respondents, results from the statistical analysis, and results of the hypothesis testing. The report on these sections was based on the data gathered from the respondents through the returned questionnaires. The returned data was then analyzed using one of the SEMs tools, which is commonly known as partial least squares (PLS). SmartPLS 2.0 statistical package software was utilized for path modeling. This chapter is outlined as follows. First, the demographic profile of the respondents was presented followed by the goodness of measure part, in which the measurement model validity was established. Next, the validation of the hypothesized structural model was also performed to confirm the final outcome of this study. Finally, a short summary of the chapter is provided in the end of the chapter.

4.2 Response Rate

In the beginning, a total of 500 questionnaires were sent by mail to the courier and freight forwarder companies in Malaysia. Nevertheless, only 80 sets were returned. From the 80 sets of the replied questionnaire, only 65 sets could be used for further analysis. A total of

15 questionnaires were discarded because they were not completely filled by the respondents. All the respondents were from the targeted group which was a logistics service provider consisted of courier and freight forwarder companies.

4.3 Profile of the Company

Demographic data were collected to develop profiles of companies, including ownership, years of operations, the core activities of the companies, number of employees in the company, and positions in the company (referring to responsible people answering the questionnaire).

The finding showed that 80 percent of the companies were from Malaysia, while the remaining were foreign companies. The details of company ownership are presented in Table 4.1.

Table 4.1
Company Ownership

Country	Frequency	Percent (%)
Malaysia	52	80
Foreign	13	20
Total	**65**	**100**

The demographic question on number of employees has been classified in three categories. The findings showed that 54 percent of the companies had less than 50 employees, 11 percent with employees ranging from 50 to 100 employees, and 35 percent of the companies that had more than 100 employees (as represented in Table 4.2).

Table 4.2
Number of Employees

Number of Employees	**Frequency**	**Percent (%)**
Less than 50	35	54
Between 50 to 100	7	11
More than 100	23	35
Total	**65**	**100**

This study targeted two main players in logistic service provider and the respondent were: 33 percent from freight forwarder companies and 67 percent from postal and courier companies (as presented in Table 4.3).

Table 4.3
Company's Core Activities

Activities	**Frequency**	**Percent (%)**
Freight Forwarders	21	33
Postal and Courier	44	67
Total	**65**	**100**

The questionnaire was answered by three level of management. The result as in Table 4.4 showed that 45 percent were from the middle level management, 38 percent were from the top level management and the remaining 17 percent were from the lower level management.

Table 4.4
Position in Company

Position	**Frequency**	**Percent (%)**
Top level management	25	38
Middle level management	29	45
Lower level management	11	17
Total	**65**	**100**

The demographic question on years of operation provided respondents with seven answer options. It was found that the big portion or 26 percent of companies at the point of the survey have been operated from 20 to 24 years in the industry. 20 percent of the respondents had been in operations between 5 to 9 years and 15 to 19 years of operations. Two categories, 10 to 14 and over 30 years of operations were 12 percent. The remaining 10 percent were for the categories of less than 5 years and 25 to 29 years. The details of the findings illustrated in Table 4.5.

Table 4.5
Years of Operations

Years	Frequency	Percent (%)
Less than 5 years	3	5
5 to 9 years	13	20
10 to 14 years	8	12
15 to 19 years	13	20
20 to 24 years	17	26
25 to 29 years	3	5
30 years and more	8	12
Total	**65**	**100**

In summary, the profile of respondents in this study depicted to some extent the validity of each response in evaluating the interested variables with respect to the variables measured for the study. Having confirmed the validity of the source of responses (including the issue of generalization) the data set collected for this study was considered as acceptable and applicable for further analysis.

4.4 Data Screening

Data screening is a process that employs different methods to analyze the data to ensure its reliability, usability and trustworthiness. In general, the data collected by researchers usually have a variety of problems, such as missing values, outliers, and extreme cases.

Any error could lead to data reliability issues such as violating normality, linearity, and violating the homoscedasticity assumption. Data for this study had been screened and carefully sorted through. From the demographic data detailing the information concerning the respondents that actually answered the given questionnaires, only 65 returned questionnaires were used for further analysis.

4.4.1 Data Normality

The collected data were thoroughly analyzed and data normality was tested. The results from the descriptive statistic and normality test showed that the data for this study were not normally distributed. Normality is achieved when the distribution of the data is normally distributed with the mean of 0, standard deviation of 1 and a symmetric bell shaped curve is created. The non-normal distribution occurred most probably was due to the small number of samples obtained in the study. The central limit theorem states that if a large enough sample is taken, the mean will follow an approximate normal distribution.

Normality is a concern in SEM because it is one of the basic assumptions that must be fulfilled in performing the structural equation modeling analysis. However, this problem is much less severe when using PLS-SEM. PLS employs the bootstrapping method in determining the significant relationship within a model for non-normal data. This is one of the major benefits of using PLS instead of SEM tools. Unlike other SEM techniques, PLS-SEM does not require any normality assumption and handles non-normal data rather well. Besides, Hair et al. (2010) also suggested a close examination of the data to make

sure substantial deviation could be recognized and removed before running PLS to guarantee the quality of the data does not compromise the outcome of the study. An absolute skewness value of more than 1 means that the data are extremely non-normal and must be removed before PLS is applied.

4.4.2 Missing Data

Missing data is one of the most pervasive problem in data analysis (Tabachnick & Fidell, 2007). It occurred when a respondent fails to answer one or more questions in a survey (Hair et al., 2014). There were few missing data detected in the returned questionnaires. Some of the respondents fail to completely answer the questionnaire. Therefore, the missing data had been treated by using SPSS and the replacement data were used for further analysis in the Smart-PLS.

4.5 Goodness of Measure: Factor Analysis and Reliability

The PLS path modeling started with validation of the measurement model used in this research. This initial step was carried out to determine the fitness of the indicators of the study on the theoretically defined constructs. Assessment of the measurement model was necessary to ensure the validity and reliability of the instruments. To determine individual item reliabilities, the researcher examined each item loading to the respective constructs.

In addition, confirmatory factor analysis (CFA) was performed for assessing the validity of the measurement model. Validity refers to test accuracy of the instruments used in the research in measuring the intended concept. In using CFA, the number of factors within each set of variables was predetermined and those with high loading were determined before computation of the results. Whereas, in EFA, factor analysis can be conducted without knowing the number of factors that really exist or which variables belong with which constructs. This is the critical difference between EFA and CFA. For the purpose of testing goodness of measure, the two main criteria used were validity and reliability.

4.5.1 Construct Validity

Construct validity was used to confirm the fitness of the outcome or the results obtained and the theories from which the tested constructs was formed. The validity is assessed through the calculation of convergent and discriminant validity. There are three different elements to be measured and assessed in convergent validity: factor loading, variance extracted and reliability.

4.5.2 Convergent Validity

Convergent validity is a validity method where multiple items are used to measure a concept to be confirmed. As suggested by Hair et al. (2010), convergent validity can be measured by referring to the value of factor loadings, composite reliability, and average variance extracted (Dolan et al., 2008). The convergent validity was achieved if the value

of factor loading for each item exceeded 0.50, composite reliability value was above 0.70, and the AVE value exceeded 0.50 (Hair et al., 2010).

The results presented in Table 4.6 showed that all of the items had the individual loading value above 0.50, while the composite reliability value of all constructs exceeded the value of 0.70. Furthermore, the value for all AVE's constructs also exceeded 0.50 which felt in the range of 0.502 to 0.653. The results of these statistical tests showed that the instrument of the study had fulfilled the convergent validity criteria stipulated by Hair et al. (2010). Therefore, the above results provided sufficient evidence that the construct of the study had met the needs of convergent validity with the presumption that the constructs used were able to measure the concepts of the study.

Table 4.6
Quality of Measurement Model

Construct	Item	Loadings	AVE	CR	Cronbach's α
Business Intelligence	BBI1	0.731	0.614	0.863	0.79
	BBI2	0.824			
	BBI3	0.866			
	BBI4	0.702			
Market Intelligence	BMI1	0.693	0.598	0.912	0.887
	BMI2	0.747			
	BMI3	0.856			
	BMI4	0.649			
	BMI5	0.805			
	BMI6	0.858			
	BMI7	0.778			
IT Capability	ITK1	0.743	0.653	0.949	0.942
	ITK2	0.867			
	ITK3	0.847			
	ITK4	0.829			
	ITK5	0.794			
	ITO1	0.730			
	ITO2	0.811			
	ITO3	0.722			
	ITO4	0.858			
	ITO5	0.864			
Service Innovation	SC2	0.719	0.502	0.889	0.862
	SC3	0.738			
	SC6	0.627			
	SDS1	0.754			
	SDS2	0.708			
	ST1	0.687			
	ST2	0.736			
	ST3	0.689			
Service Responsiveness	SR1	0.768	0.619	0.919	0.897
	SR2	0.773			
	SR3	0.773			
	SR4	0.739			
	SR5	0.804			
	SR6	0.831			
	SR7	0.816			

Note: 9 items was deleted due to low loadings. AVE=Average Variance Extracted, CR=Composite Reliability

4.5.3 Discriminant Validity

Meanwhile, the discriminant validity refers to the degree to which the constructs measured do not highly correlate other different constructs. It also measures the dissimilarity in a measurement tool's measurement of different construct. In the process of assessing discriminant validity, factor loading that is obtained from each item will be summarized into a pattern that explains the correlation from smallest to largest value between the instruments that measures a construct. A main requirement for the discriminant validity is that the shared variance between the variable and its indicator to be larger than the variance shared with other variables.

The discriminant validity is achieved when the square root of the average variance extracted is greater than the correlation between the constructs. Accordingly, the reflective measurement for validation process of the model of this study had been achieved and finalized. This model consisted of a reflective measure, therefore, two approaches were used to determine discriminant validity, namely Fornell-Larcker criterion and cross-loadings.

This approach asserts that a latent variable to be better explained the variance of its own indicators than the variance of other latent variables. Hence, the discriminant validity is achieved when the average variance extracted of a latent variable is higher than the squared correlations between the latent variable and all other variables (Fornell & Larcker, 1981). Meanwhile, the other method in determining discriminant validity is

based on the value of the cross-loadings. Note that the loadings of an indicator on its assigned latent variable should be higher than its loading on all other latent variables. As for this study, both requirements for discriminant validity were both met successfully as it fulfilled the Fornell-Larker criterion and the cross-loadings guidelines. The summary is shown in Table 4.7, and details of the cross-loadings result is presented in Appendix 4.

Table 4.7
Discriminant Validity of Constructs

	BI	MI	SI	ITC	SR
BI	0.784				
MI	0.577	0.773			
SI	0.593	0.618	0.709		
ITC	0.428	0.584	0.601	0.808	
SR	0.532	0.760	0.723	0.539	0.787

Note: Diagonal elements are AVE of constructs; Off-diagonal elements are the squared correlation between constructs

4.6 Assessment of PLS-SEM Structural Model

After analyzing the validity of the measurement model, the next step was to assess the structural model. This was done by assessing the inner model of the study. Given the adequacy of the measurement model, the hypotheses of the study were tested for its structural model. The research framework for this structural model consisted of five variables which included constructs such as business intelligence, market intelligence, service innovation, IT capability (moderating) and service responsiveness.

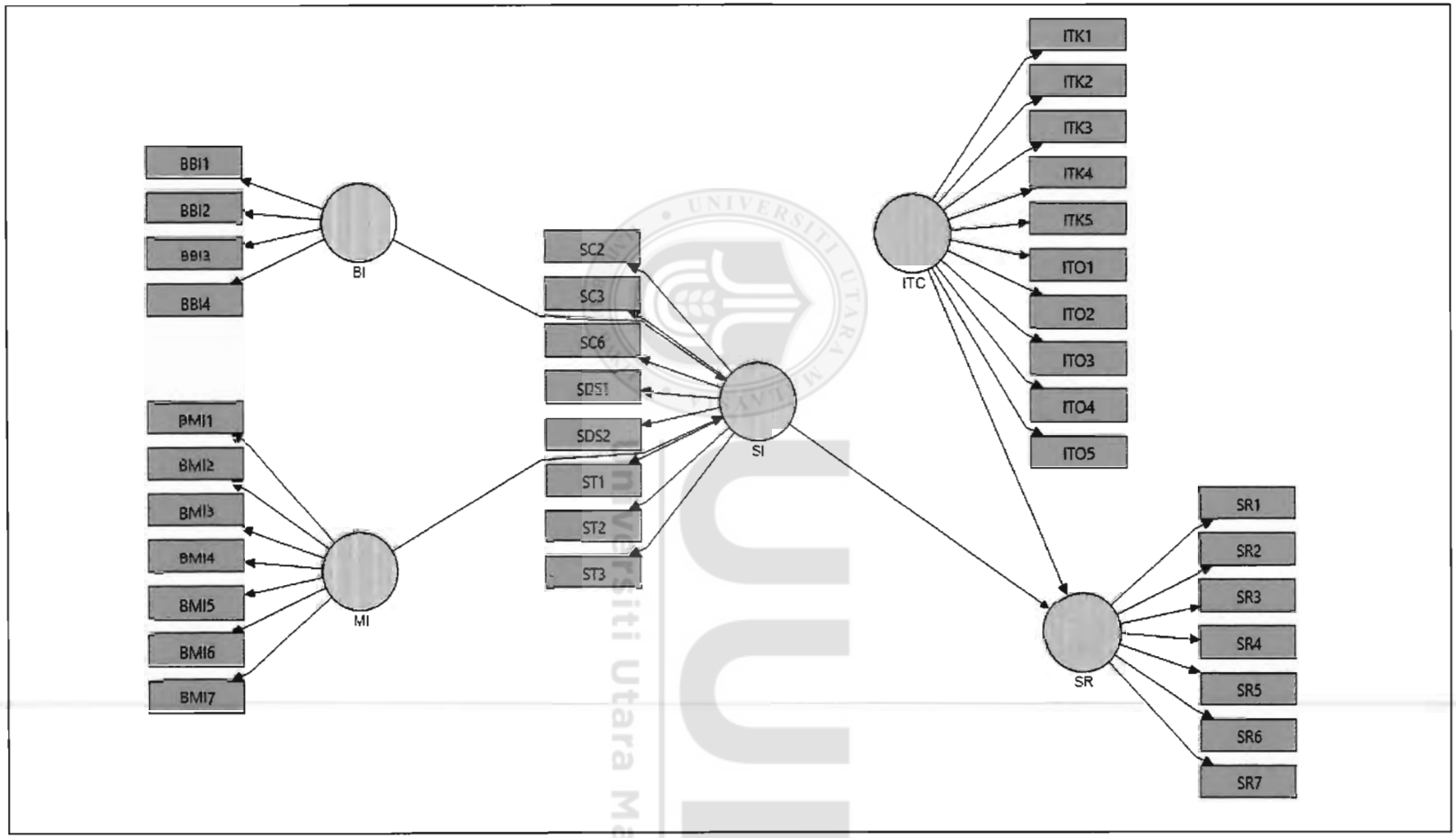

Figure 4.1
Model Depicted from Smart PLS After Removing Low Loading Items

4.6.1 Assessing the Significance and Relevancy of the Structural Model Relationship

The estimation values for the relationships in the structural model were obtained after running the PLS-SEM algorithm. The values of path coefficients were used to decide whether or not to accept the hypothesized relationship of the constructs. Basically, there were four hypothesized paths of latent variables displayed in this model as depicted in Figure 4.2 below.

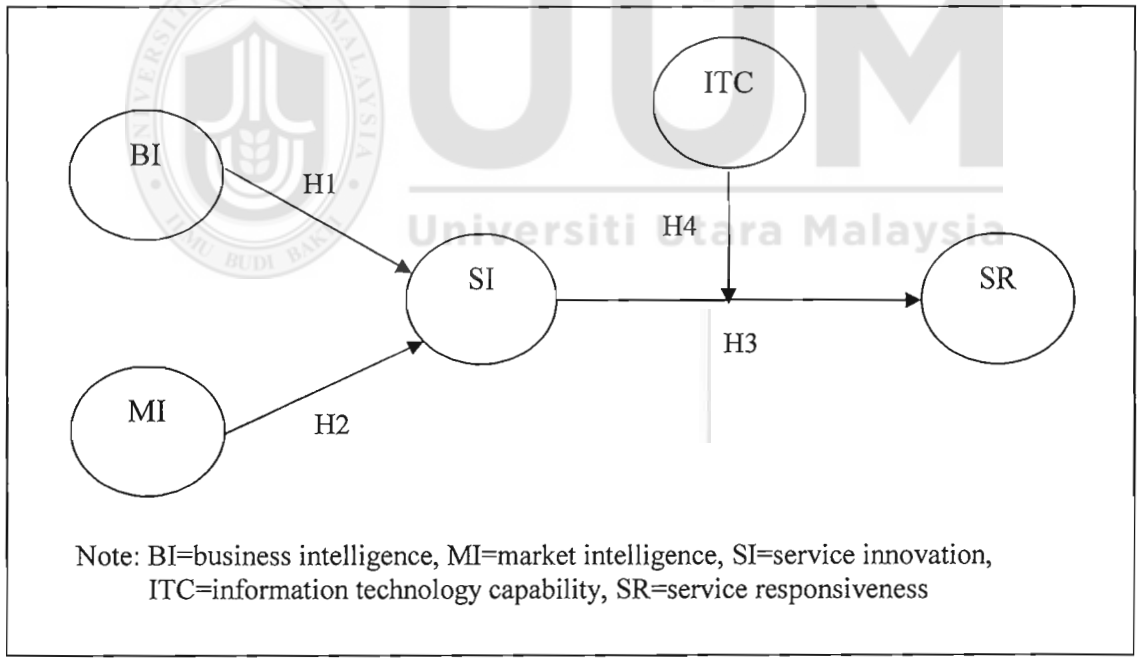

Figure 4.2
The Hypothesized Research Model

4.6.2 Business Intelligence and Service Innovation

Hypothesis 1 proposed that business intelligence to be positively related to service innovation. This hypothesis attempts to test whether the action taken by firms by taking into account their employees feedback for innovation within firm really give significant impact. The result shows that the relationship between business intelligence (BI) and service innovation (SI), at $p<0.05$, t value equals to 3.368. Therefore, this result indicated that business intelligence was significant and positively related to service innovation. (Illustration in Figure 4.3).

4.6.3 Market Intelligence and Service Innovation

Hypothesis 2 proposed a positive relationship between market intelligence and service innovation. The result of the particular test has indicated that market intelligence was significant and positively influenced the service innovation at $p<0.05$ and t value = 3.973. (Illustration in Figure 4.3).

4.6.4 Service Innovation and Service Responsiveness

Hypothesis 3 posited that service innovation was positively related to service responsiveness. This hypothesis attempts to test whether service innovation within firm really gives significant impact on the service responsiveness. The result indicated that service innovation was significant and positively impacted service responsiveness at $p<0.05$ and t value = 8.952. (Illustration in Figure 4.3).

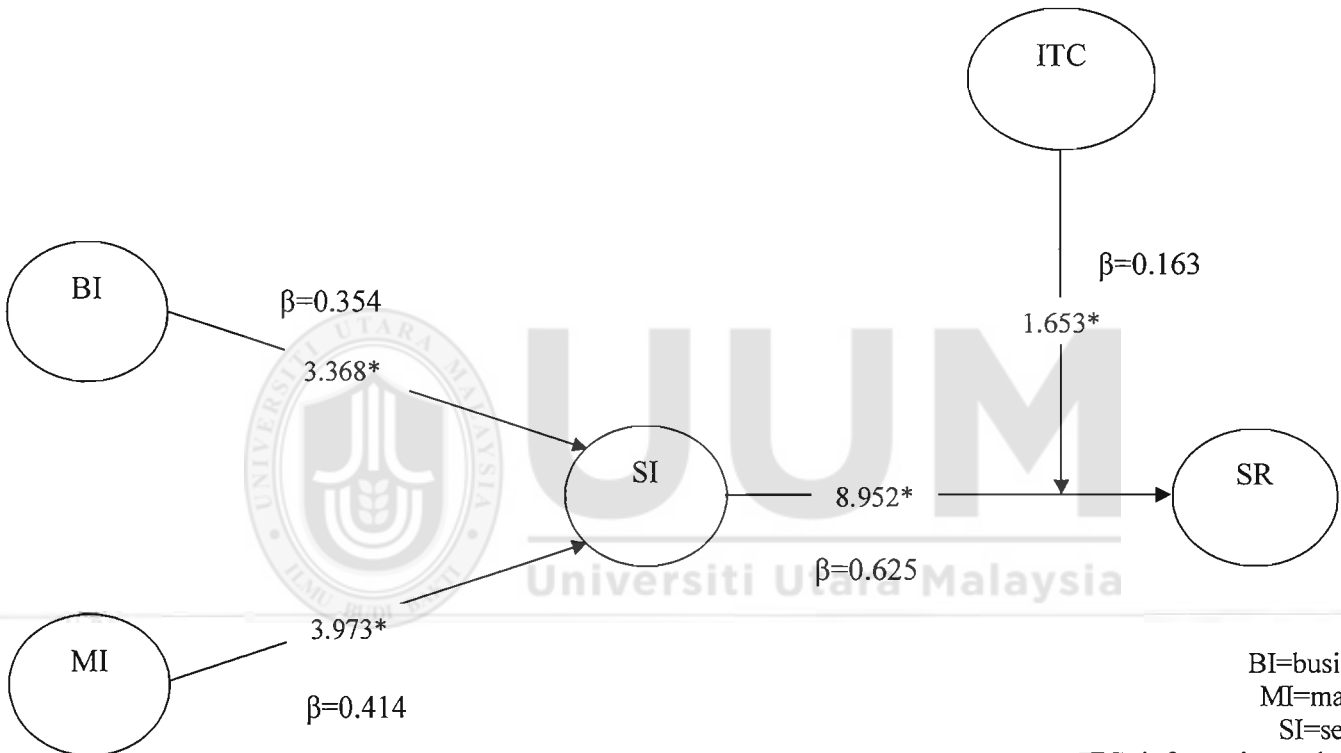

Figure 4.3
Analysis of Outcome of Hypotheses

4.6.5 Moderating Effect of Information Technology Capability

Information technology capability was a moderator variable in this study. A moderator is a variable that significantly influence the relationship between two main variables. The impact of the predictor on the criterion depends on the level or value of the moderator (Holmbeck, 1997). Hypothesis 4 proposed that IT capability to have a significant impact on service innovation and service responsiveness. However, based on the analysis, the path was found to be insignificant, and hence this hypothesis was not supported (Refer Table 4.8).

Table 4.8
Path Analysis Results

Hypothesis	Relationship	Std. Beta	Std. Error	t-value	Decision
H1	BI -> SI	0.354	0.117	3.368	Significant
H2	MI -> SI	0.414	0.111	3.973	Significant
H3	SI -> SR	0.625	0.079	8.952	Significant
H4	ITC moderate SI -> SR	0.163	0.114	1.653	Not significant

$p<0.05$

4.7 Summary of Results

The results showed that all of the variable are complement each other in order to maintain a good service delivery which in this research portrays as service responsiveness. The analysis of factor loadings showed that the measurement model used in this research was statistically significant and parsimony of the model was achieved as well. Hypothesis testing using the PLS-SEM tool yielded empirical evidence of the tested relationship between the determinants, service innovation, IT capability, and service responsiveness.

CHAPTER FIVE

DISCUSSION AND CONCLUSION

5.1 Introduction

The preceding chapter has presented the findings of this study. Hence, this chapter discussed the conclusion of the study and offers recommendation for the future research. The main section includes discussion on the findings, the contribution of the study to practical, methodological and theoretical, limitations, as well as direction for future research.

The general aim of this research was to have a better understanding of the innovation in logistic service provider, particularly regarding their ability to respond (being responsive) in providing the service, by using a quantitative approach whereby data were collected from two main players in logistic service.. The service provider must be able to excel in delivering the service expected from their customer. Therefore, the targeted outcome which is a good service responsiveness can be met. The study also investigated the moderating effect of information technology capability in the relationship between service innovation and service responsiveness.

5.2 Recapitulation of the Study

This research approached the subject of service innovation and service responsiveness for a logistic service provider (focusing on postal and courier and freight forwarding companies). Questionnaires were distributed to respondents via post and online, and returned questionnaire were then analyzed using PLS-SEM software. The analysis was carried out based on the research framework, which was presented by four main variables; service innovation determinants (business intelligence and market intelligence), service innovation, IT capability (moderating) and service responsiveness.

To recap, the study research questions were as stated below:

- How does business intelligence relate to the service innovation?
- How does market intelligence relate to the service innovation?
- How does the service innovation relate to the service responsiveness?
- Does information technology capability moderate the relationship between service innovation and service responsiveness?

The following section elaborates the major findings mainly from the studied hypotheses.

5.2.1 Hypothesis 1 and Research Question 1

Hypothesis 1 stated business intelligence is positively related to service innovation. This hypothesis was supported and thus means service innovation really needs the presence of business intelligence. Therefore, there is a significant relationship between them which

answer the first research question. This in line with previous finding by Abidin et al. (2011) that any type of innovation can be driven by internal driver such as new processes that rely on available knowledge and resources. In addition this finding also supported by Chen (2011), which stated that innovations in service will only happen in the presence of those involve in the process, which refers to the employee.

5.2.2 Hypothesis 2 and Research Question 2

Market intelligence is positively related to service innovation in hypothesis 2 was also supported. Innovation in a company does not stand by itself, but also need input from the external sources (suppliers and consumers). Logistics service, as a customer-intensive system, are highly depending on customer inputs (Yuan & Qi, 2010) and therefore they could contribute to the innovation in the service itself. Similarly, previous researchers also found that innovation is not going to happen without the input gained from customer (such as Chen, 2011; Chong et al., 2011). Therefore, the need of participation from external sources are undeniable.

5.2.3 Hypothesis 3 and Research Question 3

Hypothesis 3 posited that service innovation related positively to service responsiveness and it was supported. Innovation is a need for a service provider to succeed over a long term (Dobni, 2010). Responsive service provider can be achieved by being innovative, when innovation is a core competency of service organizations (Kandampully, 2002).

Thus it was in line with most literatures and at the same time, the third objective of this research has been achieved.

5.2.4 Hypothesis 4 and Research Question 4

Hypothesis 4 indicated that information technology capability moderates the relationship between service innovation and service responsiveness. Although previous researches claimed that information technology capability elements have a number of important implications for the management of the organizations, however this study found that it was not supported. Possible reasons could be due the nature of the logistic operations that hardly depend on human factors. Therefore it can be concluded that information technology capability was not the only variable that gives an impact to the relationship of service innovation and service responsiveness. This was an interesting findings that contradicted with previous research.

Table 5.1
Summary of findings

Hypothesis Number	Hypothesis Statement	Results
H1	Business intelligence is positively related to service innovation	Supported
H2	Market intelligence is positively related to service innovation	Supported
H3	Service innovation relate positively to service responsiveness	Supported
H4	Information technology capability moderates the relationship between service innovation and service responsiveness	Not supported

5.3 Discussion on Findings

Logistics service provider consistently facing growing demands for better service at lower cost. Therefore, innovation effort must be constantly managed by the service provider in the industry in ensuring customer needs to be fulfilled. This study found that service innovation is closely related to the service responsiveness. Therefore, service companies need the element of innovation to ensure that a better service can be provided by the company.

Consumer, as an input to the service process, would enhance the contribution of service innovation programs in a service firm. Their views enables the firm to go beyond an operations management perspective. Therefore, as an excellent service provider, company must be able to meet current and future customer needs by conjoined and affiliated the innovation program with the actor of business which is the consumer. A service innovation that will not be able to manage customer needs would be a wasted effort.

Consequently, researchers found that, most of the companies were lacking of sufficient fund to provide delivery service in highly innovative ways even if they were to show better outcome. In addition, the companies were in their comfort zone, thus the purpose of innovation cannot be seen.

In achieving better service responsiveness, companies should focus on educating employees on newly introduce service processes and encourage initiatives for employees' productivity. They are the actor in service delivery within the company that plays a vital role in making service happens excellently. Thus, innovation plan will be much smoother when peoples in the system are knowledgeable and ready for changes.

This study adds further to the role of information technology capability as a moderator in the relationship between service innovation and service responsiveness. Despite the importance of IT capability in strengthen many business activities, this study found that IT capability did not moderate the relationship between service innovation and service responsiveness. This result inconsistent with the findings in previous studies which IT capability will give an impact to the relationship of tested variables.

However, in this study, it can be concluded that, in the different context or business nature, the result will be different. Service process are highly depending on human factors, therefore, information technology which might be a costly for some service providers will get less attention. The use of technology itself incurred huge investment for upgrades, maintenance and necessary tune-ups, therefore, it will be a risky step for service provider to invest more on technology.

5.4 Contributions of the Study

This study creates some contributions to the body of knowledge relating to service responsiveness and service innovation. In this section, the contribution of the study are discussed in three main sections: practical, methodological and theoretical contributions.

5.4.1 Practical Contributions

The importance of logistics sector has resulted in the inclusion of various means of support for the service sector in the Malaysia Plan framework. Service innovation are still in a relatively early development phase, where innovation only clearly be seen through a physical product. This study provides evidence concerning how service also needs innovation to support providers in achieving superior performance. In addition, this study indicates that firms which have innovation effort are likely to achieve better performance regarding service responsiveness. Therefore, firms need to focus on all dimensions in service innovation together with the determinants as they relate significantly to responsiveness. The outcome of this study should be able to give an alarm for companies to be more customer oriented to achieve the best service.

Emerging technology based on the convergence of telecommunications, broadcasting and publishing has and will continue to change the landscape of physical communications globally. Therefore, postal organizations nowadays, regardless they small or large faced with the challenge of new technologies; with operating in the same way as private

corporations, understanding what products are profitable and which are not, and dealing with almost constant change. Postal organizations specifically, need to change in the face of deregulation and become competitive, market-oriented and customer-driven.

5.4.2 Methodological Contributions

This study provides future researchers with an extended example of the method used in measuring service responsiveness. Based on previous research, most studies on service innovation were done by using qualitative approach. Therefore, the used of quantitative approach in answering the research questions and meeting its objective for this study contributes another perspective in conducting research.

5.4.3 Theoretical Contributions

This study contributes to the understanding of the utilization of PLS-SEM for moderating testing with limited sample. It adds to the current body of knowledge on moderating analysis by providing a deeper understanding on moderating testing approaches beside the traditional and limited Baron and Kenny method. The study also highlights the robustness of PLS-SEM and its ability to predict the impact of service innovation on service responsiveness.

This study found empirical evidence to support the RBV which suggests that the performance (or in this study refers to service responsiveness) of a firm is influenced by

its internal resources. In the context of this study, independent variables: business intelligence, market intelligence, service innovation were regarded as resources. This study found that those resources are significantly related to service responsiveness.

5.5 Limitations of the Study

Although this research was conducted to fill in the gaps that were observed in the reviewed literature and empirical studies, there were still some limitations that could not be avoided mainly at the methodology and the geographical levels.

The main limitation of this research is the small number of respondents. Even though 65 respondents are adequate in terms of using the PLS structural equation modeling tool, it would be better to have more data. Thus, it has affected the overall quality of the data and the outcome of the research. Hence, the small sample size of this study may affect the generalizability of the findings.

Secondly, there is a lack of concrete sources regarding the list of targeted respondents. The respondent was identified through online and by requesting from Companies Registrar. The company's name that was obtained from the registrar are too broad, which means that the list cannot be fully utilized.

Additional limitation faced while preparing this research was the lack of conceptual and empirical studies related to service responsiveness and innovation in logistics

service provider. Regarding the methodology of research, this study was based on quantitative approaches through conducting the survey. Therefore, future studies are suggested to extend the research by using both methods: quantitative and qualitative, then greater finding can be expected from it.

5.6 Directions for Future Research

Most research in innovation ranges towards the manufacturing industry than in the services sector. Therefore, research on service innovation must be explored for further understanding of the concept and furthermore the importance of innovation in service benefited the companies. For instance, the freight forwarding industry still facing problems of a fragmented structure, inefficiency of related services, high operating costs and low volume. Initially, this research had found that service innovation may enhance the performance of freight forwarder in general. Therefore, future research may look into a deeper characteristics and process of freight forwarder.

The results from the study suggest that further research would be helpful to provide a deeper understanding of logistics service provider in Malaysia especially in ensuring the betterment and responsive service delivery. Further work needs to be done to establish the effects of changes in the service delivery, with the presence of innovation.

The use of quantitative technique in the design and analysis for this study may limit the response from the respondents, when they only answered with the self-administered

questionnaire. Future study may incorporate qualitative approach which provides insights and understanding of the problem setting. The results of the study will be meaningful if both techniques are employed as both of them can complement each other.

This study only focuses on postal and courier and freight forwarding companies, even though there were other types of companies in logistic service provider. Future research should look into enlarging the scope of this study to increase the generalizability of the research outcome. Widening the area of focus to include as many service providers in logistics service industries will provide better and more representative data.

5.7 Conclusion

Customers become more dissatisfied with decreasing quality and increasing prices in delivery service which can be heard or seen from the media. This became a bad sign for a service provider like courier service. In addition to that, using online (for example electronic mail and social media network) is a faster and quick feedback compared to the traditional way. However, something needs to be done to ensure the survival of the companies. Therefore, this study objective was to see the need and importance of service innovation as a way to ensure the survival of courier companies, as well as freight forwarder, and at the same time, customer will receive the best service from the provider.

This study reveals the significant impact of service innovation on service responsiveness in logistics service provider, especially in postal and courier and freight forwarder

companies. The importance of the contribution of the study remains as the main reason why the researcher embark on this study. Leading companies, innovation consultants, and academic researchers are shifting their focus from products to services as the next interesting area, and something that need to be done is making the service become greater and more responsive. Therefore, innovation is the answer. It is hard competing in the service industry, since one competitor can easily imitate others since it is hard to protect the service from being imitated (copyright). Thus, by keep on improving or being innovative, service providers will remain longer in the industry.

Being responsive to customer may be one of the best practices to fulfill customer expectation and meet companies' objectives. In these service industry, one of the main constraint is time, therefore, the company has to deal with it efficiently. For example, to ensure the parcel and goods reach customers on time, the company needs to make sure that they have a good transport and also a skillful employee in handling the operations.

Courier and freight forwarder service has become a major contributor to high-tech corporation strategy and profitability. It is increasingly important to optimize field service efficiency, productivity, quality, effectiveness and plays an important role in the supply chain. If the service malfunctions at a time, it will give a huge impact to other organizations or individual that related to the chain. Furthermore, the traditional ways of giving information through printed materials are still relevant to those in the area that do not have internet access.

Malaysia government has recognized that postal market is undergoing profound changes. Mail volumes in most part of the world are declining which is threatening the sustainability of universal postal service provisioning. Although there has been a rise in the usage of electronic mail services all around the world, the significance of postal and courier services have not diminished. A large section of the population still utilizes postal and courier services for efficient transfer of goods and documents all across the world. To meet this challenge, postal operator must step up its effort to modernize the postal network, innovate and diversify its product portfolio, deliver high quality of service and develop human capital to ensure that it remains relevant to the customers in the market place. As the demand for better service in logistics increased, thus, Malaysia postal and courier companies need to innovate and become more responsive to customers.

The study confirmed that service responsiveness hard to be achieved without innovation effort in managing operations particularly in logistics service. Any service provider must be excelling in delivering the planned service by being responsive. They have to make sure that customer needs and agreed service levels are met. In a simple word, service delivered must beyond customer's expectation.

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APPENDICES

Appendix 1: 17 Services Sub-sectors Foreign Equity Participation for 2012

Liberalisation of the 17 services sub-sectors announced in the 2012 budget speech

No.	Sector/Subsector	Foreign Equity Participation
1	Telecommunications Services *Applications Service Provider (ASP) licence.*	100% April 2012
2	Telecommunications Services *Network Facilities Provider (NFP) and Network Service Provider (NSP) licences.*	70% April 2012
3	Courier Services	100% January 2012
4	Private Higher Education Services with University status	100% Pending amendments to the relevant Acts.
5	International Schools	100% March 2012
6	Technical and Vocational Secondary Education Services	100% January 2012
7	Technical and Vocational Secondary Education Services for students with special needs	100% January 2012
8	Skills Training Services	100% January 2012
9	Private Hospitals Services *Foreign medical specialists/experts of any specialty and foreign dental specialists are also allowed to practise in private hospitals.*	100% Pending amendments to the relevant Acts.
10	Stand alone specialised medical clinic services	100% Pending amendments to the relevant Acts.
11	Stand alone specialised dental clinic services	100% Pending amendments to the relevant Acts.
12	Departmental Stores and Specialty Stores	100% January 2012
13	Incineration Services	100% January 2012
14	Accounting and Taxation Services	100% January 2012
15	Architectural services	100% Pending amendments to the relevant Acts.
16	Engineering services	100% Pending amendments to the relevant Acts.
17	Legal Services	International joint venture for permitted areas of practice. Pending amendments to the relevant Acts. The liberalisation initiative is only applicable to Peninsular Malaysia.

Note: Liberalisation of the 17 sub sectors is subjected to existing Malaysian laws and regulations.

Source: http://www.btimes.com.my/articles/topa1/Article/

Appendix 2: Survey Cover Letter

UUM
Universiti Utara Malaysia

Pusat Pengajian Pengurusan Teknologi dan Logistik
Kolej Perniagaan
Universiti Utara Malaysia
06010 UUM Sintok
Kedah Darul Aman, Malaysia
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Dear Sir/Madam,

A Study on Service Innovation and Responsiveness

We are conducting a research on service innovation and service responsiveness in logistic companies. In addition, this study also tries to seek the role of information technology capability in the service innovation and service responsiveness.

Please complete ALL questions in the survey. Your survey responses will be strictly confidential and data from this research will be reported only in the aggregate. After the completion of the research, identifying information will be destroyed and the data will be completely anonymous in the analyses and reports of the research.

This survey will only take 10 minute of your time. Your cooperation will be valuable to continuous improvement effort in the service industry in Malaysia. Please provide necessary information at the back of the questions if you need a copy of the executive report.

If you have questions at any time about the survey or the procedures, you may contact Alminnourliza Noordin at 017-4977781 or by email (alminnourliza@uum.edu.my).

Thank you very much for your time and support.

Yours sincerely,

Alminnourliza Noordin
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Appendix 3: Questionnaire

SECTION A — **General Information of Company & Respondent's Profile**
Maklumat Am Syarikat & Profil Responden

Please (/) the appropriate answer and fill in the blanks to describe your company in general.
Sila (/) jawapan yang bersesuaian dan isikan ruang kosong untuk menggambarkan syarikat anda secara am.

1. Company ownership (*Pemilikan syarikat*):

   ☐ Malaysia
   ☐ Foreign

2. Number of employees (*Bilangan pekerja*):

   ☐ Less than 50 (*Kurang dari 50*)
   ☐ Between 50 to 100 (*Antara 50 ke 100*)
   ☐ More than 100 (*Lebih daripada 100*)

3. Years of operations (*Bilangan tahun operasi*):

   _____ years (*tahun*).

4. Company location (*Lokasi syarikat*):

   _____

5. Core activities of the company (*Aktiviti-aktiviti utama syarikat*):
   (May tick more than one/*Boleh tanda lebih daripada satu*)

   ☐ Postal/Courier (*Pos/Kurier*)
   ☐ Transport and Communication (*Pengangkutan dan Komunikasi*)
   ☐ Retailing (*Peruncitan*)
   ☐ Construction (*Pembinaan*)
   ☐ Warehousing (*Pergudangan*)
   ☐ Others (*Lain-lain*)

6. Your position in company (*Jawatan anda dalam syarikat*):

   ☐ Top level management (*Pengurusan peringkat atasan*)
   ☐ Middle level management (*Pengurusan peringkat pertengahan*)
   ☐ Lower level management (*Pengurusan peringkat bawahan*)
   ☐ Non managerial (*Bukan pengurusan*)

For SECTION B to SECTION E, please indicate your level of agreement from 1 to 7 for each statement.
Untuk BAHAGIAN B ke BAHAGIAN E, sila tentukan tahap persetujuan anda dari 1 hingga 7 untuk setiap penyataan.

SECTION B	**Service Innovation Determinants** *Penentu-penentu Inovasi Perkhidmatan*

Business Intelligence	Strongly Disagree			Moderate			Strongly Agree
The employees are valuable to our company. *Pekerja adalah berharga kepada syarikat kami.*	1	2	3	4	5	6	7
Our company has employees who are knowledgeable on organizations' operation. *Syarikat kami mempunyai pekerja yang mempunyai pengetahuan tentang operasi organisasi.*	1	2	3	4	5	6	7
Our company has a medium for employees to point out their opinion. *Syarikat kami mempunyai medium untuk pekerja menyatakan pendapat mereka.*	1	2	3	4	5	6	7
Managers consider the lower level employee opinions for the benefit of our company. *Pengurus mempertimbangkan pendapat pekerja bawahan untuk faedah syarikat kami.*	1	2	3	4	5	6	7
Market Intelligence	Strongly Disagree			Moderate			Strongly Agree
Our company meets customers regularly. *Syarikat kami bertemu pelanggan dengan kerap.*	1	2	3	4	5	6	7
Our company conducts related market research. *Syarikat kami menjalankan penyelidikan pasaran yang berkaitan.*	1	2	3	4	5	6	7
Our company detects changes in consumers' preferences. *Syarikat kami mengesan perubahan dalam minat pengguna.*	1	2	3	4	5	6	7
Our company polls customers' opinion at least once a year. *Syarikat mengumpul pendapat pelanggan sekurang-kurangnya sekali setahun.*	1	2	3	4	5	6	7
Our company detects fundamental shifts in industry. *Syarikat kami mengesan perubahan asas dalam industri.*	1	2	3	4	5	6	7
Our company frequently reviews the effect of changes in business environment on customers. *Syarikat kami sering mengkaji kesan perubahan dalam persekitaran perniagaan terhadap pelanggan.*	1	2	3	4	5	6	7
Our customer feedbacks are taken into account for company's innovation plan. *Maklumbalas pelanggan kami diambil kira bagi pelan inovasi syarikat.*	1	2	3	4	5	6	7
Our suppliers have an influence in company's decision making. *Pembekal kami mempunyai pengaruh dalam pembuatan keputusan syarikat.*	1	2	3	4	5	6	7

SECTION C	Service Innovation *Inovasi Perkhidmatan*

Service Technology	Strongly Disagree Moderate Strongly Agree
The postal/courier service requires the installation of new software to our company. *Perkhidmatan pos/ kurier memerlukan pemasangan perisian baru kepada syarikat kami.*	1 2 3 4 5 6 7
The postal/courier service requires the installation of new hardware to our company. *Perkhidmatan pos/kurier memerlukan pemasangan perkakasan baru kepada syarikat kami.*	1 2 3 4 5 6 7
Our postal/courier service is supported by innovative technology. *Perkhidmatan pos/kurier kami disokong oleh teknologi inovatif.*	1 2 3 4 5 6 7
Service Concept	Strongly Disagree Moderate Strongly Agree
Our postal/courier service is totally new to the market. *Perkhidmatan pos/kurier kami adalah benar-benar baru kepada pasaran.*	1 2 3 4 5 6 7
Our postal/courier service has new features. *Perkhidmatan pos/kurier kami mempunyai ciri-ciri baru.*	1 2 3 4 5 6 7
Our postal/courier service requires a change in customer buying behaviour. *Perkhidmatan pos/kurier kami memerlukan perubahan dalam tingkah laku membeli pelanggan.*	1 2 3 4 5 6 7
The postal/courier service is totally new to our company. *Perkhidmatan pos/kurier adalah benar-benar baru kepada syarikat kami.*	1 2 3 4 5 6 7
The postal/courier service allows our company to enter a new market. *Perkhidmatan pos/kurier membolehkan syarikat kami memasuki pasaran baru.*	1 2 3 4 5 6 7
The postal/courier service supplement on our existing product line. *Perkhidmatan pos/kurier melengkapkan barisan produk kami yang sedia ada.*	1 2 3 4 5 6 7
The postal/courier service creates a new product line for our company. *Perkhidmatan pos/kurier mewujudkan barisan produk baru bagi syarikat kami.*	1 2 3 4 5 6 7
Service Delivery System	Strongly Disagree Moderate Strongly Agree
Our company sufficiently trains the employees to deal with customers. *Syarikat kami melatih pekerja secukupnya untuk berurusan dengan pelanggan.*	1 2 3 4 5 6 7

Our company has employees who are able to handle the operations excellently. *Syarikat kami mempunyai pekerja yang mampu untuk mengendalikan operasi dengan cemerlang.*	1 2 3 4 5 6 7
Our company offers door-to-door courier service. *Syarikat kami menawarkan perkhidmatan kurier dari pintu ke pintu.*	1 2 3 4 5 6 7
Customer Service Interface	Strongly Disagree Moderate Strongly Agree
Our customers are able to know where their parcel/goods are (track and trace). *Pelanggan kami boleh mengetahui di mana bungkusan/barang-barang mereka (jejak dan kesan).*	1 2 3 4 5 6 7
Our customers are provided with medium for them to check their parcel status either through online or help desk. *Pelanggan kami disediakan dengan medium untuk mereka menyemak status bungkusan mereka sama ada melalui atas talian atau meja bantuan.*	1 2 3 4 5 6 7
Our repeating customer will have extra advantage (membership or offering additional service at no cost). *Pelanggan kami yang berulang akan mempunyai kelebihan tambahan (keahlian atau menawarkan perkhidmatan tambahan tanpa kos).*	1 2 3 4 5 6 7

SECTION D — Information Technology Capability
Keupayaan Teknologi Maklumat

IT Knowledge	Strongly Disagree Moderate Strongly Agree
Our operations employees are knowledgeable on IT operations. *Kakitangan operasi kami adalah berpengetahuan mengenai operasi IT.*	1 2 3 4 5 6 7
Our IT employees are qualified for the job. *Kakitangan IT kami berkelayakan untuk kerja.*	1 2 3 4 5 6 7
Our IT networking engineers are professionally qualified. *Jurutera-jurutera rangkaian IT kami berkelayakan profesional.*	1 2 3 4 5 6 7
Our employees are proactive in company innovation effort. *Kakitangan kami adalah proaktif dalam usaha inovasi syarikat.*	1 2 3 4 5 6 7
Our employees attend ICT training courses regularly. *Kakitangan kami kerap menghadiri kursus latihan ICT.*	1 2 3 4 5 6 7
IT Operations	Strongly Disagree Moderate Strongly Agree
Our company is linked to the computer network. *Syarikat kami mempunyai pautan kepada rangkaian komputer.*	1 2 3 4 5 6 7

Our company's computer system down time is minimal. *Masa sistem tergendala bagi komputer syarikat kami adalah minimum.*	1 2 3 4 5 6 7
Our company has computerized all of its operations. *Syarikat kami menggunakan komputer bagi semua operasinya.*	1 2 3 4 5 6 7
Our IT policy is in line with regulatory guidelines. *Polisi IT kami adalah selaras dengan garis panduan kawal selia.*	1 2 3 4 5 6 7

SECTION E — Service Responsiveness
Tindak balas Perkhidmatan

Responsiveness	Strongly Disagree Moderate Strongly Agree
The need of different customer groups drives new service development activities in our company. *Keperluan kumpulan pelanggan yang berbeza memandu aktiviti pembangunan perkhidmatan baru dalam syarikat kami.*	1 2 3 4 5 6 7
When our customers are unhappy with the quality of products/services, we will take corrective actions immediately. *Apabila pelanggan kami tidak berpuas hati dengan kualiti produk / perkhidmatan, kami akan mengambil tindakan pembetulan dengan segera.*	1 2 3 4 5 6 7
We use a formal program where we meet with our customers to determine their service needs regularly. *Kami menggunakan program formal di mana kami bertemu dengan pelanggan kami untuk menentukan keperluan perkhidmatan mereka secara kerap.*	1 2 3 4 5 6 7
We make use of a formal program in which we ask customers for feedback on practices or policies regularly. *Kami menggunakan program rasmi di mana kami meminta pelanggan untuk memberi maklum balas mengenai amalan atau dasar secara kerap.*	1 2 3 4 5 6 7
Our company involves in a formal internal process in which service and quality levels are examined regularly. *Syarikat kami terlibat dalam proses formal dalaman di mana tahap perkhidmatan dan kualiti diteliti secara kerap.*	1 2 3 4 5 6 7
We deliver our services on time. *Kami menyampaikan perkhidmatan kami tepat pada masanya.*	1 2 3 4 5 6 7

This research finding will give valuable information that is relevant to your company. Please indicate if you like to receive the executive summary of the research by providing your email address.

Email address:.....

THANK YOU FOR COMPLETING THIS QUESTIONNAIRE
YOUR PRECIOUS TIME AND COOPERATION IS HIGHLY APPRECIATED.

Appendix 4: Cross Loadings of Constructs

	BI	MI	SI	ITC	SR
BBI1	0.730845	0.521299	0.381678	0.35623	0.455513
BBI2	0.823975	0.436648	0.506286	0.39946	0.503028
BBI3	0.865518	0.52456	0.556366	0.318695	0.483728
BBI4	0.702434	0.320627	0.381421	0.271784	0.186613
BMI1	0.373104	0.693484	0.353454	0.1853	0.50846
BMI2	0.503504	0.74718	0.56459	0.694561	0.50407
BMI3	0.593974	0.855626	0.592198	0.444572	0.660361
BMI4	0.333025	0.649384	0.290838	0.437617	0.387247
BMI5	0.370597	0.805301	0.424711	0.492558	0.565312
BMI6	0.379542	0.857589	0.52356	0.532049	0.722364
BMI7	0.49511	0.778452	0.475984	0.29148	0.699684
SC2	0.212764	0.4254	0.719297	0.341373	0.485401
SC3	0.336885	0.422947	0.738443	0.371333	0.555421
SC6	0.377416	0.192235	0.626524	0.230661	0.413007
SDS1	0.557103	0.578926	0.754214	0.367014	0.650238
SDS2	0.547161	0.597696	0.708433	0.516291	0.686662
ST1	0.403278	0.294418	0.686999	0.516046	0.265681
ST2	0.354298	0.401287	0.736389	0.462543	0.40085
ST3	0.45158	0.383012	0.689439	0.596839	0.418023
ITK1	0.502037	0.497392	0.579106	0.743286	0.540478
ITK2	0.431266	0.541024	0.492142	0.867303	0.421811
ITK3	0.298881	0.495766	0.449435	0.846635	0.36506
ITK4	0.508996	0.552738	0.660696	0.828724	0.630386
ITK5	0.300179	0.386908	0.452854	0.793931	0.31493
ITO1	0.086083	0.329057	0.272125	0.730224	0.247274
ITO2	0.19419	0.4734	0.407316	0.810696	0.39792
ITO3	0.353484	0.388311	0.445489	0.721857	0.408793
ITO4	0.237855	0.483172	0.470606	0.85767	0.41224
ITO5	0.275059	0.440265	0.386552	0.8636	0.353276
SR1	0.502006	0.572393	0.599009	0.493654	0.768091
SR2	0.399971	0.669628	0.490085	0.270494	0.772658
SR3	0.252866	0.600357	0.512964	0.300031	0.77322
SR4	0.222911	0.659576	0.541251	0.505467	0.738733
SR5	0.485734	0.587642	0.499617	0.457251	0.803782
SR6	0.505444	0.584651	0.635887	0.46777	0.831241
SR7	0.514416	0.542096	0.659183	0.426686	0.815622