INFLUENCY FACTORS OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) IN LOGISTICS ON THIRD PARTY LOGISTICS SERVICE PROVIDERS IN MALAYSIA.

AWOYEMI ADEBARE OMOTAYO

MASTER OF SCIENCE

(TECHNOLOGY MANAGEMENT)
UNIVERSITI UTARA MALAYSIA.

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BY

AWOYEMI ADEBARE OMOTAYO

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ABSTRACT

The function of Information Communication Technology is still unevenly distributed among the logistics providers leading to sizeable front-linersin controlling the market. The ICT involves directly with the customers' relationships, manufacturing, transportation, warehousing networks and data streams directly.The concepts of third party logistics came to bear from the arising needs to extend transportation services by transportation industries to its numerous customers. This study targeted at providing remedies to the most of existing gaps relating the influence of ICT facilities in logistics especially among the Third Party Logistics Services in Malaysia. Third Party Logistics Services can be referred as an outsourcing of transport and logistics activities to outside companies that are not consignors or consignees to the transaction. In most cases, more than one activities are outsourced and it includes storage, warehousing and transportation.In malice of the effort put into action by organisations in creating a high responsive team that will run into the commuting and increasing demand of their highly fickle and impatient clients and the companies supply chain challenges. Grounded on this fact, this study targeted at providing antidotes to most of the existinglacuna relating the role of ICT facilities in logistics and supply chain management, most especially among the 3PLs in Malaysia.The study utilized in the used of questionnaire to gather the required information from Third Party Logistics service providers. The data were analysed among 150 respondents and correlatedresult shows that the selection onan appropriate tools of ICT has a significant effect on the competitive advantage of third party logistics'companies. The result of study is able to be used for the measurement of the performance and benchmarking on the importance of ICT in leading the 3PLs logistics industry.

Keywords*;* Information, communication, technology, third party Logistics, competitive advantage.

ABSTRAK

Fungsi teknologi maklumat dan komunikasi (ICT) masih lagi tidak tersebar secara sama rata dalam kalangan pembekal-pembekal logistik menyebabkan pengawalan pasaran dalam saiz yang agak besar oleh barisan hadapan. ICT terlibat secara langsung dengan perhubungan antara pelanggan, pembuatan, pengangkutan, rangkaian pergudangan dan aliran data. Konsep untuk pihak ketiga logistik diperkenalkan adalah bagi menghadapi sebarang peningkatan keperluan dan meluaskan perkhidmatan pengangkutan oleh industi pengangkutan kepada pelbagai pelanggan. Kajian ini bertujuan meyediakan jalan penyelesaian bagi kebanyakan jurang yang wujud berkaitan dengan pengaruh kemudahan ICT dalam bidang logistik terutamanya dalam kalangan Third Party Logistics Services (Perkhidmatan Logistik Pihak Ketiga) di Malaysia. Third Party Logistics Services boleh merujuk kepada penyumberan luar bagi aktiviti pengangkutan dan logistik kepada syarikat-syarikat luar yang bukan merupakan pengirim atau penerima barang dalam transaksi. Dalam kebanyakan kes, terdapat lebih daripada satu aktiviti yang disalurkan dan ianya merangkumi penyimpanan, pergudangan dan pengangkutan. Terdapat beberapa usaha daripada pihak atau organisasi yang berniat jahat untuk mewujudkan satu kumpulan responnsif tinggi di mana mereka akan meningkatkan permintaan yang tidak stabil, sering berubah-ubah dan juga pelanggan yang tidak sabar. Berdasarkan fakta ini, kajian mensasarkan penyediaan "antidotes" atau penawar untuk masalah yang sedia ada berhubung peranan kemudahan ICT di dalam ligistik dan pengurusan rantaian bekalan, terutama di kalangan 3PLs di Malaysia.Kajian ini menggunakan soal selidik untuk mengumpul maklumat yang diperlukan daripada pembekal-pembekal Third Party Logistics Services. Data yang diperolehi dianalisa dalam kalangan 150 responden dan hasil berhubung kait menunjukkan pemilihan peralatan ICT yang sesuai mempunyai kesan yang ketara dalam kelebihan daya saing bagi syarikat-syarikat logistik pihak ketiga. Keputusan kajian boleh digunakan sebagai ukuran prestasi dan tanda aras terhadap kepentingan ICT dalam menerajui industri logistik 3PL.

Katakunci; Maklumat, Komunikasi, Teknologi, Logistik pihak ketiga, pengangkutan, kelebihan daya

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LIST OF ABBREVIATIONS

3 P L	Third Party Logistics
I C T	Information Communication Technology
G P S	Global Position System
I T S	Intelligent Transport System
R F I D	Radio Frequency identification
E R P	Enterprise Resource Planning
E D I	Electronic Data Interchange
S C M	Supply Chain Management
L I S	Library Information Science

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

Logistics and supply chain businesses all over the world are commencing some strategic worldwide networks that can deliver both efficient and high quality, swift response to customer's demand from all over world market segments. This they do in order to withstand international competition. The process of efficient and integrated organization of these series of activities is often referred to as global logistics or preferably supply chain management (SCM), this in the sector has been seen as the front lines of competitive power globally.

The reasons why logistics and supply chain businesses adopt information and communication technologies can be adduced to the facts that some companies experience low and shrunk margins, competition is also fiercer, globalization has consolidated itself rather enduringly and supply chains have become more extended and dispersed. Also, energy and labor costs are on the rising side, environmental impact are growing due to increasing public awareness of issues at stake, customization can be said to be increasing meanwhile the lifecycle keep reducing, there are costly remediation of shipment errors and delays, (Blanchard 2010;Sarac, Absi et al.,2010;McCormack et al. 2010).

Benefits of these ICT facilities in logistics and supply management services can not be over emphasise, they enables organizations more coordinations or integration, makes it more smarter, leaner,agile, efficient and more productive. Most of these advantages give most organizations the opportunity to achieve satisfactory level of real time visibility of their resources and coordinate their operations, both internally and with network partners. The end result industrial paradigms are e-business, e-commerce, on-demand collaboration, event driven decision support system, and agent based control of supply chains, such as third party logistics supply providers

Logistics on the other hand can be referred to as the last frontier that even recently, the innovations of logistics have been the basic source of companies' profit and to sustain competitive advantage. Although, there arise many instances that logistics system has resulted to barriers in the overall management of some companies. The ability to dilute the overall monetary value and still reach a noteworthy advance in the yardstick of discharged services to the terminal users can be ameliorated through the elimination of bottlenecks. Likewise from the social point of view, an efficient logistics system has been considered to render probable means of reducing environmental degradation and pollution which serve as a probable sourceof increase in macroscopic economic productivity as affirmed by (stock et al. 1998).

Logistics system has been advanced through the introduction of several innovations. The innovations can be broadly classified into two parts, namely innovations on individual logistics process enhancement as well as innovation on complete overhauling of logistics systems. The former can be said to include innovative hardwares which include

new intermodal terminals with efficient transshipment strength and capacity, also innovative software like truck route planning with ITS (Intelligent Transport System) and GPS (Global Positioning System). And all these serial innovations can be improved upon to their full potential if engaged in reducing bottlenecks.

Most often, there are likely situations whereby companies encounter one challenges or the other in their daily business practices and processes. They instead have many potential challenges in such that eliminating one leads to the emergency of another single. This makes it more important to monitor the stages and procedures of business as a system and also to invent new ideas related to system management innovations. And among these new ideas can be referred to as SCM and 3PL established by (DeWitt et al. 2001; Stock et al. 2006;Tuuli, 2010; &Bowersox, 2011).

The imbibing ideology like attribute of service with marketing affinity has turned around not only the academic research field but also the practices of logistics business. Basically, Logistics is considered as manufacturing and utilization. Arose from this view, a firms logistics task was perceived to only be a fund raiser without any impact of making meaningful differences (Ballou, 2004). However, this wrong perception began to give way in the mid years of 1990s when studies on logistics focused on marketing precept for the expansiation of the logistics efficiency to deliver excellent service hence an improved customer contentment and allegiance, (Myers et al. 2004;Daugherty et al. 2007;Ernst et al., 2008). Contemporarily, the logistics sector is considered a specialize illustration of industrial development that is service based in nature, (Soosay et al. 2003)and it is concluded that an elaborate in-depth studies and research work of logistics

are needed in the area or field of supply channels relationships, (Mentzer et al. 2004;Knemeyer & Murphy, 2004;Knemeyer et al. 2004).

And to compliments this, the engagement of ICT facilities has caused significant revolutionary changes in many businesses and logistics activities is not an exemption. Many aspects of logistics which includes assets management, transport with warehousing are prominent logistics practices that fully gain from the impressive innovations and opportunities renders by ICT to outline new types of relationships in supply chain , however, with the recent engagement of ICT facilities in logistics process and practices, studies shows that there remains lack of adequate comprehension of how ICT facilities are engaged as well as the significant magnitude (Feng & Yuan 2006).

A Third Party logistics services is a practice in which a third party to a transaction, rather than the first and second parties, performs logistics activities that could be performed by either the first and second parties. In essense, the third party service provider usually take the possession and the handling of the goods but without the title and its services is provided at an agreed fee. Third party logistics illustrate the organizational practice whereby logistics activities that were previously handled internally are let out fully or partially on contract, (Bowersox, 1990;Aertsen, 1993; Langley Jr et al. 1996). Examples of areas where third party logistics are practices includes and not limited to warehousing and distribution, International and transportation management, trucking and rail.

The concepts of 3PL came to bear from the arising needs to extend transportation services by transportation industries to its numerous customers. Fundamentally, 3PL can

be refered as an outsourcing of transport and logistics activities to outside companies that are not consignors or consignees to the transaction. In most cases, more than one activities are outsourced and it includes storage, warehousing and transportation. Study of literatures revealed that 3PL came into existence in the era of deregulation of freight transport industry in the 1980s and has improved tremendiously in the 1990s along side the development of Information technologies,(Skjoett-Larsen, 2000;Lumsden, 2007).

1.2 Problem Statement

Some Third Party Logistics companythat lack the efficient ability, areincapableto senseand respondto external changeas effectiveas more efficient competitors. And base on this inability, their market share and profitabilitydecline(Padmanabhan, et al. 1997; Disney et al. 2004;Nilchiani, et al. 2009) .Contrary to this,an efficient and viable 3PL firmsthat areableto leveragetheircapabilities tocreate and execute well coordinated supplychain responses to market demands in a precise, timelyandflexiblemanner through the use of ICT facilities, in responsetomarket changes,hence a competitive advantageover competitors companies,(Zhang & Sharifi, 2000). The significanceofInformation and communication tools in encouraging efficient and healthy competitivemoveshas increased because of the merits of ICT facilities that are available forcommunication and coordination management within the Logistics and supply chain sectors (Moore, 2009).

Using ICT facilities to manage Logistics and supplychain relationshipis considered as an important approach to enhancing afirm'sabilityto forcast, sense and respond to market changes (Bharadwaj, et al., 2003;Waarts, et al., 2006) .A supplychain techniques and

plan that is able to identify and adjust to a swift changes rapidlyhas ahigher and betterpriviledge of long-term success and prosperity (Ghosh et al. 2008;Nilchiani, et al. 2009) .

The possible inefficiencies and shortcomings of supply networks are alwas evaluated by the proffesionals of supply chain to improve their ability to make delivery to customers. This is true nowadays because of the fast moving, ever changing and highly competitive environment where supply chain performance and prompt delivery of goods can place the manufacturers ahead of the competition in the ever-changing market place (Somuyiwa & Toyin 2011). As business dynamics continue to increase, manufacturers are faced with the challenges of growing global competition, reduced product lifestyles, distributed and outsourced operations and unstable demand, all of which increasingly integrate the supply chain as an inportant factors of a company's success (Evangelista, et al. 2004).

Meanwhile there exists a continuous enhancement in the role of logistics and supply chain management, many still argue about the job yet to be done. Researchers continue to take the pain in distinguishing between the successful strategy versus the ICT infrastructures to be put in place in order to remain at the edge of competition. Companies face the challenges of aligning their supply with the demand in today's complex and changing manufacturing environment. Inordinate amount of time and resources were spent by firms in an attempt to have a better prediction of their demand. They therefore outsource their Logistics activities to another firm (3PLs) specializing in

these activities. Despite this, the contemporary industrial developments has contributed immensely to the widen gap between large and small 3PLs (Caiazzo, et al. 2004).

Despite the effort put into action by organizations to creating a high responsive team that will meet the changing and increasing demand of their highly frickle and impatient customers and the companies supply chain challenges. The use of ICT is still unevenly distributed among the logistics providers leading to a sizeable frontliners dominating and controlling the market, the relationships with customers, and transportation-warehousing network and information flows (Caiazzo, et al. 2004) . Also, organization still experience delay, inaccurate information, incomplete services, inefficient operation and a high product damage rate. Based on this afore mentioned issues,this research intends to examine the impact of ICT facilities on the logistics and supply chain among the 3PLs in Malaysia.

It is the intention of the researcher to provide antidotes to most of the existing lacuna relating the use of ICT facilities in logistics and supply chain management, most especially among the 3PLs in Malaysia.

1.3 Research Questions

This study objectives focus on the influence of ICT facilities in the Third party Logistics and Supply chain management. Among numerous multi-dimensional problems facing the influence of ICT on logistics and supply chain, this study aims to look at the following research questions:

1) What is the significants of the relationship between competitive advantage and ICT selection by the selected 3PL service providers in Malaysia?.
2) What is the influence of ICT tools on the competitive advantages of the third party logistics service providers in Malaysia?.
3) What is the significant effect of the ICT tools on the selection process by 3PL service providers in Malaysia?

1.4 Research Objectives

In this research study, the aim is to investigate the influence of ICT in Logistics on third party logistics service providers in Malaysia.Basically, the objectives of this study are:

1) To assess the relationships between competitive advantages and ICT selection. by the selected 3PL service providers in Malaysia.
2) To analyse the influence of ICT tools on the competitive advantages of the third party logistics service providers in Malaysia.
3) To examine the effect of the ICT tools on selection process by 3PL service providers in Malaysia.

1.5 Scope of the Study

This research is limited to the Third Party logistic service provider in Malaysia. Also, the usage of ICT tools such as RFID, ERP, EDI and many others are to be studied. The main characterization of the companies is medium size companies with an average turnover of between 50 million -100 million Malaysian ringgit and an average size of between 120 to 200 employees. Also, an average ICT investment of 0.5 percent of the total turnover. This characterization is in compliance with the study and result of the study done by Chuang, et al. (2007) which recognize company size as key factor in ICT adoption. The Logistic activities within the manufacturing companies and fourth party logistics will be excluded from this study and the study will focus only on Malaysia 3PL service providers. This research has limitation to explore logistics practices which include among others, information communication management, inventory management, facilities and warehouses management, tarnsportation management, sourcing and purchasing. Also, excluded is the general factors that has relativity with the terms organization manageent.

In this study,the objectives and focus of investigation will be streamline to the managers and the ICT or IT managers of third party logistics and supply chain management service providers. They are the ones that assess the ICT facilities in use in each 3PL firms. Beside this, they are the one that has assess to the customer service level, activities and usage level of ICT in their firms.

1.6 Significant of the study

This study will investigates various technology systems and ICT facilities available for use in logistics companies. Hence provide means of dealing with the usual bootlenecks encountered in the 3PL system and given them edge in their competitive advantages. In addition to this, it is expected that this study will contribute by revealing the significant benefits of adoption and selection of useful Information and communication tools for the process of information exchange by 3PL service providers. It will also provide better platform to enable competitive advantages that can be derives from this process. These available information will be advantageous in the decision making of 3PL service providers.

As this study will combine both theoretical and empirical research,that is case study, it will abstract factors of adoption and selection which can make most significant effect to the services of 3PL firms. And these can be used as guide lines by managers and ICT managers of various 3PL firms.

1.7 Structure of Thesis

This study consist of five chapters and chapter one is the introduction and it discused about the background of the study, problem statement,research objective, scope of study and significant of study.

Chapter two discusses the literature reviews where details of related works done in the area of influence of ICT facilities in logistics and supply chain management shall be reviewd. The process and details of work done by logistics and supply chain services

providers shall be studied and reviewed. The formal details of the third party service provider shall be narrated and review. The use and roles of information and communication tools as engaged by this third party service providers specifically in their logistics and supply management services shall be reviewed including the selection process of appropriate tools that match up with their services and granted them better competitive advantages.

Chapter three discuses the research methodology whereby the details of the methods to be adopted in the analyses of all the variables of this topic was explained and detailed. It gives details of the quantitative methods to be used in this study to analize the variables identify in this study. It also includes the qualitative approach method adopted to verify and compliments the result of the quantitative methods which will be used as the main methods of analysis.

The chapter four of this study reveals the findings, it overview the data collection and the data analysis. The chapter gives details of the datas collected and the software to be used to analyse this datas. It reveals the full interpretation of the result after the analyses of the data.

While chapter five shows the discussion,recommendation and conclusion of the study based on the outcome of the analyses as mentioned in chapter four. The discussion of each findings based on the variables analysis results will be fully and elaborately explained. Then recommendation shall follow and this shall be according to the research output and discussion. The chapter shall be completed with conclusion.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

A critical view of past literature is an important stage of this research study. Hence this chapter outline the high level of interest in the influence of ICT facilities, most importantly in the area that concerns the logistics and supply chain management of 3PL services. The Historical changing in Logistics and supply management cum 3PL's services is well elaborated and explanation was made on different information and communication tools that can be adopted. The different stages and scope of 3PL service provider was also explained. In summary, This chapter reviews theliteratureon supplychainagility and capability of 3PL service providerandthe attendingennobling influencesof ICT facilities in their service deliveries.

2.2 Third Party Logistics Providers

The globalization idea has lead into an improved competition among companies, and this resulted in many market evolutions like an expansive varieties of products, and an increase in the quantities of some peculiar customer-oriented products, as well as a reduction in the life cycles of some products (Christopher et al., 2004). To maintain stable, competitive ability in business circle, firms commences to lay hold, specialize and develop more on those activities and practices they feel to be their core business area, and contract out the other section to specialized party (Sahay & Mohan, 2006).

This process of an increased outsourcing of non-core activities has resulted in an emerging business opportunity.

In this contemporary years, there is an increase of academic focus and publications centralized on 3PL firms. This may be due to an increase in the drift of outsourcing activities of logistics in a large varieties of business sectors (TransportIntelligent, 2004). The process and practices of fortification among the 3PL firms brings about an advent of mega firms or a conglamorate that possess the strength to render elaborate or complicated logistics solutions even on a continental as well as global scale at large.

2.3 Definition

The word Third party logistics as a term has been used interchangeably times before now. Such terms like "logistics outsourcing", "logistics alliances" ,"3PL's", "contract logistics" with "contract distribution" have been used interwovenly to explain the organisational procedures of letting-out fully or partially, all logistics services that were handled in-house previously, (Sink, et al. 1996). Logistics service providers (LSPs) as such then aspire to attain a more key role among the clients supply chain, try to expand their ranking and confines of practices with all means to sustain and accommodate the trends of changes.

Although, several definitions intend to stress explicitly different aspects of outsourcing arrangements, such as the service offering, relationships, nature and duration, the extent of third party responsibility over the logistics process, performance outcomes, and outline position or role in the supply chain. Usually, 3PL is associated with the offering

of multiple, bundled services, rather than just a singular role of transport or warehousing functions. In the contemporary ages, 3PL contracts are established on formal contractual terms, which can either be short or long term contrary to on the spot procurement of logistics engagement (Murphy &Poist, 1998). 3PL is also identify as the management, control and delivery of logistics activities on behalf of a shipper by an external provider (Dogru, 2010;Kildow, 2011).

The influence of ICT facilities in the services provided by this 3PL companies can not be over emphasize as it encourages the management of interrelated flow of major informations among all actors in the 3PL organization service production process. ICT shows significant values in improving logistics practices in a unique context. In compliance to this view, (Sauvage 2003) opined that in a very aggresive business environment,the features includes among other, time compression, a critical technological effort and an indicative alter of services in logistics facilities as offered by the providers.

Van Hoek, (2002) designate a specific influence of ICT for 3PLs service providers that target a unique operation performance for end users services hence gain a certain competitive advantages over others. The efficient incorporation of specified technological capabilities can as well result in the services of both transport and logistics service leverages resulting in the facilitating of more effective integration among companies in the logistics and supply chain services. In addition, ICT can facilitates increase in products suprintendent and aggressive lead period. This will bring about a situation whereby competitive advantage in the 3PL firm sector will be founded on ever

increasing of utility creation for end users. This was established in such that many value added activities are depended on ICT applications either directly or indirectly(Crowley, 1998).

Presently, the term 4PL has also appear signifying more ameliorate contracting arrangements, this, as subsantiated by (van Hoek & Chong 2001: p. 463) gives defination of 4PL asa supply chain service provider that get involve in supply chain co-ordination more than operational services. 4PL is view as a highly information based and monitors multiple asset-based players on behalf of its clients.

Noteworthy also is the fact that some authors supply a broader definitions of the 3PL industry, to include freight forwarders and shipping lines as established by (Rao &Young 1994). Customer-oriented 3PL firms that specialise in the provision of several ranges of logistics activities and are well-recognized as key enablers of their customers service-related competitive advantages in most developed economies (Soh, 2010;Cui, et al. 2012).

2.3.1 Different Type of 3PL Service Providers.

Various studies categorise 3PL service providers into four different categories and they are as described below;Standard 3PL service providers: This is considered as the fundamental type of 3PL service providers, their choice of activities involves pick and pack,warehousing and distribution business. Often, majority of the firms in this category are not focusing on 3PL services.

3PL service providers: In this category are the 3PL firms that offers their customers advanced value added services which involves tracking and tracing, specific packaging, cross-docking and at times unique security system. According to Vasiliauskas and Jakubauskas (2007), a strong foundation and focus on economies of scale and scope will provides means for this type of 3PL service providers.

The third category of 3PL service provider is the Customer adapters: This type of 3PL takes over all logistics services of the firm at the request of the customer. Their involvement improves the logistics system of the customer firms though without any new service development. The customer data base is always a small size.

The last category of the 3PL service provider is the Customer developers: This category provides way for the 3PL service provider to involve itself with the customer and take over all logistics function and activities. They normally perform an extensive functions on behalf of the firm but usually have few customers, (Skjoett-Larsen, 2000).

2.3.2 Benefits and Risks of Third Party Service

Many benefits acrue to 3PL services can be classified into three main categories which involved strategy, finance and operations related. It is established that 3PL services which is otherwise refered to as out-sourcing non strategic activities of a firm enables organization to focus on core competencies and engage external logical expertise (Sink & Langley 1997). Also, 3PL service providers can as well contribute to improved customer's satisfaction and provide access to international distribution networks as established by (Bask 2001). In most cases, users of 3PL enhance their market flexibility i.e investment and demands changes i.e volume. Yet, lack of responsiveness to customers needs is also cited as a problem of outsourcing,(van Damme &Van Amstel 1996). However, the most cited risks is associated with loss of control over the function of logistics and loss of in-house capability and contacts of the customers (Ellram & Cooper, 1990). A mixed strategy is normally employed regarding logistics and then important logistics activities are retained by the firm, such activities as order management, (Wilding & Juriado, 2004).

In furtherance to this, 3PL services in logistics offers many other cost related advantages as well, this involves reduction in asset investment and maintenance of labour and equipments (Bardi & Tracey, 1991). The 3PL services option may be chosen to give an impression of in-house costs and serve as an external benchmark(Van Laarhoven, et al. 2000).

In respect of Operational advantages and problems of 3PL service, there is a reduction in inventory levels, order cycle times, lead times and improvement in customer

service,(Bhatnagar &Viswanathan, 2000, Song, et al. 2000). Worth of mentioning are some problem that have been cited that are peculiar to 3PL services. In respect to service performance, distruption to inbound flows, inadequate provider expertise, loss of customers feedback and lack of knowledge to deal with customers need of special product needs (Gibson & Cook 2001;Svensson, 2001).

2.4 3PL Agility and Strength.

It is a well known fact that in this generation volatile markets, modern 3PLfirmsservice providers are confronted withglobal competition, rapidchanges ofcustomers demand,and a continuous increase paceof technologicalchanges (Overby, et al. 2006, Ganguly, et al. 2009). These throw them into some challenges and threaten their capacity to establish and maintain a competitive advantage.Based on these prevailing conditions, the strength of logistics and supply chain service providers abilityto perceive changes in market and make quick response to the changes efficiently becomes an important issue to logistics and supply chain service providers success. Based on this sensitive business environment, the ideaof "agility" and "Competitive advantage"has evolvedas a priviledgefor firms to address uncertain and turbulentmarkets situations (Ganguly, et al. 2009).

For better understanding of 3PL's logistics and supply chain management, there is need to take a deep look on the agility and ability of this special firms called 3PL firms. From literature, the idealogy of firms agilityemancipated from themanufacturingsector sinceearly1990s.In successiveresponse to a congressional request on regaining U.S. manufacturing competitiveness, (Nagel & Dove 1991) edited a book published by theIacoccaInstitute report21stCentury ManufacturingEnterpriseStrategy:AnIndustry-LedView".In thereport, an agile manufacturing firm was defined as the manufacturing ability to shift swiftly among products in line with changing market needs.

Agilemanufacturing was seen to be more focusedon flexible technology, theskill baseof aknowledgeable work force,and innovativemanagement structures (Kidd, 1995).

Sincethe origination of firmsagilityas a conceptin theearly1990s, severaldefinitions havebeen developedleadingto a lack of consensus. Although, thereis not agreement on a single definition of 3PL firms agility, thereis a common focus on the firmsabilityto sensemarket changes andrespondto these changes inatimelymanner. Goldman (Goldman, et al. 1995)definesagilityas respondingto the rapidlychanging,fragmented global markets forhigh-quality,high-performanceand customer-configuredgoods andservices.

While (Kidd, 1995)describes theagile corporation as fast- moving, adaptable, androbust with the capabilityto quicklyreconfigurein responseto market opportunities. Meanwhile,(Zhang & Sharifi, 2000)describeagilitycapabilitiesthat a firm requires in order to respond to a changingmarket includingresponsiveness, competency, flexibilityand speed.(Yusuf & Adeleye, 2002)defineagilityin terms of asuccessful responsecharacterized byspeed, flexibility, quality, innovation proactivity, and profitabilityusingreconfigurable resources and aknowledge-richenvironment to provide customer-driven products in a rapidlychangingmarket.

The abilityof the firm to respond rapidlyto changes in demand in terms ofvolume and varietyis definedas agilityby(Christopher 2000).Usinga perspectiveof physical and intellectual ability, Dove,(2001)describesagilityasa firms responseand knowledgemanagementability, that is, decidingwhatto act on. Swafford (2003)explainedagilityas the firmsabilityto respond quickly, efficientlyandeffectivelyto market changes.

In reference to an elaborativeliterature reviewon supplychain agility,Li et al. (2008) madeprovision foraunifyingdefinitionofagility. He stated thatagilityresults in integrating the sensitivity to changes with the commensurable strengthto leverage resources to respond to the changes and allin a timely and flexible manner.Similarly, Overby etal.(2006)defines agilityas the abilityto persive environmental change and respondreadily and promptly. In like manner, Haeckel(1999)explained that the sense-andrespond organization that involvesin an adaptive loop incorporatingenvironment change sensing, interpretingthesechanges,decidinghow to respond and actingontheirdecisions.

2.4.1 3PL Different Attributes

Basically, three major primary competitive benefits has been identify that is perculiar to 3PL service providers and these are cost reduction, quick service delivery reduced cost, and augument reputability (da Silveira, 2005;Voss, et al. 2006). The contemporary development as per supply and chain management reveals that a new paradigm is emerging based on a more vibrant and highly technological cum sophisticated supply chain (Melnyk, et al. 2012).

2.5 Logistics Supply Chain Management Services.

Supply chain management was explained as a series of interwoven activities which incorporate planning, coordinating and controlling materials, parts and finished goods from both suppliers and customers(Stevens, 1989). It actually consist of the geaographycal distribution of facilities and transportation links connecting all these

facilities. In such services as retails and delivery services, the supply chain is minimise to a peculiar challenges of distribution logistics whereby the starting point is the finished product that has to be timely supply to the client in a jiffy. Not same as in pure service operation, like a financial services firm or a consulting operation services whereby the supply chain is principally the flow of information (Bowersox, et al. 2002;Christopher 2012).

Supply chain management focus on improvement of performance through elimination of time and resources waste and gear towards the effective and efficient use of both internal and external suppliers capacities and technology know-how. Hence creating a seamlessly coordinated supply chain hence elevating inter-company competition to inter-supply chain competition.

Meanwhile, Logistics management is that integral part of supply chain management that focuses on the planning, implementation and efficient control cum good storages and forward and backward flow, service with accompany information beginning from production point to consumption point so as to meet customers requirement. (CSCMP, 2006). Logistics is believed necessary for production and consumption points connection.

It is also judged traditionally important for creating links between the production and consumption. Basically, firms logistics practices was only observed as a costs creator without any impact of meaningful differences, (Ballou, 2004). The change came to the fore in the mid years of 1990s as logistics research based on marketing principles began to analyze the capacity of logistics to deliver quality and thus produce greater customer

satisfaction and loyalty (Mentzer, et al. 2004;Richey, et al., 2007). And according to study, the contemporary logistics sector is a typical industry based on services development (Chapman, et al. 2003).

Due to the increasing globalization of market in nineteen centuries, Logistics and Supply chain service providers comences to see logistics far beyond a process of cost saving but source of products enhancement of services offers. And as part of elaborate supply chain procedures to consolidate competitive advantages (McDuffie, 2001).

The inclusion of service and concepts of marketing links concepts has influenced both the academics and business perspectives of logistics services and supply chain management services significantly. It begins withadiscussionofthe evolution of 3PL's agility, the theoretical andempirical research on 3PL agility,and the enablinginfluence ofICT in logistics and supply chain service providers alertness and capability.Theremainder ofthis chapter discusses the literaturerelated to theconceptual model for this study. Most importantly and specifically, sensingmarket changesin terms ofinformation qualityand swift response tomarket changes in terms of supplychaincollaboration through the use of 3PLs areinvestigated.

Theliteratureaddressingthe market, firm, and supplychain factors influencing agility and competitive advantageis reviewed as well. In thischapter controversiesand knowledgegaps inboth thetheoretical andempirical literature areidentified and theirimplicationsforthis studydiscussed. Logistics executes major influence in shielding any product prestige by means of proper channels of transportation, storage and handling within the supply chain until it finally get to its final destination (Tieman

2006). Logistics service management comprises gathering, alliance, storage handling, benefit added,track and trace cum movement and storage monitor of products. Based on this, Logistics and supply management service providers engage in a substantial role to realize this goal for all sectors.

The influence of ICT facilities in all the aforementioned activities, functions and services provided by this Logistics and supply chain management is very important as monitoring integrity of any product is very germaine but many researcher observed the potential of ICT facilities to make a remarkable difference in logistic activities (Tieman 2009). According to Malaysia logistics Directory,(Malaysia, 2011), it reveals the theory of adopting visibility technologies for security management purposes such as radio-frequency identification(RFID) and global positioning systems(GPS) is certainly very new despite the fact that the demand by logistics end-users who expressed their interest in the use of RFID and GPS as forms of logistics security management is actually high.

The use of technology in logistics is presently focused on warehousing, bar coding and transportation management systems. As at present time, it is estimated that only 35% of logistics service providers are using the technologies in Malaysia. The low adoption of RFID system may be as a result of initial high capital intensive cum level of maturity across the region ASEA, Malaysia inclusive, (Malaysia, 2011).

Information and communication technologies performs an all important influence in the process of giving effective, efficient and unique services, products and packages for the better satisfaction of their various customers. The ever increasing importance role of ICT in Logistics and supply chain management presents two major positive and

negatives options for various organizations. These may be either positivelly pursue the costly and problematic processes of attaining the position of value added organization or company through an extensive use of ICT tools. OR on the contrary, to overcome in the low-esteemed cost world of service providers, (Evangelista & Sweeney,2009).

The influence and usefulness of ICT facilities in the management of supply chain operations has witnessed true revolutions over decades (Closs & Xu, 2000;Ballou ,2004). The concepts was revolutionalised most importantly in the category of companies affinity, (Parasuraman & Grewal, 2000;Chen & Dwivedi, 2007). In this concept, the structure of the idea was reframed to collection and collation procedure and dissemination to enhance decision making process in both the supply chain management and internally(Angeles, 2000). As Lewis and Talalayevsky suggested in their study (LEWIS & Talalayevsky, 1997;Bharadwaj, 2000), that information management does not have to follow the same structure path as the physicalflow path.

Information and Communication technology can be used to reduce the channels, the intermediaries, and generating immediate and direct connection with the customers in refrence to ICT (Álvarez, s et al., 2004). The aspect of reducing communication channels actually increase relay of communication and reduce transmission costs of information as established by (Christopher, 2012). The important process of information and physical flow differentiated management brings about ease of optimization of each information separately hence enhance company productivity. Logistics information system (LIS) is the means of doing differentiated information management. LIS can means an interactive structure consisting of people, teams,

methods, and controls that altogether provides the needed knowledge to establish a footing verdict on planning, implementation and control, (Casanovas & Arbós 2001).

The LIS benefits lies in its amplitude to convert data into purposeful, relevant and important knowledge to expedite business management (Introna, 1993;Wu, et al., 2006). Another important aspect is the external perspective of information management which is considered as the most relevant characteristic of Information and communication technology technology logistics. Logistics duty has an obvious inter-company attributes to the level of relating with other relevant agents in the supply chain procedures like the suppliers and also the customers (Ballou, 2004). This interaction can be better and better when logistics activities are subcontracted to third pary,such as 3PL service providers(Heras, et al. ,2001).

The need and importance of external interaction makes the process of collation and dissemination of knowledge organization more essentials. According to study, it is a question or matter of establishing inter-organization knowledge systems to enhance a firms rivary through dissemination of concurrent information (Sánchez, 2002).

Based on extensive review of literature, there are some and most widely used or applied ICT facilities in logistics and more importantly to improve the quality services of Logistics and supply chain management(Feng & Yuan, 2006). The software include but no limited to the following;

Business software called Enterprise resource Planning- This software gives firms the opportunity of planning and controlling of all the required resources for the collation,

processing, forwarding and detailing of customers orders which complied with manufacturing, dispersion and services firms, (Huang, et al. 2008).Software for planning material resources-This is engaged for the optimization of materials needs and planning, (Bardi, et al. 1994).

Software for interchanging of electronic data- this is for transmission of telematics information in a standardized style from a firm system to another firm's system. This system eliminates manual interference which can come up through a network managed by a third party, (Sánchez & Pérez 2005;Leonard & Davis, 2006).Software for transport optimizing technology. This is a normal software for planning routine. E.g. GPS.

2.6 ICT and Factors Influencing ICT Adoption by Malaysian 3PL Service Providers.

The generalize engagement of ICT facilities has brought a greater and high level metamorphosis to various business transaction which includes logistics, management procedures for stock and placing of order, warehousing and hauling seems to be main strategic practices that can gain the betterment of innovations presented by ICT facilities to expedite a new supply chain relationship channels. Relative to the present implementation procedure of ICT facilities to strategic management, yet there are still lack of deep understanding of ICT facilities application and their influences,(Feng & Yuan 2006).

The economic growth and development of Malaysia as a nations cut across all sectors. The interelated links of all this sectors in booming the economic of the nations brings

about some major challenges most important out of them is the transportation industry. The transport industry is consider as one of the major industry in Malaysia economy. It is considered that the economic influence of this industry can not be over emphasised with main links to both manufacturing and services sector of the nation. Based on this known fact, the issues of liberation and globalization factors coupled with competitive advantages over each other brought about ever increasing pressures on Malaysian producers and manufacturers to reduce time of geting goods to market, marketers and and buyers, also improve customer service levels, improve quality of service and comfort to the customers as well as offer more product varieties.

Moreso, its require of producers and manufacturers to improve their agility to maintain competitiveness domestically at the same time source for means to exploit a big and expanding ASEAN and global market.To be at breath with all these, adoption of ICT in logistics and engagement of third party logistics service providers is considered a necessity and this is in tune with studies done in the past by Byrd and Davidson (2003) and Power (2006). In their studies, they both described the effects and potential gains of adopting ICT logistics and supply chain management as peculiar also to third party logistic service providers.

ICT is regarded as a tool for effeciency and to improve the effectiveness as well as the competitive advantages of an organization, in this case third party logistics service providers. Some analyst considered it as critical to cost reduction and influence the competitive advantages of 3PL service providers and most importantly those service

providers that compete with countries with lower production cost within the ASIA region.

As a result of increased competition in year 2000 when market become globalized and dynamic, customers becomes more demanding hence request for more varieties of more goods, better qualities,high reliability and most importantly faster delivery. Also, the fact that product life span is more reduced yet more proliferation of product as well as faster rate of technological developments (Li & Lin 2006). Logistics services is characterized with a lot of complexity as a result of multiple relationships and interaction among stake holders partners. These interactions have not only been considered complicated by their volume and variation in processes but as well as complexity inherent in the dependencies that exists among parties relatively to time and space (Power 2006). He was of the opinion that companies also find it so difficult to work with global partners due to language barriers and time difference factors.

Studies shows that, the use of ICT for most of the elements involved in logistics services including procurement and communication, data exchanges and supply chain running, become faster. ICT has an important influence in the sucess of logistics and supply management contrary to what is obtained in the past when there were difficulty in obtaining information because of lack of accessibility to receive or to send such information on time (Power & Simon 2004). It is a well known fact that for third party logistics service providers to keep abreast with global competition, logistics and supply chain firms usually communicating with each other. It is a developmental required of all memebers of logistics and supply chain management firms to coordinate their

production and logistics activities . According to Sanchez and Perez (2003) as quoted by (Kamaruddin & Udin 2009), this type of co-ordination can be facilitated by supple chain technology, which includes all the ICT facilities, particularly when these technologies are used to span the traditional boundaries of supply chain firms.

2.7 Benefits of ICT adoption by 3PLs Firms in Malaysia.

New technologies and modernization are persistently changing and recuperating the manner of doing thing and approach problems. Today, ICT and the application and the services shore up touch human live every second. ICT has aided practice, institutions, and industries around rethought and redesigned. In the modern decade, supply chain ICT plays an significant role in supply chain management, especially by 3PLs. It wisely afford link between people, processes, data, and things. It is clear that supply chain ICT proffer higher benefits such as presenting new ways to produce value by better and more resourcefully arrange the use of physical, information, financial, and human resources. As illustrated in the Global Information Technology Report (2013), supply chain ICT by 3PLs firms would established a positive force on short and long term performance, and the new supply chain ICT adoption further move forwards the growth effects of the supply chain management.

As pointed out by Mentzer et al, (Mentzer et al. 2000), amongst benefits from implementation of ICT resources by 3PLs firms in Malaysia in the supply chain are: a) incorporating a worldwide enterprise with its universal supply chain network, b) connecting the various tiers of a supply chain, c) Speeding up information flow from and to organizations across the supply chain, d) Breaking down barricades between

organizations in the supply chain, and e) changing the huge quantity of data flowing in the supply chain into valuable concerted information. Additionally, the use of technology, particularly information technology (IT) and information and communications technology (ICT), can be manipulated and integrated in all these facets such as high disintegration, large waste, poor productivity, cost and time overruns, as well as arguments and disagreement for a long time, since it can assist proficient information flow as well as check the accomplishment and relationships between each unit in the supply chain.

The information and communication technologies (ICTs) in Malaysia, particularly the utilisation of internet to practice online business is fast turning things around compare to the contemporary way of business interaction among brick and mortal companies. In the face of the strong waves of globalization and liberalization all over the globe, ICT is perceived to be the most cost-effective instrument to assist companies gain bigger markets and the capacity to contend with larger organizations in alluring customers to their products, services and information (Tan et al., 2009). This is in tune with the benefits accrue in internet which includes speed, user-friendliness, low cost and world-wide accessibility which has enabled electronic commerce (e-commerce) to be increasingly disseminated globally, converging many nations together into a global networked village economically (Gibbs and Kraemer, 2004). The continuous and growing interest in ICT adoption is also attached to the exponential increase in the number of users of internet globally, with a larger sunk of the increase reportedly from users in developing countries specifically in the Asia Pacific as compared to the USA and the European regions (International Telecommunication Union, http:// itu.int/ITU-

D/ict/statistics). Certainlly, it has been established that countries with higher GDP per capita, literacy rate, well-established telecommunication infrastructure and political stability will enjoy higher internet dissemmination. That depict why advanced economies such as Hong Kong, Singapore, South Korea, and Taiwan lead Asia in internet development, closely followed by countries like Malaysia, Brunei, and Thailand (Hao and Chow, 2004).

In Malaysia, for instance, it has been highlighted in the web site of Malaysian Communications and Multimedia Commission (www.mcmc.gov.my) that the intrusion of internet in 2007 is almost half the size of the population (47.8 percent of 28,294,120 people) as against only 3,700,000 users in the year 2000 (International Telecommunication Unit, www.itu.int). The strong development is as a result of the initiatives took by the Malaysian government. For instance, the Seventh Economy Plan (1996-2000) serves as goldplate to the country's serious attention on the important growth of infrastructure and environment of ICT so as to ensure that they are in place to allow the country to grow switly into the millenium age of information. Actually, the venture in ICT in Malaysia has blown up at a rate of 9.2 percent per annum from RM 3.8 billion in 1995 to RM 5.9 billion in 2000 (Economic Planning Unit, 2001). Such efforts have been continued and enlarge to the small and medium enterprises (SMEs) in the Ninth Malaysian Plan (2006-2010) where different funds have been made ready for ICT growth in these enterprises.

Further more, the National Information Technology Agenda was established in 1996 to assist in the provision of an ICT framework to develop Malaysia to become an

information and knowledge-based hubs by 2020 (www.nitc.org.my/index.shtml). The ICT industry received extral boost when the Multimedia Super Corridor Malaysia (MSC Malaysia) project was notionalized in 1996 to accelerate the process of transformation [for more information, see Chong (2006)]. The MSC Malaysia suggested an ideal development environment for the ICT SMEs including 3PLs to Change themselves into global oriented companies by means of different incentives make available under the Promotion of Investment Act 1986. As of March 2008, there are 2,006 MSC Malaysia-status companies, whereby more than 70 percent of them are owned locally, largely SMEs (MSC Malaysia web site, www.mscmalaysia.my). Summarily, in many countries, the efforts played by the government and the increasing number of internet users have far-fetched implications to SMEs firm including 3PLs, agitating on using internet-based ICT to reach out to bigger pool of potential customers locally and worldwide.

2.8 Usage of ICT by 3PL and the Competitive Advantage.

In the word of Porter and Millar (1985), competitive advantage arise when a company is having the ability to deliver the same benefits as competitors at a very low price or in another sense deliver certain benefits that surpass those of the competitors' products or services. In the view of the same author, competitive advantage is at the centre of any strategy and in other to achieve such, there must be a decision to make choice. This choice is categorise under two broad base perspectives. The first perspective is associated to the type of competitive advantage that the company seeks while the second is more related to the scope within which the firm intend to attain it.

Porter (1985) opined that there are three specific strategies for creating competitive advantages. The first of it is refered to as 'the cost leadership' in which the firms attempts to become a low cost producer in their field. But, this type of firm will be advised not to sideline the fundamental principle of differentiation. The second tactic is termed 'differentiation'. In this type of tactic, firms endeavour to be exceptional in each sector by offer products and services that their competitors are not able to provide. The third strategy is named 'focus' and in this,the firms opt for serving a section of the market or group of customers and adjust their services for this definite sector. In all these three segment, none of it is suppose to be neglected for another.

Consequense of poor tactis tends to be in the increaseas firms desire to generate competitive advantage in the global market location. For instance, if firms decides to establish competitive advantage relative to low cost,they should bring to their focus that low cost strategies may diminish the quality of the products and services asestablished by (Whipple & Roh 2010).

More fundamental truth is that the main factor which dictate firms or companies success and their competitive advantage is called innovation. Due to the global marketplace dynamism, firms are forced to look for alternative innovations, as expressed by (Flint, et al. 2005). Another factor is the issue of collaboration which leads to effectual supply chain and can yield definitive core capabilities. Good collaboration is a factor that assist firms and companies to gain competitive advantages. It involves such activities which are listed thus; information sharing, joint planning, joint problem solving, efficiency, profitability and effectiveness. (Min, et al. 2005).

In another perspective,the development of a competitive advantage is becoming difficult in the face of existing hyper-competitive, complex global market environment (Yazdanparast, et al. 2010). The authours goes further to suggest that logistics companies can attain competitive advantage through co-creation of logistics services with their customers.

In addition, ICT has been adjudged an important component of 3PL competitive advantage, (Evangelista & Sweeney 2006). Moreso, firms operations and their social consequences have fascinated the attention of government, activists and media. Many organization ranked companies based on their social responsibility and this actually do attract substantial publicity. If firms are able to make do of their social responsibility in an effective means, they generate opportunities, innovation and competitive advantage (Porter & Kramer 2006).

Supply chain management and logistics has been seen viewed by many companies as a major source of competitive advantage hence the acceleration of information flows along the supply chain multiple levels. This makes the system of logistics and management more flexible, logical, effective and efficient for quick response to changes in the market (Evangelista, 2002). The use of ICT by 3PL service providers is seen as an effective management of Complex Supply Chains.

The usage of ICT by 3PL expedite the management of major information flows to good flows among all stakeholders in the production services of an organization. For instance, in the study conducted by Forrester Research, it was revealed that U.S. manufacturer depends on ICT or IT increasingly to achieve some of their functions to stay and be

stable in business, such function includes among others, supply chain agility improvement, recycle time reduction, higher efficiency and products delivery to customer at the apporiate time schedule,(Auramo, et al. 2005).

Likewise, the use of ICT by 3PL in supply chain management resulted to integration of interorganization, according to (Fasanghari, 2008). The integration involves information sharing and processing across organization boundaries. Systems such as internal ICT systems like Enterprise Resource Planning ERP, Radio Frequency Identification RFID, can effectively be used to integrate an interorganization system.

Currently, in the supply chain industry, overabundance of ICT applications for individual 3PL service provider have been developed hence adoption and selection of such that fits into the system of operation of individual firm for better competitive advantages.These abundant ICT tools are generally classified into three major areas as identified by techtarget in their publication(Rouse, 2014).

The first category of ICT applications are the one that support the management of one link in the supply chain process i.e at the store link, the Warehouse Management System. This target to back up the capability management of goods stored through optimization of warehouse space as well as the factoring in of regulations that maximize the shelf life of goods and products. A wireless networks could link warehouse staff using either handheld terminals and forklift with real-time picking systems. Using this system, it will enables placed order to be filled easily without any delay in contrast to manual handling.

The second category is refered to as the best breed solutions of supply chain management using ICT. The aim of this category is to integrate the best of firm's existing point solution. The demerit of point solution in supply chain management is that various system in use may likely not communicate adequately, and may use different data base and lack of high connectivity. Situation which can result to "Island of automations meaning a condition whereby there is poor interfacing. A data translation technology has been adopted which make use of best of breed approach.

Another category is the Enterprise solution of Supply Chain Management based on Enterprise Resource Planning ERP, this came into existence since 1990s. This involves change in computer systems from inventory centered and systems focused on customers service. ERP make an attempts to integrate all the departments with functions across a company into a single unit computer system that is capable to cater for all the departments needs. The strong merit of ERP is that instead of traditional means of each department to possess their own computer system and optimized for the particular way the department perform it function, ERP unified them into one single integrated software programme that make use of single database so that various departments in the firm can share information and communicate with ease.

2.9 Summary

This Chapter present the literature review of major previous studies that focuses on the influence of ICT facilities in the services related to strategic and management of supply chain. The review of past studies of Third party logistics and supply chain management service firms is also presented. The advantages of 3PL service providers is reviewed with the influence of ICT facilities, the rate of adoptions and the eventual competitive advantages gains as a result of the adoption of the well recognized ICT facilities are all reviewed according to literatures.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter will discuse the methods of research employed in this research study. The research framework which related to facilities of information and communication, Third party logistics providers and their agility or strength and competitive advantages of third party logistics firms. The general factors responsible for the selection of Information and computer facilities in the process of Logistics and supply chain services of third party logistic provider was presented in this chapter. Then a broad based discussion on the population and sampling cum the approach of collecting data will be presented. In this study, quantitative approach of data collection will be used to analyze the level of ICT facilities selection by third party logistics service providers and the resulting effect on the competitive advantages of such firms.

3.2 Research Framework

The study will focused on three main areas which borders on the relationship between ICT tools usage and competitive advantages, relationship between speed and competitive advantage and relationship bewteen accuracy and competitive advantages.

Roger's model as adopted by (Tan, et al. 2012) will be used and factors considered and focused are potential advantage, compatibility of the facilities, complexity of the ICT facilities, Usage Speed, Accuracy and Cost i.e how effective it is costwise, the selection and integration. All these Four factors shall be considered as independent variables to be

used to test the agility and strength which determines the competitive advantages of Third party logistics and supply chain providers. The competitive advantage of 3PL shall be considered as the dependent variable, selection will be consider as the intermediate variabe and all the aforementions such as ICT facilities Usage, Speed, Accuracy, Quality and Cost shall be taken as the independent variables.

Specifically, the modeltested empiricallythe extent to whichICT facilities improves the competitive advantage of 3PL service provider in terms of logistics and supply chain activities to respond to the factors that militate against the selection of such ICT facilities. Selection of appropriate tools was then added to the model as a factor that can determine the competitive advantage of 3PLs service provider. The model tested the selection and integration of these various ICT facilities by 3PL service providers with the improvement in their competitive advantage.

3.3 Research Process Desigh

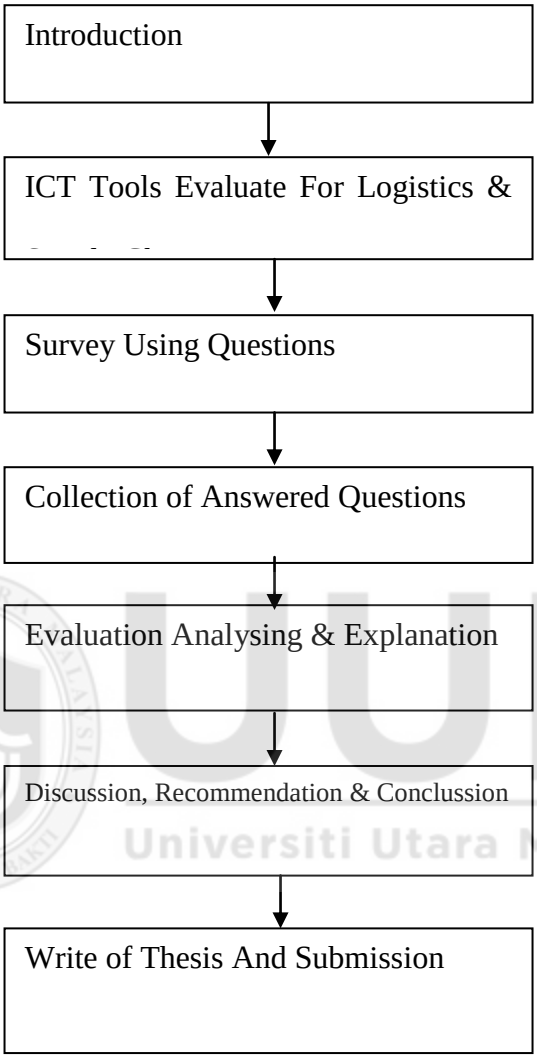


Figure 0.1 ***Research process***

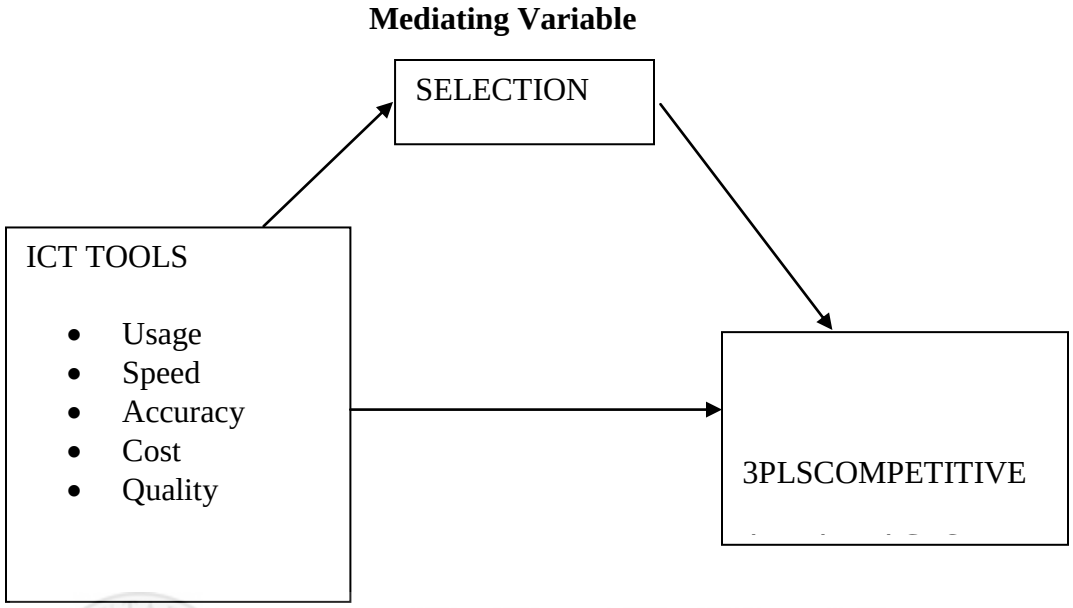
3.4 Conceptual Framework

Conceptual framework, according to (Abidin, 2005), is aimed to give an assessment of research purpose,develop and select relevant questions and methods in research design. In the light of literature review on factor affecting the selection process of ICT tools, a conceptual framework was designed as shown in the Figure below. The research study adopt IS or IT adoption and diffussion models for Logistics supply providers and identify the important factors that may affect the ICT selection process.

Four attributes factors from Roger's model as adopted by (Tan, et al. 2012) are relative advantage, compatibility, image and cost effectiveness, complexity. All these will be used in this study to verify the aforementioned factors affecting the adoption of ICT facilities. These are also categorized as the compatibility and relative advantage variables of ICT as per the level to which the adoption is discerned.

The conceptualmodel designedforthisstudyis founded upon the level to whichICT facilities selection enhance the competitive advantage of 3PL service providersand the assessment of the factors that contribute to the selection of the available ICT facilities. Specifically, the modeltested empiricallythe extent to whichICT facilities improves the competitive advantage of3PL service provider in terms of logistics and supply chain activities to respond to the factors that contribute to selection of ICT facilities. Selection of appropriate tools was then added to the model as a factor that can determine the competitive advantage of 3PLs service provider. The model tested the selection and integration of these various ICT facilities by 3PL service providers with the improvement in their competitive advantage.

ConceptualFramework



Independent VariableDependent Variable

Figure 0.2*A conceptual diagram of a conditional process model:of Tan, et al 2012*

3.5 Formulation of Research Hypotheses

The hypotheses of this study was developed based on the extent to whichICT improves logistics and supplychain agilityand its impact on 3PL firm's competitive advantages. Specifically, the modeltested empirically,the extent to whichICT improves thequalityand competitive advantages of 3PLS firms. Response of firms towards changes in market and operational methodology communicated throughout the logisticssupplychainby means of ICT facilities leading to improves competitive advantages. Thesupplychains abilitytorespond to market changes byplanning and executing a coordinated response.

H1: 3PL makes use of effective ICT facilitiess to achieve the competitive advantage in logistics and supply chain services.- These hypothesis is to be used to assess the relationship between ICT facilities and the competitive advantage of 3PL service providers in logistics and supply chain.

It will involve Null Hypothesis (Ho): There is no significant relationship between the use of ICT facilities and the competitive advantage of 3PL service provider in logistics and supply chain.

Alternative Hypothesis (H1): There is a significant relationship between the use of ICT facilities and the competitive advantage of 3PL service provider in logistics and supply chain.

H2: There is a relationship between speed and accuracy of the selected ICT facilities and the competitive advantages of 3PL service providers.

Null Hypothesis: There is no significant relationship between the speed and accuracy of the selected ICT facilities and the competitive advantages of 3PL service provider.

Alternate Hypothesis: There is significant relationship between the speed and accuracy of the selected ICT facilities and the competitive advantages of 3PL service provider.

H3- There is a relationship between quality and cost of the selected ICT facilities and the competitive advantages of 3PL service provider.

Null Hypothesis: There is no significant relationship between the quality and cost of the selected ICT facilities and the competitive advantages of 3PL service provider.

Alternate Hypothesis: There is significant relationship between the quality and cost of the selected ICT facilities and the competitive advantages of 3PL service provider.

3.6 Research Methods Design

Research design aims is to build the mechanism to assess, investigate and analyze research questions for an expected output. And according to study,(Hittleman and Simon 2002, Suter 2011) its to ascertain the reliabity and viability of the data collected in the area of answers the question raised in the study without any ambiguities in the research study.

Literature review has actually made simple the possibility to present a conceptual meaning and explanation of all variables under this study. And through this, an establishment of accurate scales for evaluation of these variables will be done.This research shall make use of both quantitative and a research method refered to as case study shall be used for data collection and analysis. The main reason behind the decision to choose this type of methodology is to present a quantitative data that produce a substantive data which will be used to established and analyse the variables highlighted.

To compliment this, case study enables us to understand in-depth situation of the cases from respondent point of view by the engagement of multiple sources of data (Yin, 2009). As this study aimed and focused on the roles of ICT facilities in the logistic and supply chain management and case study of 3PL service provider, then an exploratory

case study approach is employed. According to study, a research that is an exploratory in perspective like this study is certified to be more appropriate (Yin, 2009).

This multifacet research study explores the roles of ICT facilities in logistics and supply chain management focusing on the adoption, selection and integration of such tools to yield an added competitive advantage of 3PL firms.

The first stage of this research study shall be by identifying the companies to be studied,that is the established registered 3PL's service firms in Malaysia. This will be followed by a quantitative study on the various 3PL service provider's firms and this will be done to provide a first proposal for a questionaire. Third party logistic service provider firms shall be sourced out of a pool of Malaysia benchmark third party logistic industry as potential case candidates. It shall comprises of all third party logistic providers that are using ICT facilities and those that are not using ICT facilities in their logistics and supply chain services. Top management officers were to be interview to provide data based on their various experience for the purpose of this study.

The questionaire will be assessed and the reliability checked using a pre-test as this opportunity for some of the scales used to be scrutinized. Then there will be an adhoc questionnaire which allow some data collection through personal interview on field work. The expected sample shall be targeted to be between 120 and 175 companies around Malaysia and they will be contacted through e-mails and telephone calls as the case may arise to organize a meeting for the one-on-one interview. The targeted group in each company are their Managers and the IT or ICT officers.

There will be characterization of the companies to be examined and it shall be small, medium and large scaled sized companies that are having an average turn over of Rm5million-30millions and between 20 to 100 labour force with about 0.5% of the turnover on ICT facilities investments. This will cut across all business sectors in Malaysia. This characterization is in perfect compliance with the outcome of a study conducted by (Chuang, et al. 2007;Saura, et al. 2008) in which identification of firm's size is a key factor in the adoption of ICT.

The pre- test questionaire shall be collected and use as a data to be analyzed using SPSS software and then case data shall be collected basically by structured interviews with managers and the IT or ICT officers of these companies. Aside this, when the need arises, telephone interview with other execitive officers of the companies may be conducted to supplement the informations that are gather from the managers and IT or ICT officers during the personal interview to ascertain the autenticity of such informations. Further more, for validity and reliability purposes, participants verification of all summaries of various findings of each interview shall be done at the close of each interview session beside the use of structured guidelines that were to be used for all the interviews.

3.7 Research Population

In doing this study, the researcher need to make sure the existing population first before spreding the questionnaire. Resercher's population is a large collection of individual wanted to analyse. In this study, the population which will be analyzed are the organization that logistics practices which include among others, information

communication management, inventory management, facilities and warehouses management, tarnsportation management, sourcing and purchasing . In driving this study successfully to achieve the reserch's objective , a survey carried out to the 1-5 employees and practitioners that work in the 3PLs in Malaysia

3.8 Sampling Data

Sampling denotes selecting a certain proportion of individuals from the overall population of study subject and which must be able to represent the features and characteristics of the study subjct. The benefits of using this samples include and not limited to lower cost and less time of research period (McMillan and Schumacher 2014). The main characterization of the companies is small, medium and large size companies in Malaysia with an average turnover of between 50 million -100 million Malaysian ringgit and an average size of between 120 to 200 employees. There are numerous 3PLs firms and very large in this to select our sample size Roscoe (1975) postulation was used in soliciting the sample, therefore sample of 175 were selected and the questionnaires was distributed, however a total number of 150 was collected and analysed. Also, an average ICT investment of 0.5 percent of the total turnover. This characterization is in compliance with the study and result of the study done by Chuang, et al. (2007) which recognize company size as key factor in ICT adoption. This will cut across all business sectors in Malaysia. This characterization is in perfect compliance with the outcome of a study conducted by (Chuang, et al. 2007;Saura, et al. 2008) in which identification of firm's size is a key factor in the adoption of ICT.

3.9 Research Findings and Data analysis

The results of the 5 scale likert questionaire shall be analyzed with the use of SPSS software while that of the the case studies through interview shall be analyze using SPSS software analysis. SPSS and PLS are among the list of computer-assisted quantitative and qualitative data analysis (CAQDAS) which can improve and facilitate the quality research procedures, it can immediately process queries as it arises and the same time expand analytical avenues, (Auld, et al. 2007).

The findings from this research study is expected to confirm the influence of ICT facilities in the logistics and supply chain management services provided by third party service provider.

3.9 Summary

This chapter gives details of the methodology adopted for this research study. It gives the details of the methods both qualitative and quantitative. The focused grouped, probable population of sampling which are the 3PL's service providers in Malaysia, the sample size, selection of respondents for the pre-test questionaires and interviews questions, development of well structures questionaire,the statistical data analysis methods to be adopted in this research.

CHAPTER FOUR

DATA ANALYSIS AND FINDINGS

4.1 Introduction

This chapter presented the findings of the study. The research was conducted in order to determine how 3PL companies use the ICT tools in their logistics business. Through the means of quantitative approach,the researcher generated a survey questionnaire for the gathering of the data.

4.2 Background of the survey material

The study survey was selected as the basic research approach and collection of the data system. The study survey was conducted by means of a questionnaire which involved self administered features. Moreover, in respect of the numbers of the respondents and in order to gather an in-depth information about the findings, the survey questionnaire was well packaged into five different sections. However, the research follows the standard principles of high confidentiality and esteem the respondents' privacy. Notwithstanding, the questionnaire reveals some pertinent information of each participant, that are germane to the research and key findings.

4.3 The Survey

As highlighted in the methodology section, the survey is founded on a questionnaire of 5 different sections of closed questions. The first section is about the organization and the respondent profile, the second section consists of ICT tools factors, the third section

includes the selection process, the fourth one consists of competitive advantages performance, while the fifth sections contained the general performance or observation of the organizations.

4.3.1 Survey Response Rate

The survey response rate is presented in this section of the study. A total of 170 survey questionnaire were distributed to the respondents, out of which 165 questionnaire were received.15 among the received questionnaire were disqualified from the analysis due to incomplete filling, high percentage of missing responses and outlier issues, leaving 150 questionnaire representing 88.24% as qualified and usable for further analysis in the study. Table 4.1 presents the overall survey response rate of the study

Table 4.1 *Survey response rate*

	Frequency	**Percentage (%)**
Questionnaire Distributed	170	100
Questionnaire Returned	165	97.06
Questionnaire Rejected	15	8.82
Questionnaire Retained	150	88.2

4.3.2 Detection and Treatment of Missing Data

It is important that data collected in a survey be screened for errors and missing values prior to the main data analysis.Else, erroneous inference could be made from the findings of such data. Therefore, this research ensures a thorough screening and cleaning through SPSS software analysis package. In order to detect errors descriptive analysis was employed. Mean substitute was utilized to replace missing values of a questionnaire that is less than. A questionnaire with a high missing values (more than 50%) was removed from the analysis (Hair, Black, Babin, & Anderson, 2010). In addition, certain set of data was found with error of out of range data. In order to correct this, the study traces back the original data in the questionnaire so as to retrieve the correct data. Thus, the out of range data was replaced with the original data.

4.3.3 Non Response Bias

The late respondents in this study might have not responded should the researcher not follow up with the data collection. Hecne, the claim that non-respondents on several occasions are different from the respondents in term of their demographic characteristics, which influences the outcomes of a study was assessed in this study using the independent sample t-test. (Malhotra, Hall, Shaw, & Oppenheim, 2006).

This study classified the responses into two groups based on the time of which the responses were received. 100 responses were classified as early responses while 50 were classified as late responses. Levene's test for equality of variance and descriptive test were further conducted on the demographic variables to compare the standard error mean, standard deviation and mean between the early and late respondents. Table 4.2 below presents the descriptive statistics of the non-response bias test.

Table 4.2 *Independent Sample T-test*

		N	Mean	Std. Deviation	Std. Error Mean
Race	Early Respondents	100	2.23	.827	.083
	Late Respondents	50	1.98	.685	.097
Gender	Early Respondents	100	1.43	.498	.050
	Late Respondents	50	1.44	.501	.071
Age	Early Respondents	100	1.42	.535	.054
	Late Respondents	50	1.24	.431	.061
Edu	Early Respondents	100	1.45	.730	.073
	Late Respondents	50	1.44	.787	.111
Status	Early Respondents	100	1.79	1.149	.115
	Late Respondents	50	2.16	1.330	.188
Stat Owner	Early Respondents	100	2.02	.899	.090
	Late Respondents	50	1.96	.807	.114
Ogre	Early Respondents	100	1.62	.826	.083
	Late Respondents	50	1.60	.833	.118
Cups	Early Respondents	100	2.23	.962	.096
	Late Respondents	50	1.94	.998	.141
Working	Early Respondents	100	1.48	.731	.073
	Late Respondents	50	1.46	.788	.111
Legato	Early Respondents	100	1.78	.917	.092
	Late Respondents	50	2.26	1.175	.166
Tunb us	Early Respondents	100	1.41	.494	.049
	Late	50	1.28	.454	.064

	Respondents				
Flump	Early Respondents	100	1.49	.559	.056
	Late Respondents	50	1.60	.535	.076
Owner	Early Respondents	100	2.07	.946	.095
	Late Respondents	50	2.42	.906	.128

Table 4.3 *Levine's Test for Equality of Variances*

		F	**Sig.**	**T**	**Do**	**Sig. (2-tailed)**
Race	Equal variances assumed	7.133	.008	1.844	148	.067
	Equal variances not assumed			1.963	115.989	.052
Gender	Equal variances assumed	.051	.822	-.116	148	.908
	Equal variances not assumed			-.115	97.437	.908
Age	Equal variances assumed	17.622	.000	2.065	148	.041
	Equal variances not assumed			2.218	118.655	.028
Edu	Equal variances assumed	.090	.764	.077	148	.939
	Equal variances not assumed			.075	91.850	.940
Status	Equal variances assumed	4.865	.029	-1.763	148	.080
	Equal variances not assumed			-1.679	86.388	.097
Stat Owner	Equal variances assumed	.607	.437	.398	148	.691
	Equal variances not assumed			.413	108.034	.680
Ogre	Equal variances assumed	.030	.863	.139	148	.889
	Equal variances not assumed			.139	97.385	.890
Cups	Equal variances assumed	.009	.924	1.718	148	.088

	Equal variances not assumed			1.697	94.988	.093
Working	Equal variances assumed	.083	.773	.154	148	.878
	Equal variances not assumed			.150	91.877	.881
Legato	Equal variances assumed	7.282	.008	-2.746	148	.007
	Equal variances not assumed			-2.530	79.710	.013
Tunb us	Equal variances assumed	11.717	.001	1.560	148	.121
	Equal variances not assumed			1.605	105.982	.111
Flump	Equal variances assumed	.731	.394	-1.152	148	.251
	Equal variances not assumed			-1.170	102.208	.245
Owner	Equal variances assumed	.118	.732	-2.167	148	.032
	Equal variances not assumed			-2.199	101.985	.030

As shown in Table 4.2 there is no statistical difference of the demographic variable. In addition, Table 4.3 reveal the, the independent t-test conducted to compare the early respondents and the late respondentand the findings show that there is no significant difference between the early respondents and the late respondents. Thus, the response of the non respondents are represented by the late respondents in this study.

4.3.4 Outlier

An outlier indicates an observation that falls extremely outside the pattern of a distribution of data (Pallant, 2011). The presence of an outlier possesses a threat to the conclusion and interpretation of an analysis. That is, outliers represent a case that does not fit into the model under observation. As suggested by Pallant (2011), this study detected the presence of outliers by determining the Mahalanobis distance from the expected research values and compared with the chisquare table to determine the treshold value of each responses (Hair et al., 2013). The result found that 12 cases of outliers having a Mahalanobis distance greater than the Chisquare value. Hence, the outlier icases were removed from the analysis

4.4 Reliability Test

Reliability analysis indicates the internal consistency of the measurement instrument (Pallant, 2011). It indicates the consistency of the data collected by the survey questionnaire. In this study, the reliability analysis was conducted by determining the Cronbach's alpha for the constructs. Hair et al. (2013) reccommended that the result of Cronbach's alpha greater or equal to 0.7 indicates a good reliability measure. Hence, based on the values of the Cronbach's alpha indicated in Table 4.2. the study assumed that the constructs of this study are reliable.

Table 4.4 *Reliability measure*

Construct	No of Item	Cronbach's Aplha
ICT facilities	8	0.747
Competitive Advantages	8	0.804
Selection	13	0.722

4.4.1 Common Method Bias

Common method bias is a variance that is attributable to the measurement procedure instead of the actual concept of the interest of the researcher (Podsakoff, Mackenzie, Lee & Podsakoff, 2003). It is one of the sources of measurement error which pose a threat on validity of the conclusion of relationships between constructs (Podsakoff *et al*., 2003; Meade *et al.*, 2007). The measure of the constructs in this study were obtained from a single source and thus, may create a possibility for the existence of common method bias (Meade *et al*., 2007). Statistically, this study examined the presence of common method bias using the herman's single factor test. Herman's single factor test assumed that if a single factor emerged from the covariance analysis among the measures, it indicates a substantial amount of common method variance (Podsakoff *et al*., 2003). However, the unrotated exploratory factor analysis of this study showsa total 17.18% variance explained by a single factor indicating that no general factor in the unrotated factor structure is explained. Therefore, there is no substantial amount of common method bias in this study.

4.4.2 Test of Linearity

In multivariate analysis, the relationship between the independent and the dependent variable must be linear to avoid Type 1 and Type 11 error. Based on this assumption, the researcher examined if the multicollinearity among the independent variabes of the study. The tolerance value and the variance inflation factor (VIF) value are used in assessing multicollinearity. Hair *et al.,* (2013) suggested that the value of tolerance greater or equal to 0.2 and VIF greater than 5 is a strong indication of multicollinearity. Table 4.5 presents the result of the Collinearity diagnostics in this study.

Table 4.5 *Multicolinearity test*

Variables	**Collinearity Statistics**	
	Tolerance	VIF
Usage	.507	1.973
Speed	.704	1.420
Accuracy	.478	2.090
Cost	.574	1.741
ICT	.393	2.541

As shown in Table 4.3, the tolerance values of the variables in this contracts are above 0.2 while the VIF values are below 5 indicating that multicollinearity is not a threat to this study.

4.4.3 Test of Normality

Non-normal data in a survey has the potentials to distort an existingsignificance of the relationships between two variables in a study (Hulland, 1999). Hence, the relationship between the variables are supposed to be normal in a multivariate analysis (Abdulateef, 2011). Therefore, the Kurtosis and Skewness of the data in this study were assesed as the test of normality of the study. The result of the normality test as shown in Table 4.4 revealed that the value of the skewness are within the +2/-2 treshold and the Kurtosis values of the contructs are within the +7/-7 treshold reccomended for skewness and Kurtosis. This indicates that the assumption of normality is achieved in this study.

Table 4.6 *Test of Normality*

	ICT	Selection	Comp'd	Usage	Speed	Accuracy	Cost
Scenes	-.126	-.456	-.224	-1.196	.001	-.503	-.855
Std. Error of Scenes	.198	.198	.198	.198	.198	.198	.198
Kurtosis	-.373	.935	-.137	.731	-.864	-.020	.109
Std. Error of Kurtosis	.394	.394	.394	.394	.394	.394	.394

4.5 The organization and the Respondent Profile.

From section one of the questionnaire, the respondents' profile or demographic data was the focus of all the questions and the respondents' answers are presented in Table 4.1.From the table, it can be seen that Chinese race is the majority of the respondent,they were 78 in number which represent 52.0%. In second position as reflected in the table is the Indian race with 35 numbers, which represents 23.33% and the Malay race was 29 in number which represent 19.33%, while others, the immigrants are 8 in number and this represent 5.33%.

In terms of the responds age group, most of the respondents are below the age of 30 with 98 numbers which is 65.3%, while those respondents between the age of 31-40 were 49 in number which represent 33.3%. Those respondents above 41 years of age are 3 numbers.

The respondent's marital status revealed that the singles are 83 in numbers, which represent 55.3% of the total number. The married are 32 in number which is 21.3%, while others are 35 in number, representing 23.3%. The respondent gender identified male to be 85 in number representing 56.7%, the female were 65 numbers representing 43.3%.

Table 4.7 *The respondents' race and age.*

Descriptive Table presenting respondents' race and age – group, marital status and gender.

Item	Frequency	Percentage	Item	Frequency	Percentage
Respondent's Race			Respondent's Age Group		
Malay	29	19.33	Below 30	98.0	65.3
Chinese	78	52.0	31 – 40	33.3	33.3
Indian	35	23.33	41 Above	1.3	1.3
Others	8	5.33	TOTAL	150	100
TOTAL	150	100			
Respondent's Marital Status			Respondent's Gender		
Single	83	55.3	Male	85	56.7
Married	32	21.3	Female	65	43.3
Other	35	23.3	Total	150	100
Total	150	100			

In table 4.2, the respondents educational background indicated that the respondent with SMP are 104 in numbers, indicating 69.3%. Those respondents with STPM are 27 in number, indicating 18.0% of the total respondents, while those with the degree are 17 in number represented 11.3%. Those respondents with Master degree and above were 2 in number,representing 1.3%. The table 4.2 presented the respondents marital status and the educational background.

Table 4.3 revealed the descriptive value of the ownership of the companies surveyed for this study; it can be revealed that 42 number of those surveyed are the owner of the company,this represent 28% of the total number, 67 were co-owner,which 44.7%, the staffs are 20 in number which is 13.3% and others are 21 in number which is about 14.0% .

Table 4.8 *Descriptive Table for Marital Status and Educational Background*

Respondent's Marital Status			**Respondent's Education background**		
Single	83	55.3	SMP	104	69.3
Married	32	21.3	STPM	27	18.0
Other	35	23.3	Degree	17	11.3
Total	150	100	Masters and above	2	1.3
			TOTAL	150	100.0

Table 4.9 *Descriptive Table for Respondent Gender and Ownership Status*

Respondent's Gender			**Ownership Status**		
Male	85	56.7	Owner	42	28.0
Female	65	43.3	Co-Owner	67	44.7
Total	150	100	Staff	20	13.3
			Other	21	14.0
			TOTAL	150	100.0

Table 4.10 *Descriptive Table for Respondent's current position and number of years in industry*

Current Position			**Working in Industry**		
	Frequency	Percentage		Frequency	Percentage
C.E.O/MD	42	28.0	3years	100	66.7
Manager	67	44.7	3-5 years	31	20.7
Executives	20	13.3	6-10 years	17	11.3
Other	21	14.0	> 10 years	2	1.3
Total	150	100.0	Total	150	100.0

Consequently, questions related to the respondent's current position were asked. From the analysis result presented in the Table 4.4 above, 28% (42) were found to be the firm's CEO, 44.7% (67) of the respondents are a firm's manager, 13.3% (20) were executives while the remaining 14% (21) were found to occupy other positions in the firm. The questionnaire distributed also asked about the number of years in which each respondent has been working in the industry. The following result was presented in the table as well. Most of the samples surveyed were 3years or less in the industry, having the largest percentage of 66.7% (100) followed by 3 – 5 years, having 20.7% (17), the respondents that falls to the group of 6 – 10 years were found to have 11.3% (17) while the least group has 1.3% (2) of the total respondents surveyed.

Table 4.11 *Descriptive Table for legal form of operation, turnover in business fiscal year, ownership share*

Legal Form of Operation			**Turnover In Business Fiscal Year**		
Soleproprietorship	59	39.3	10-30M	95	63.3
Partnership	66	44.0	31-40M	55	36.7
Public limited	25	16.7	Total	150	100.0
TOTAL	150	100.0			
Turnover In Business Fiscal Year			Ownership Share		
1-10	75	50.0	<30%	43	28.7
11-20	71	47.3	31-50%	48	32.0
21-30	4	2.7	51-70%	47	31.3
Total	150	100.0	71-100%	12	8.0
			Total	150	100.0

For an in depth knowledge, questions were asked on the form of legal operation of the respondent's firm. Sole proprietorship firm's were found to consist of 39.3% (59) of the total samples surveyed. The partnership was found to be on a percentage of 44% (66) while a Public Limited form of operation is presented in the table to have 16.7% (25) of total respondents. Also the table presents annual turnover it is seen that 63.3% (95) of the total samples has an average turnover of 10 – 30 Million Malaysian Ringgit while the remaining 36.3% (55) experience annual turnover of above 30 million Ringgit per annum.

Questions were as well asked on ownership 28.7% (43) was found to have while 32% (48) were observed to be having an ownership share of 31 – 50%, 31.3% (47) of

respondents are found to be having an ownership share ranging from 51 – 70%, the remaining percentage 8.0% of the total sample surveyed was found to be having an ownership share of 71 – 100%.

Table 4.12 *Frequency Table for Descriptive Statistics*

Company's Practices			
	Responses		Percent of Cases
	N	Percentage	
Warehousing	74	21.8%	51.4%
Inventory	69	20.4%	47.9%
ICM	72	21.2%	50.0%
FWM	67	19.8%	46.5%
Sourcing &Purchasing	57	16.8%	
Total	339	100.0%	

Dichotomy group tabulated at value 1.

The last but not the least part under demographic questions asked about activities that the company engaged in. The Table 4.6 above shows that 21.8% (74) of the company engage in warehousing, 20.4% (69) in inventory keeping, 21.2% (72) engage in Information Communication Management (ICM), 19.8% (67) is found to be engaged in Facilities, Warehousing Management, and the last but not the least activity listed on the list that is, sourcing and purchasing is found to be 16.8% (57).

4.6 The second section consists of ICT tools factors

The respondent was asked questions about their assessment based on their perception on the degree of ICT Tools Factors on 3PL's Implemented in your organisation. The questions were segmented into four parts with partA focused on how Well has ICT Tools Satisfied you in the following?. Part B centred on to what extend have the following factors made ICT influence make your company remain at the edge of competition?. Part C was pointed to what extent is your company willing to use ICT? While part D pointed to what extend your company influence under the usages of ICT tools?. All the respondents filled in this section of the survey. The grading in this section is ranked from 1 to 5 with the 1 being the lowest, indicate strongly disagree and the 5 as the highest which indicate strongly agree. The result is highlighted in Table 4.7. below.

Table 4.13 *The correlation table*.

		Selection	Comp Adv	General	Usage	Speed	Accuracy	Cost	ICT
Selection	Pearson Correlation	1							
	Sig. (2-tailed)								
	N	150							
Comp Adv	Pearson Correlation	.763**	1						
	Sig. (2-tailed)	.000							
	N	150	150						
General	Pearson Correlation	.563**	.298**	1					
	Sig. (2-tailed)	.000	.000						
	N	150	150	150					
Usage	Pearson Correlation	.297**	.186*	.279**	1				
	Sig. (2-tailed)	.000	.023	.001					

	N	150	150	150	150				
Speed	Pearson Correlation	.042	.062	.168*	-.016	1			
	Sig. (2-tailed)	.611	.449	.040	.841				
	N	150	150	150	150	150			
Accuracy	Pearson Correlation	.218**	.201*	.188*	.553**	.159	1		
	Sig. (2-tailed)	.007	.014	.021	.000	.052			
	N	150	150	150	150	150	150		
Cost	Pearson Correlation	.183*	.152	.217**	.470**	.167*	.623**	1	
	Sig. (2-tailed)	.025	.063	.008	.000	.042	.000		
	N	150	150	150	150	150	150	150	
ICT	Pearson Correlation	.454**	.343**	.617**	.594**	.427**	.599**	.508**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	
	N	150	150	150	150	150	150	150	150

4.7 The Selection Process

The section C of the survey, which is all about the aim of this study talked about the degree of ICT model/ tool selection process by 3PL companies and different questions were asked. The respondents were asked to give their opinion on the selection of ICT in the course of executing their responsibilities as a 3PL company. The question was separated into two different sections which focus on the importance or influence of some listed criteria to the selection of an ICT model or tools by 3PL companies while the second part focus on the extent or degree to which the company need selection of ICT model/tools. The grading was from 1 to 5, whereby 1 indicate the lowest level, strongly disagree and 5 indicates the highest level, strongly agree. A total number of 150 respondents were able to answer these questions. The result can be viewed from the Table 4.7. The correlation table.

4.7.1 The Competitive Advantages

The Section D of the survey focused on the competitive advantages performance of 3PL companies in Malaysia. The questions under this section was divided into three parts, the first part talked about the performance of 3PL companies based on the competitive advantages they utilized over others by the selection of appropriate ICT tools. The second part talks about the willingness of the company to utilize their competitive advantages over others while the third part talks about the general level of satisfaction with the 3PL service providers. The grading of this section of the survey was also ranked from 1 to 6 and the 1 is the lowest and indicate strongly disagree while 6 is the

highest, signify strongly agree. All the 150 participants answered this section of the survey. The result is can be viewed in Table 4.7. The correlation table above.

4.7.2 The General Performance

The last section of the survey talks about the general performance of the 3PLs companies. It focuses on the companies that are not engaged in the utilization of ICT.The questions was asked about the most important reason why such company is not using ICT tools in their operations. The result of this section is not so significant as no respondent filled this section of the survey.

CHAPTER FIVE

DISCUSSION, RECOMMENDATION AND CONCLUSION.

5.1 Introduction

The previous chapter highlights the data results and hypothesis test results while this chapter consists of discussion about the survey hypothesis result. The survey results will be analysed and explained in an attempt to answer the research questions and the objectives. Based on the analysis and the discussion of the result, the researcher put forward some recommendation for further research in the future.The recommendation were expected to be applied by 3PLs firm within and around Malaysia to improve their competitive advantage at both local and international market.

5.2 Discussion

5.2.1 Respondents race and age- group, marital status and gender.

From the result as highlighted in Table 4.1. It's clearly shown that the race that engaged in 3PL services in Malaysia are the Chinese with 52% frequency. Then the Indians 23.33%, Malay has19. 33%, while another race has 5.33%. This is a clear indication that the service of logistics providers and the providers of 3PL are spearheaded by the Chinese race. The Indians also participate effectively in the 3PLs services. The Malay is very little in the business of logistics and supply chain management by means of 3PLS. This is represented in Figure 5.1.

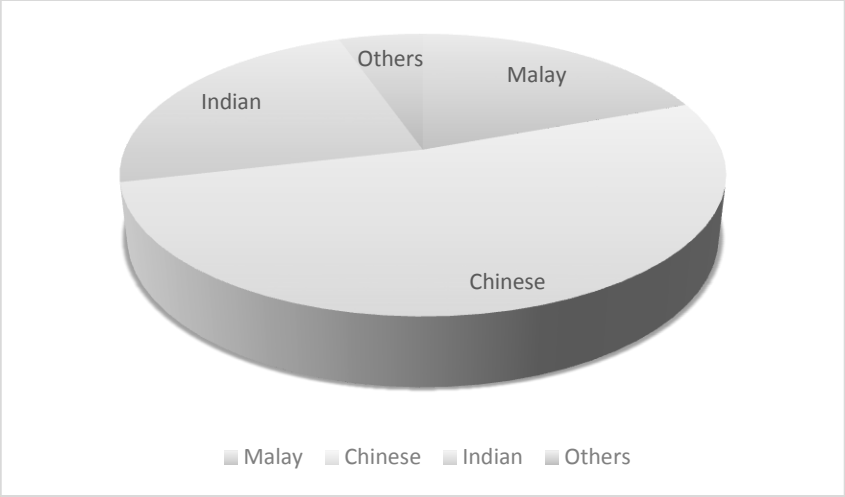


Figure 5.1 *The respondent race*

The respondent's age group is analysed in Figure 5.2. It shows that the active working age group in Logistics services is at the prime of their age, below 30, one can consider this to be energetic age.. The reason for this may be because of the nature of the service coupled with the ability and strength that such work entails. The second largest age group is between age 31 and 40. This is a confirmation of the needs or requirement of the Logistics services. The last group with 1.3% is the age group above 40. They have the least number. The indication of this is that the logistic service provider, such as 3PL is full of staffs at the prime age, perhaps because of the energy and strength such services needed.

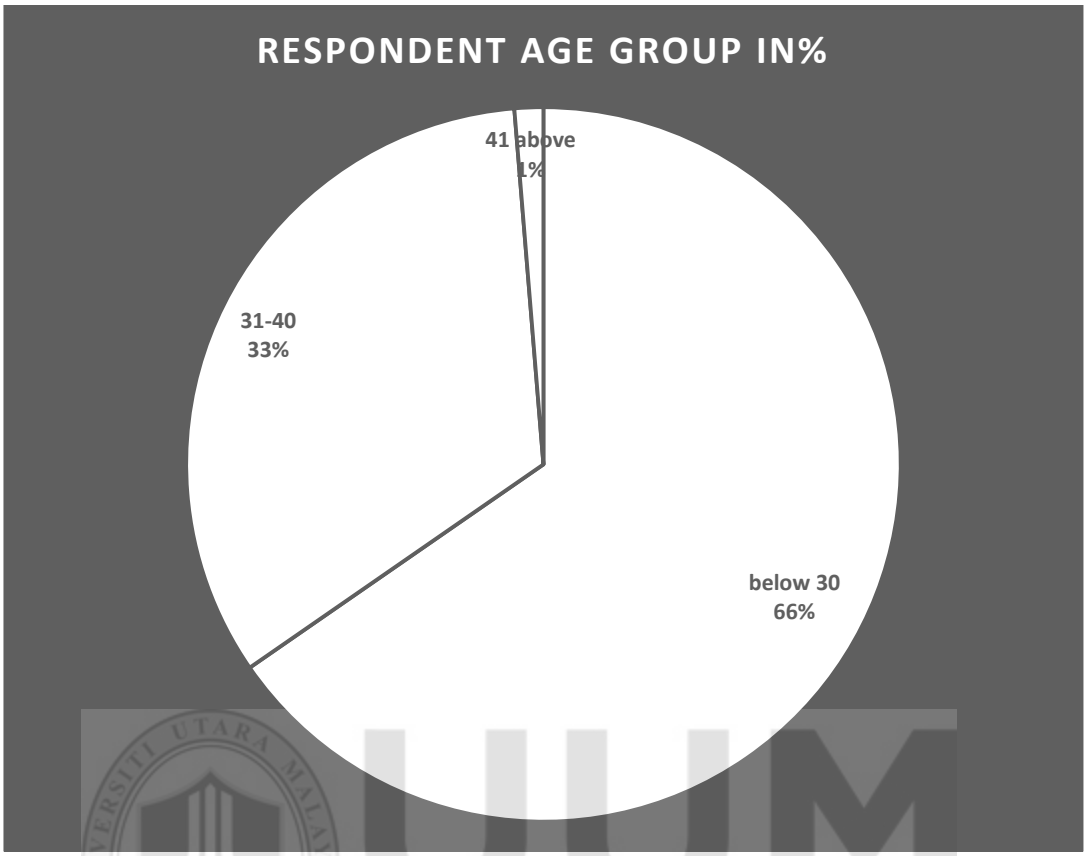


Figure 5.2 *The respondent age group*

The respondent's marital status is shown in Figure5.3 and it shows that a reasonable percentage of the respondents are single with 21.3 % only married while others are 23.3%. The others comprise of separations and divorces. This goes to show that the logistics service providers are dominated by the singles hence more active and very mobile to any destination at any point in time.

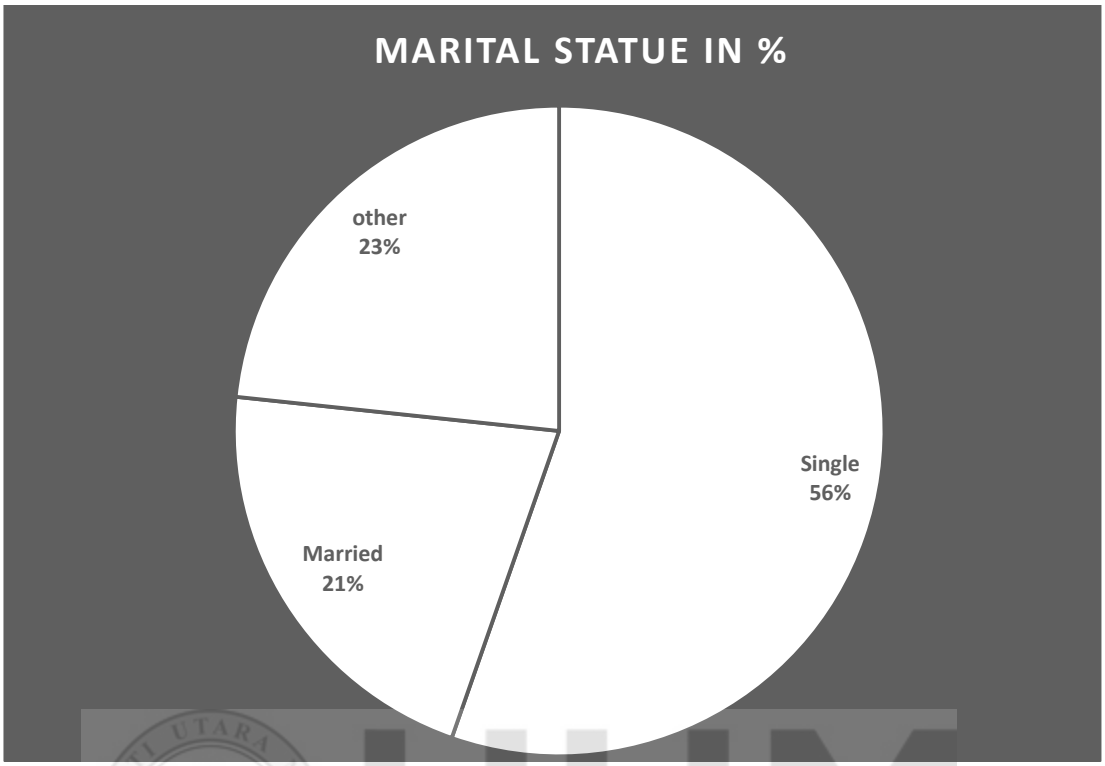


Figure 5.3*The respondents marital status*

The respondent's gender in all the 3PLs service provider is highlighted in Figure 5.4 and it shows that the male is more than the female in the logistics companies. The respondent in the survey revealed 56.7% compared to 43.3% of female.This may be as a result of the task the process of logistics requires.

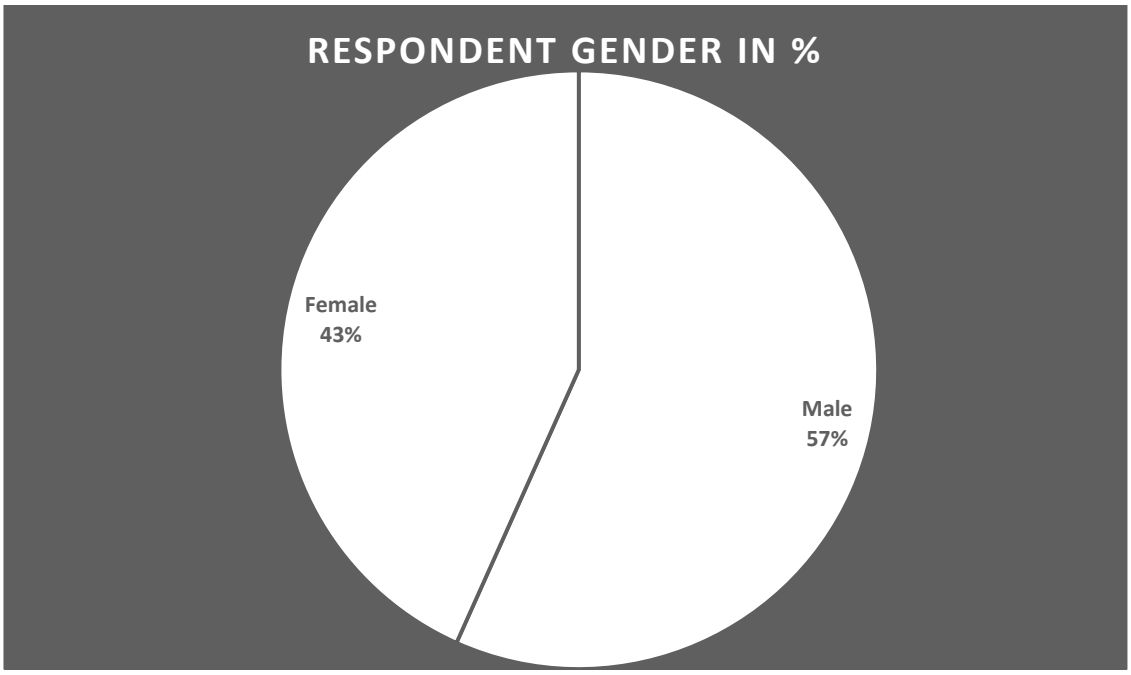


Figure 5.4 *The respondent gender.*

The educational background of the respondents is highlighted in Figure 5.5. It depicts that staff with SMP are predominant among the respondent followed by those with STMP and then those with degrees and only 1.3% are a second degree holder among the respondents. This indicates that the 3PLs company are dominated by the SMP holder, this may be due to the nature of the job involved. The degree holder and the Post degree are few, perhaps the executives nag the top managers.

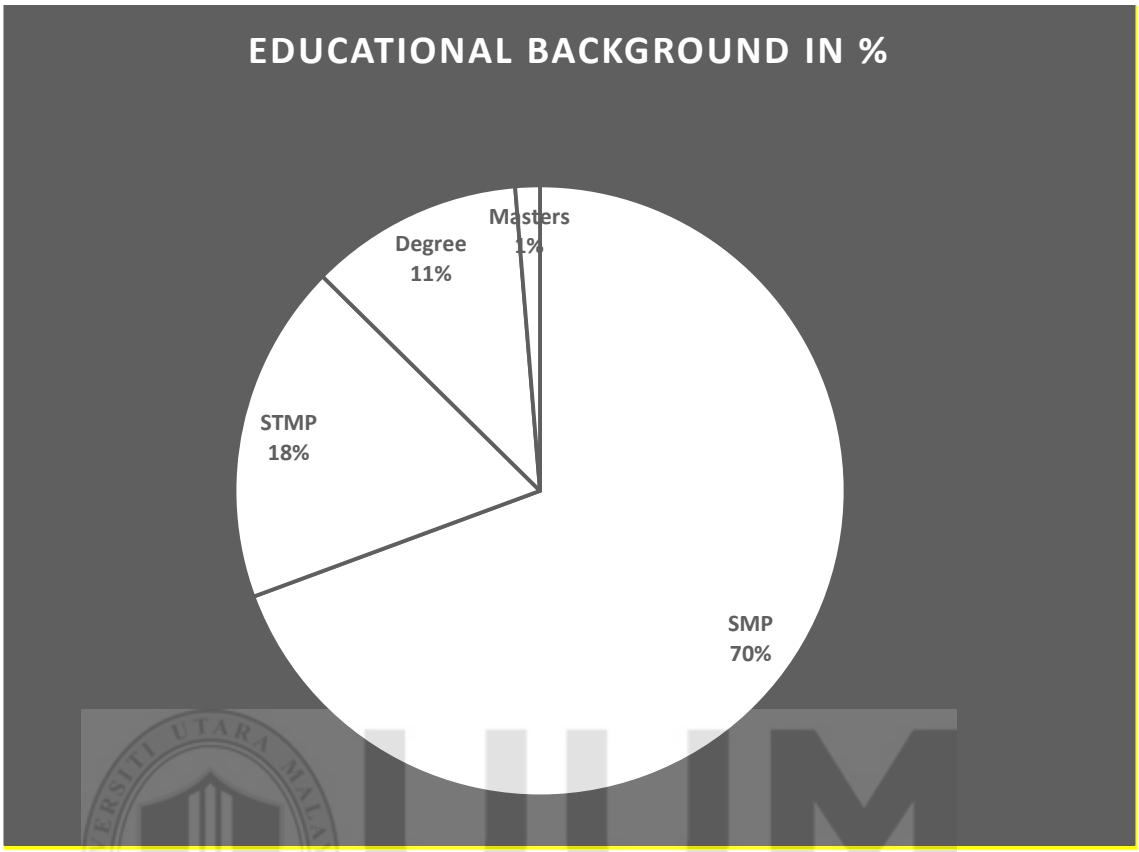


Figure 5.5 *The Educational background of the respondents*

The ownership status of the respondents is presented in Figure 5.6. It goes to revealing that the owner among the respondents are 28%, while the co-owners are 44.7%. An indication that the co-owner are more than the owner. It also shows that co-owner are more active in the business of logistics in all the 3PL companies surveyed. The staffs among the respondents are 13.3% lower than both owner and co-owner. This showed that the respondents are more of those that have a stake in the company.

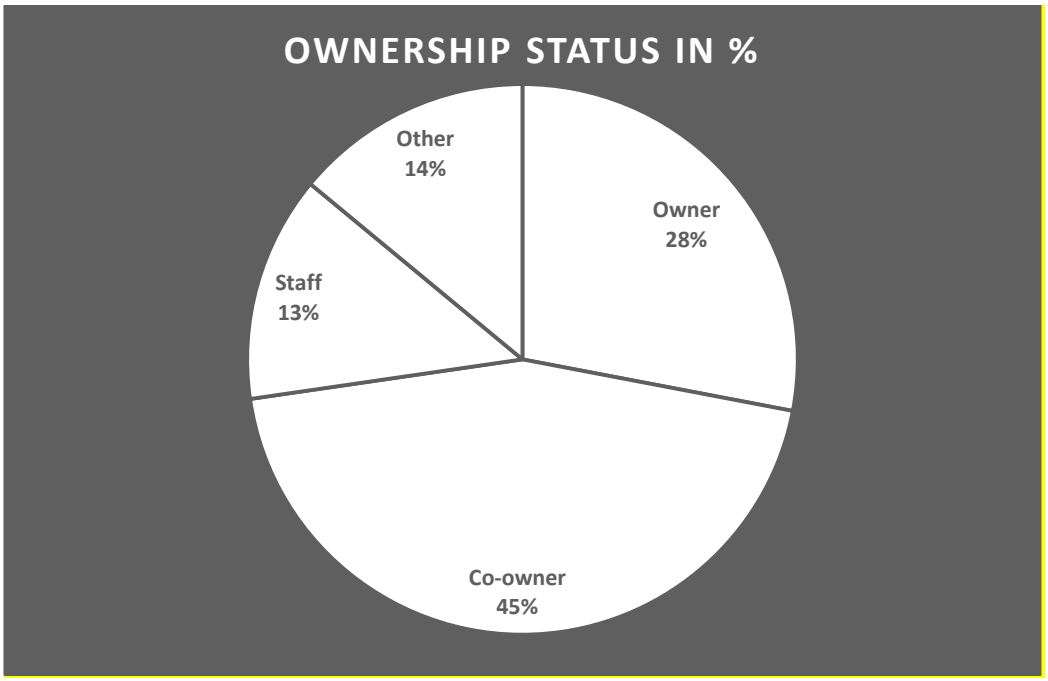


Figure 5.6 *The respondent's ownership status.*

The respondent's current position is shown in Figure 5.7 whereby the CEO/MD have 28% while the Manager has 44.7%. This is the highest number of the participant and this indicate that Managers are major players in logistics services in 3PLs companies. The executives was having 13.3%. The other has 14.0%.

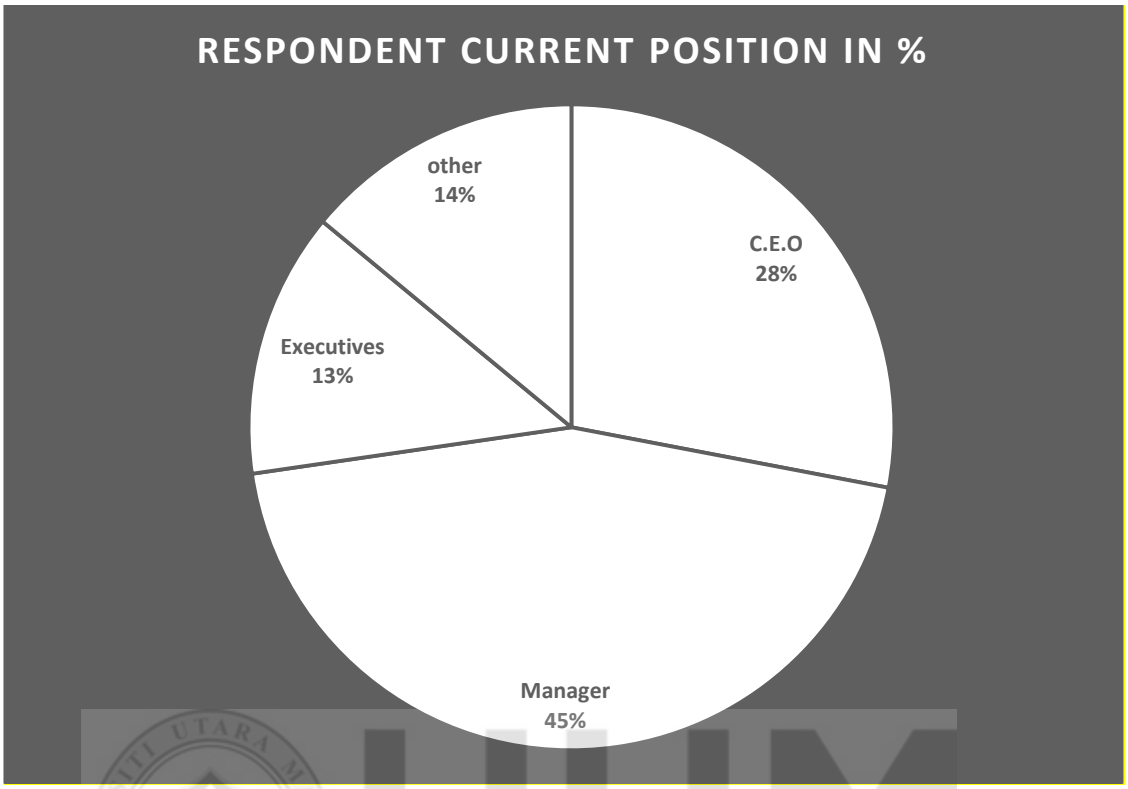


Figure 5.7 *The respondent's current position.*

In a like manner, the years of experience of the respondent were surveyed and it was found out that those with 3 years of experiences were more than other with 66.7%, followed by those with years of experience of between 3 and 5 years with 20.7%. Those with years of experience between 6 to 10 years are having 11.3%, while other have 1.3%. The implication of this is that those with 3 years experience are more than others in the companies,but those with 6-10 years of experience are few compared to those with 3 years.

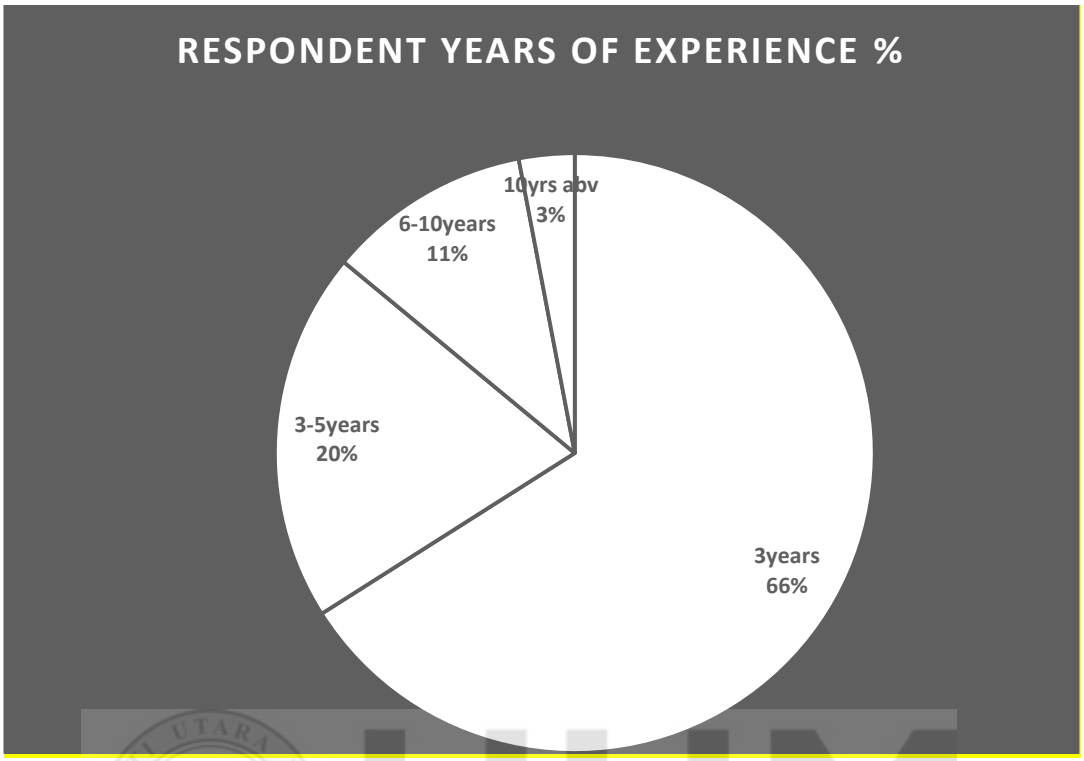


Figure 5.8 *The respondent years of experience*

The Legal form of operation of the 3PLs Logistics service providers, surveyed for this study is shown in Figure 5.8. It revealed that Partnership form of legal operation dominated the 3PL company surveyed in this study. It was 44%, while those with sole proprietorship has 39.0%. The company with Public limited has 16.7%. The indication of this is that the majority of 3PL logistics service provider in Malaysia is operated under a Partnership legal form of operation. Few engaged in sole proprietorship while the remaining were operated under public limited.

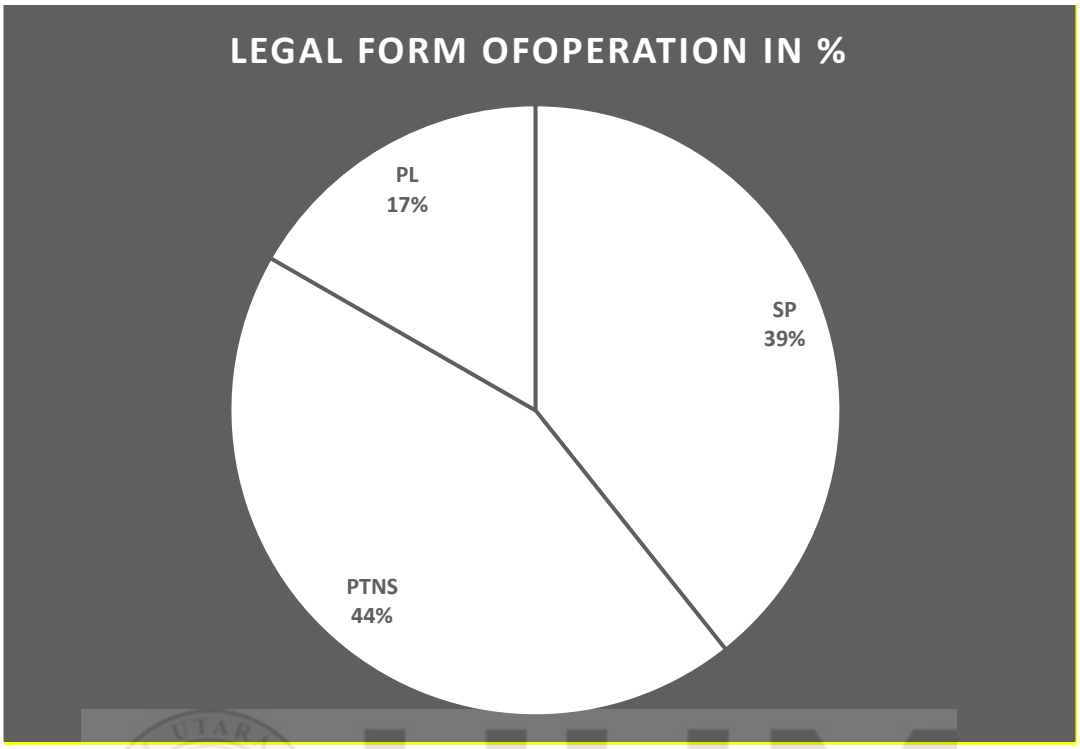


Figure 5.9 *The Legal form of operation of all the 3PLs.*

The 3PL company's fiscal year turnover in business was classified into two broad base for easy survey and this is shown in Figure 5.9. Those 3PL companies with between 10-30 million Ringgit and those between 31-40 million Ringgit. In the survey, it was revealed that most of the 3PL company surveyed is having turnover of between 10-30 million Ringgit while those with between 31-40 million Ringgit are few in number. This implies that the 3PL companies that are surveyed are predominantly those in the category of between 10-30 million Ringgit.

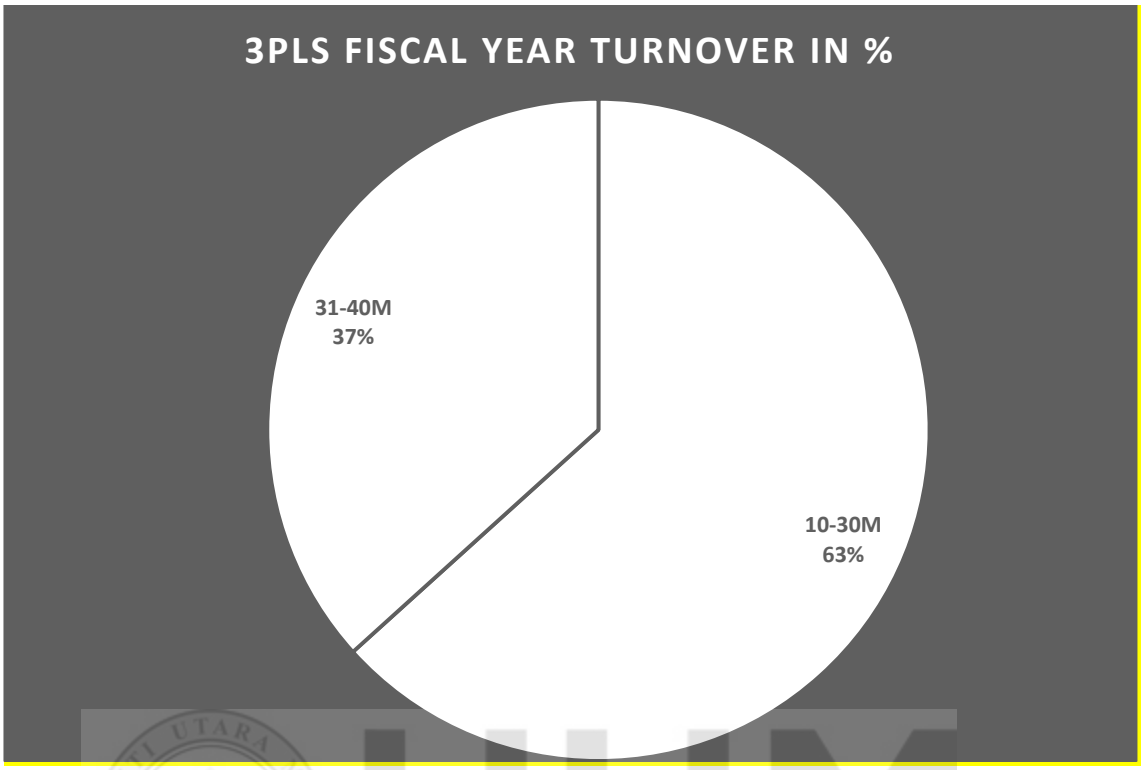


Figure 5.10 *The 3pls Fiscal year turnover in %*

In a like manner, the ownership share of the 3PLs companies is surveyed and the result is shown in Figure 5.9. The ownership of between 31-50% has the highest percentage. It has 32%. This is closely followed by those with between 51-70% ownership share. Those 3PLs companies with less than 30% ownership has28. 7%, while those with between 71-100% ownership has 8%. This is an indication that the majority of the 3PLs companies surveyed has their ownership share to be between 31-50% and that only few has their ownership share between 71-100%.

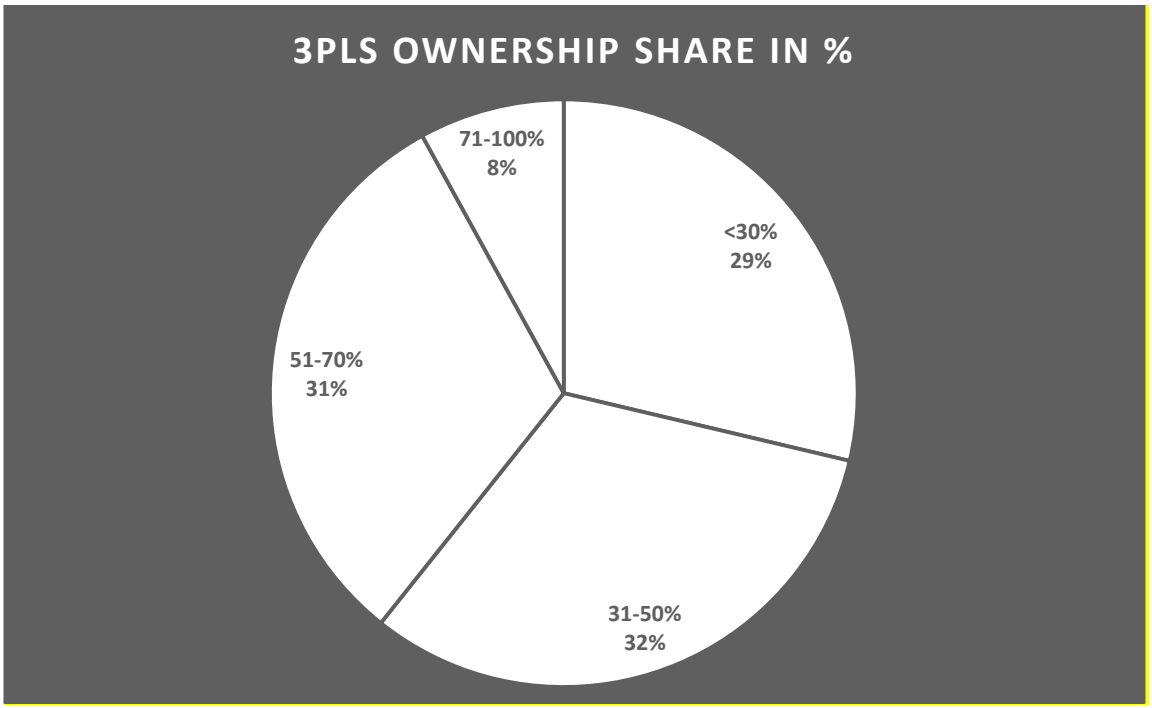


Figure 5.11 *The 3PL Company's ownership share*

The company practices of all the 3PL companies are shown in Figure 5.10. The result revealed that the majority of the company do warehousing management, then engage also in information, communication management with 21.2 % lesser than warehousing management with only 0.6%. This is closely followed by Inventory management practices with 20.4%. Facilities,warehousing management was at 19.8% and finally sourcing and purchasing has 16.8%. This means that, most of the companies do little of sourcing and purchasing compared with the management of warehousing and information communication management. The second most practice management is the inventory. They do keep inventory.

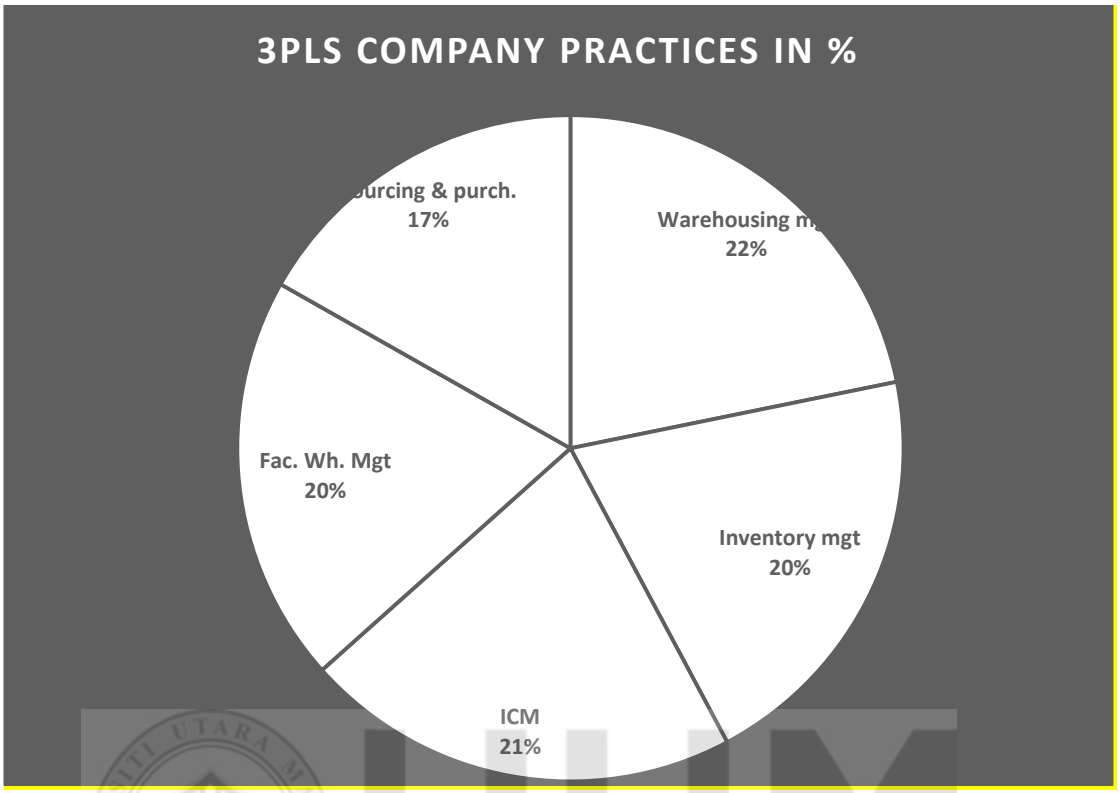


Figure 5.12 *The 3PLs company practices*

The findings in the demography of 3PLs company structures included in this study is in line with the findings of previous studies that revealed that there is a significant relationship between decentralized organization structure and technological adoption and selection process (Russell & Hoag 2004).

The findings also align with the findings of Mabert, et al. (2003), in which it was established that organization size plays a major significant role in terms of the selection process, adoption level and the use of technologies. This was as well established by (Thi, et al. 2003).

The result of the survey of the ICT tools which is the independent variable, the selection process which is the intermediate variables and the competitive advantages of 3PLs company. The correlation result as presented in Table 5.1 shows that the correlation is significant.

5.3 Discussion on Research Objectives.

5.3.1Research objective 1: To assess the relationships between competitive advantages and ICT selection. by the selected 3PL service providers in Malaysia.

5.3.1 Pearson Product-Moment Correlation.

In this study, Pearson Product-Moment Correlation was used to test the relationships between Competitive advantage, ICT tools (usage, speed, accuracy and cost), and selection. Pearson Product-Moment Correlation is used to test the strength and the direction of a relationship between two constructs (Pallant, 2011). Table 5.1 presents the findings of the pearson product moment correlation of this study.

Table 5.1 *Pearson Product-Moment Correlation*

		Competitive Advantage	Selection
ICT	Pearson Correlation	.343**	.454**
	Sig. (2-tailed)	.000	.000
	N	150	150
Selection	Pearson Correlation	.763**	1
	Sig. (2-tailed)	.000	
	N	150	150
Usage	Pearson Correlation	.186*	.297**
	Sig. (2-tailed)	.023	.000
	N	150	150
Speed	Pearson Correlation	.062	.042
	Sig. (2-tailed)	.449	.611
	N	150	150
Accuracy	Pearson Correlation	.201*	.218**
	Sig. (2-tailed)	.014	.007
	N	150	150
Cost	Pearson Correlation	.152	.183*
	Sig. (2-tailed)	.063	.025
	N	150	150

****. Correlation is significant at the 0.01 level (2-tailed).**

***. Correlation is significant at the 0.05 level (2-tailed).**

Table 5.1 above presents that there is a weak positive significant relationship between ICT tools and competitive advantage (r = 0.343).The correlation coefficient result (r = 0.763) between selection and competitive advantage indicates that there is a strong positive significant relationship between selection and competitive advantage. In addition, the correlation coefficient result (r = 0.186) reveals a weak positive significant relationship between ICT usage and competitive advantage. Furthermore, the correlation coefficient (r = 0.201) indicates a weak positive relationship between ICT tools' accuracy and competitive advantage.However, the correlation coefficient result (r = 0.152) reveals that there is a weak positive insignificant relationship between ICT tool's cost and competitive advantage and the correlation coefficient result (r = 0.062) reveals a weak insignificant relationship between the speed of ICT tools and competitive advantage.

Similarly,the correlation co-efficient result (r = 0.454) indicates that there is a moderate positive significant relationship between ICT tools and selection process. The correlation co-efficient value (r = 0.297) reveals a weak positive significant relationship between the usage of ICT tools and selection process. The correlation coefficient value (r = 0.218) reveals that there is a weak positive significant relationship between the accuracy of ICT tools and selection process. Furthermore, the correlation co-efficient result (r = 0.183) indicates a weak positive significant relationship between the cost of ICT tools and selection process.

5.3.2 Research Objective 2: To analyse the influence of ICT tools on the competitive advantages of the third party logistics service providers in Malaysia.

Multiple regression analysis was conducted to test the influence of ICT tools (usage, speed, accuracy and cost) on competitive advantage of 3PLs firms in this study. Table **5.3.2 presents the result of the multiple regression analysis.**

Table 5.2 *Influence of ICT tools (usage, speed, accuracy and cost) on competitive advantage*

Model		**Unstandardized Coefficients**		**Standardized Coefficients**	**T**	**Sig.**
		B	Std. Error	Beta		
1	(Constant)	.700	.263		2.663	.009
	Usage	-.033	.026	-.085	-1.258	.210
	Speed	.008	.027	.016	.298	.766
	Accuracy	.041	.040	.076	1.026	.307
	Cost	.000	.038	.001	.007	.994
	Selection	.836	.061	.771	13.745	.000
R^2						0.589
Adjusted R^2						.575
F Change						41.310
Sig. F Change						.000

a. Dependent Variable: Competitive Advantage

b. Predictors: (Constant), Selection, Speed, Cost, Usage, Accuracy

The result of the multiple regression analysis as shown in Table 5.2 has a R^2 value of 0.589 (R^2 Adjusted = 0.575) indicating that the predictors (Selection, Speed, cost, Usage and accuracy of ICT tools) explained 58.9% variance in competitive advantage. Furthermor, it is provided in the result that selection process of ICT tools ($\beta = 0.836$), has more contribution than the other variables in explaining the variance in competitive advantage of 3PLs in Malaysia. This is followed by Usage of ICT tools ($\beta = -0.33$)

explaining 33% of the variance in competitive advantage among the 3PLs in Malaysia. The beta value of accuracy ($\beta = 0.041$) indicates that accuracy of ICT tools only explains about 4% of the variance in competitive advantage. While the speed and the cost of the ICT tools ($\beta = 0.008$ and $\beta = 0.000$) absolutely does not have any effect in explaining the variance in the competitive advantage among the 3PLs in Malaysia.

In addition, the result indicates that only the selection process has a significant influence in explaing the variance in competitive advantage ($P < 0.05$), while the other constructs (Usage, speed, accuracy and cost) of ICT tools have P values greater than 0.05 and hence, do not significantly influence the competitive advantage of 3PLs in Malaysia.

5.3.3 Research Objective 3: To examine the effect of the ICT tools on selection process by 3PL service providers in Malaysia.

This section presents the regression analysis to test the influence of ICT tools (usage, speed, accuracy and cost) on selection process in 3PLs in Malaysia. Table 5.3 presents the result of the multiple regression analysis.

Table 5.3 *Effect of ICT tools on selection process*

Coefficients						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.455	.216		5.990	.000
	Usage	.091	.035	.254	2.603	.010
	Speed	.015	.037	.033	.407	.685
	Accuracy	.029	.054	.059	.538	.500
	Cost	.011	.051	.022	.207	.836
R^2						.094
Adjusted R Square						.069
F Change						3.746
Sig. F Change						.006

a. Dependent Variable: Selection

b. Predictors: (Constant), Cost, Speed, Usage, Accuracy

As shown in Table 5.3, the regression analysis results shows a R2 value of 0.094 and Adjusted R2 value of 0.069, indicating that the predictors (speed, cost, usage and accuracy of ICT tools) explained 9.4% variance in the selection process of ICT tools in 3PLs. Furthermor, the result provides that usage has a higher contribution to explaining the variance in selection process ($\beta = 0.091$), followed by accuracy with a beta value ($\beta = 0.029$), speed ($\beta = 0.015$) and cost ($\beta = 0.011$). Furthermore, the result of the regression analysis indicates that there is a significant influence of Usage of ICT tools on the selection process ($P < 0.05$) and a significant influence of accuracy of ICT tools on selection process ($P < 0.05$).The result also shows that both speed ($P > 0.05$) and cost of ICT tools ($P > 0.05$) do not influence the selection process of ICT.

5.3.3 Mediating Effect of Selection between ICT tools and CompetitiveAdvantage

The mediating effect of Selection between ICT tools and competitive advantage is shown in Table 5.4 below.

Table 5.4 *Mediating Effect of Selection between ICT tools and CompetitiveAdvantage*

Model Summary	**Coefficient**	**r^2**	**P-value**
Constant	1.1296	.5827	.0000
IV	.7045		.0000
Outcome of Indirect Relationship between IV and DV			
Model Summary	Coefficient	r^2	p-value
Constant	1.9838	.2065	.0000
MV	.5115		.0000
IV	-.0087		.9370

n = 150; C.I = 5%

To test for the mediating effects of the selection process, Hayes (2013) test is employed and the results are displayed in table 5.2 above. From the analysis, it is seen that IV, which is the independent variable can explain 70.65% of DV, that is the dependent variable with P-value of 0.0000 at 5% CI using direct relationship. However, the introducing MV, selection process as a mediator the following information was observed. The MV was observed to be significant to the DV having P-value of 0.0000 explaining 51.15% of the DV which is the dependent variable. Contrary to what is found under a direct relationship between (IV) and (DV), under the indirect relationship the IV

is seen to be insignificant having a P-value of .9370 at 5% CI. Furthermore, it is observed that with the introduction of a mediator, Selection process, the IV ICT tools can only explain a negative 8.7% of the DV, competitive advantage.

5.4 Decision

For the fact that the mediator, the selection process changes greatly the relationship and the significance that exist between the independent variable (ICT Tools) and dependence variable (Competitive advantage), it is concluded that the mediator (selection process) is having a full mediating effect in the framework. So it is decided that the use of ICT tools has a full effect on third party logistics.

The implications as seeing in the result is that the mediating factor, Selection process, in this study influence the 3PLs company competitive advantage over each other. The selection of appropriate, functional ICT tools matters most to the level of edge they have on each other. The adoption of ICT into logistics operations does not really matter as much as the selection of the appropriate and most efficient ICT tools that will greatly influence the level of the competitive advantage of the 3PLs.

As there are a lot of ICT tools and softwares that can be used for same operation and it now depends on the company to know how to select the appropriate ICT tools to be engaged for the purpose of achieving the task at a no time and at the lowest cost to secure a competitive advantage over another company in the same business.

According to Closs and Xu (2000), the use of ICT on logistics leads to an important impact on firms' competitive advantage. But it can be observed as deduced from the result of this study, that its the process of selecting an efficient and appropriate ICT tools that matter most to gaining competitive advantages. Likewise, according to the study done by (Lai, Ngai et al. 2005), firms require to be able to administer information, efficiently as well as integrate several logistics activities by including both inbound and outbound transportation, distribution, warehousing and fleet management so as to rationalize the physical product flows of their customer firms. As good as this claim or findings is, it still bothers on the fact that the selection of appropriate ICT tools among so many available dictate the height of the competitive advantage gained by a 3PLs service provider.

5.4.1 Decission Table

Table. 5.5 *Summary of Hypotheses result*

Questions	Objectives	Hypotheses	Results	Decission
What are the ICT facilities adopted by 3PL service providers in Malaysia?.	To study the ICT facilities and technology system adopted by the selected 3PL service providers in Malaysi.	H1:P>0.05	H1:P<0.05	H1: Rejected

What are the significant roles played by the ICT facilities employed by the 3PL service providers in Malaysia to achieve competitive advantages in the logistic and supply chain industry?.	To analyse the infleuence of ICT in logistics employed by third party logistics service providers in Malaysia	H2:P>0.05	H3:P<0.05	H2:Rejected
What are the significant factors that affect the adoption and selection of ICT in logistics on 3PL service providers in Malaysia.	To analyse the factors that affect the adoption and selection of ICT in logistics on 3PL service providers in Malaysia	H3:P>0:05	H3:P>0.05	H3:Accepted

5.5 Limitation of Study

In the course of this research study, there are some noticeable limitations and these are hereby highlight for the benefits of other research study.

One of the main limitation is the fact that the study tested and verified the stipulated hypotheses with questionaire suvey system hence give room for cross-section analysis of the study nature. This, on the other hand restrict to imply causal effect on the relationships among the construct items. A longitudinal research method whereby interview can be utilized and then tested using another type of statistics software. The finding may be more interesting to see. This, in essence is because observations in longitudinal surveys are done over a certain period of time given previledge of many or several observations to be carried out over a specific period of time.

Another point of limitation is the use of stratified random sampling which has limited the generalization of the reseach findings. This is because of the firms covered in this study are only the third party logistics firms registered with Malaysia government. It does not include those firms that are not registered and those in the process of registration.

Likewise, the study adopted the method of self reporting approach and there is a probability for over reporting relative to the slection and adoption of ICT tools by the third party logistics firms. In this type of survey method, over statement or assessment can not be over look as some respondents may not give precise or accurate assessment

of what they seems might cause negative consequence at long run no matter the confidential clause inserted in the questionaire.

Further more, the research was conducted with the purview of Malaysia which is a developing country hence some traditional norms and culture in some part of the country can be a factor.

5.6 Recommendation

Based on the result of this study whereby it was established that selection of ICT tools has a significant effect on the competitive advantage of 3PLs. It will be interesting to know through research study, the best ICT tools that produce in the highest significant effect on the competitive advantage of 3PLs. Furthermore, it is recommended that study could be carried out on the best selection process that could enhance the competitive advantage of 3PLs generally. Further studies could employ other type of theory to explore more data and information on the study variables.

5.7 Conclusion

This study has empirically revealed the influence of ICT in Logistics on third party logistics service providers in Malaysia. Using the multiple regression analysis to test the influence of ICT facilities (Usage, speed, accuracy and cost) on the competitive advantages of third party logistics through the mediating effect of selection process of ICT tools. The analysis result of the pearson product-moment correlation revealed that ICT facilities (usage, speed, accuracy and cost) has a significant relationship with

selection process and competitive advantage. Furthermore, the multiple regression analysis found that only the selection process has a significant on competitive advantage while the Usage, speed, accuracy and cost of ICT tools do not significantly influence the competitive advantage of 3PLs in Malaysia. In addition, the result indicates that Usage and the accuracy of ICT tools significantly influence the selection process but the cost and sped of ICT tools do not influence the selection process of ICT.

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Appendix

Research Questionnaire

To Whom It May Concern

Dear Sir / CEO / Director / Management.

A Survey Questionnaire on Usage of ICT Tools and Influence In 3PL's Provider; in Part of Malaysia.

I am a Master Student at University Utara Malaysia. As Partial Fulfilment of Master Study, I am required to conduct a research as the above mention title. My research is pertaining to usages of ICT tools and impact / Influence in 3PL's provider in part of Malaysia.

This questionnaire should take approximately 5-10 minutes to be completed. There are no right or wrong answer. Hence, we would appreciate your honest and complete response to help us understand your views. We would like to re-assure you that the information you give will be **treated strictly confidential.**

The questionnaire is divided into five. You are kindly request to answer the question in all of the section.

Please return the completed question at your earliest convenience through email (self-addressed envelope)

AwoyemiAdebareOmotayo
C/O Dr.Mustakim Bin Melan
H.O.DSchool of Technology Management and Logistics
Colleges of Business
University Utara Malaysia
06010 Sintok , Kedah, Darul Amen
Email: simpletayo2008@yahoo.com

Section A: ORGANIZATION AND RESPONDENT PROFILE

Please tick(√)or highlight only one response as appropriate from each of the following

Race:☐Malay☐Chinese ☐ Indian☐Other

Gender:☐Male☐Female☐Other

Age group in years : ☐Below30☐31-40☐40 Above

Education Background:☐SMP☐STMP☐ Degree☐Master & Above

Marital Status:☐ single☐Married☐other

Status of ownership:☐ Owner☐Co-worker☐ Staff☐Other

How long has your organisation been existence:?

☐ 3-5☐ 6-10☐11-15☐16&Above

What is your current position in organisation?

☐C.E.O /MD☐Manager☐Executive☐Other

How long have you been working this industry?

☐3 years☐ 3 to 5 years

☐6 to 10 year's☐More Than 10 years

What's your legal form of operation?

☐ Sole proprietorship☐Partnership

☐Privatecompany☐Public company

What is the turnover of your business in the last fiscal years?

☐ RM10-30Milion☐ 31-40Million

☐41-50Million☐50 Million & above

How many full-time employees does your organisation have?

☐ 1-10☐ 11-20☐ 21-30☐ 31 & Above

Ownership:☐<30%☐31-50%☐51-70%☐71-100%

Which of the following activities does your company practices?

Warehousing Management	
Inventory Management	
Transportation Management	
Information communication Management	
Facilities warehousing management	
Sourcing and Purchasing	

Section B: ICT TOOLS FACTOR

The following statement assess your perception on the degree of ICT Tools Factors on 3PL's Implemented in your organisation. Please tick (√) or highlight only response to indicate the the extent to which you agree with the statement based on the scale provide below

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	2	3	4	5

A.How Well has ICT Tools Satisfied you in the following ?					
Reliability	1	2	3	4	5
Quality of services	1	2	3	4	5
Flexibility	1	2	3	4	5
Communication & Problem Solving	1	2	3	4	5
Information Communication Capital	1	2	3	4	5
Delivery Frequency	1	2	3	4	5
B.To what extend have the following factors made ICT influence make your company remain at the edge of competition ?					

Improve company's focus	1	2	3	4	5
Improved delivery Times	1	2	3	4	5
Be more competitive	1	2	3	4	5
Reduce product life styles	1	2	3	4	5
C. To what extend is your company willing to use ICT ?					
Usage of tools	1	2	3	4	5
Speed	1	2	3	4	5
Accuracy	1	2	3	4	5
Cost	1	2	3	4	5
Quality Control	1	2	3	4	5
D. To What extend your company influence under the usages of ICT tools ?					
Low OR	1	2	3	4	5
High	1	2	3	4	5

Section:C SELECTION PROCESS.

The following statement assess your perception on the degree of ICT MODEL /TOOLS SELECTION in 3PL's Implemented in your organisation. Please tick (√) or highlight only response to indicate the the extent to which you agree with the statement based on the scale provide below

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	2	3	4	5

E. How Important / Influence the following criteria in other to select a model or tools in 3PL's ?					
Financial stability	1	2	3	4	5

Reliability	1	2	3	4	5
Quality of services	1	2	3	4	5
Flexibility	1	2	3	4	5
Trust and fairness	1	2	3	4	5
Experience	1	2	3	4	5
Environment friendly operation	1	2	3	4	5
Transportation safety E.g (Damages, theft e.t.c	1	2	3	4	5
Improved our operational stability	1	2	3	4	5
Contributed to the growth of organisation	1	2	3	4	5
Minimized unplanned disruption to organization	1	2	3	4	5
Obtain High customer satisfaction on the reliable services	1	2	3	4	5
Relocated the organization resources in the most economical way through business impact analysis	1	2	3	4	5
F. To what extend your company need selection of ICT Model / tools?					
Low	1	2	3	4	5
High	1	2	3	4	5

Section D: COMPETATIVE ADVANTAGES PERFORMANCE

The following statement assess your perception on the degree of COMPETATIVE ADVANTAGES in 3PL's Implemented in your organisation. Please tick (√) or highlight only response to indicate the extent to which you agree with the statement based on the scale provide below.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	2	3	4	5

G. To what extend of the 3PL's Provider has help your company to ?					
Reduction transportation cost.	1	2	3	4	5
Warehousing cost.	1	2	3	4	5
Improve company's focus.	1	2	3	4	5
Improved delivery times.	1	2	3	4	5
Obtain access to other market.	1	2	3	4	5
Be more competitive with other company.	1	2	3	4	5
Successfully retained customer confidence and loyalty by providing continuous and interrupted services.	1	2	3	4	5
Achieved competitive advantage ahead other company.	1	2	3	4	5
H. How willing are your company to be more competitive advantages?					
Low	1	2	3	4	5
High	1	2	3	4	5
Very High	1	2	3	4	5
I. What is your General level of satisfaction of current 3PL's provider in your company?					
Low	1	2	3	4	5
High	1	2	3	4	5

SECTION E: GENERAL PERFORMANCE OR OBSERVATION

If your company does not currently INFLUENCE by (ICT) tools, please answer the question below:

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	2	3	4	5

J. Which of the following attributes are the most important reason why your company not used ICT Information?					
ICT is a competency at our firm.	1	2	3	4	5
It would too challenge.	1	2	3	4	5
Cost reduction would not be experienced.	1	2	3	4	5
Reduction of human capital.	1	2	3	4	5
Too difficult to integrated with our system.	1	2	3	4	5
Control over outsources function's would diminish.	1	2	3	4	5
Services level commitment would below.	1	2	3	4	5
We have qualified and expertise 3PL's.	1	2	3	4	5
Minimum level of supply chain complaint.	1	2	3	4	5
In general, our logistics performance is excellent.	1	2	3	4	5

Influence of ICT Tools on Competitive Advantage

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Cost, Speed, Selection, Usage, Accuracy[b]	.	Enter

a. Dependent Variable: CompAdv

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.768[a]	.589	.575	.25588

a. Predictors: (Constant), Cost, Speed, Selection, Usage, Accuracy

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	13.524	5	2.705	41.310	.000[b]
	Residual	9.428	144	.065		
	Total	22.952	149			

a. Dependent Variable: CompAdv

b. Predictors: (Constant), Cost, Speed, Selection, Usage, Accuracy

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.700	.263		2.663	.009
	Selection	.836	.061	.771	13.745	.000
	Usage	-.033	.026	-.085	-1.258	.210
	Speed	.008	.027	.016	.298	.766
	Accuracy	.041	.040	.076	1.026	.307
	Cost	.000	.038	.001	.007	.994

a. Dependent Variable: CompAdv.

b.

Effect of ICT Tools on Selection Process

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Cost, Speed, Usage, Accuracy[b]	.	Enter

a. Dependent Variable: Selection

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.306[a]	.094	.069	.34957

a. Predictors: (Constant), Cost, Speed, Usage, Accuracy

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.831	4	.458	3.746	.006[b]
	Residual	17.719	145	.122		
	Total	19.550	149			

a. Dependent Variable: Selection

c. Predictors: (Constant), Cost, Speed, Usage, Accuracy.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.455	.216		15.990	.000
	Usage	.091	.035	.254	2.603	.010
	Speed	.015	.037	.033	.407	.685
	Accuracy	.029	.054	.059	.538	.592
	Cost	.011	.051	.022	.207	.836

a. Dependent Variable: Selection

Multicolinearity Test

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.830	.259		3.210	.002		
	Selection	.949	.069	.876	13.689	.000	.656	1.523
	General	-.177	.057	-.202	-3.125	.002	.643	1.556
	Usage	-.023	.026	-.059	-.892	.374	.615	1.625
	Speed	.022	.026	.046	.846	.399	.917	1.091
	Accuracy	.033	.039	.062	.858	.392	.514	1.944
	Cost	.009	.037	.017	.248	.805	.578	1.730

a. Dependent Variable: CompAdv