Effective, Efficient and Reliable Postcode Alternative System in the Context of Online Shopping for Solving the Problem of Home Delivery Service in Jordan

A Thesis submitted for the degree of Doctor of Philosophy

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ABSTRACT

The home delivery service is considered as the bottleneck of online shopping and plays an important role in the success of such business application. A lack of postcode system in the developing countries, Jordan specifically, is one of the main challenges that face delivery couriers and e-retailers.

The main aim of this PhD project reported in this thesis is the development of a novel postcode alternative system to enable online shopping and home delivery service of purchased goods in Jordan. The system incorporates two modules: the front-end and the back-end module. The front-end module is combined of two platforms: desktop and smart phone platforms and can be used by online shoppers; the back-end module is designed to be used by retailer/delivery courier as the system administrator.

Two studies were conducted in this research; the first study was aiming to understand the problems that face e-consumers when shopping online and the work behaviour of the delivery system in Jordan. Whilst; the second study was aiming to evaluate usability of the designed system. Data was collected by conducting an experimental sessions and distributing questionnaires among three samples of people (consumers, retailers, and delivery couriers). The findings of these studies showed that there was a concern from consumers-side in describing their delivery address to the retailer/delivery courier. In addition, there was a concern from retailers and delivery couriers-side in finding the delivery address location. Furthermore, a user testing was conducted on both modules by involving a number of participants according to the relevance of their use of the system to evaluate the usability of the system. In the evaluation, it was demonstrated that the system makes an important contribution for solving the problem of home delivery service and improving online shopping in Jordan.

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ABBREVIATIONS AND ACRONYMS

APIs	Application Programming Interfaces
B2C	Business-to-Consumer
CO2	Carbon Dioxide
E-commerce	Electronic Commerce
GAS	Ground Antenna Station
GIS	Geographic Information System
GNSS	Global Navigation Satellite System
GPS	Global Positioning Technology
GUI	Graphical User Interface
HTTP	Hypertext Transfer Protocol
ICT	Information and Communication Technology
ISPs	Internet Service Providers
JPC	Jordan Post Company
LBS	Location Based Service
MCS	Master Control Station
MOICT	Ministry of Information and Communication Technology
MLR	Multiple Linear Regression

MS	Monitor Station
OSs	Operating Systems
PDAs	Personal Digital Assistants
QoS	Quality of Service
SCM	Supply Chain Management
SMEs	Small and Medium Enterprises
UPS	United Parcel Service
3PL	Third-Party Logistics

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND

The 21st century has witnessed dramatic sophistications of Internet business models and its related services such as online shopping. Online shopping identified as the process of buying goods and services directly over the Internet (Islam and Hossain, 2012) and has been considered as a form of e-commerce. Since the Internet is the only medium for online shopping, it became one of the most attractive facilities for Internet users where consumers place an online order and the retailer is responsible for fulfilling their orders (Yousept and Li, 2004). Xia, Huang and Zhu 2010; identified the process of order fulfilling as the process of planning, organizing and dispatching consumers' orders and prepare them to be delivered to the consumer's doorstep or any other delivery location. Home delivery service is one of the most important services and plays a crucial role in the success of online shopping (Ehmke and Mattfeld, 2012).

Online shopping has potential advantages for consumers; these advantages lie in the convenience, save time, price comparison, huge selection of goods, and availability of home delivery service (Islam and Hossain, 2012; Ghazali, Mutum and Mahbob, 2006; Khatibi, Haque and Karim, 2006; Kaufman-Scarborough and Lindquist, 2002). However, consumers remain to worry about the quality of service (QoS) such as delivery time, delayed and damaged or lost items and quality of goods (Consulting *et al.*, 2011; Cairns, 1996); consumer

enquiries which includes post-sale service, answering consumers' enquiries and questions, and providing the consumers with return and payment policies. In addition to, issues related to the security of online payment (Ghazali, Mutum and Mahbob, 2006).

The utilisation of Internet as a channel for shopping as well as development of business models (e.g. B2C) has increased the growth of online shopping which has led to a huge demand for the delivery service(Robusté, Galván and López-Pita, 2003). Thus, significant developments in the supply chain management (SCM) operations led to further improvements in the information and communication technology (ICT) infrastructure and the delivery operations (Browne *et al.*, 2001). Home delivery is identified as the process of delivering bought items to its final location (e.g. Consumer's doorstep) or another location (e.g. Workplace) (Campbell and Savelsbergh, 2003; lewise @ Your Home, 2001). Physical distribution of items bought online must be operated by the seller's delivery fleet or by third-party logistics (3PL) Company (Browne *et al.*, 2001). Hence, delivery service is considered as a key driver for online shopping success and a complementary for its services (Ehmke and Mattfeld, 2012; Auramo, Aminoff and Punakivi, 2002).

However, online shopping consumers expecting efficient and reliable delivery service from the seller/retailer to deliver their items quickly and reliably (Boyer, Prud'homme and Chung, 2009). Therefore, the retailer must meet the consumers' expectations by having a suitable delivery system that will fulfil their needs in order to gain their trust and satisfaction (De Koster, 2003; Kaufman-Scarborough and Lindquist, 2002; Li and Zhang, 2002).

The home delivery service, also called "last mile" which play an important role in the preservation of the environment by generating less CO2 in comparison with conventional shopping and energy saving by reducing consumers' trips into the shops for shopping or collecting their items(Edwards, McKinnon and Cullinane, 2010; Edwards, McKinnon and

Cullinane, 2009). In addition, reduce the impact of traffic by delivering consumers' orders using one vehicle within specific time windows(Cairns, 2005). However, the development of the delivery service needs a developed addressing system to enable the consumers to provide their shipping address details to the delivery couriers to be able to find this address. This system is called "postcode or ZIP code system" which consists of series of letters and digits to give each house a unique identifier for the purpose of mail sorting (Lombaard, 2010; Dzuba, Filatov and Volgunin, 1997). The lack of this system hinders the delivery service efficiency, which thus in turn affects the consumers' decision to shop online and the retailers' ability to start adopting e-shopping as a channel for selling their commodities (Kapurubandara, 2009; Almeida, G., Avila, A., & Boncanoska, V., 2006).

For example, Jordan and other Arab countries are in developing countries that lack of postcode system, which affects the delivery service efficiency due to the difficulty in finding consumers' house location. In addition, the lack of such system affects consumers' and retailers' attitudes and decisions to start using online shopping either for buying or selling.

However, the main operator of the postal services in Jordan is Jordan Post Company (JPC), which covers all the Kingdome cities and areas (Chaudhry, 2006). JPC provides a variety of services to the citizens and beneficiaries, such as e-services, SMS services, postal services, financial services and supplementary services (Jordan Post, 2013). However, JPC does not provide home delivery service to the consumers due to unavailability of a reliable delivery system. They offer private post boxes based at the post office for the citizens to rent to enable them to receive and collect their letters and small sized parcels. However, the delivery service for goods bought online from outside or inside the Kingdome are provided to the consumers by international delivery couriers such as DHL, UPS, TNT, and ARAMEX. This is because those delivery couriers have enough experience in delivering customers' orders even with the

absence of delivery systems. Moreover, these couriers are dependent on their drivers experience in the area of delivering their customers' orders, whereas all streets have names and all houses have numbers, which helped making the delivery service more efficient. However, the developments of naming the streets and numbering the houses are still not enough to attain a reliable delivery system, due to the delivery driver being unable to plan delivery routes to the delivery address location.

The lack of postcode system caused by the lack of infrastructural developments, which affected the process of online shopping and then, home delivery service. Thus, the designed system came as an alternative way that enables online shoppers to identify their house location on the map in order to enable the retailer/delivery courier to find this location easily. Also, the system will enable the retailer/delivery courier to plan the delivery routes to the delivery address location and export it as excel sheet in order to import it into handheld/in car GPS device. This will help in improving the delivery service of online purchased goods by lowering the costs and increasing the efficiency of the delivery service. In addition, it leads to the creation of a customer value and meeting customers' expectations by increasing the quality of the provided services.

1.2 MOTIVATION

Online shopping is one of the most significant Internet business models that have received much attention in the recent era. The potential benefits to the consumers can be generated from such business that have encouraged enterprises to adopt and for researchers to develop.

However, the growth of Internet users for shopping has increased online shopping importance and led to an increase in the demand on the delivery service (Robusté, Galván and López-Pita, 2003). Also, home delivery service considered as an important factor for the success of

online shopping business (Ehmke and Mattfeld, 2012; Auramo, Aminoff and Punakivi, 2002). Home delivery service is one of the most challenging issues for e-retailers and delivery logistics, which require an efficient and reliable delivery system to provide the consumers with convenient services to gain their trust and satisfaction (De Koster, 2003; Kaufman-Scarborough and Lindquist, 2002; Li and Zhang, 2002).

Today, the delivery service in Jordan still inefficient and needs to become improved; this is due to the lack of postcode system that led to the lack of reliable delivery system. Recently, the ICT infrastructure in Jordan has been developed; nevertheless, retailers and delivery logistics still suffer from the problem of a lack of postcode system that hindered the process of home delivery.

Extensive research has been carried out to solve the problem of home delivery service around the world. These researches were trying to solve the delivery problems by using home delivery alternatives such as unattended delivery (e.g. Collection and delivery points (CDPs), communal reception boxes and home reception boxes). Concluding, that there are no researches that have paid particular attention in solving the problem of lack of the postcode system where most of the world countries do not have such system, particularly in Jordan. In continuation, the lack of research about online shopping and mainly the lack of postcode system have helped design a system to help improve the delivery service in Jordan.

This research investigates the attitudes and perceptions of consumers, retailers, and delivery couriers toward online shopping and home delivery problems. Due to the lack of a postcode system, which has led to an unreliable delivery service, an alternative postcode system in the context of online shopping has been designed to improve the delivery service and then online shopping business in Jordan. Online shopping customers can use this system to assign their house location on the map and submit this information to the retailer to enable him to plan

and schedule delivery routes. Eventually, the findings of this research will help in refining as well as sophisticating the online shopping business, its related delivery service, and enhancing customers and retailers' decisions to adopt such businesses in the future.

1.3 RESEARCH AIM AND OBJECTIVES

The main aim of this research is to design and develop a system that is capable of improving the delivery service of online retailers in Jordan. This research works toward developing an alternative postcode system in the context of online shopping to be used by both consumers and e-retailers in Jordan to solve the problem of home delivery service for online purchased goods. Online retailers can utilise this system to improve home delivery service provided to the customers.

To fulfil the aim of this research, the study has been broken down into a number of objectives; these objectives are:

- Conduct a comprehensive literature review to cover all aspects related to online shopping and home delivery service in the developed and developing countries.
- Investigate the attitudes and perceptions of Jordanian consumers and retailers toward online shopping and home delivery service benefits and concerns.
- Investigate the attitudes and perceptions of retailers and delivery logistics toward home delivery service problems and concerns in Jordan.
- Develop and conduct initial testing of the postcode alternative system that will help in improving online shopping business by solving the problem of home delivery service.
- Assess the validity of the system modules by performing set of experiments and analyse the collected data to get the results.

1.4 RESEARCH METHODOLOGY

When a research project is undertaken, clear methods and strategies of research are required to efficiently carry on to accomplish the required research work. In addition to this, it must enable other researchers to effectively undertake the research in the same way. This study encompasses research methods required to perform this research with respect to others research. According to Sue Greener (2008), research work can be performed using primary or secondary research methods. The primary research material is considered as the data that has been collected by the researchers themselves, which relate to the research problem in which they are interested, whereas secondary research material is considered as the data that has been gathered or written by other researchers (John W. Creswell, 2009; Black, 1999). Primary methods include different ways for data collection; these ways can be as questionnaires, observations, interviews, and experimental tests. In this research, the secondary research was built up by reviewing the existing literatures from textbooks, journal papers, conference papers, and the related subject topics. The main aim was to gather information, review the existing strategies and implementations, and understand the work behaviour of the related technologies through emphasising on new materials such as journal papers and textbooks.

The primary research work of the first study conducted the attitude of the participants, such as consumers, retailers, and delivery couriers towards online shopping benefits and barriers, home delivery service concerns in order to understand the situation of online shopping and home delivery service in Jordan. The outcome of this study was to design a system that can solve the problem of a lack of postcode and reliable delivery system.

Next, the second primary research of the second study established to conduct an experimental evaluation of the designed system modules usability. The system consisted of two platforms: front-end and back-end module platforms. The front-end module consisted of desktops and smart phone platforms to be used by online consumers, whereas the back-end module consisted of a system administrator platform to be used by retailer/delivery courier. The evaluation conducted using the user testing method by recruiting a number of experienced participants in the internet, and online shopping, and home delivery service depending on their context of use for the system. Four groups of participants were recruited in the experiments: Two groups of participants were acting as online consumers to evaluate the front-end module platforms, and two groups of participants were acting as system administrators recruited to evaluate the back-end module platform. Finally, further details of each study methodology are explained in their chapter.

1.5 CONTRIBUTION TO KNOWLEDGE

This doctoral thesis, contributes to the body of knowledge in the following ways:

- The first contribution of this study is the conducted study in chapters three and four, which investigated the benefits and barriers of online shopping, as well as home delivery service concerns from the perspective of consumers, retailers, and delivery couriers. The findings of the study can be applied to the other developing countries (i.e. Arab countries) because they share the same traditions, culture, and ICT infrastructure. Further details about the findings can be found in chapters three and four.

- The system front-end module which is responsive to desktop and handheld devices (i.e. Smart phone and tablet), this system solved the problem of lack of the postcode

system in Jordan by developing a mechanism that enables the customers to identify their house location on the map easily. This mechanism is called “Geocoding” which lie in relating an address to its location on the earth surface by placing a marker on the house location that reads X and Y coordinates of this location. In addition, by exploiting the existing positioning technologies such as GPS receivers embedded in smart phone and other handheld devices to enable the users from identifying their house location easily and comfortably. Further details can be found in chapter five.

- The system back-end module platform, which solved the trouble of home delivery service in Jordan by enabling retailers/delivery courier to find their customers’ house location efficiently. After finishing the requisite tasks of the front-end module platform and submitting the delivery address location details, the retailer/delivery carrier will be able to plan delivery routes to the customer’s house on the map. Thereafter, they will be able to export the submitted order information, including the delivery address location information as excel sheet and import this information into handheld/in car GPS device. Further details can be found in chapter five.

- The usability evaluation of the system trial outcomes as well as the system usefulness in solving the problem of home delivery service in Jordan with the lack of postcode system and the lack of ICT infrastructure is also considered as a novelty and such as, original contribution to knowledge per se. Further details can be found in chapter six.

1.6 THESIS LAYOUT

The thesis layout incorporates seven chapters including this introductory chapter; further chapters are briefly presented as follows:

Chapter 2 provides an overview of the extant literature related to online shopping, home delivery, and other topics related to this PhD project.

Chapter 3 provides an overview of the used approach for conducting this research and the data collection approach. In addition to, an overview of the analytical tools used for analysing the collected data. Moreover, a detailed description of the research methodology used in designing the first study for investigating the attitude of consumers, retailers and delivery couriers toward online shopping and home delivery service in Jordan. Additionally, a detailed description of the research methodology used in designing the second study for evaluating the designed system in this PhD thesis was provided.

Chapter 4 describes the first study undertaken in this research that presents attitudes and perceptions of Jordanian consumers, retailers, and delivery couriers toward online shopping and home delivery service. The chapter explained the research methods, participants, procedure, and data analysis. Finally, results are reported and discussed in the chapter and a summary of the study was provided.

Chapter 5 presents the designed system architecture, functions and models. The designed system consists of two modules: front-end and back-end modules. The front-end module consists of desktop and smart phone platforms. The back-end module consists of one

platform. These two modules were developed and deployed in real world for the purpose of usability evaluation.

Chapter 6 presents the testing approach used for evaluating the designed system usability. Additionally, the results of the designed system usability evaluation and discussion are provided.

Chapter 7 presents the conclusion of the research findings from chapters three and four, potential limitations of the conducted studies, and recommendations for future work in order to draw up research directions.

CHAPTER 2

LITERATURE REVIEW AND TECHNICAL BACKGROUND

2.1 INTRODUCTION

Online shopping is a business model of e-commerce that has many potential advantages for companies and individuals; thus, many researchers have focused their attention to solve the obstacles that hamper the process of buying goods online. Online shopping has been identified as the process of buying commodities and its related services electronically over the Internet (Islam and Hossain, 2012; Chaffey, 2009). With the advancement in the use of the internet and the increase of the awareness among people in the developed countries, online shopping has become one of the most attractive facilities for internet users (Yousept and Li, 2004; Development. Working Group on Urban Freight Logistics, 2003). In addition, online shopping is much more of a convenient channel for the consumers that offer potential benefits such as time saving, convenience in search for a product, availability of product's information and eliminating the need to travel for shopping(Kacen, Hess and Chiang, 2002; Szymanski and Hise, 2000). However, home delivery is an essential service for online shopping and its considered as a key factor in the success of this kind of business (Ehmke and Mattfeld, 2012; Auramo, Aminoff and Punakivi, 2002; Yrjo, 2001). Home delivery is identified as the items that are delivered to its final destination (e.g. Consumer's home) or another location (e.g. Workplace) (Edwards, McKinnon and Cullinane, 2010; Campbell and Savelsbergh, 2003; lewise @ Your Home, 2001). Also, online purchased goods can be

delivered to another location instead of the customer's house (i.e. shared reception boxes or collection points). These alternative methods of direct home delivery can be placed in the nearest location of the customers' living area (i.e. petrol station or bus station) (Punakivi and Tanskanen, 2002). Moreover, Hollming Oy in Finland and Boxcar Systems Inc. in the USA have introduced such kinds of delivery alternatives for receiving groceries (Punakivi and Tanskanen, 2002). Recently, Amazon has developed a method for delivering their customers' parcels safely by employing lockers in the convenience stores and drugstores that helped in saving delivery costs (Bailey *et al.*, 2013; Lang *et al.*, 2012). Home delivery in Jordan is believed as the most challenging issue that face e-retailers and delivery couriers when delivering customers' orders; this is ascribable to the deficiency of a postcode system which has contributed to the lack of a delivery system. The lack of the postcode system could be caused by the lack of a developed addressing scheme and deficiency of developed transportation infrastructure.

2.2 ONLINE SHOPPING

From a historical point of view, online shopping is not a novel phenomenon. Since the beginning of the 1990's, the emergence of World Wide Web (WWW), for commercial use has led to the development of the first online shop (Harn, Khatibi and Ismail, 2006). Thereafter, the subsequent technological innovations started to take place in order to develop such business models. The most popular transaction forms for online shopping are Business-to-Business (B2B), and Business-to-Consumer (B2C). B2C transactions are considered as the way of exchanging products and services between e-retailers and individuals over the internet (e.g. Amazon and e-bay) (Tassabehji, 2003); whilst B2B transaction is considered as the most profitable business models and identified as the way of exchanging the products and services between companies and businesses (Categorization, 2006; Tassabehji, 2003).

However, online shopping is one of e-commerce models that has rapidly increased in the developed countries, but whose progress has been noticeably slower in developing countries, due to infrastructural (e.g. Internet access) and cultural barriers (e.g. High uncertainty) (Islam and Hossain, 2012; Nuseir *et al.*, 2010) these obstacles contribute to a large part of the barriers that hinder online shopping in the developing countries, in this chapter the rest of these barriers will be discussed in more details.

On the other hand, online shopping has potential benefits for both consumers and e-retailers that can lead the consumers to adopt it as a channel for shopping. Also, consumers can be attracted to the shopping website depending on its commodity value, quality of service (QoS), post-sale customer services, availability of home delivery service, and finally, payment security and privacy (Shergill and Chen, 2005). Thus, when these benefits and services meet the consumers' needs, the consumers will have a positive attitude towards online shopping (Wu, 2003; Vijayasarathy and Jones, 2000; Jarvenpaa and Todd, 1996a).

Figure (2.1) indicates the overall online shopping process model that illustrates the whole process of online shopping as well as the required tasks for consumers, retailers and the financial institution. In addition, it indicates the problem of home delivery service that the online consumers and retailers in Jordan face, which is the main problem that this research aims to solve. As indicated in the model, the problem that faces online consumers in the checkout section is the problem of identifying their delivery address which indicated as number "1" in the checkout section. Likewise, the model shows the trouble that faces the retailer in finding the consumer's delivery address location which indicated as number "2" in the order fulfilment section. The problems suggested in the model which face both consumers and retailers are due to the lack of a postcode system in Jordan, which led to the lack of efficient and reliable delivery system that enables the retailer/delivery courier from delivering their customers' orders efficiently.

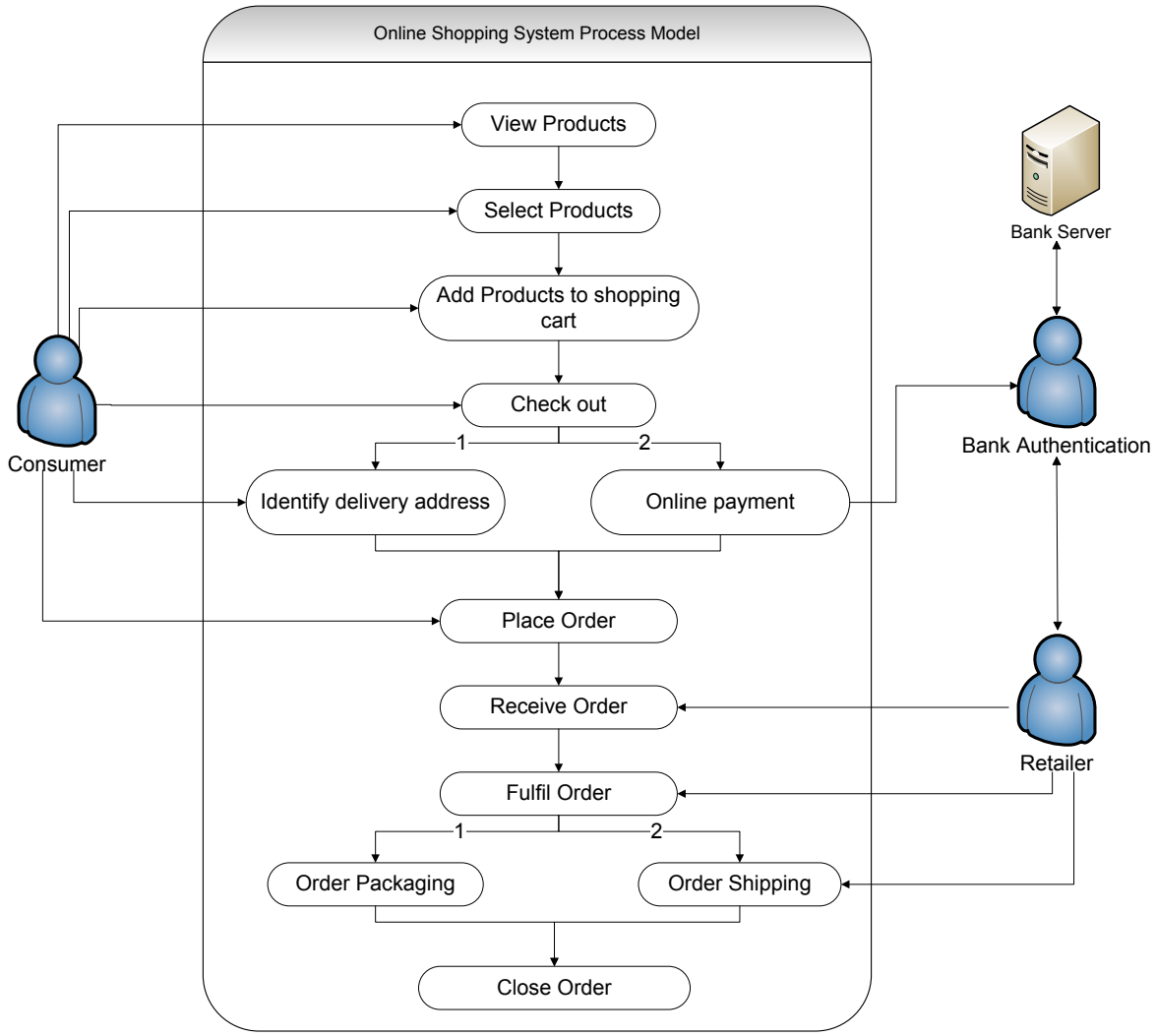

Figure 2. 1: Online shopping process model

2.2.1 Online Shopping in Developing Countries

Online shopping in developing countries still in its early stages, whereas SMEs are facing challenges and obstacles in adopting an online business; these challenges are: the high cost of ICT, lack of ICT awareness, poor communication infrastructure, and payment security concerns (Kshetri, 2008b; Elbeltagi, 2007; Andam, 2003). On the other hand, the lack of a reliable delivery system for delivering consumers' orders is considered as the most

challenging issue and essential part of online shopping diffusion in developing countries (Ahmed, Zairi and Alwabel, 2006; Hawk, 2004; Kamel and Hussein, 2002; Travica, 2002).

These challenges face retailers in developing countries and affect their decisions for establishing and adopting an online business instead of traditional business. To overcome these challenges, retailers in developing countries must establish communication channels over the Internet with their peers across the globe who engaged in the same business to exchange information, share experiences and solutions for technical problems (Andam, 2003).

As the Internet is the only medium for online shopping and for performing online transactions, Internet diffusion in developing countries is still slow compared with developed countries, which led to low efficiency in IT businesses performance and productivity (Kshetri, 2008b; Fraser and Wresch, 2005; Dewan and Kraemer, 2000). The slow diffusion of the Internet can be attributed to the unavailability of developed ICT infrastructure that controls the growth of e-businesses around the world (Andam, 2003). In addition, most of the transactions are cash-based which indicate that there is a lack of an e-banking system for processing credit card payments in electronic means (Kshetri, 2008b; Wresch and Fraser, 2006). However, the rapid growth of e-businesses such as online shopping in the developed countries attributed to the developed infrastructure and the availability of delivery system for goods where such systems are rare in developing countries (Hawk, 2004).

2.2.2 Online Shopping Barriers

Online shopping barriers are considered as key challenges that affect the development and diffusion of such businesses in developing countries where most enterprises there are classified as small and medium enterprises (SMEs) (Andam, 2003).

As shown in Figure (2.2), online shopping barriers are divided into delivery-based barriers and non-delivery-based barriers (Consulting *et al.*, 2011). Accordingly, this division has been adopted because the main focus of this research is on the delivery service in Jordan. Online shopping barriers include:

2.2.2.1 DELIVERY-BASED BARRIERS

These sorts of online shopping barriers depend primarily on the delivery service, which involves consumers and small retailers:

- Delivery Costs

Transportation costs are considered as a significant factor, which plays a vital role in the success and the continuity of the delivery service, either the domestic delivery or the international delivery (Consulting *et al.*, 2011). The success of such service can be done by adopting a specific time window slot for each delivery to enable a better route and scheduling optimisation which thus leads to cost reduction (Punakivi and Saranen, 2001). Cost reduction depends on the delivery mode used, for example, delivery alternatives (e.g. Reception boxes and shared boxes) are the most cost-efficient way for the delivery when the recipient is not present to receive his delivery (Punakivi, Yrjölä and HolmstroÈm, 2001). To improve the cost-effectiveness of the delivery service, Norberg and Lundblad 2001, argues that physical stores can serve as pickup and delivery point for goods ordered online which achieve a huge cost savings. In addition, if the consumer wants his purchases to be delivered to his doorstep, home delivery should be originated from the retailer's store(Norberg and Lundblad, 2001).

- Quality of Service (QoS)

QoS includes delivery time, delayed and damaged or lost items, quality of goods, and technology used for processing and delivering consumers' orders, and consumer service

which includes after-sale service, answering consumers' enquiries and questions, and providing the consumers with return and payment policies (Consulting *et al.*, 2011; Cairns, 1996).

- Delivery Information

The requirement of providing information from the retailer and delivery service provider about delivery time, how to return unwanted products and what happens if the merchandise is damaged or delayed, is evaluated by the quality of the used system for this determination. However, Failure to provide such data leads to consumer mistrust and this can cause malfunction of delivery service. Also, the consumers must provide the retailer staff with some information such as delivery full address, delivery preferred time and contact details to enable the retailer to supply their goods without any delay in order to reduce the delivery costs (Consulting *et al.*, 2011). The most affected retailers with these problems are the small retailers because they lack of awareness on how to provide information in some areas(Consulting *et al.*, 2011).

- Lack of ICT infrastructure

The lack of information and communication infrastructure hinders the process of developing online shopping and its related services such as delivery service (Elbeltagi, 2007; Kapurubandara and Lawson, 2007). In addition to, the low speed of internet access, low internet penetration, low bandwidth of internet which affects the process of data transfer, and the lack of e-banking system for processing electronic payments (Kshetri, 2008b; Kurnia, 2006)are all considered as major hurdles for e-business development.

2.2.2.2 NON-DELIVERY-BASED BARRIERS

Non-delivery barriers can affect both retailers and consumers, which generate market imperfection due to the lack of information, especially if one of them was overseas (Consulting *et al.*, 2011). The barriers that consumers face when the retailers are from overseas are language problems, product standards, product return or exchange, and fraud; whilst the barriers that the retailers face when the consumers are from overseas lies in cultural barriers, language, issues related to payment fraud, advertising, and taxes (Consulting *et al.*, 2011). These barriers are discussed in more details as follows:

- Socio-cultural issues

Social and cultural issues involve the consumers' desire in touch and feeling the products' quality before purchase(Kshetri, 2008a; Elbeltagi, 2007), and the desire of purchasing from well-known vendors with a good reputation(Travica, 2002). The language barrier lies in using web sites written in some other languages (e.g. English), where most of people in developing countries do not speak English, this inhibits non-English speaking consumers from using online shopping websites (Gibbs, Kraemer and Dedrick, 2003; Kenny, 2003). In addition, the lack of trust and concerns about the privacy of the personal information when shopping online and payment security are attributed to the lack of financial systems and considered as important inhibitors for people in these countries (Molla and Licker, 2005; Hilbert, 2001). Eventually, the lack of the awareness and knowledge among consumers and retailers toward the benefits of using online shopping as an alternative way for shopping have hindered online shopping business (Kshetri, 2008b; Kurnia, 2006).

- Economic and political issues

The high costs of Internet subscription, in comparison to lower average income levels of the consumers in developing countries (Kurnia, 2006; Andam, 2003; Tigre, 2003); and the changes in the economic climates and regulations (Kapurubandara and Lawson, 2007) hindered the adoption of e-businesses. Furthermore, work behaviour of the retailers in developing countries affects the efficiency of e-business, which is attributed to the preference of face-to-face communications with international retailers (McKinsey, 2001). In addition, higher tax charges on the items bought online from international retailers that are considered as luxury items hinder online shopping (Kshetri, 2008b).

- Human resources issues

The lack of personal skills for using computer for exploring the Internet is considered as a barrier for using online shopping websites for shopping (Kurnia, 2006; Lane *et al.*, 2004; Andam, 2003). In addition, the low knowledge and awareness of the possible benefits derived from online shopping for both consumers and retailers are considered as a barrier that hinders the diffusion of online shopping.

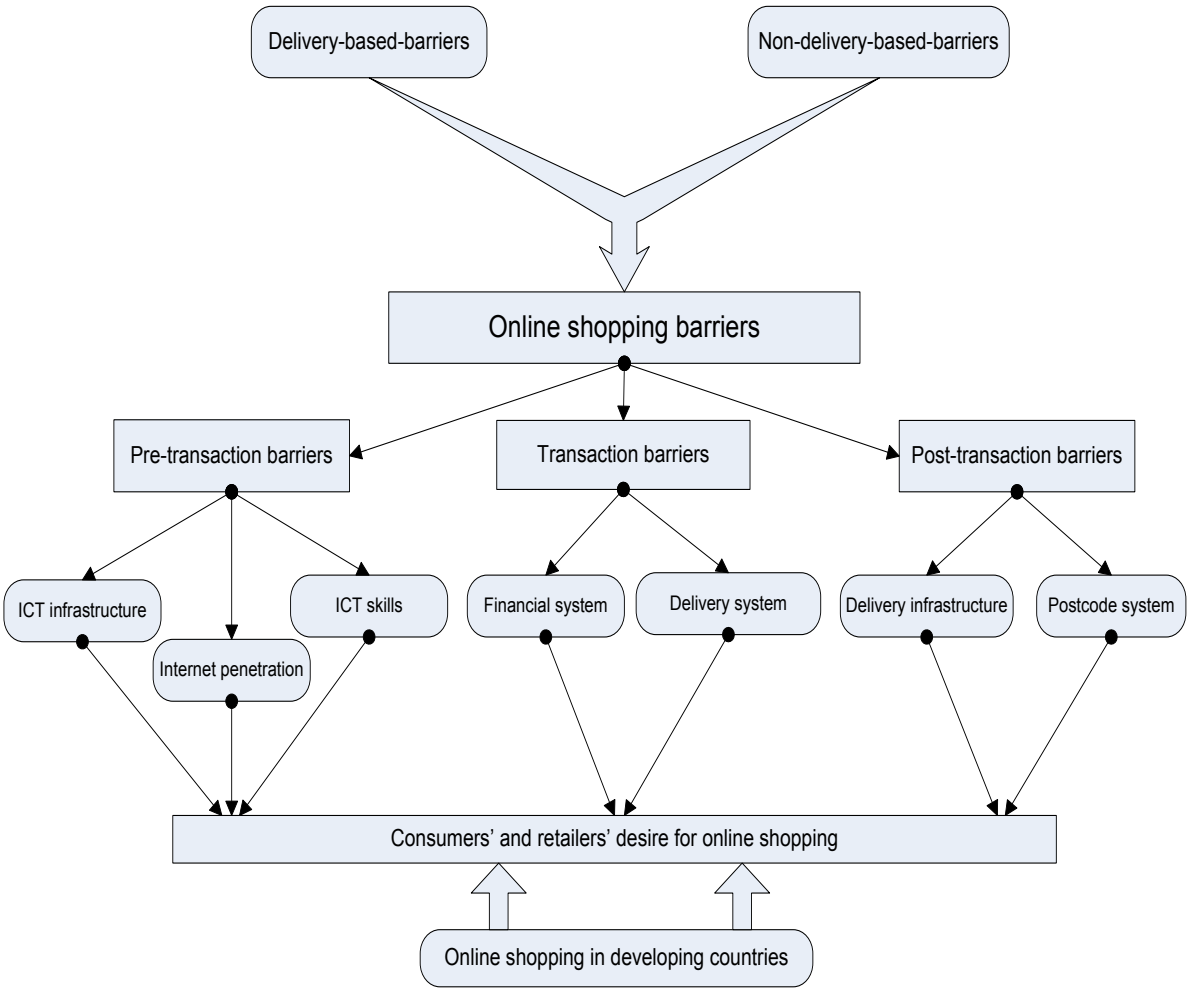

Figure 2. 2: Online shopping diffusion barriers in developing countries

2.2.3 ONLINE SHOPPING PERCEIVED BENEFITS

Perceived benefits are considered as the positive outcomes or motives that attract consumers and retailers to adopt online shopping as a channel for goods selling and buying (Liu *et al.*, 2013). According to previous studies of (Vijayasarathy and Jones, 2000; Jarvenpaa and Todd, 1996a), which emphasized that online shopping benefits will have a positive impact on both consumers and retailers attitude toward online shopping; these benefits are:

- Initiating a borderless marketplace

Although borderless marketplaces are not initiated for consumers in specific geographical areas only, it is designed for all people around the world in order to enable consumers and retailers to interact with each other globally throughout e-marketplaces(Tassabehji, 2003). These e-marketplaces (e.g. Amazon and eBay) provide the consumers and retailers with various benefits and advantages that attract them to shop online.

- Low transaction costs

Technologies of online shopping have improved operational efficiency of the retailers and led to a reduction in the cost of creating, processing, distributing, storing and retrieving information (Alam *et al.*, 2005; Tassabehji, 2003). In addition, these technologies provide retailers with several cost effective ways to launch new products, initiate communication channels with the consumers, products and services digitisation by delivering them in electronic form (e.g. Software, music, etc.), inventory control and take the right decision by keeping updated with market information (Turban *et al.*, 2009; Alam *et al.*, 2005; Tassabehji, 2003).

- Convenience

Convenience is considered as a major benefit of online shopping that motivates the consumers to buy from e-retailers since utilizing the Internet as a shopping platform (Jiang, Yang and Jun, 2013). However, the benefits of online shopping convenience include saving time and effort, ease of product search and browsing, product information, 24/7 access to online shopping websites, ease of product exchange and return, secure electronic payment and availability of an efficient delivery service (Jiang, Yang and Jun, 2013; Kwek, Tan and Lau, 2010; Koo, Kim and Lee, 2008).

- Price comparison

Price is the factor that attracts the consumers to buy online; consumers compare the prices of the products offered by e-retailers and choose the lowest price discount. Therefore, retailers must pay attention to the consumer shopping orientation by offering a good price discount on their products to attract the consumers (Liu *et al.*, 2013).

2.3 ONLINE SHOPPING IMPLEMENTATION MODEL

As mentioned before, online shopping faces a number of significant challenges that affect the consumers' and retailers' decision to adopt it as a channel for shopping. These challenges need immediate solutions in order to develop e-commerce business applications. Travica (2002) has built a model to be considered as a roadmap for implementing a successful e-commerce business; the model reflects the stages of applying and implementing e-commerce infrastructure which is adopted in the developed countries such as the USA and western European countries with some developments (Travica, 2002).

As shown in Figure (2.3), the model consists of six tiers that built in accordance with the developments of e-commerce that depends on technological, economical, and cultural aspects in pyramid form, each tier considered as the infrastructural need for developing such business. These tiers are discussed from the bottom to the top as follows:

- Transportation Tier

The transportation tier refers to the transportation modes, such as road, air, and railroads. This tier is considered as an essential infrastructure for countries that adopt e-commerce business and needs to be supportive of the future changes and developments which come in the bottom of the pyramid (Travica, 2002).

- Delivery Tier

The delivery tier is the supportive tier for the previous one; this tier includes the technologies and strategies used in the delivery service and needs to be reliable, and efficient to deal with delivery difficulties and correspond to the upcoming changes and developments of e-commerce (Travica, 2002). These strategies lie in having a developed delivery infrastructure, such as postal systems, delivery alternatives and addressing schema (Travica, 2002). In addition, home delivery is considered as a crucial part of e-commerce, which attracts the consumers to shop online locally and globally.

- Telecommunications Tier

The telecommunication tier includes the modern, secure telecommunication channels and information systems that are considered as the key factors of the presence of e-commerce business (Amor, 2000; Rajput, 2000). In addition, this tier considered as the base of the success of e-commerce business because of its relation to the availability of fast, secure, and affordable Internet connection infrastructure (Travica, 2002).

- Software Industry Tier

Software industry tier refers to the ability of implementing and maintaining computer applications that are necessary for e-commerce operations and services development (e.g. e-payment system) (Amor, 2000; Rajput, 2000). However, today's developed software packages (e.g. PHP, Java Scripts, XML, etc.) have led the developers to produce many systems that can create huge improvements in e-commerce sector.

- E-Payment Tier

E-payment tier involves all parties (i.e. Retailers, consumers and bank institutions) interested in e-commerce(Travica, 2002). Retailers argue that the trust of credit cards or debit card issuers (e.g. Bank institutions) will improve the customers' trust in e-payments. Consumers are expecting to have a secure and safe payment transaction by having credit cards or debit cards to make an e-payment when shop online; these transactions must be done by bank institutions. Bank institutions must enhance consumer's trust in the security as well as safety of e-payments and the possibility of cancelling or changing incorrect payments by having advanced and secure banking and telecommunication systems for processing their customer's transactions(Travica, 2002).

- Cultural Tier

Cultural tier is the final tier, which comes at the top of the pyramid; this tier refers to consumers' attitudes and perceptions toward online shopping, including trust in retailers and products being sold online uncertainty (Travica, 2002; Cronin, 2000). Trust is the most important factor that motivates the consumers to shop online, this can be found in the products and services provided by the retailer. These services include quality of service (QoS), such as goods quality, delivery service and the technologies used for processing customers' orders (Consulting *et al.*, 2011; Cairns, 1996). In addition, customers services which includes after sale services, answering customers' enquiries and questions, providing customers with adequate information of products return and payment policies (Cairns, 1996; Zairi, 1992).

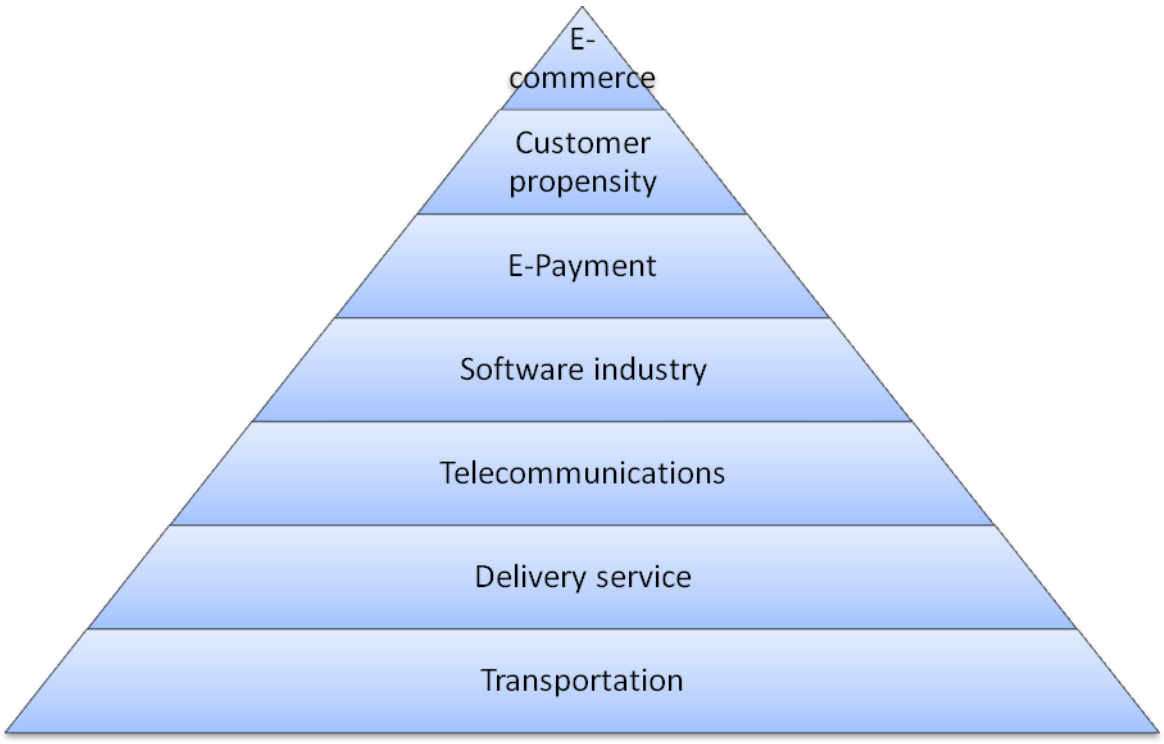

Figure 2. 3: E-commerce diffusion model (Travica, 2002)

As mentioned earlier, e-commerce diffusion model shows the stages of implementing and developing e-commerce business that have been adopted in the developed countries. Thus, this model discusses the key factors that need to be developed in order to reach the readiness level of adopting e-commerce in developing countries. Furthermore, this model gives the researchers an overview of the elements that need to be investigated in order to develop them and reach the level of adopting e-commerce.

2.4 HOME DELIVERY SERVICE

As the last and the most important stage in the supply chain, home delivery also known as "last mile" which is considered as an essential part of online shopping that play a crucial role in the success of such business(Ehmke and Mattfeld, 2012; Edwards, McKinnon and

Cullinane, 2009). Therefore, e-retailers must have a reliable delivery system in order to deliver their customers' orders efficiently. By delivering goods to the customer's doorstep, home delivery service is the ultimate value-added service for consumers that poses enormous logistical challenges and is struggling to meet customer expectations (Campbell and Savelsbergh, 2003). However, online shopping has become one of the most attractive facilities for Internet users where the consumers are placing an order online and the retailer is responsible for fulfilling their orders (Yousept and Li, 2004). Order fulfilling is identified as the process of planning, organizing, dispatching the customer's order and prepare it to be delivered to his/her doorstep or any other delivery location (Xia, Huang and Zhu, 2010; Yousept and Li, 2004). Home delivery is the physical delivery of purchased goods online and must be operated by the retailers' delivery fleet or by third-party logistics (3PL) company in case the retailer outsourcing the delivery service (Browne *et al.*, 2001). Hence, delivery service is considered as a vital process for e-retailers success and continuation (Auramo, Aminoff and Punakivi, 2002). Moreover, the advantages of home delivery have attracted the consumers to shop online; these advantages include time saving, convenience, reduce traffic and energy consumption which has led to lower CO2 emissions (Edwards, McKinnon and Cullinane, 2010; Edwards, McKinnon and Cullinane, 2009). In the developed countries, such as the UK and USA post/zip code system has solved the problem of home delivery service for online purchased goods for consumers and retailers/delivery couriers. Each house in these countries has its own identification code, which can be used as a unique identifier of the resident's house location. Such systems have been exploited to improve the delivery service of online purchased goods where consumers have to provide their zip/postal code, plus to their house/flat number in the delivery address section of the shopping website. This information helped the delivery courier to find the house location easily because each zip/post code has its own unique coordinates (i.e. Latitude and Longitude). The process of

relating addresses to a specific location on the earth is called “Geocoding” (Daly, 2008). Each location has its own unique coordinates by relating a set of symbols, letters, and numbers for each location to make it easy to remember. These coordinates enabled the delivery courier to find a customer’s house location easily by importing the related letters to the house locationinto the GPS device to get the driving directions to this location. In addition, it helped in improving home delivery service by assigning delivery time slots for each order. These time slots can be determined by the consumer or by retailer/delivery courier depending on the purchased item's nature (i.e. Groceries) or the offered delivery service. Thereafter, the retailer/delivery carrier will be able to schedule their delivery routes depending on the delivery time slots that make the delivery process more efficient.

The growth of online shopping and home delivery leads to significant developments in the supply chain operations, which then lead to more advanced developments in the ICT infrastructure (Browne *et al.*, 2001). However, online customers expect high-level logistical services and reliable delivery service from the retailers (Boyer, Prud'homme and Chung, 2009). Home delivery is classified into “Attended home delivery” and “Unattended home delivery” where the focus of this research is on attended home delivery. Attended delivery is that where the customer must be present at home to receive his/her delivery and may be for security reasons depending on the bought good type (e.g. Perishable goods). To avoid delivery attempt failure, the retailer/delivery courier must adopt a strategy to arrange delivery times with the customers, such as determining delivery time windows or time slots (Campbell and Savelsbergh, 2003). The unattended delivery comes as an alternative way for delivering customer’s goods into alternative place in order to solve the problems of not at home or the problems of lack of the postcode system(Park and Regan, 2004). These alternatives lie in offering an alternative place for delivering the customer’s order such as pick up or a collection point (e.g. nearest petrol station), home reception boxes, communal or shared

reception boxes (McKinnon and Tallam, 2003; Punakivi, 2003). Figure (2.4) shows the whole process of the delivery service and the steps required from both consumers and retailers to complete its requirements.

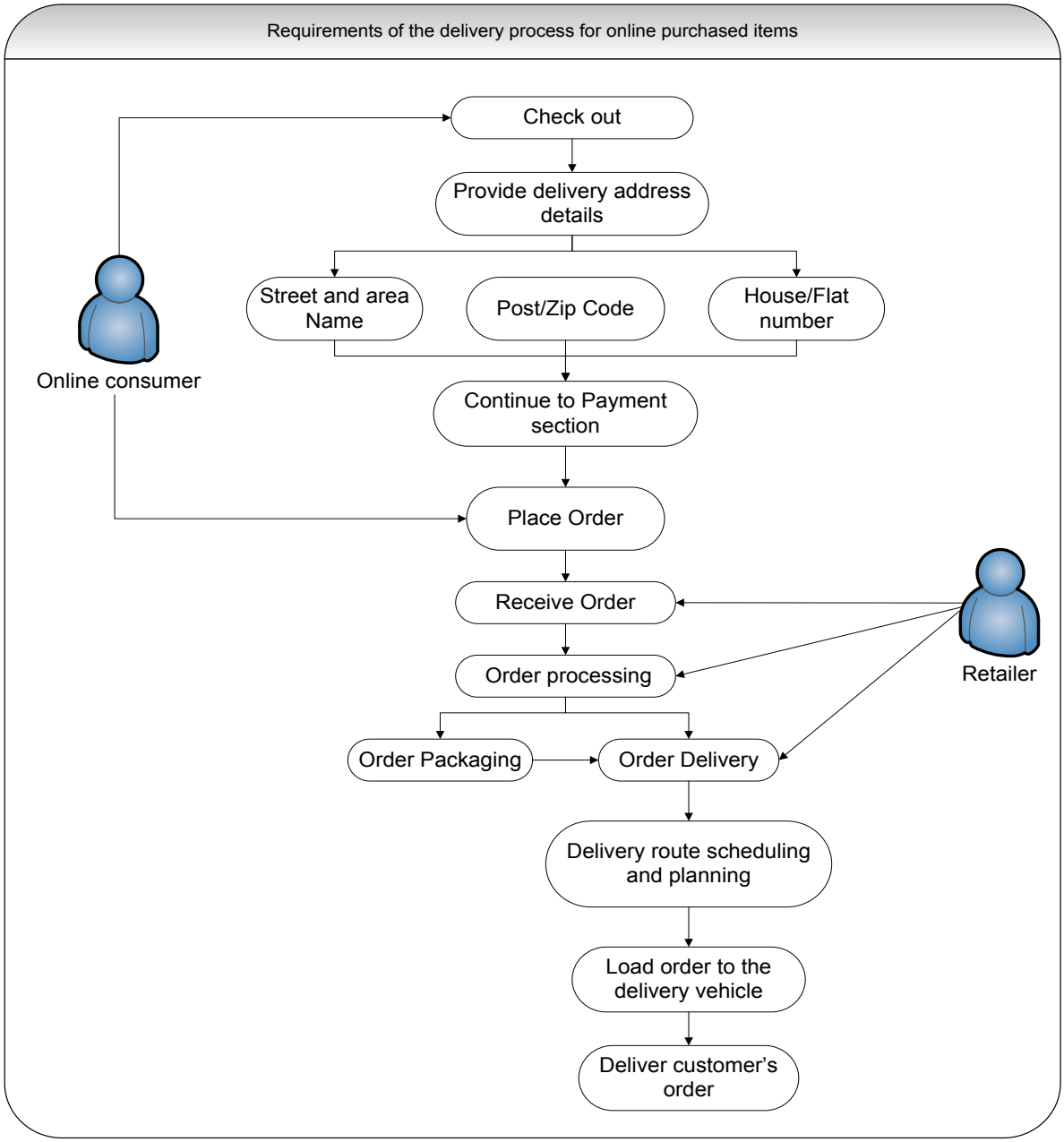

Figure 2. 4: Home delivery model for online purchased items

2.5 HOME DELIVERY RELATED TECHNOLOGIES

2.5.1 POSITIONING TECHNOLOGIES

Positioning technologies are the state-of-art technologies such as global positioning technologies (GPS) and geographic information system (GIS). These technologies changed the concept of logistical services where it became an integral part of the home delivery services. Logistical services mainly depend on the positioning technologies for delivering goods bought online for the customers' place.

GPS descends from the global navigation satellite system (GNSS) and fully adapted for a variety of air, land and sea navigation applications (AL Nabhan, 2009; Alkan, Karaman and Sahin, 2005). GPS consists of three segments; control segment, space segment and user segment.

The space segment consists of a constellation of 24 satellites and 6 spare satellites. The control section consists of three stations; monitor station (MS), master control station (MCS) and Ground antenna station (GAS). This section is responsible for the monitoring of satellites health and operations of the space segment. Ultimately, the user segment consists of hardware and software (e.g. Smart phones) that contain a GPS receiver to receive the signals from GPS satellites and determine user location on the map (AL Nabhan, 2009). GPS system terminals used in the delivery logistics as the main system for monitoring and determining vehicle's location, these terminals are installed in the delivery vehicles combined with a communication module to send the location information to the service centre system. Furthermore, GPS in logistics delivery is used for managing and scheduling delivery routes and optimizing them; these operations done under control of web GIS (Shiyu, 2012).

GIS is a system capable of assembling, sorting, manipulating, analysing and displaying geographically referenced locations (also called "Geospatial data") (Tarantilis and Kiranoudis, 2002). Geospatial data are stored in a coordinating system form called "spatial data" (e.g. Latitude, longitude and elevation); these three coordinate points refer to a particular place on the earth (Worboys and Duckham, 2004). The rapid growth of GIS as a business application led the businesses using it for solving their problems (Miller, 2006). For example, GIS has been applied in many areas to solve a wide range of problems, such as transportation, urban planning, engineering, education, business, etc. (Li *et al.*, 2003; Bernhardsen, 2002). Also, GIS is being used as a tool for improving logistics analysis techniques such as spatial data analysis, manipulating, retrieval, processing and decision-making (Zheng *et al.*, 2009).

On the one hand, the development of telecommunication infrastructure and computing power led GIS applications to be available as web services. In addition, GIS is utilised in location-based applications that allow small portable devices (e.g. mobile devices) connected by the Internet to send and receive data to and from centralised computing resources (Pick, 2005). On the other hand, web GIS is a special environment of GIS introduced as a graphical user interface (GUI) through web browsers over the internet for map display, enquiry, spatial search and analysis (Ren *et al.*, 2011; Guan and Lin, 2008).

In the 21st century, with the developments of web GIS technology and the wide usage by the logistics in their goods flow operations; it became the main system used for optimising route, road planning, choosing distribution centre's location and vehicle monitoring (Zhang, Wang and Lin, 2008). For example, Beijing has constructed logistics system based on GPS and GIS technologies to serve regional logistic distribution, supermarket distribution centres and sale enterprises. In addition, Haier group has established a logistics system based on GIS and related techniques for monitoring their vehicles (Zhang, Wang and Lin, 2008).

2.5.2 POSITIONING TECHNOLOGIES AND MOBILE TERMINALS

In the recent era, the diffusion of smart phone handset usage and the usage of mobile GIS and location-based services (LBS) has led the users to perform real time data updates and exchange between the centralized map servers and distributed map servers. Mobile GIS is an integrated application that enables the users to access to geospatial data and location-based services through hand held smart phone and personal digital assistants (PDAs) (Tsou, 2004). GIS has been used by field workers and LBS consumers (Peng and Tsou, 2003), for example, field GIS is used for collecting, adding, deleting, validating and updating data in the work field, such as adding new point data or changing the attribute of tables. LBS services focus on business management operations and decision making such as navigation, route planning, finding nearby petrol station or restaurant, etc. by using GIS technology (Zheng *et al.*, 2009; Schiller and Voisard, 2004). LBS services are provided to the users as web services via web browsers. The architecture of LBS consists of three-tier communication model, including positioning tier, middleware tier and application tier. The positioning tier is responsible for calculating the current location/position of the mobile device user. The location information known as "geospatial data" are held in the GIS and translated into geographical information (i.e. longitude and latitude), and then, it passed into the middleware tier. Finally, the application tier compromises all of those data that request location data to integrate it into their offering (e.g. Friend finding) (Schiller and Voisard, 2004). The architecture of LBS is as Figure (2.5).

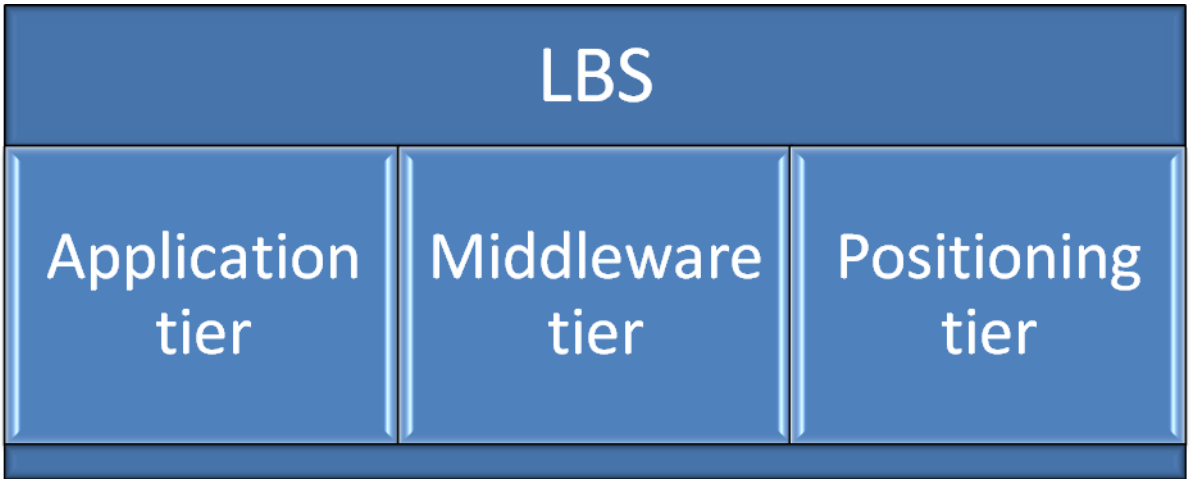

Figure 2. 5: Location-based service (LBS) architecture (Schiller and Voisard, 2004)

The increase of competition between smart phone manufacturers has led them to build special operating systems (OSs) for their devices where the most popular mobile operating systems are: Nokia Symbian, RIM blackberry, windows mobile, android and Apple iPhone (Allen, Graupera and Lundrigan, 2010; Fling, 2009). These smart phones use applications known as "apps" implemented in two ways:

- Native applications that execute on a particular operating system; and
- Web applications that run in a web browser context.

The smart phone apps have its pros and cons. These are shown in Table (2.1).

	Pros	Cons
Native apps	• Better access to hardware and software on mobile device. • Provide more advanced features. • Run more efficiently.	• Code must be written in more than one programming language to run on different devices. • Require development, testing and distribution to different platforms. • Require separate versions of the app to work on different devices.
Web apps	• Run on any OS. • No need to be installed. • Run directly from the website. • Code can be written once. • Cross-platform. • Easy, cheap and fast to build.	• Limited capabilities. • Limited use of on-board hardware and software such as camera and GPS. • Require high-speedInternet connection.

Table 2. 1: Smart phone apps Pros and Cons (Lionbridge, 2013)

Today's diffusion of mobile apps, has allowed many e-commerce companies to build mobile applications due to the increased circulation of smart phones for the use of shopping (Hu, Li and Hu, 2008). The main advantage of the mobile web and native applications is the cross platform compatibility, which allows them to reach the users around the world for the least effort(Allen, Graupera and Lundrigan, 2010). Native and web applications have their advantages and disadvantages; therefore, the developers have introduced a mix of those two approaches called "Hybrid apps". This kind of apps works on different mobile devices with different operating systems and the user interface appears in a browser. In addition, hybrid apps can be downloaded from the app store on the mobile handset and launched like a native app (Firtman, 2013).

The technology of mobile and the other technologies integrated with these devices, including GPS, GIS and LBS are used in the modern logistics for managing their goods flow operations, such as routes scheduling and optimization, vehicle location monitoring, cargo dispatch, etc. (Zheng *et al.*, 2009). For instance, united parcel service (UPS) is one of the lead

delivery logistics that has launched mobile-based application for delivering and tracking their packages and showing the nearest parcel station. In addition, the smart phone-based logistics used by the delivery couriers to login to the delivery system to enquire about the delivery information of orders, such as delivery location and time and get the delivery route for such orders (Liangqi, Daxi and Yuan, 2011). Smart phones allow the delivery logistics and delivery recipients to communicate with each other through initiating a communication channel between them to optimize the delivery process (Petrovic, Harnisch and Puchleitner, 2013). For example, mobile apps can be used for initiating such communication channels. These channels allow the delivery logistics to send the delivery recipients an email or SMS to notify them that their parcel/package will be delivered on the following day. Also, the delivery recipients will be able to track-and-trace their shipment status as if the shipment is delivered or delivery attempt was unsuccessful (Petrovic, Harnisch and Puchleitner, 2013).

2.6 ONLINE SHOPPING IN JORDAN

Jordan is one of the developing countries that face problems that affect retailers and consumers decision to adopt online shopping phenomenon due to its less popularity among them. In the last few years, Jordan has witnessed improvements and developments in the information and communication technology (ICT) sector, which offer a developed ICT infrastructure to reach the required level of ICT readiness to start initiating e-businesses (Almeida, G., Avila, A., & Boncanoska, V., 2006). ICT readiness has been identified by the ministry of information and communication technologies (MICTs) in Jordan as the developments of ICT infrastructure that attract the community to benefit from these developments (Ministry of Information and Communication Technologies in Jordan, 2011). On the one hand, Internet service providers (ISPs) number in Jordan has been increased which added more improvements on the Internet services offered by those providers (e.g.

WiMAX and Wi-Fi) with lower subscription prices. On the other hand, Internet penetration has been increased by the users since smart phones being connected to the Internet and used in daily life activities (Al Bakri, 2013).

Despite the improvements of ICTs infrastructure, online shopping in Jordan is still unsophisticated and humble where there are many barriers hindering the diffusion of such business. These barriers can be attributed into socio-cultural, human resources, economic, political barriers and other infrastructural barriers (e.g. Lack of delivery system). In addition, there are many challenges that affect the diffusion of online shopping, such as lack of governmental support, lack of trust, worries about payment security and information privacy, lack of online shopping promoting standards and lack of laws and regulations that reduce consumers' anxiety when using online shopping websites (Al Bakri, 2013; Al-Qirim, 2010; Obeidat, 2001). Finally, the diffusion of online shopping could be achieved by adopting strategies that combine public and private sectors in order to recognize and avoid the barriers that affect online shopping diffusion in Jordan (Sahawneh, 2003).

2.7 HOME DELIVERY IN DEVELOPING COUNTRIES

The lack of postcode and home delivery systems are considered as the main challenges hinder both consumers and retailers decision to adopt online shopping as a channel for buying and selling in developing countries. In addition to, as mentioned previously, the other barriers that hinder their willingness for adopting online shopping such as internet penetration, lack of financial system to deal with online payments, trust among consumers and e-retailers, socio-cultural issues, economical and political issues, and the quality of service including the quality of the goods being sold online. However, the need for reliable and efficient delivery system is essential to start initiating an online shopping channel. This lie in owning the required infrastructure for initiating a reliable home delivery service that is not existent in the

developing countries. The requirements of reliable and efficient delivery system are: digitised addressing scheme which include street address and house name/number, work strategies for mail sorting and distribution, and home delivery alternatives in case the customer is not present at home at the delivery time (Travica, 2002). This section reviews the current home delivery system in developing countries and reviewing the designed system pros and cons during this research. Postal service in developing countries is relatively weak, specifically, in Arab countries such as Saudi Arabia, Egypt, Kuwait, Syria and Jordan were mail sorting is done manually which make the delivery service difficult and time consuming. In addition to, the lack of digitised addressing scheme, which make the process of finding the delivery address difficult. Moreover, most of developing countries offer private post office boxes based at the post office for the citizens to rent on annual basis, which enable them to receive and collect their mail.

Recently, Saudi post has launched a new service to the citizens to enable them to receive their mail directly at their front door instead of pick it up from the post office (Aleid, 2012). This service is called “wasel” which enable the customers to register their full address details in the post office, then, the post office will install a reception box at the subscriber’s house to deliver their mail. In addition, the new service provides the subscribers with an address to enable them from buying from global marketplaces. Moreover, Saudi consumers use the other delivery couriers such as FedEx, UPS, DHL and ARAMEX for delivering their online bough goods as in the other developing countries. In addition to, local delivery couriers in Saudi Arabia who offering a pick up or home delivery to the customer’s doorstep with extra fees. This can be done by asking the customer to provide his delivery address details by phone which indicates a lack of reliable delivery system there and in the other developing countries that share same infrastructure (Aleid, 2012; AlGhamdi, Drew and Al-Ghaith, 2011).

The designed system in this research comes to solve the problem of lack of postcode system in developing countries and other infrastructural problems. The main pros of the designed system during this research are solving the problem of home delivery service and the problem of lack of postcode system that been caused by the lack of developed addressing scheme. The system is developed to be responsive to desktop and smart phone platforms that enable the user to use the system on both platforms. Moreover, the system enables online consumers to identify their house location on the map easily by typing the nearest street name in the search box provided; then, consumers will be able to move the marker into their house location. Thereafter, consumers will provide extra information about their house location in the provided text fields and submit this information to the retailer/delivery courier. Thus, retailer/delivery courier receive these information will be able to plan the delivery route to the identified house location by the customer. In addition, the designed system enables retailer/delivery courier to export delivery route information (e.g. street name and destination coordinates) as excel sheet to import them into handheld/in car GPS device. The main cons of the designed system during this research is the lack of reliable addressing and mapping infrastructure in developing countries which make the process of identifying house location of the customer who uses desktop bit difficult. The difficulty is caused by the unavailability of embedded GPS receiver in the PCs, which is considered as a technological shortcoming.

However, the designed system during this research is considered as the first system trying to solve the problem of home delivery service in developing countries that lack of postcode system, specifically Jordan. Also, the system is designed depending on the available infrastructure in Jordan that enables the user to provide accurate address information to the retailer/delivery courier.

2.8 HOME DELIVERY IN JORDAN

Jordan is one of the Middle East countries and is part of the developing countries that have a lack of postcode system that makes online shopping less popular and the delivery service inefficient. As shown in Figure (2.4), the lack of such system will make the delivery of online purchased goods very difficult because retailer/delivery courier will not be able to schedule and plan delivery routes to the delivery address location correctly. The main operator for postal services is Jordan Post Company (JPC) and covers all the kingdom areas(Chaudhry, 2006). JPC provides a variety of services to the citizens, such as postal services (e.g. Private post boxes, EMS and parcel mail service), financial services (e.g. Bill's collection, money order, etc.), E-services (e.g. Bill payment, P.O. Box rent or renew, etc.), SMS services and finally ancillary services (Jordan Post, 2013). Additionally, JPC provides the postal and financial services on behalf of institutions, departments, and companies in the public and private sectors by the collection of invoices as well as telegram and phone booth services (Jordan Post, 2013). However, JPC does not provide home delivery service for customers due to the lack of postcode system, which leads to the lack of efficient and reliable delivery service system in the kingdom. They offer private post boxes based at the post office for the citizens to rent, which enable them to receive and collect their letters and small sized parcels. However, the delivery service for goods bought online from outside or inside the Kingdome are provided to the consumers by international delivery couriers such as DHL, UPS, TNT and ARAMEX (Haraizah and Saket, 2010). This is because these delivery couriers have enough experience in delivering customers' orders even with the absence of delivery system. Also, those couriers are depending on their drivers experience in the area for delivering their customers' orders whereas all streets have names and all houses have numbers which helped making the delivery service more efficient. However, the improvements and developments of

naming the streets and numbering the houses are still not enough to have a reliable delivery system because the delivery driver will not be able to schedule and plan delivery routes to the delivery address locations. In addition, they will not be able to provide an efficient delivery service that meets their customers' expectations. Jordan has witnessed improvements in the ICT sector and the ministry of information and communication technologies (MOICT) has issued a new ICT strategy in 2007, which involves three objectives to be achieved in five years (Ministry of Information and Communication Technologies in Jordan (MOICT), 2007). These objectives include, increasing the size of the ICT sector to $3 billion, increasing the employment in the ICT sector to 35,000 and increasing Internet penetration to 50% (Ministry of Information and Communication Technologies in Jordan (MOICT), 2007). To achieve this new national strategy, the government reduced the taxes on the Internet related services in order to increase the number of Internet subscribers in Jordan (Meddeh, 2008). Thus, the developments of ICTs and e-commerce, lead to the increase of delivery service importance, while delivery service is considered as one of the factors that affect the client desire to shop online.

A study was carried out by Arab advisors group reveals that 15.4% of internet users in Jordan are e-commerce users, which means more than 181,000 and 3.0% of the total population in Jordan (Arab advisors group, 2010). In addition, the users spent an estimated $ 192 million in e-commerce transactions (buying products, paying bills online and paying for services) in 2009 (Arab advisors group, 2010). We notice that there is a high diffusion of e-commerce in Jordan, where the delivery providers have the opportunity to improve their work strategies in order to match the customers' needs while shopping online and promote e-commerce services. However, the delivery service has been delivered by its providers and still needs to be improved by developing a reliable delivery system for home service or finding an alternative way for the delivery problem to reduce the delivery costs and gains customer's

satisfaction. Therefore, retailers and delivery couriers must look forward to the advanced information systems that use modern technologies, such as positioning technologies and route scheduling, in addition to, an optimisation systems to consequently help in solving the problem of a lack of reliable delivery system.

2.9 HUMAN COMPUTER INTERACTION (HCI)

The Association for Computing Machinery (ACM) defines HCI as "a discipline concerned with the design, evaluation and implementation of interactive computing systems for human use and with the study of major phenomena surrounding them" (Gawande, 2009). This definition includes both computer and mobile as a species of interactive computing systems. However, HCI is considered as a field of research and development that aims to evaluate computer-based interactive systems in order to be used by users efficiently, effectively, safely and with satisfaction (Rex Hartson, 1998). HCI is used to develop interaction techniques under what situation these techniques might be used depending on the interaction between hardware and software components (Booth, 1989). Moreover, it create methods for designing platform interface depending on the user's requirements to ensure that users are accessing the system to do the required functions (Wickens, 2008; Sears and Jacko, 2007). The interaction between human and computer software and hardware is done using the software interface. This interface has functions that enable the user to manage the intended activities of using this software by the maximum performance of the software functionality (Gulliksen *et al.*, 2009; Zaphiris and Ang, 2008; Sears and Jacko, 2007). The goals of the discipline of HCI are to improve the usability of computer-based systems including safety, effectiveness, efficiency and satisfaction of the user (Diaper and Sanger, 2006).

Hix and Hartson 1993a, and shneiderman 1992 identified usability as “ease-of-use” including learnability, task performance, user error rate and subjective user satisfaction. However, a system that does not support the functionality of users’ needs and considered ease-to-use is of little value. Thus, usability is extended to include ease-of-use plus usefulness (Rex Hartson, 1998). Also, Nielsen (1994) stated that usability is not a single attribute; usability has multiple components associated with the user and the system. Therefore, usability is defined depending on the following five characteristics (Nielsen, 1994):

- Learnability: The system should be easy to operate, so users can accomplish their tasks quickly with the system.
- Efficiency: The system should be easy to remember, so when the user has learned the system work behaviour, they will achieve their tasks efficiently.
- Memorability: The system should be easy to remember, so that the user is able to return to the system after a period of not having used it, without having to learn everything from the start point.
- Errors: The system should have a low error rate, so that if users make any errors during the use of the system they can easily recover from them. In addition, major errors must not occur.
- Satisfaction: The system should be pleasant to use, so that users are subjectively satisfied during the usage time.

These definitions of usability indicate that usability is defined according to a set of attributes. The International Standards (ISO 9241-11 1998) defined usability as “the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use” (International Organization for

Standardization, 1998). This definition includes three important elements that describe the usability of any product: specified users, specified goals and specified context of use (Hasan, 2009). Also, the definition includes three measures can be used to measure the extent to which a product is used in a specific context of use. These measures are effectiveness, efficiency and subjective satisfaction of the user (International Organization for Standardization, 1998).

However, usability testing is the method of evaluating the usability of a product or software (Lee and Grice, 2004). The main goal of the usability testing is to find usability problems during the test in order to fix them before releasing the final product. Usability testing starts by identifying users, task analysis and setting usability specifications and characteristics (Lee and Grice, 2004). Then, it moves through developing and testing prototypes and continues through iterative cycles of testing and development in order to achieve the primary goal of usability testing, which lie in improving the usability of a product or software application and then, increase users' subjective satisfaction.

2.10 SUMMARY

This chapter presents the summary of the literature review-based studies that were conducted in the field of online shopping, home delivery service and the related technologies used to solve this problem. The outcome of the studies helped in designing the postcode alternative system in the context of online shopping for solving home delivery as a crucial part of the online shopping success problem in Jordan.

The chapter started with an introduction of online shopping and home delivery role in the success of such business. Afterward, an overview about online shopping in the developed and developing countries followed by the barriers and perceived benefits that affect customers'

and retailers' decision to adopt online shopping. In continuation, an overview of online shopping and home delivery status in Jordan are presented. In addition, two models explaining the whole process of online shopping and home delivery service and the required steps that both consumers and retailers will go through. Eventually, a background of the recent technologies that deployed to solve the problem of home delivery service has been provided followed by a critical review of the designed system in this research and the current delivery system in developing countries, specifically Jordan.

The review of this chapter has helped in identifying the gap through the literature of online shopping and home delivery. This gap lies in the lack of a reliable delivery system, subsequently caused by the lack of the postcode system in Jordan. Postcode system helps customers to identify their house location to enable retailers/delivery couriers to find their customers' delivery address location easily and efficiently.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 INTRODUCTION

This chapter provides an overview of the used approach for conducting this research and the data collection approach. In addition to, an overview of the analytical tools used for analysing the collected data. Moreover, a detailed description of the research methodology used in designing the first study for investigating the attitude of consumers, retailers and delivery couriers toward online shopping and home delivery service in Jordan. Additionally, a detailed description of the research methodology used in designing the second study for evaluating the designed system in this PhD thesis was provided.

In the first study, three questionnaires were distributed among three different kinds of participants to gauge their perceptions and attitudes toward online shopping and home delivery service in Jordan. The study firstly investigated Jordanian consumers' and retailers' attitudes toward online shopping and their willingness to adopt it as an alternative to the traditional high street shopping mode. Then, concerns of home delivery service have been investigated from the point of view of consumers, retailers and delivery couriers.

In the second study, two experimental sessions were conducted on the system trial in order to evaluate its usability. The first session of experiments was conducted to test the designed system front-end module desktop and smart phone platforms and the second session of experiments was conducted to test the designed system back-end module. After completing the experimental sessions, two questionnaires were distributed among the participants: one

for the first session participants and one for the second session participants to measure their subjective satisfaction of using the designed system.

3.2 METHODOLOGY

The study methodology was carried out using quantitative methods depending on questionnaire survey in order to gauge attitudes and perceptions of consumers, retailers and delivery companies toward online shopping and its related services in Jordan. Quantitative method involves collecting of primary data from involved community participants and refers to studies whose findings are concluded by statistical summary (John W. Creswell, 2009; Black, 1999). In addition, this method usually used by researchers for data collection in order to provide better understanding of the research problem relying on survey, observations and interviews. Data collection using survey is the most popular amongst researchers, which is used for: exploration, description and explanation depending on the study purpose (Pinsonneault and Kraemer, 1993). Exploration using survey aims to understand the topic and its related concepts in more depth in order to determine the most important concepts and also to understand how to measure them. In addition, exploration aims to elicit participant's viewpoint when using multiple point responses (e.g. Five-point Likert scale) in a distributed questionnaire. Description in survey aims to investigate the situation, attitude and perception of the participants in subgroups of the population about the provided services. In this case, the aim of the researchers is to describe the situation of specific phenomenon by making comparisons between groups of people as described in this study about online shopping. Explanation in survey aims to test the theory and casual relations by identifying the relationship between the variables. The relationship between variables can be tested to determine the direction whether positive or negative relationship (Pinsonneault and Kraemer, 1993).

The first study investigates Jordanian consumers' and retailers' attitude toward adopting online shopping benefits and barriers to start buying and selling online. In addition, it investigates the problems that face retailers and delivery couriers when delivering customers' orders.

The second study tests the designed system by conducting experimental sessions, and then, measuring the participants' subjective satisfaction by distributing subjective questionnaires among them.

3.2.1 QUESTIONNAIRE DEVELOPMENT

The items of the designed questionnaires for collecting the data were depending on Likert scale for investigating participants' attitude toward online shopping and home delivery service. Likert scale range from 1 to 5 points or 1 to 7 points, and can reach a maximum number of 1 to 9 points. In this thesis, all questionnaire items were depending on 1 to 5 scale because it's the most popular used scale among researchers and the most effective method for measuring participants' attitude (Dix, 2009). In addition, Coolican (2014) mentioned that Likert scale has a high degree of validity and reliability (Coolican, 2014).

For the questionnaire design, some of the questionnaires sections had a combination of positive and negative statements to control random answering and reduce the probability of common method bias (Turel, Serenko and Bontis, 2007; Travica, 2002). Also, the questionnaires were designed carefully and piloted prior to conducting the main study to ensure the validity of the questions. Further details are presented in chapters four and six.

3.2.2 EXPERIMENT DEVELOPMENT

Designing a system that can be used in the real life must be evaluated by the system users in order to assess the validity of this system. System evaluation can be done by running several experimental tests based on the system prototype or trial in order to assess the usability of the system (Turaif, 1999). Experiments are classified into two types: the first type is the conducted experiments in laboratory environment and the second type is the conducted experiments in the field environment. These two types of experiments have its pros and cons; the pros of the laboratory controlled environment experiments lie in controlling the variables that being tested to measure the changes and effects of the participants' attitude and satisfaction (Coolican, 2014), thus allowing different designs to be compared. Furthermore, laboratory experiments offer the participant a free environment of distraction. Coolican (1994) found some pros of the laboratory experiments. These pros lie in the inability of the participant to interact with the technology settings offered in the laboratory that might affect their behaviour and lead to a negative impact during the experiment. In addition to, participants who might prefer a specific preference in accordance to their understanding of the experiment goals and what they required to do. The effects of these pros lead to results that cannot be generalised to the real world.

The second type of field environment experiments is an alternative of laboratory experiments, which lie in allowing the participants to interact with the system under the normal real-world environment. Furthermore, using this type of experiments will be done under real-world conditions compromising many factors, such as distraction, surrounding noise, movement and interruption. These factors might enable the results to be generalised to the real world.

In this research, laboratory experiments environment were used to evaluate the designed system because such kind of settings were required to run the system. In order to assess the

validity, the proposed system trial was developed and deployed for the purpose of experimental tests. In addition, to make the experimental test easier for the participants, the system trial utilised along with shopping website where participants have had to sign up as a first step to be able to use the system. Further details are shown in chapter six.

3.2.3 DATA ANALYSIS

Once all the required data were collected, it has been entered into SPSS data file for the purpose of error check as well as screening and cleaning the data before starting the analysis. The statistical tests applied to the data must be decided upon prior to the start of the study to choose the appropriate type of questions when designing a questionnaire (Wilkinson *et al.*, 2000). In addition to, be able to use different statistical tests depending on the questions type. In this PhD research, three types of parametric statistical tests were used: correlation, multiple linear regression and t-test depending on the nature of the questions.

Correlation was used in the first to describe the strength and direction of the linear relationship between two variables. Specifically, Pearson correlation coefficients (r) were used to explore the relationship between the variables. This kind of correlation can only take on values from -1 to +1; the sign out the front indicates the direction of the correlation between the two variables and the size of the value indicates the strength of the relationship (Pallant, 2010). Further details are presented in chapter four.

Thereafter, multiple linear regression (MLR) was used to explore the interrelationship among a set of variables and to see which variable affects the dependent variable. Multiple regression provides information about the variables that make up the scale and which variables contribute significantly and how much variance in the dependent variable explained by the independent variables. In addition, multiple regression allow to test whether adding a

variable to the other variables already in the model will contribute to the predictive ability of the model or not (Pallant, 2010). Further details are presented in chapter four.

In the second study, t-test was used to compare the mean values of the two groups of participants. This kind of statistical tests can be used when comparing the mean values of two groups of participants and to see if there is a statistically significant difference between them or not (Pallant, 2010). Further details are presented in chapter six.

In addition to the used statistical tests in this work, Cronbach Alpha test was used to test the reliability and validity of the questions in the two conducted studies.

3.3 SUMMARY

This chapter illustrated the general methodologies and analytical methods used for the work carried out during this PhD research. The chapter provided an overview of the used data collection instruments and the used analytical tools for analysing the collected data in the two conducted studies. Finally, an illustration of the data analysis procedure and the used tests to draw conclusions from the conducted studies were presented.

CHAPTER 4

CONSUMERS, RETAILERS AND DELIVERY COURIERS ATTITUDE TOWARD ONLINE SHOPPING AND HOME DELIVEY SERVICE IN JORDAN

4.1 INTRODUCTION

The second chapter in this thesis provided an overview about online shopping and home delivery issues in developing countries, in Jordan particularly. In addition, barriers and perceived benefits of online shopping that affect the attitude of consumers and retailers to adopt online shopping.

This chapter investigates the attitudes and perceptions of consumers, retailers and delivery couriers toward online shopping and home delivery service concerns in Jordan. The perceived benefits as well as concerns of online shopping, home delivery concerns that affect consumers' as well as retailers' attitude and intention toward adopting online shopping as a channel for buying and selling were investigated. In addition, concerns of home delivery service that faces retailers and delivery couriers when delivering their customers' orders were investigated.

This study used questionnaires to gauge customers' perceptions and attitudes toward online shopping in Jordan. The study firstly investigated Jordanian consumers' and retailers' attitudes toward online shopping and their willingness to adopt it as an alternative to the

traditional high street shopping mode. Then, concerns of home delivery service have been investigated from the point of view of consumers, retailers and delivery couriers.

The findings of this study aims to feed the system design in this research that is part of a larger project aiming to improve the delivery system in Jordan.

4.2 METHOD

University students and young professionals have been found to be the most frequent users of the Internet and its related activities in terms of online purchases in the developing countries. Hayhoe et al. (2000), found that they represent a significant portion of e-markets and potential markets because most of their purchases are clothing, travel food, educational expenses, household products, entertainment and personal items (Hayhoe *et al.*, 2000). Three questionnaires were distributed to three samples of participants (consumers, retailers and delivery couriers) of the study. 130 samples of the questionnaire were distributed among consumers such as university students and academic staff to get their perceptions and attitudes toward online shopping. 10 samples were distributed among retailers' managers and employees to understand the concerns that hinder their decision to adopt online shopping and the concerns of home delivery service; and 15 samples were distributed among delivery company managers and employees to investigate the problems they face when delivering customers' orders. For the design process, some of the questionnaires' sections had a combination of positive and negative statements of the attitude scale to control random answering of the participants and to reduce the probability of common method bias (Turel, Serenko and Bontis, 2007).

Customers' post-questionnaire (Appendix D, Section 1) was divided into four parts, the last of which concerned participants' demographic information, such as gender, age, level of education and job title and income level.

The first part of the questionnaire was prepared to ask consumers about online shopping and online shopping adoption by asking the participants if they bought anything online, type of goods they buy online, how often they shop online, payment method and the total of online purchases. The second part was prepared to ask about online shopping perceived benefits and concerns that affect their attitudes toward such mode of shopping and home delivery service concerns in order to conduct establish their perceptions toward online shopping. The third part was prepared to ask about the delivery service by asking the participants about home delivery service concerns they faced in describing their home location, quality of service, delivery time slots and delivery costs.

Retailers' post-questionnaire (Appendix D, Section 2) was divided into four parts, the last of which concerned participants' demographic information, such as gender, age, level of education and job title.

The first part of the questionnaire was prepared to ask retailer participants about their work behaviour by asking the participants about how they sell their products and about the best method for selling products. The second part was prepared to ask about online products selling by asking the participants if they have a shopping website to sell their products online and about the percentage of annual sales. The third part was prepared to ask about the delivery service of selling goods online by asking the participants if they deliver their customers' orders, how they deliver these orders and if they were satisfied about the provided delivery service.

Delivery couriers' post-questionnaire (Appendix D, Section 3) was divided into three parts, the last of which concerned participants' demographic information, such as gender, age, level of education and job title.

The first part of the questionnaire was prepared to ask delivery couriers about their work behaviour by asking the participants about the kinds of goods they handle, kind of delivery service they provide to their customers and if they received items from online retailers to be delivered to its buyer. The next part was prepared to ask about the delivery service they provide to their customers by asking the participants if they have a delivery system to deliver customers' orders, how they detect their customers' home location, if they have vehicle routing and scheduling system and if they use the GPS during the delivery process.

4.3 PARTICIPANTS

As mentioned previously, three questionnaires were distributed among three samples of people according to their involvement of online shopping and home delivery service. Participants' demographic data have been introduced as follows:

- Customers' participants

A total of 130 questionnaires were distributed to the study participants "Consumers" and the response rate was 100%. Table 4.1 illustrates the demographic data of the customers' participants were 66.9% of the participants were male and 33.1% female. The majority of participants (56.2%) were aged 21-30, with 16.9% in the age range 31-40, 16.2% in the range 41-50 and 10.8% in the age range 18-20.The education level of the participants consists of three groups, with 66.9% for BSc. Students, 20% for PhD degree holders and 13.1% MSc. Students. The majority of the participants were students (60%); the others were working as employees (27%) and (19.2%) academic staff. The monthly income level of the participants

consists of four groups which is in Jordanian Dinar (JD) (approximately £ 0.90), with 29.2% of the participants who get a salary of 701-1000, 26.9% get a salary of 401-700, 23.1% get a salary of 100-400and 20.8% get salary of more than 1000 (Respectively).

Demographic Variable		Participants	Percent	Total
Gender	Male	87	66.9	130
	Female	43	33.1	
Age range (yrs.)	18-20	14	10.8	130
	21-30	73	56.2	
	31-40	22	16.9	
	41-50	21	16.2	
Educational level	PhD	26	20.0	130
	MSc	17	13.1	
	BSc	87	66.9	
Job title	Employee	27	20.8	130
	Student	78	60.0	
	Academic staff	25	19.2	
Income level	100-400	30	23.1	
	401-700	35	26.9	
	701-1000	38	29.2	
	1000+	27	20.8	

Table 4. 1: Customer's participant demographics

- Retailers' participants

A total of 10 questionnaires were distributed to the study participants "Retailers" and all of them were fully answered. Table 4.2 shows the demographic data of the retailers' participants. It shows that 100% of the participants were male. The majority of participants (60%) were aged 21-30 (40%) in the range 31-40.The-education level of the participants

consists of two groups, with 70% for BSc and 30% for Diploma holders. The job title of the participants consists of two groups, with managers (60%) and (40%) employees (Respectively).

Demographic Variable		Participants	Percent	Total
Gender	Male	10	100.0	10
	Female	0	00.0	
Age range (yrs.)	21-30	6	60.0	10
	31-40	4	40.0	
Educational level	BSc	7	70.0	10
	Diploma	3	30.0	
Job title	Employee	4	40.0	10
	Manager	6	60.0	

Table 4. 2: Retailers' participant demographics

- Delivery couriers' participants

A total of 15 questionnaires were distributed to the study participants "Delivery companies" and all of them were fully answered. Table 4.3illustrates the demographic data of the delivery companies' participants. It shows that 86.7% of the participants were male and 13.3% female. The majority of participants (53.3%) were aged 21-30; with 40% in the age range 31-40, 6.7% in the range 41-50.The education levels of the participants consist of two groups, with 53.3% for BSc and 46.7% for Diploma holders. The job title of the participants consists of two groups, with employees (60%) and (40%) managers (Respectively).

Demographic Variable		Participants	Percent	Total
Gender	Male	13	86.7	15
	Female	2	13.3	
Age range (yrs.)	21-30	8	53.3	15
	31-40	6	40.0	
	41-50	1	6.7	
Educational level	BSc	8	53.3	15
	Diploma	7	46.7	
Job title	Employee	9	60.0	15
	Manager	6	40.0	

Table 4. 3: Delivery companies' participant demographics

4.4 PILOT STUDY

In this study, to ensure high reliability among scale items, a pilot study took place, which helped in refining the questionnaires into its final form prior to conducting the final study. The pilot study was conducted on 15 Jordanian students based at Brunel University to ensure the clarity of the questions in the three questionnaires. Some comments were obtained from the participants of the pilot study regarding the questionnaire items; where some of them were not clear enough and not providing a full meaning. In addition to, some questions were omitted from the questionnaires due to its unimportance and do not have any purpose, which make the questionnaire long and time consuming. Thus, the three questionnaires were refined into its final form by reviewing the ambiguous questions and correct them before distributing the final questionnaire on the participants. The pilot study questionnaires "pre-questionnaire" are shown in (Appendix C) Afterwards, reliability analysis was done to all items that make up

the scale using Cronbach's Alpha test to ensure that there is no items affect the reliability of the questionnaire.

4.5 PROCEDURE

The questionnaires were distributed to the participants, who was instructed to fill it in at the most convenient time for them and asked to return it within one month. In addition, most of the questionnaires were filled with the presence of the researcher, which helped in collecting the required number of samples and getting full answers toall the questions.

As described previously, the structured questionnaires were distributed among 130 consumers such as university students and academic staff, 10 among retailer's employees and managers, and 15 among delivery companies' employees and managers. All questionnaires returned (100%) were used in the analysis. The survey was carried out in Amman, the capital of Jordan. By reading related literature about online shopping and home delivery service, the distributed questionnaires have been built and before distributing them to the participants, a pilot study took place, which helped in refining the questionnaire into its final form. In addition, the main aim of the research was introduced in the cover page of the questionnaire.

The questionnaire took around 15 minutes to complete, where some of its items were measured using 5-point Likert scale ranging from 1 ('strongly disagree') to 5 ('strongly agree') and some of them were multiple choice depending on the question nature. SPSS as a statistical analysis tool was used to analyse the data to get the results.

4.6 RELIABILITY SCALE

According to Julie Pallant (2010) and Uma Sekaran (2006), the reliability of a scale represents the internal consistency of the items that make up the scale which provide an

indication of the correlation among these items (Pallant, 2010; Sekaran, 2006). High correlation between items provides high internal consistency, which represents high reliability. The most famous reliability test is Cronbach's coefficient Alpha thatrefers to the degree of how the items are closely related to the controlling construct(Sekaran, 2006).

- Customers' study reliability test result

Customer's participants' questionnaire items were tested for reliability, the Cranach's Alpha test that took placewas0.728 (Table B.1, AppendixB). According to Uma Sekaran (2006), Cronbach's Alpha should be at least 0.7-whereasa value of 0.7 is acceptable, and a value of 0.8 and higher is preferable(Sekaran, 2006).

- Retailers' study reliability test results

Retailer participants' questionnaire items were tested for reliability; the Cranach's Alpha test that took place was 0.824 (Table B.5, AppendixB). According to Uma Sekaran (2006), Cronbach's Alpha should be at least 0.7 whereas a value of 0.7 is acceptable, and a value of 0.8 and higher preferable (Sekaran, 2006).

- Delivery couriers' study reliability test result

Delivery company's participants' questionnaire items were tested for reliability; the Cranach's Alpha test that took place was 0.807(Table B.9, Appendix B). According to Uma Sekaran (2006), Cronbach's Alpha should be at least 0.7 whereas a value of 0.7 is acceptable, and a value of 0.8 and higher is preferable (Sekaran, 2006).

4.7 RESULTS

4.7.1 CONSUMER PARTICIPANTS

4.7.1.1 ONLINE SHOPPING EXPERIENCE

Consumer participants such as university students and academic staff were asked about their online shopping experience by asking them if they bought anything from shopping websites, period between online purchases, the percentage of purchases from online shopping websites, payment method, online payment concerns, if they faced problems with the delivery service and the delivery service concerns that hinder their attitude toward online shopping.

Table 4.4 illustrates the participants' online shopping experience. It shows that 76.2% of the participants have not experienced online shopping, whereas 23.8% of the participants experienced online shopping.

Category	Participants	Percent
I have not bought anything online	99	76.2
I have bought online	31	23.8
Total	130	100.0

Table 4. 4: Percentage of participants who bought from online shopping websites

Category	Participants	Percent
I have not bought anything online	76	58.5
Once a month	25	19.2
When needed	22	16.9
Once a week	7	5.4
Total	130	100.0

Table 4. 5: Period between online purchases

Table 4.5 illustrates the period between purchases from online shopping websites. It shows that the majority of the participants (58.5%) never bought anything from online shopping websites, 19.2% buy from online shopping websites once a month, with 16.9% buy from online shopping websites when needed, and 5.4% buy from online shopping websites once a week (Respectively).

Table 4.6 illustrates the percentage of online purchases. It shows that the majority of the participants (71.5%) buy 1-20% of their goods online, 17% buy 21-40% of their goods online, 11% buy 41-60% of their goods online, 4.6% buy 61-80% of their goods online and 2.3% buy 81-100% of their goods online (Respectively).

Category	Participants	Percent
1-20%	93	71.5
21-40%	17	13.1
41-60%	11	8.5
61-80%	6	4.6
81-100%	3	2.3
Total	130	100.0

Table 4. 6: Percentage of online purchases

Table 4.7 illustrates the preferred payment method of online purchases. It shows that the majority of the participants (63.1%) prefer to pay for online by cash on delivery, and 36.9% prefer to pay using their credit or debit cards. The preference for cash on delivery among the participants was generated from the concerns of online payment. Table 4.8 shows that 67.7% ofthe participants have concerns from making an online payment and 32.3% do not have any concerns from making an online payment (Respectively).

Category	Participants	Percent
Cash on delivery	82	63.1
Credit or Debit card	48	36.9
Total	130	100.0

Table 4. 7: Preferred payment method

Category	Participants	Percent
I am afraid of making online payment	88	63.1
I am not afraid of making online payment	42	32.3
Total	130	100.0

Table 4. 8: Online payment concern

Table 4.9 illustrates the percentage of the participants who faced problems with the delivery service. It shows that the majority of the participants (76.2%) have faced problems with the delivery service and 23.8% have not faced any problems.

Category	Participants	Percent
I have faced problems with the delivery service	99	76.2
I have not faced problems with the delivery service	31	23.8
Total	130	100.0

Table 4. 9: Percentage of participants who faced problems with the delivery service

4.7.1.2 ONLINE SHOPPING PERCEIVED BENEFITS

Online shopping perceived benefits are considered as the independent factors that affect consumers' attitudes toward online shopping which are presented in Table (4.10). The table illustrates the mean values (marked as M) and the standard deviation of the mean values (marked as SD) for online shopping perceived benefits.

Variable	M	SD
Convenience	3.84	0.987
Low Prices	3.98	0.816
Wider selection	3.58	0.833
Price comparison	3.80	0.857
24/7 availability	3.89	0.800
Information availability	3.73	0.805
Delivery service availability	3.88	0.737

Table 4. 10: Mean values and standard deviation of online shopping perceived benefits

To determine whether there is a potential relationship between consumers' attitude toward online shopping and perceived benefits of online shopping including convenience, low prices, products wider selection, price comparison, 24/7 availability, products' information availability, and delivery service availability; Pearson correlation coefficients (r) was measured.

Correlation coefficient (r) value range from -1.00 to 1.00 which indicates the strength level of the relationship between two variables; correlation value of -1.00 indicates that there is a strong negative relationship between the variables being tested, a correlation value of 0 indicates that there is no relationship between the variables, and a correlation value of 1.00 indicates that there is a strong positive relationship between the variables (Pallant, 2010).However, to interpret the correlation values in appropriate way, Cohen (1988) suggests the following guidelines for classifying the relationship between two variables as indicated in Table 4.11(Pallant, 2010; Cohen, 1988).

Correlation value (r)	Classification
R= 0.10 to 0.29	Small
R= 0.30 to 0.49	Medium
R= 0.50 to 1.0	Large

Table 4. 11: Correlation value classification (Pallant, 2010)

- Convenience

Table B.2 (Appendix B) shows the correlation value between customers' attitude toward online shopping and convenience. The correlation analysis results in this case shows that the relationship between attitude toward online shopping and convenience(r = 0.656, P-value = 0.000) is of large strength (Cohen, 1988). Correlation is significant at the 0.01 level as the P-value state at 0.000.

- Low prices

Table B.2 (Appendix B) shows the correlation value between customers' attitude toward online shopping and Low prices. The correlation analysis results in this case shows that the relationship between attitude toward online shopping and low prices (r = 0.758, P-value = 0.000) is of large strength (Cohen, 1988). Correlation is significant at the 0.01 level as the p-value state at 0.000.

- Wider selection

Table B.2 (Appendix B) shows the correlation value between customers' attitude toward online shopping and products wider selection. The correlation analysis results in this case shows that the relationship between attitude toward online shopping and products wider selection (r = 0.373, P-value = 0.000) is of medium strength (Cohen, 1988). Correlation is significant at the 0.01level as the p-values state at 0.000.

- Price comparison

Table B.2 (Appendix B) shows the correlation value between customers' attitude toward online shopping and products price comparison. The correlation analysis results in this case shows that the relationship between attitude toward online shopping and price comparison (r

= 0.364, P-value = 0.000) is of medium strength (Cohen, 1988). Correlation is significant at the 0.01 level as the p-value state at 0.000.

- 24/7 availability

Table B.2 (Appendix B) shows the correlation value between customers' attitude toward online shopping and 24/7 availability. The correlation analysis results in this case shows that the relationship between attitude toward online shopping and 24/7 availability (r = 0.535, P-value = 0.000) is of large strength (Cohen, 1988). Correlation is significant at the 0.01 level as the p-value state at 0.000.

- Information availability

Table B.2 (Appendix B) shows the correlation value between customers' attitude toward online shopping and information availability. The correlation analysis results in this case shows that the relationship between attitude toward online shopping and products information availability (r = 0.486, P-value = 0.000) is of medium strength (Cohen, 1988). Correlation is significant at the 0.01 level as the p-value state at 0.000.

- Delivery service availability

Table B.2 (Appendix B) shows the correlation value between customers' attitude toward online shopping and delivery service availability. The correlation analysis results in this case shows that the relationship between attitude toward online shopping and delivery service availability (r = 0.523, P-value = 0.000) is of large strength (Cohen, 1988). Correlation is significant at the 0.01 level as the p-value state at 0.000.

After determining the relationship size and direction between customers' attitude toward online shopping and online shopping perceived benefit constructs using Pearson correlation coefficient. Multiple Linear Regression (MLR) analysis is used to see how much variance in

the dependent variable and to assess the relationship importance and strength between customers' attitude toward online shopping as the dependent variable (DV) and online shopping perceived benefits as the independent variables (IVs) including convenience, low prices, products wider selection, price comparison, 24/7 availability, information availability and home delivery service availability (Tabachnick and Fidell, 2012; Pallant, 2010).In addition, MLR is useful for predicting the relationship value on DV from combining several IVs using the following equation (Tabachnick and Fidell, 2012; Pallant, 2010).

$$CATOS\ (OSPB) = \alpha + \beta + \beta 2LP + \beta 3PWS + \beta 4PC + \beta 5AT + \beta 6IA + \beta 7DSA$$

Where CATOS denote to customers' attitude toward online shopping, OSPB denote to online shopping perceived benefits (customers' attitude toward online shopping using its perceived benefits), α is constant coefficient, β1 to β7 are the regression coefficients for IVs, C denote to convenience, LP denote to Low prices, PWS denote to products wider selection, PC denote to price comparison, AT denote to 24/7 availability, IA denote to information availability, and DSA denote to delivery service availability.

According to Table (4.12), the value of R^2 is shown as 0.752 and the adjusted R^2 value is shown as 0.738;this implies that 73.8% of online shopping perceived benefits including convenience, low prices, products wider selection, price comparison, 24/7 availability, information availability, and delivery service availability explained the changes of customers' attitude toward online shopping in Jordan. In addition, the results show that online shopping perceived benefits have significantly explained 73.8% of the variance in customers' attitude toward online shopping in Jordan.

Table 4. 12: Model summary for online shopping perceived benefits

Model	R square	Adjusted R square	Std. Error of the estimate
1	0.752	0.738	0.366

a. Predictors: (Constant), C, LP, PWS, PC, AT, IA, DSA
b. Dependent Variable: CATOS

Table 4. 13: ANOVA[a] for online shopping perceived benefits

Model	Sum of squares	Df	F	Sig.
Regression	49.565	7	52.957	0.000[b]
Residual	16.312	122		
Total	65.877	129		

a. Dependent variable: CATOS
b. Predictors: (Constant), C, LP, PWS, PC, AT, IA, DSA

According to Table (4.13), the regression model with the predictors including convenience, low prices, products wider selection, price comparison, 24/7 availability, information availability, and delivery service availability indicates a statistically significant relationship between them and customers' attitude toward online shopping at 0.000 (P<0.01).

Table 4. 14: Coefficients for online shopping perceived benefits

Model	Unstandardized coefficients		Standardised coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	0.216	0.224		0.963	0.337
C	0.216	0.040	0.298	5.416	0.000
LP	0.400	0.052	0.457	7.652	0.000
PWS	-0.137	0.052	-0.160	-2.628	0.010
PC	0.030	0.046	0.043	0.775	0.440
AT	0.119	0.052	0.133	2.278	0.024
IA	0.165	0.052	0.186	3.178	0.002
DSA	0.174	0.050	0.179	3.449	0.001

Based on Table (4.14), the following equation is formed:

$$CATSO\ (OSPB) = 0.216 + 0.216C + 0.400LP - 0.137PC + 0.119AT + 0.165IA + 0.174DSA$$

Where:

CATOS: Customers' attitude toward online shopping

OSPB: Online shopping perceived benefits

C: Convenience

LP: Low prices

PWS: Products wider selection

PC: Price comparison

AT: 24/7 availability

IA: Information availability

DSA: Delivery service availability

The linear equation shows a significant relationship between online shopping perceived benefits including convenience, low prices, price comparison, 24/7 availability, information availability and delivery service availability, and customers' attitude toward online shopping; except products wider selection which was insignificant and did not influence customers' attitude toward online shopping significantly. In addition, the equation shows that low prices is the most significant variable that influence customers' attitude toward online shopping in Jordan (β = 0.400), followed by convenience (β = 0.216), delivery service availability (β = 0.174), information availability (β = 0.165), products wider selection (β = -0.137), and 24/7 availability (β = 0.119) respectively; while price comparison (β = 0.036) was insignificant.

4.7.1.3 ONLINE SHOPPING CONCERNS

Online shopping concerns are considered as the independent factors that affect consumers' attitude toward online shopping which are presented in Table (4.15). The table illustrates the

mean values (marked as M) and the standard deviation of the mean values (marked as SD) for online shopping concerns.

Variable	M	SD
Trust	2.29	1.007
Payment security	2.37	0.997
Personal information privacy	2.52	1.073
Lack of technological skills	2.65	0.954
Quality of Service (QoS)	2.68	1.058
Social issues	2.64	1.049

Table 4. 15: Mean values and standard deviation of online shopping concerns

To determine whether there is a potential relationship between consumers' attitude toward online shopping and online shopping concerns including trust, payment security, personal information privacy, lack of technological skills, QoS and social issues; Pearson correlation coefficients (r) was measured.

- Trust

Table B.3 (Appendix B) shows the correlation value between customers' attitude toward online shopping and trust. The correlation analysis results in this case shows that the relationship between attitude toward online shopping and trust (r = -0.702, P-value = 0.000) is of large strength (Cohen, 1988). Correlation is significant at the 0.01 level as the p-value state at 0.000.

- Payment security

Table B.3 (Appendix B) shows the correlation value between customers' attitude toward online shopping and payment security. The correlation analysis results in this case shows that the relationship between attitude toward online shopping and payment security (r = -0.582, P-

value = 0.000) is of large strength (Cohen, 1988). Correlation is significant at the 0.01 level as the p-value state at 0.000.

- Personal information privacy

Table B.3 (Appendix B) shows the correlation value between customers' attitude toward online shopping and personal information privacy. The correlation analysis results in this case shows that the relationship between attitude toward online shopping and personal information privacy (r = -0.507, P-value = 0.000) is of medium strength (Cohen, 1988). Correlation is significant at the 0.01 level as the p-value state at 0.000.

- Lack of technological skills

Table B.3 (Appendix B) shows the correlation value between customers' attitude toward online shopping and lack of technological skills. The correlation analysis results in this case shows that the relationship between attitude toward online shopping and lack of technological skills (r = -0.519, P-value = 0.000) is of large strength (Cohen, 1988). Correlation is significant at the 0.01 level as the p-value state at 0.000.

- Quality of Service (QoS)

Table B.3 (Appendix B) shows the correlation value between customers' attitude toward online shopping and quality of service (QoS). The correlation analysis results in this case shows that the relationship between attitude toward online shopping and QoS (r = -0.633, P-value = 0.000) is of large strength (Cohen, 1988). Correlation is significant at the 0.01 level as the p-value state at 0.000.

- Social issues

Table B.3 (Appendix B) shows the correlation value between customers' attitude toward online shopping and social issues. The correlation analysis results in this case shows that the relationship between attitude toward online shopping and social issues (r = -0.306, P-value =

0.000) is of medium strength (Cohen, 1988). Correlation is significant at the 0.01 level as the p-value state at 0.000.

After determining the relationship size and direction between customers' attitude toward online shopping and online shopping concerns constructs using Pearson correlation coefficient. Multiple Linear Regression (MLR) analysis is used to see how much of variance in the dependent variable and to assess the relationship's importance and strength between customers' attitude toward online shopping as the dependent variable (DV) and online shopping concerns as the independent variable (IVs) including trust, payment security, personal information privacy, lack of technological skills, QoS, and social issues (Tabachnick and Fidell, 2012; Pallant, 2010). In addition, MLR is useful for predicting the relationship value on DV from combining several IVs using the following equation (Tabachnick and Fidell, 2012; Pallant, 2010).

$$CATOS\ (OSC) = \alpha + \beta 1T + \beta 2PS + \beta 3PIP + \beta 4TS + \beta 5QoS + \beta 6SI$$

Where CATOS denote to customers' attitude toward online shopping, OSC denote to online shopping concerns (customers' attitude toward online shopping using its concerns), α is constant coefficient, β1 to β6 are the regression coefficients for IVs, T denote to trust, PS denote to payment security, PIP denote to personal information privacy, TS denote to lack of technological skills, QoS denote to quality of service, and SI denote to social issues.

According to Table (4.16), the value of R^2 is shown as 0.705 and the adjusted R^2 value is shown as 0.691; this implies that 69.1% of online shopping concerns including trust, payment security, personal information privacy, lack of technological skills, quality of service and social issues explained the changes of customers' attitude toward online shopping in Jordan.

In addition, the results show that online shopping concerns have significantly explained 69.1% of the variance in customers' attitude toward online shopping in Jordan.

Table 4. 16: Model summary for online shopping concerns

Model	R square	Adjusted R square	Std. Error of the estimate
1	0.705	0.691	0.397

a. Predictors: (Constant), T, PS, PIP, TS, QoS, SI
b. Dependent Variable: CATOS

Table 4. 17: ANOVA[a] for online shopping concerns

Model	Sum of squares	Df	F	Sig.
Regression	46.450	6	49.017	0.000[b]
Residual	19.426	123		
Total	65.877	129		

a. Dependent variable: CATOS
b. Predictors: (Constant), T, PS, PIP, TS, QoS, SI

According to Table (4.17), the regression model with the predictors including trust, payment security, personal information privacy, lack of technological skills, quality of service, and social issues indicates a statistically significant relationship between them and customers' attitude toward online shopping at 0.000 (P<0.01).

Table 4. 18: Coefficients for online shopping concerns

Model	Unstandardized coefficients		Standardised coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	5.912	0.130		45.424	0.000
T	-0.324	0.040	-0.457	-8.069	0.000
PS	-0.175	0.046	-0.244	-3.777	0.000
PIP	0.011	0.046	0.017	0.241	0.810
TS	-0.096	0.048	-0.128	-2.021	0.045
QoS	-0.207	0.040	-0.307	-5.211	0.000
SI	0.022	0.038	0.033	0.591	0.556

Based on Table (4.18), the following equation is formed:

$$CATOS\ (OSC) = 5.912 - 0.324T - 0.175PS + 0.011PIP - 0.096TS - 0.207QoS + 0.022SI$$

Where:

CATOS: Customers' attitude toward online shopping

OSC: Online shopping Concerns

T: Trust

PS: Payment security

PIP: Personal information privacy

TS: Lack of technological skills

QoS: Quality of service

SI: Social issues

The linear equation shows that, there is a significant relationship between customers' attitude toward online shopping and online shopping concerns including trust, payment security, lack of technological skills, and quality of service; except personal information privacy and social issues, these were insignificant and did not influence the customers' attitude towards online shopping significantly. In addition, the equation shows that the trust factor is the most significant variable that can influence the customers' attitude negatively towards online shopping in Jordan (β = -0.324), followed by quality of service (β = -0.207), payment security (β = -0.175), and lack of technological skills (β = -0.096) respectively; while social issues (β = 0.022) and personal information privacy (β = 0.011) were insignificant.

4.7.1.4 HOME DELIVERY SERVICE CONCERNS

Home delivery service concerns are considered as the independent factors that affect consumers' attitudes toward online shopping, whichare presented in Table (4.19). The table illustrates the mean values (marked as M) and the standard deviation of the mean values (marked as SD) for home delivery service concerns.

Variable	M	SD
Delivery costs	2.78	1.284
Delivery time slots	2.58	1.250
Delivery first attempt failure	2.51	1.215
Order accuracy	2.56	1.245
Problems in describing home address	2.51	1.129

Table 4. 19: Mean values and standard deviation of home delivery service concerns

To determine whether there is a potential relationship between consumers' attitude toward online shopping and home delivery service concerns including delivery costs, delivery time slots, delivery first attempt failure, order accuracy, and problems in describing home address; Pearson correlation coefficients (r) was measured.

- Delivery costs

Table B.4 (Appendix B) shows the correlation value between customers' attitude toward online shopping and delivery costs. The correlation analysis results in this case show that the relationship between attitude toward online shopping and delivery costs (r = -0.618, P-value = 0.000) is of large strength (Cohen, 1988). Correlation is significant at the 0.01 level as the p-value state at 0.000.

- Delivery time slots

Table B.4 (Appendix B) shows the correlation value between customers' attitude toward online shopping and delivery time slots. The correlation analysis results in this case show that

the relationship between attitude toward online shopping and delivery time slots (r = -0.428, P-value = 0.000) is of medium strength (Cohen, 1988). Correlation is significant at the 0.01 level as the p-value state at 0.000.

- Delivery first attempt failure

Table B.4 (Appendix B) shows the correlation value between customers' attitude toward online shopping and delivery first attempt failure. The correlation analysis results in this case show that the relationship between attitude toward online shopping and delivery first attempt failure (r = -0.634, P-value = 0.000) is of large strength (Cohen, 1988). Correlation is significant at the 0.01evel as the p-value state at 0.000.

- Order accuracy

Table B.4 (Appendix B) shows the correlation value between customers' attitude toward online shopping and order accuracy. The correlation analysis results in this case show that the relationship between attitude toward online shopping and order accuracy (r = -0.473, P-value = 0.000) is of medium strength (Cohen, 1988). Correlation is significant at the 0.01 level as the p-value state at 0.000.

- Problems in describing home location

Table B.4 (Appendix B) shows the correlation value between customers' attitude towards online shopping and problems in describing home location. The correlation analysis results in this case show that the relationship between attitude toward online shopping and problems in describing the home location (r = -0.730, P-value = 0.000) is of large strength (Cohen, 1988). Correlation is significant at the 0.01 level as the p-value state at 0.000.

After defining the relationship size and direction between customers' attitude toward online shopping and home delivery service concerns constructs using Pearson correlation coefficient. Multiple Linear Regression (MLR) analysis is used to see how much variance in

the dependent variable and to assess the relationship's importance and strength between customers' attitude toward online shopping as the dependent variable (DV) home delivery service concerns as the independent variable (IVs) including delivery costs, delivery time slots, delivery first attempt failure, order accuracy, and problems in describing home location (Tabachnick and Fidell, 2012; Pallant, 2010). In addition, MLR is useful for predicting the relationship value on DV from combining several IVs using the following equation (Tabachnick and Fidell, 2012; Pallant, 2010).

$$CATOS\ (DSC) = \alpha + \beta 1DC + \beta 2DTS + \beta 3DF + \beta 4OA + \beta PDHL$$

Where CATOS denote to customers' attitude toward online shopping, DSC denote to delivery service concerns (customers' attitude toward online shopping in using delivery service), α is constant coefficient, β1 to β5 are the regression coefficients for IVs, DC denote to delivery costs, DTS denote to delivery time slots, DF denote to delivery first attempt failure, OA denote to order accuracy, and PDHL denote to problems in describing home location.

According to Table (4.20), the value of R^2 is shown as 0.604 and the adjusted R^2 value shown as 0.588; this implies that 58.8% of home delivery concerns including delivery costs, delivery time slots, delivery first attempt failure, order accuracy, and problems in describing home location explained the changes of customers' attitude toward online shopping in Jordan. In addition, the results show that online shopping concerns have significantly explained 58.8% of the variance in customers' attitude toward online shopping in Jordan.

Table 4. 20: Model summary for home delivery service concerns

Model	R square	Adjusted R square	Std. Error of the estimate
1	0.604	0.588	0.459

a. Predictors: (Constant), DC, DTS, DF, OA, PDHL
b. Dependent Variable: CATOS

Table 4. 21: ANOVA[a] for home delivery service concerns

Model	Sum of squares	Df	F	Sig.
Regression	39.803	5	37.859	0.000[b]
Residual	26.074	124		
Total	65.877	129		

a. Dependent variable: CATOS
b. Predictors: (Constant), DC, DTS, DF, OA, PDHL

According to Table (4.21), the regression model with the predictors including delivery costs, delivery time slots, delivery first attempt failure, order accuracy, and problems in describing home location indicates a statistically significant relationship between them and customers' attitude toward online shopping at 0.000 ($P<0.01$).

Table 4. 22: Coefficients for delivery service concerns

Model	Unstandardized coefficients		Standardised coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	5.200	0.106		49.258	0.000
DC	-0.167	0.057	-0.301	-2.926	0.004
DTS	0.192	0.055	0.335	3.465	0.001
DF	-0.098	0.064	-0.168	-1.528	0.129
OA	0.048	0.051	0.084	0.939	0.350
PDHL	-0.429	0.064	-0.679	-6.675	0.000

Based on Table (4.22), the following equation is formed:

$$CATOS\ (DSC) = 5.2 - 0.167DC + 0.192DTS - 0.048OA - 0.429PDHL$$

Where:

CATOS: Customers' attitude toward online shopping

DSC: Delivery service concerns

DTS: Delivery time slots

DF: Delivery first attempt failure

OA: Order accuracy

PDHL: problems in describing home location

The linear equation shows that, there is a significant relationship between customers' attitude toward online shopping and delivery service concerns includingdelivery costs, delivery time slots, delivery first attempt failure, order accuracy, and problems in describing home location. In addition, the equation shows that problems in describing home location factor is the most significant variable that influence customers' attitude toward online shopping in terms of home delivery service concerns in Jordan (β = -0.429), followed by delivery time slots (β = 0.192) and delivery costs (β = -0.167) respectively; while delivery first attempt failure (β = -0.098) and order accuracy (β = 0.048) were insignificant.

4.7.2 RETAILERS PARTICIPANTS

Retailer participants such as employees and managers were asked whether if they have used shopping websites for selling their products online and the percentage of annual online sales. Also, they were asked about how they send online sold goods to the customers and if they satisfied about the provided delivery service to the customers.

Table 4.23 illustrates the percentage of retailers who have shopping website to sell their products online. It shows that 50% of the retailers have shopping website and 50% of them

do not have shopping website. In addition, online annual sales were investigated in order to see the market size of online shopping in Jordan. Table 4.24 shows that 70% of retailers sell 1-20% of their products online per year, with 20% of retailers sell 21-40% of their products online per year, and 10% of retailers sell 41-60% of their products online per year.

Category	Participants	Percent
I have shopping website	5	50.0
I do not have shopping website	5	50.0
Total	10	100.0

Table 4. 23: Percentage of retailers who own shopping website

Category	Participants	Percent
1-20%	7	70.0
21-40%	2	20.0
41-60%	1	10.0
Total	10	100.0

Table 4. 24: Online annual sales

Table 4.25 illustrates how retailers send online sold goods to the customers. It shows that 60% of retailers send online sold goods to the customers via their own delivery fleet and 40% of retailers send online sold goods to their customers via third-party delivery companies such as ARAMEX, DHL, and TNT. In addition, the quality of the provided delivery service whether by retailer's delivery fleet or by third-party delivery companies was investigated. Table 4.26 shows that 80% of retailers were unsatisfied about the provided delivery service to the customers with regardless to the reasons and 20% of retailers were satisfied about the provided delivery service to the customers.

Category	Participants	Percent
Via my own delivery fleet	6	60.0
Via third-party delivery company	4	40.0
Total	10	100.0

Table 4. 25: Way of delivering online sold goods

Category	Participants	Percent
I am satisfied about the provided delivery service	2	20.0
I am not satisfied about the provided delivery service	8	80.0
Total	10	100.0

Table 4. 26: Retailers' satisfaction about the provided delivery service

4.7.2.1 ONLINE SHOPPING ADOPTION BENEFITS

Online shopping adoption benefits which considered as the independent factors that affect retailers' attitudes toward adopting online shopping as a business are presented in Table (4.27). The table illustrates the average values (marked as M) and the standard deviation of the mean values (marked as SD) for retailer attitudes toward taking on online shopping in Jordan.

Variable	M	SD
Convenience	4.10	0.738
Attract customers	4.00	0.816
Reap more profit	3.90	0.876
Extend communication network	3.80	1.135

Table 4. 27: Mean values and standard deviation of online shopping adoption reasons

To determine whether there is a potential relationship between retailer's participants' attitude toward adopting online shopping as a business in Jordan and online shopping adoption

reasons including convenience, attract customers, reap more profit, and extend communication network; Pearson correlation coefficients (r) was measured.

- Convenience

Table B.6 (Appendix B) shows the correlation value between retailers' attitude toward online shopping and convenience. The correlation analysis results in this case showthat the relationship between attitude toward adopting online shopping and convenience as a reason for adopting such business (r = 0.513, P-value = 0.129) is of large strength (Cohen, 1988).

- Attracting customers

Table B.6 (Appendix B) shows the correlation value between retailers' attitude toward online shopping and attracting customers. The correlation analysis results in this case show that the relationship between attitude toward adopting online shopping and attract customers as a reason for adopting such business (r = 0.605, P-value = 0.064) is of large strength (Cohen, 1988).

- Reap more profit

Table B.6 (Appendix B) shows the correlation value between retailers' attitude toward adopting online shopping in terms of the reasons for adopting such business and reap more profit. The correlation analysis results in this case show the relationship between attitude toward adopting online shopping and reap more profit (r = 0.320, P-value = 0.368) is of medium strength (Cohen, 1988).

- Extend communication network

Table B.6 (Appendix B) shows the correlation value between retailers' attitude toward adopting online shopping in terms of the reasons for adopting such business and extending

communication network with other retailers. The correlation analysis results in this case show that the relationship between attitude toward adopting online shopping and extending communication network (r = 0.348, P-value = 0.324) is of medium strength (Cohen, 1988).

4.7.2.2 ONLINE SHOPPING ADOPTION BARRIERS

Online shopping adoption barriers are considered as the independent factors that affected the retailers' attitudes toward adopting online shopping as a business, which are presented in Table (4.28). The table illustrates the mean values (marked as M) and the standard deviation of the mean values (marked as SD) for online shopping barriers in Jordan.

Variable	M	SD
Lack of awareness	2.40	0.843
Lack of technological skills	2.50	0.972
Lack of financial system	2.30	1.059
Less popularity of online shopping among people	2.50	0.850
Governmental issues	2.50	0.850
Social issues	2.20	0.789

Table 4. 28: Mean values and standard deviation of online shopping barriers

To determine whether there is a potential relationship between retailer participants' attitude toward adopting online shopping as a business in Jordan and online shopping adoption barriers including lack of awareness, lack of technological skills, lack of financial system, less popularity of online shopping among people, governmental issues, and social issues; Pearson correlation coefficients (r) was measured.

- Lack of awareness

Table B.7 (Appendix B) shows the correlation value between retailers' attitude toward online shopping adoption in terms of adoption barriers of such business and lack of awareness. The correlation analysis results in this case show that the relationship between attitude toward

online shopping adoption in terms of adoption barriers of such business and lack of awareness (r = -0.547, P-value = 0.102) is of large strength (Cohen, 1988).

- Lack of technological skills

Table B.7 (Appendix B) shows the correlation value between retailers' attitude toward online shopping adoption in terms of adoption barriers of such concern and lack of technical skills. The correlation analysis results in this case show that the relationship between attitude toward online shopping adoption in terms of adoption barriers of such business and lack of technological skills (r = -0.593, P-value = 0.071) is of large strength (Cohen, 1988).

- Lack of financial system

Table B.7 (Appendix B) shows the correlation value between retailers' attitude toward online shopping adoption in terms of adoption barriers of such concern and lack of financial arrangement. The correlation analysis results in this case show that the relationship between attitude toward online shopping adoption in terms of adoption barriers of such business and lack of financial system (r = -0.326, P-value = 0.357) is of medium strength (Cohen, 1988).

- Less popularity of online shopping among people

Table B.7 (Appendix B) shows the correlation value between retailers' attitude toward online shopping adoption in terms of adoption barriers of such business and less popularity of online shopping among the people. The correlation analysis results in this case show that the relationship between attitude toward online shopping adoption in terms of adoption barriers of such business and less popularity of online shopping among the people (r = -0.678, P-value = 0.031) is of large strength (Cohen, 1988).

- Governmental issues

Table B.7 (Appendix B) shows the correlation value between retailers' attitude toward online shopping adoption in terms of adoption barriers of such concern and governmental events. The correlation analysis results in this case show that the relationship between attitude toward online shopping adoption in terms of adoption barriers of such business and governmental issues (r = -0.484, P-value = 0.156) is of medium strength (Cohen, 1988).

- Social issues

Table B.7 (Appendix B) shows the correlation value between retailers' attitude toward online shopping adoption in terms of adoption barriers of such occupation and societal topics. The correlation analysis results in this case show that the relationship between attitude toward online shopping adoption in terms of adoption barriers of such business and social issues (r = -0.501, P-value = 0.140) is of large strength (Cohen, 1988).

4.7.2.3 DELIVERY SERVICE CONCERNS

The mean values for home delivery service concerns, which are considered as the independent factors that affect retailers' attitudes toward adopting online shopping as a business, are presented in Table (4.29). The table illustrates the mean values (marked as M) and the standard deviation of the mean values (marked as SD) for home delivery service concerns in Jordan.

Variable	M	SD
Lack of reliable delivery system	2.10	0.876
Lack of postcode system	2.10	0.738
Delivery costs	2.30	0.949

Table 4. 29: Mean values and standard deviation of home delivery service concerns

To see whether there is a possible relationship between retailer's participants' attitude toward adopting online shopping as a business in Jordan and home delivery service concerns including lack of a reliable delivery system, lack of postcode system, and saving costs; Pearson correlation coefficients (r) was measured.

- Lack of reliable delivery system

Table B.8 (Appendix B) shows the correlation value between retailers' attitude toward online shopping adoption in terms of home delivery service businesses and lack of dependable delivery system. The correlation analysis results in this case show that the relationship between attitude toward online shopping adoption in terms of home delivery service concerns and lack of reliable home delivery system ($r = -0.508$, P-value = 0.134) is of large strength (Cohen, 1988).

- Lack of postcode system

Table B.8 (Appendix B) shows the correlation value between retailers' attitude toward online shopping adoption in terms of home delivery service businesses and lack of postcode system. The correlation analysis results in this case show that the relationship between attitude toward online shopping adoption in terms of home delivery service concerns and lack of postcode system ($r = -0.602$, P-value = 0.065) is of large strength (Cohen, 1988).

- Delivery costs

Table B.8 (Appendix B) shows the correlation value between retailers' attitude toward online shopping adoption in terms of home delivery service businesses and delivery prices. The correlation analysis results in this case show that the relationship between attitude toward online shopping adoption in terms of home delivery service concerns and delivery costs ($r = -0.538$, P-value = 0.109) is of large strength (Cohen, 1988).

4.7.3 DELIVERY COMPANIES PARTICIPANTS

Delivery companies' participants such as managers and employees were asked around if they sustain a scheme to detect customers' address and how they detect customer's address to deliver their social clubs. Also, they asked if they have routed and scheduling system and if they use the GPS during the delivery process.

Table 4.30 illustrates the percentage of delivery companies who have a system to detect their customers' addresses to deliver their orders. It shows that 93.3% of the delivery companies do not sustain a system to detect their customers' addresses and 6.7% of the delivery companies have an arrangement to detect their customers' addresses. In addition, the process of how the delivery companies enquire about customers' addresses was investigated. Table 4.31 shows that 93.3% of the delivery companies enquire about customer's address by phone and 6.7% of the delivery companies depend on the deliveryman experience in the area of delivery to deliver customers' orders.

Category	Participants	Percent
I have a system to detect customers' addresses	1	6.7
I do not have a system to detect customers' addresses	14	93.3
Total	15	100.0

Table 4. 30: Percentage of delivery companies who own a scheme to detect their customers' addresses

Category	Participants	Percent
Enquire about customer's address by phone	14	93.3
Depend on the delivery man experience in the delivery area	1	6.7
Total	15	100.0

Table 4. 31: The way of enquiring about customers' addresses by the delivery companies in Jordan

Table 4.32 illustrates the percentage of delivery companies who have vehicle routing and scheduling system to manage their delivery times. It shows that 100.0% of the delivery companies in Jordan do not use vehicle routing and scheduling system for delivering customers' orders. In addition, the percentage of the delivery companies who use the GPS during the delivery process of the customers' orders was also investigated. Table 4.33 shows, that 100.0% of the delivery companies in Jordan do not use the GPS during the delivery process.

Category	Participants	Percent
I have vehicle routing and scheduling system	0	000.0
I do not have vehicle routing and scheduling system	15	100.0
Total	15	100.0

Table 4. 32: Percentage of delivery companies who have vehicle routing and scheduling system

Category	Participants	Percent
I do use the GPS during the delivery process	0	000.0
I do not use the GPS during the delivery process	15	100.0
Total	15	100.0

Table 4. 33: Percentage of delivery companies who use the GPS during the delivery process

Home delivery failure reasons are considered as the independent factors that affect delivery companies' attitude toward home delivery service in Jordan which are presented in Table 4.34. The table illustrates the mean values (marked as M) and the standard deviation of the mean values (marked as SD) for home delivery failure reasons in Jordan.

Variable	M	SD
Nobody at home	2.40	0.737
Could not find delivery address location	2.33	0.816
Lack of reliable delivery system	2.27	0.799
Lack of postcode system	2.47	0.743

Table 4. 34: Mean values and standard deviation of home delivery failure reasons

To see whether there is a possible relationship between delivery companies participants' attitude toward home delivery service in Jordan and delivery failure reasons, including nobody at home, could not determine a delivery address location, lack of a reliable delivery system, and lack of postcode system; Pearson correlation coefficients (r) was measured.

- Nobody at home

Table B.10 (Appendix B) depicts the correlation value between delivery couriers' attitude toward home delivery service in Jordan and delivery failure reasons of nobody at home to pick up the legal transfer. The correlation analysis results in this case show that the relationship between attitude toward home delivery service in Jordan and nobody at home to receive the delivery ($r = -0.496$, P-value = 0.060) is of medium strength (Cohen, 1988).

- Couldn't find delivery address location

Table B.10 (Appendix B) depicts the correlation value between delivery couriers' attitude toward home delivery service in Jordan and delivery failure reasons of could not find a delivery address location. The correlation analysis results in this case show that the relationship between attitude toward home delivery service in Jordan and could not find the delivery address location ($r = -0.663$, P-value = 0.007) is of large strength (Cohen, 1988).

- Lack of reliable delivery system

Table B.10 (Appendix B) depicts the correlation value between delivery couriers' attitude toward home delivery service in Jordan and delivery failure causes of lack of reliable delivery system. The correlation analysis results in this case show that the relationship between

attitude toward home delivery service in Jordan and lack of reliable delivery system (r = -0.644, P-value = 0.010) is of large strength (Cohen, 1988).

- Lack of postcode system

Table B.10 (Appendix B) depicts the correlation value between delivery couriers' attitude toward home delivery service in Jordan and delivery failure causes of lack of postcode system. The correlation analysis results in this case show that the relationship between attitudes toward home delivery service in Jordan and lack of the postcode system (r = -0.528, P-value = 0.043) is of large strength (Cohen, 1988).

4.8 DISCUSSION

This study highlights online shopping and home delivery service factors that influence attitudes and perceptions of consumers, retailers, and delivery companies toward adopting such businesses in Jordan.

4.8.1 CONSUMERS' STUDY

The survey divided the factors that influence the customers' decision to shoponline into three categories: online shopping perceived benefits, online shopping concerns, and home delivery service concerns. Whilst, factors that influences the retailers' attitude toward adopting online shopping into three categories: online shopping adoption benefits, online shopping adoption barriers, and home delivery service concerns. Eventually, factors that influence delivery companies' attitude toward home delivery service concerns are considered in this study as well.

In relation to consumers' study, the results suggest that the main factors influence Jordanian consumers' attitude toward online shopping positively in terms of its perceived benefits are:

convenience, low costs, broader selection, price comparison, 24/7 availability, information accessibility, and delivery service available. Simultaneously, factors that influence customers' attitude toward online shopping negatively in terms of online shopping concerns are: trust, payment security, personal information privacy, lack of technical skills, quality of service (QoS), and social issues. Whilst factors that affect customers' attitude toward online shopping negatively in terms of home delivery service concerns are: delivery costs, delivery time slots, delivery first attempt failure, order accuracy, and problems in describing delivery address location. In addition, online shopping experience is associated with consumers' attitude toward online shopping and intention to shop online, which consistent with previous studies of (Vijayasarathy and Jones, 2000).

The study investigated consumers' intention toward adopting online shopping as an alternative to conventional shopping by asking about the advantages of adopting such mode of shopping. Table 4.10, shows the mean values and standard deviations of the main benefits of online shopping that influence consumers' decision positively toward online shopping are: convenience, low prices, products wider selection, price comparison, 24/7 availability, information availability, and delivery service availability. These benefits are considered as the main motives for adopting online shopping as an alternative method of shopping which helps cut costs of transportation and car park, and enables the customers from selecting from varying degrees of quality depending on their budget (Delafrooz *et al.*, 2009a; Kacen, Hess and Chiang, 2002; Morganosky and Cude, 2000). The relationship between attitude toward online shopping and perceived benefits was measured using Pearson coefficients (r). As shown in (Appendix B section 2.1), the strongest relationship was found to be between consumers' attitude toward online shopping and online shopping perceived benefits is low prices (r = 0.758, P-value = 0.000), followed by convenience (r = 0.656, P-value = 0.000), 24/7 availability (r = 0.535, P-value = 0.000), delivery service availability (r = 0.523, P-value

= 0.000), information availability (r = 0.486, P-value = 0.000), products wider selection (r = 0.373, P-value = 0.000), and price comparison (r = 0.364, P-value = 0.000) respectively. The positive correlation indicated that as the score of online shopping perceived benefits increases, consumers' positive attitude toward online shopping do so. These results of positive and significant relationships between consumers' attitude toward online shopping and online shopping perceived benefits are consistent with the findings of early studies of (Wu, 2003; Vijayasarathy and Jones, 2000; Jarvenpaa and Todd, 1996b). Multiple regression analysis results show significant positive correlation between consumers' attitude toward online shopping and online shopping perceived benefits. Table 4.12, shows $R^2 = 0.752$and the adjusted $R^2 = 0.738$ values for the relationship between online shopping perceived benefits and consumers' attitude toward online shopping. Depending on the value of the adjusted R^2 which provides a better estimate of the true population value which implies that the predictors explained 73.8% of the variance in the consumers' attitude toward online shopping (Pallant, 2010). Also, Table 4.13 shows the ANOVA test results, which indicate a statistically significant relationship between consumers' attitude toward online shopping, and online shopping perceived benefits ($P<0.01$). Table 4.14 illustrates estimates of the model coefficients, which indicates that low prices and convenience are the most significant factors, which make the strongest contribution to the prediction of consumers' attitude toward online shopping in Jordan. Low prices and better discounts offered by e-retailers influence consumers' decision positively to shop online, which finding is consistent with previous research (Al-Madi, Al-Zawahreh and Al-Qawasmi, 2013; Sultan and Uddin, 2011; Delafrooz, Paim and Khatibi, 2009; Forsythe *et al.*, 2006; Liao and Cheung, 2001). Online shopping convenience is considered as one of the most important factors that attract consumers to shop online which affect their decision positively (Wu, 2003). Moreover, convenience is the most prominent factor that motivates consumers to shop online due to its characteristics which lie

in time, effort, energy, and money saving (Lloyd *et al.*, 2014; Delafrooz *et al.*, 2009a; Farquhar and Rowley, 2009; Colwell *et al.*, 2008). These results are consistent with the findings of the previous studies of (Kim and Kim, 2004; McKinney, 2004; Karayanni, 2003; Moe, 2003). The factors that have less significance and contribution to the prediction of consumers' attitude toward online shopping in terms of online shopping benefits are information availability, delivery service availability, 24/7 availability and price comparison (respectively); whilst products wider selection was insignificant. According to Forsythe and Shi (2003), products' information availability, delivery service availability, 24/7 availability and price comparison are considered as important factors that attract consumer to shop online as well (Rohm and Swaminathan, 2004; Forsythe and Shi, 2003). However, information availability about product description and price helps in minimizing search costs and time which lead to more convenient shopping (Lee, 2007; Hoque and Lohse, 1999). In addition, information availability influences consumers' intention and behaviour to shop online by website quality, design, ease-of-use and usefulness (Li and Zhang, 2002). These results are consistent with the findings of (al-Smadi, 2013; Wei and Lu, 2013; Lee, Park and Ahn, 2001; Song and Zahedi, 2001). Home delivery service is one of the most essential services for online shopping success (Auramo, Aminoff and Punakivi, 2002; Yrjo, 2001), whereas e-retailer cannot establish e-business without having a delivery fleet or dealing with third-party courier to deliver customers' orders (Yousept and Li, 2004; Browne *et al.*, 2001). In addition, home delivery service has a great impact on consumers' intention to shop online (Bauer, Falk and Hammerschmidt, 2006). These results are consistent with the findings of (Subramanian *et al.*, 2014; Sultan and Uddin, 2011; Liu *et al.*, 2008; Jun, Yang and Kim, 2004; Yoo and Donthu, 2001). Many researchers mentioned that time efficiency is one of the most significant elements that affect consumers' attitude toward online shopping adoption. The 24/7 accessibility of online shopping has a good impact on consumers' intention to shop

online, especially whose amount of free time is limited (y Monsuwé, Dellaert and De Ruyter, 2004), which finding is consistent with previous research of (Sultan and Uddin, 2011; Delafrooz, Paim and Khatibi, 2009; To, Liao and Lin, 2007; Karayanni, 2003). Price comparison is considered as a motive for online shopping which enable consumers to compare the prices from more than one retailer and choose the cheapest in order to save money (Chang and Wang, 2011; Delafrooz *et al.*, 2009a; Pechtl, 2003). These results are consistent with the findings of (Clemes, Gan and Zhang, 2013; Delafrooz *et al.*, 2009a; Cho, 2004; Rohm and Swaminathan, 2004).

In relation to the factors that affect consumers' attitude negatively toward online shopping, the results of the study showed that most participants have not bought anything online (Table 4.4); this is a big indicator of low experience among Jordanian consumers about using online shopping websites for shopping due to barriers that influence their decision to shop online. These barriers are associated with trust more specifically with payment security, personal information privacy as well as a lack of technological skills, QoS, and common social issues. This study investigated the consumers' intentions to adopt online shopping as an alternative for conventional shopping by asking about the concerns and barriers of adopting such a mode of shopping. Table 4.15 shows the mean values and standard deviations of the barriers associated with online shopping that can hinder the consumers' intention and behaviour to shop online including trust, payment security, personal information privacy, lack of technological skills, QoS and social issues.

These barriers are considered as important inhibitors, which affects consumers' attitude negatively toward online shopping in Jordan. The relationship between attitude toward online shopping and online shopping concerns and barriers were measured using Pearson coefficients (r). As shown in (Appendix B section 2.2), the strongest relationship found to be between consumers' attitude toward online shopping and online shopping barriers and

concerns is trust (r = -0.702, P-value = 0.000), followed by QoS (r = -0.633, P-value = 0.000), payment security (r = -0.582, P-value = 0.000), lack of technological skills (r = -0.519, P-value = 0.000), personal information privacy (r = -0.507, P-value = 0.000) and social issues (r = -0.306, P-value = 0.000) respectively. The negative correlation indicated that when the score of online shopping concerns and barriers increase, consumers' negative attitude toward adopting online shopping do so. These results of significant relationships between consumers' attitude toward online shopping and online shopping concerns are consistent with findings of previous studies of (Al-Madi, Al-Zawahreh and Al-Qawasmi, 2013; Sultan and Uddin, 2011; Flavián and Guinalíu, 2006; Forsythe and Shi, 2003; Miyazaki and Fernandez, 2001; Hoffman, Novak and Peralta, 1999).Multiple regression analysis results show significant negative correlation between consumers' attitude toward online shopping and online shopping concerns. Table 4.16 shows $R^2 = 0.705$ and the adjusted $R^2 = 0.691$ values for the relationship between online shopping concerns and barriers predictors, and consumers' attitude toward online shopping. Depending on the value of the adjusted R^2 which provides a better estimate of the true population value which implies that the predictors explained 69.1% of the variance in the consumers' attitude toward online shopping (Pallant, 2010). Also, Table 4.17 shows the ANOVA test results, which indicates a statistically significant relationship between consumers' attitude toward online shopping and online shopping concerns ($P<0.01$). Table 4.18 illustrates the estimates of the model coefficients, indicates that trust, QoS and payment security are the most significant factors that make the strongest contribution to the prediction of consumers' attitude toward online shopping in Jordan. In addition, trust, QoS and online payment security are considered as the major obstacles that affect consumers' intention toward online shopping in Jordan. However, people with low experience in online shopping have more worries about providing their credit/debit card details over the Internet due to the feeling of insecurity of online payment system

(Forsythe and Shi, 2003). This is due to worries regarding their personal and financial information security. This indicates that Jordanians are afraid of making online payment to Internet retailers due to the lack of online payment systems, lack of regulations for online transactions and low knowledge of using credit cards for online purchases. However, trust concerns for consumers when shop online also comprises personal data privacy and security, quality of service and quality of goods provided by online retailers affect the consumers' decision to shop online. The reasons behind the concerns about quality of goods offered by online retailers among Jordanians is related to their historical legacy of traditional eastern habits for shopping, which include ascertaining the quality of tangible products (literally touching and feeling) prior to making a purchase decision, and they also enjoy traditional shopping more than online shopping. Moreover, due to the other barriers that prevent them from using online shopping as an alternative for traditional shopping, most of them do not have any experience of using the Internet for shopping. The reasons behind their fear about their information privacy are low knowledge and experience about online shopping websites' privacy and policy terms and conditions. Faqih (2011) argues that reducing perceived risk within web environment by applying mechanisms for risk reduction, customers' trust in online shopping can be increased, thereby enhancing their intention to shop online. Therefore, bank institutions must focus their attention in constructing a highly secured payment system for online shopping websites. These results are consistent with the findings of the previous studies of (Al-Madi, Al-Zawahreh and Al-Qawasmi, 2013; al-Smadi, 2013; Chang and Wang, 2011; Nuseir *et al.*, 2010; Lee, 2007; Bauer, Falk and Hammerschmidt, 2006; Forsythe *et al.*, 2006; Forsythe and Shi, 2003; Miyazaki and Fernandez, 2001; Vijayasarathy and Jones, 2000). Factors that has less significance and contribution to the prediction of consumers' attitude toward online shopping in terms of online shopping concerns is the lack of technological skills; whilst social issues and personal information

privacy were insignificant. Lack of technological skills is found to be an important factor for affecting consumers' intention to shop online. Karjaluoto et al. (2002) stated that previous experience of using computers and technology has a great impact on consumer understanding of such technologies which lead to positive attitude toward using newer technologies, which consistent with the findings of (Hausman and Siekpe, 2009; Karjaluoto, Mattila and Pento, 2002; Hoque and Lohse, 1999).

Eventually, home delivery service concerns that affect Jordanian consumers' attitude toward online shopping, such as delivery costs, delivery time slots, delivery first attempt failure, order accuracy, and problems in describing delivery address location were investigated. Table 4.19, shows the mean values and standard deviations of home delivery service concern that affect consumers' intention to shop online. As mentioned previously, home delivery is considered as one of the most important stages in online shopping which play an important role in the success of such kind of businesses (Auramo, Aminoff and Punakivi, 2002; Yrjo, 2001). In addition, the advantages of home delivery service attracted the customers to shop online. However, there were some concerns that have negative impact on the consumers' decision to shop online in Jordan. Pearson coefficients (r) were used to measure the relationship between these concerns and consumers' attitude toward online shopping in Jordan.

As shown in (Appendix B section 2.3), the strongest relationship found to be between consumers' attitude toward online shopping and home delivery service concerns is the problem of describing delivery address location (r = -0.730, P-value = 0.000), followed by delivery first attempt failure (r = -0.634, P-value = 0.000), delivery costs (r = -0.618, P-value = 0.000), order accuracy (r = -0.473, P-value = 0.000) and delivery time slots (r = -0.428, P-value = 0.000) respectively. These results of significant relationships between consumers'

attitude toward online shopping and home delivery service concerns are consistent with the findings of previous studies of (Clemes, Gan and Zhang, 2013; Sultan and Uddin, 2011; Delafrooz, Paim and Khatibi, 2009; Liu *et al.*, 2008; Robinson *et al.*, 2007; Bauer, Falk and Hammerschmidt, 2006; Pechtl, 2003; Zeithaml, Parasuraman and Malhotra, 2002; Gommans, Krishman and Scheffold, 2001; Liao and Cheung, 2001). Multiple regression analysis results show a significant positive correlation between consumers' attitude toward online shopping and home delivery service concerns. Table 4.20shows $R^2 = 0.604$ and the adjusted $R^2 = 0.588$ values for the relationship between home delivery service concerns predictors and consumers' attitude toward online shopping. Depending on the value of the adjusted R^2 which provide a better estimate of the true population value which implies that the predictors explained 58.8% of the variance in the consumers' attitude toward online shopping (Pallant, 2010). Also, Table 4.21 shows the ANOVA test results, which indicates a statistically significant relationship between consumers' attitude toward online shopping and home delivery service concerns ($P<0.01$).

Table 4.22 illustrates estimates of the model coefficients, which indicates that the problem in describing delivery address location and delivery time slots and delivery costs are the most significant factors that make the strongest contribution to the prediction of consumers' attitude toward online shopping in Jordan. Problem of describing delivery address location in Jordan is attributed to the lack of postcode system that has led to the lack of reliable and efficient delivery system for online purchased goods. Therefore, international delivery carriers, such as DHL, ARAMEX, TNT and UPS, provide home delivery service for goods bought online from outside or inside the country to the customers. The lack of postcode system caused by the lack of developed addressing schema affected the process of home delivery and transportation infrastructure. The other factors such as delivery first attempt

failure and order accuracy do not contribute significantly to the prediction of consumers' attitude toward online shopping in terms of home delivery service concerns.

However, home delivery concerns for consumers when shopping online comprises many facets, such as worries about the quality of service (QoS) which include delivery time, delayed and damaged items, and quality of goods (Consulting *et al.*, 2011; Cairns, 1996). Consequently, online retailers and delivery companies should develop strategies and methods in order to uptake consumers' concerns toward online shopping done by home delivery service. These strategies lie in owning a reliable and efficient delivery system that enables them from delivering customers' orders to their doorstep on time to meet customers' expectations (Agatz *et al.*, 2011). In addition, to avoid delivery first attempt failure, retailers who own and operate their delivery fleet must use advanced optimisation techniques and information technologies to assign delivery time windows with delivery routes, especially grocery retailers (Agatz *et al.*, 2011; Campbell and Savelsbergh, 2006). Thus, reduce the impact of traffic by delivering consumers' orders using one vehicle within specific time windows (Cairns, 2005). Transportation costs are considered as a significant factor, which plays a vital role in the success and the continuity of the delivery service, either the domestic delivery or the international delivery (Consulting *et al.*, 2011). The success of such service can be done by adopting a specific time window slot for delivering customers' orders to enable better route and scheduling optimisation which leads to cost reduction (Punakivi and Saranen, 2001; Punakivi, Yrjölä and HolmstroÈm, 2001). Cost reduction depends on the used delivery mode; for example, delivery alternatives (e.g. Reception boxes and shared boxes) are the most cost-efficient way for delivery when the recipient is not present at home to receive his delivery (Punakivi, Yrjölä and HolmstroÈm, 2001). Customer's absence at the delivery time is a major factor that acts as a significant part in the success of home delivery service. The modern lifestyle has led people to leave their homes for long periods during the day

which results in the failure of delivery first attempt, causing lower customer satisfaction and higher costs for retailers and delivery companies(Park and Regan, 2004). To improve the cost-effectiveness of the delivery service, (Norberg and Lundblad, 2001), argues that physical stores can serve as pickup and delivery points for goods ordered online which achieve a huge cost savings. To avoid delivery attempt failure, retailer/delivery courier must adopt a strategy to arrange delivery times with the customers, such as determining delivery time windows or time slots to make the delivery successful and gain customers' satisfaction(Boyer, Prud'homme and Chung, 2009; Campbell and Savelsbergh, 2006; Campbell and Savelsbergh, 2003).

4.8.2 RETAILERS' STUDY

Factors that influence retailers' attitude toward adopting online shopping are divided into three categories including online shopping adoption benefits, online shopping adoption barriers, and home delivery service concerns. In relation to retailers' study, the results indicate that the main factors influence Jordanian retailers' attitude toward adopting online shopping as a business in terms of its benefits are: convenience, attract customers, reap more profit, and extend communication network, which affect retailers' attitude positively toward adopting online shopping as a business in Jordan.

Table 4.27 shows the mean values and standard deviations of the main benefits of online shopping adoption for retailers', which include convenience, attract customers, reap more profit, and extend communication network. These benefits are considered as motives for retailers to adopt online shopping as a business. The relationship between attitude toward adopting online shopping as a business and its benefits was measured using Pearson coefficients (r). As shown in (Appendix B section 4.1), the strongest relationship was found to be between retailers' attitude toward adopting online shopping as a business and online

shopping benefits is attracting customers locally and globally (r = 0.605, P-value = 0.064), followed by convenience (r = 0.513, P-value = 0.129), extend communication networks with consumers and other retailers locally and globally (r = 0.348, P-value = 0.324), and reap more profit (r = 0.320, P-value = 0.368) respectively.

Convenience is considered as one of the most motives that attract consumers to shop online and retailers to start initiating an online business. However, e-retailers will be able to offer a wide range of products to their consumers due to the unlimited space and number of products can be displayed on their e-storefront (Delafrooz *et al.*, 2009a). Therefore, e-retailers must concentrate on website design which is vital for online business as it is the main interface of the retailer (Srinivasan, Anderson and Ponnavolu, 2002). In addition, retailers must provide efficient and reliable delivery service and information about the return policy that make the shopping process easy and simple (Liu *et al.*, 2008; Pechtl, 2003). These results are consistent with findings of (Clemes, Gan and Zhang, 2013; Ortinau, Babin and Chebat, 2013; Delafrooz, Paim and Khatibi, 2009; Liu *et al.*, 2008; Pechtl, 2003; Srinivasan, Anderson and Ponnavolu, 2002).

The communication between retailer and consumers and other retailers is a very important factor that affects consumers' and retailers' attitude toward online shopping. However, communication with consumers to answer their enquiries and solve problems pre and post purchase is considered as an important factor that affects consumers' intention to buy from this retailer (Liu *et al.*, 2008). Therefore, retailers must understand consumers' shopping habits and behaviours in order to gain familiarity and good reputation among them, which leads to attract more customers, increase sales, and reap more profit (Lee, 2007; Srinivasan, Anderson and Ponnavolu, 2002). Also, communications with other retailers are important for the retailers because it enhances their familiarity with e-retailing as a whole and familiarity with their own e-store in particular (Pechtl, 2003). In addition, e-retailers will gain more

experience from other retailers about how to develop marketing strategies such as reducing operations cost, information processing, and get more sources for products in order to provide their customers with competitive prices and offers (Clemes, Gan and Zhang, 2013; Delafrooz *et al.*, 2009b; Pechtl, 2003).

In recounting to the barriers that affect Jordanian retailers' attitude toward adopting online shopping as a business are: lack of awareness, lack of technical skills, lack of financial system, less popularity of online shopping among people, governmental issues, and social issues which affect retailers' attitude negatively toward adopting online shopping as a business in Jordan. Table 4.28 shows the mean values and standard deviations of the main barriers of online shopping adoption for retailers in Jordan which include lack of awareness, lack of technical skills, lack of financial arrangement, less popularity of online shopping among people, governmental issues, and societal issues. These barriers are seen as inhibitors that affect retailers' intention to embrace online shopping as a business in Jordan. The relationship between attitude toward adopting online shopping as a business and its barriers was measured using Pearson coefficients (r). As shown in (Appendix B section 4.2), the strongest relationship was found to be between retailers' attitude toward adopting online shopping as a business and online shopping barriers is less popularity of online shopping among people (r = -0.678, P-value = 0.031), followed by the lack of technological skills (r = -0.593, P-value = 0.071), lack of awareness (r = -0.547, P-value = 0.102), social issues (r = -0.501, P-value = 0.140), and governmental issues (r = -0.484, P-value = 0.156) respectively. Less popularity of online shopping among people is an important factor that affects retailers' intention negatively toward adopting online shopping as a business in Jordan. This is due to the Middle Eastern shopping habits and behaviours for shopping, whereas most of them prefer traditional shopping for enjoyment and fun purposes. Furthermore, these habits and behaviours are considered as social issues due to the desire of ascertaining the quality of

tangible products (literally touching and feeling) prior to making a purchase decision and the desire of buying from a retailer with good reputation (Elbeltagi, 2007; Travica, 2002). These issues led people to be more attracted to the conventional shopping rather than online shopping which led to less popularity of online shopping. On the one hand, the lack of technological skills such as low experience in using computers, internet, and shopping websites among retailers' staff and consumers has affected retailers' intention to adopt online shopping (Kurnia, 2006). On the other hand, lack of awareness among retailers and consumers about the benefits of adopting online shopping which led online shopping to be ambiguous and less popular. This is due to the recent life style, different social behaviours, and limited of free times. In addition, governmental issues can hinder retailers' intention to adopt online shopping as a business due to the high tax added value and the lack of rules and regulations for such kind of business.

In relation to home delivery service concerns that affect Jordanian retailers' attitude toward adopting online shopping as a business are: lack of reliable delivery system, lack of postcode system, and delivery costs which affect retailers' attitude negatively toward adopting online shopping as a business in Jordan.

Table 4.29 shows the mean values and standard deviations of home delivery service concerns in Jordan, which include lack of reliable delivery system, lack of postcode system, and delivery costs. These barriers are considered as inhibitors that affect retailers' intention to adopt online shopping as a business in Jordan. The relationship between attitude toward adopting online shopping as a business and home delivery service concerns was measured using Pearson coefficients (r). As shown in (Appendix B section 4.3), the strongest relationship was found to be between retailers' attitude toward adopting online shopping as a business and home delivery concerns is the lack of the postcode system (r = -0.602, P-value =

0.065), followed by delivery costs (r = -0.538, P-value = 0.109), and lack of reliable delivery system (r = -0.508, P-value = 0.134) respectively.

The lack of reliable and efficient home delivery system is an important element that hampers the success of online shopping and affects retailers' intention negatively to adopt such business. Therefore, home delivery service is considered as one of the most important key factors in the online shopping success (Auramo, Aminoff and Punakivi, 2002; Yrjo, 2001). The lack of efficient and dependable delivery system is induced by the deficiency of a developed ICT and transportation infrastructure, and lack of developed addressing scheme, which caused by the lack of the postcode system in Jordan. Furthermore, the lack of awareness toward online shopping benefits among retailers and consumers, and the benefits of the positioning technologies such as GIS and GPS, which assisted in improving the transportation process and then the physical distribution of commodities. Today, delivery couriers in the developed countries are using positioning technologies to locate their customer's home location. The use of such technologies has led to cut-off the delivery costs by planning and scheduling delivery routes, and optimising these routes for items to its final destination (Jung, Lee and Chun, 2006; Taniguchi and Thompson, 2004). These results are consistent with the findings of (Aixiong, 2011; Kunkel and Schwind, 2011; Dong and Xiang, 2006; Jung, Lee and Chun, 2006; Taniguchi and Thompson, 2004; Sokol, 2002).

4.8.3 Delivery Companies' Study

In relation to delivery companies' study of home delivery service failure reasons that affect Jordanian delivery couriers' attitude toward home delivery service are: nobody at home, could not find a delivery address location, lack of reliable delivery system and lack of postcode system which affect delivery companies participants' attitude negatively toward home delivery service in Jordan. Table 4.34 shows the mean values and standard deviations

of home delivery service failure in Jordan, which include nobody at home, could not find a delivery address location, lack of a reliable delivery system, and lack of postcode system. These barriers are seen as inhibitors that affect delivery couriers' towards home delivery service in Jordan. The relationship between attitudes toward home delivery first attempt failure was measured using Pearson coefficients (r). As shown in (Appendix B section 6.1), the strongest relationship was found to be between delivery couriers' attitude toward home delivery first attempt failure is the inability to find a delivery address location (r = -0.663, P-value = 0.007), followed by the lack of reliable delivery system (r = -0.644, P-value = 0.010), lack of the postcode system (r = -0.528, P-value = 0.043), and nobody at home (r = -0.496, P-value = 0.060) respectively.

The results in Tables 4.31 and 4.32 shows that the majority of delivery companies in Jordan do not have a system to detect delivery address location and most of them enquire about the delivery address location by phone; this indicates that most of delivery couriers in Jordan do not use positioning technologies such as GPS and GIS which considered as an integral part in the delivery logistics. As mentioned previously, the lack of a reliable delivery system caused by the lack of postcode system which made the process of finding a delivery address location difficult. Furthermore, the lack of developed ICT and transportation infrastructure has led tothe inefficiency of the delivery service (Yu, 2006). In addition, retailer/delivery courier will not be able to provide his customer with a delivery time slot, which caused the customer to not be present at home at the delivery time. These factors increase the delivery first attempt failure chances which increase the delivery costs and decrease profit, which led to a negative impact on retailers' and delivery couriers' attitude toward home delivery service in Jordan.
(Campbell and Savelsbergh, 2006), argues that to provide a successful delivery service, customers must be present at home at the delivery time by agreed delivery time slot between the delivery company and customers. Delivery time slots play a crucial role in increasing and

decreasing profit and delivery costs, where narrow delivery time slots decrease profits and increase deliver costs while wider delivery time slots increase profit and decrease delivery costs (Campbell and Savelsbergh, 2006). Hence, retailers and delivery companies must employ strategies for delivering consumers' orders at convenient times that fit their existence at home. These delivery times lie in night deliveries, such as early night where consumers are present at home at the delivery time and to avoid traffic peak time in order to cut-off the delivery trip costs (Campbell and Savelsbergh, 2003). These results are consistent with the findings of (Agatz *et al.*, 2011; Boyer, Prud'homme and Chung, 2009) and with the results of the previously published literature of(Agatz, Fleischmann and Van Nunen, 2008) who discussed delivery service issues.

4.9 SUMMARY

This chapter investigated the attitude of Jordanian consumers toward online shopping as an alternative channel for shopping, retailers' attitude toward online shopping as a business and its home delivery service, and delivery couriers' attitude toward home delivery service in Jordan. From the results of the study, Jordanian consumers are willing to adopt online shopping as an alternative way for shopping. The willingness of online shopping is due to the advantages of such shopping mode such as competitive prices, convenience, wider selection of products, and delivery service availability. On the other hand, consumers had some concerns regarding online shopping such as personal information privacy, payment security, QoS, trust, social issues and lack of technical skills. These concerns can be skipped by developing a satisfying strategies and policies to insure consumers' and retailers' rights. At the same time, retailers had positive and negative attitudes toward adopting online shopping to start selling goods online. Positive attitudes lie in convenience, attracting customers, reap more profit, and extend communication network. These attitudes are

considered as the main factors that influence retailers' decision positively toward online shopping adoption. Furthermore, the benefits of such business will help in developing supply chain management operations and reduce delivery costs. These developments can be done by extending the communication network with other retailers in order to exploit their experience in such business application. Negative attitudes are divided into two types including online shopping barriers and home delivery concerns. Online shopping barriers lie in lack of awareness, lack of technical skills, lack of financial system, less popularity of online shopping, and governmental and social issues. Home delivery concerns lie in lack of a reliable delivery system, lack of postcode system, and delivery costs. These barriers and concerns are attributed to the low knowledge and experience in online shopping amongst retailers' staff.

Finally, the delivery company's attitude toward home delivery service were affected negatively due to the lack of a reliable delivery system and postcode system which lead to the delivery failure and increase delivery costs. The increase in delivery costs affects both retailers' and consumers' intention and behaviour for adopting such kind of shopping.

CHAPTER 5

SYSTEM DESIGN

5.1 INTRODUCTION

As mentioned in the previous chapter, it is important to establish an efficient and reliable delivery system to make home delivery service more efficient, reliable, comfortable, and cost-effective. Jordan is one of the developing countries that lack of postcode system which make online shopping less popular and the delivery service inefficient. Consequently, the lack of such a system has led to the absence of a reliable delivery system that aids the consumers' in identifying their delivery address location as well as helping the retailer/3PL plan a delivery route to the delivery location.

Also, retailers and delivery couriers in Jordan are facing problems with the delivery process where most of them do not have a reliable delivery system that help them to find their customer's home location easily. So, to assist them in solving the delivery service problem, a postcode alternative system in the context of online shopping was designed for e-retailers in Jordan. The planned system will assist consumers to identify their delivery address location and retailers to determine this location by planning delivery routes to these locations.

The designed system depends on the state-of-art positioning technologies such as GPS and GIS that play a crucial part in improving the transportation process and then the physical distribution of commodities. Furthermore, the system contains two modules: front-end and back-end modules. The front-end module consists of two platforms: desktop and smart phone platforms to be used by online shoppers. The back-end module consists of one platform to be

used by retailers/delivery couriers as system administrator to plan delivery routes. In addition, the system is developed as a trial in order to evaluate the usability of the trial system. In the test, the system was deployed in conjunction with a trial shopping website which was taken as the optimal means for testing such system. Moreover, the system evaluation is typically taken in the form of trial in which the system usability tested by volunteered participants on both system modules.

5.2 SYSTEM DESIGN

5.2.1 SYSTEM MODEL

The system design was uniformed by the newly conducted study in the previous chapter; the system consists of two modules: the front-end and back-end modules. The front-end module can be used by online shoppers and consists of two platforms: desktop and smart phone. The back-end module consists of one platform and can be used by the system administrator, such as retailer/delivery courier. The system front-end module platforms enable online consumers to place their house location on the map and fill the required text fields and submit them to the retailer/delivery courier. After submitting this information, retailer/delivery courier will be able to plan the delivery route between his depot location and the customer's house location. Later, he will be capable to export customer orders' information, including the delivery route information as excel sheet and import them into handheld/ in car GPS device to find the driving directions to the required address.

The system front-end module flowchart model contains input and output parameters required to run the system. Inputs are made out by consumers such as information in the textual fields and the identified location on the map. Outputs are the provided location information by the

consumer, including the identified location coordinates to enable the retailer/delivery courier from planning the delivery routes using the back-end module platform.

5.2.1.1 THE FRONT-ENDMODULE FLOWCHART MODEL

Figure (5.1), stands for the flowchart model of the front-end module of the system design; the model explains the required steps by users such as online consumers to run the system. The model comprises two primary components: map and text fields. As discussed earlier, the main aim of the map is to enable the consumers to mark their delivery address location on it whereas the aim of the text fields is to enable the consumers to provide more information about the delivery address (i.e. House number, flat number, street name, etc.). After marking the delivery address on the map and filling the required text fields, consumers will be entitled to submit this information to the retailer in order to start planning delivery routes to the customers' submitted delivery address location. The following section represents the back-end module flowchart model.

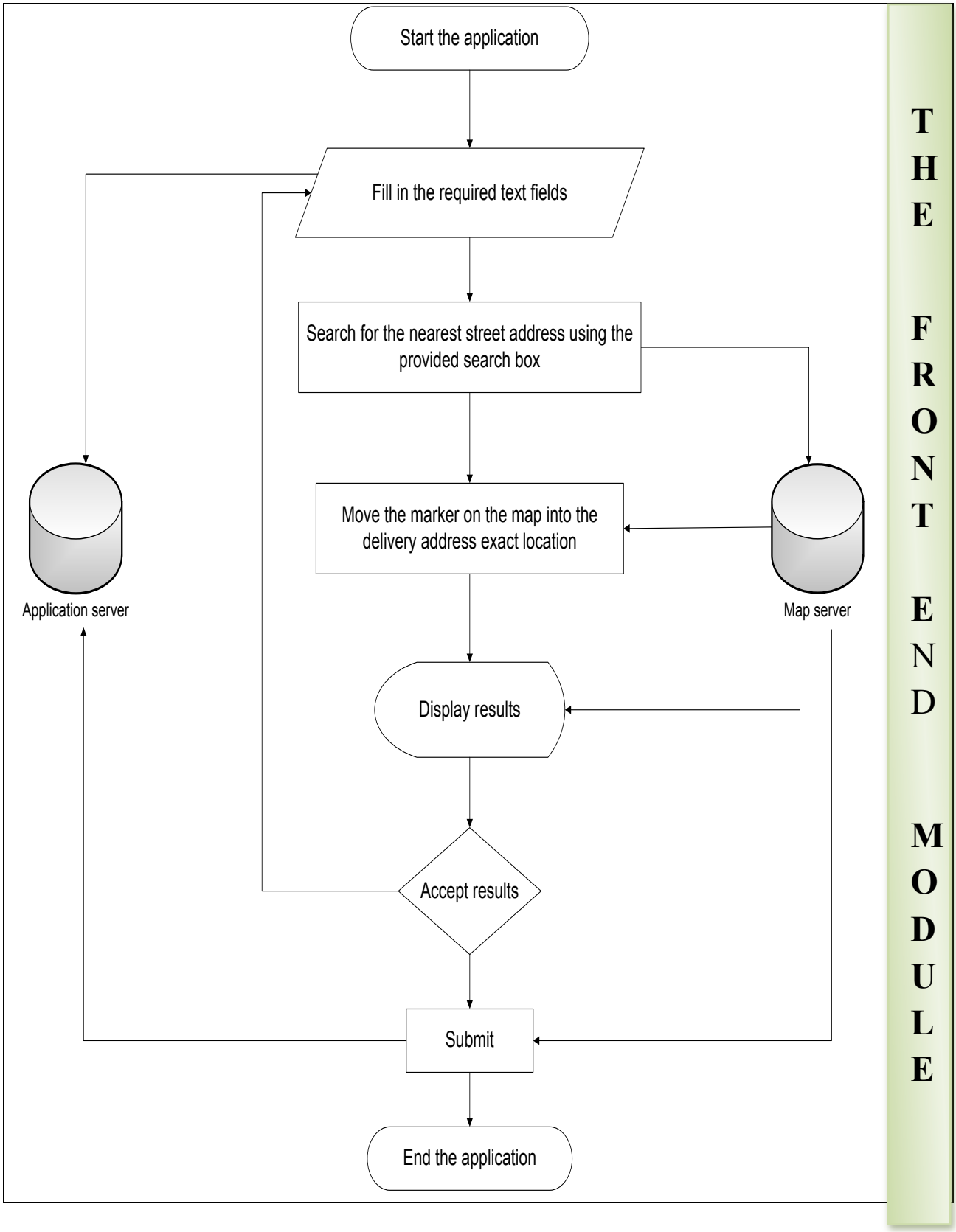

Figure 5. 1: The Front-end Module Flowchart Model

5.2.1.2 THE BACK-ENDMODULE FLOWCHART MODEL

Figure (5.2), represents the flowchart model of the back-end module of the system design; the model explains the required steps by system administrator such as online retailers to run the system.

The model outputs enable the retailers to manage the submitted delivery address information by their consumers on the map by planning the delivery route between the delivery terminal and the customers' address location. Therefore, retailers will be capable to export delivery route information as an Excel file in order to import this data into handheld/in car GPS device. Moreover, retailers will get extra information about the delivery address such as house number, flat number, street name, mobile number of the customer in order to make the delivery process more efficient.

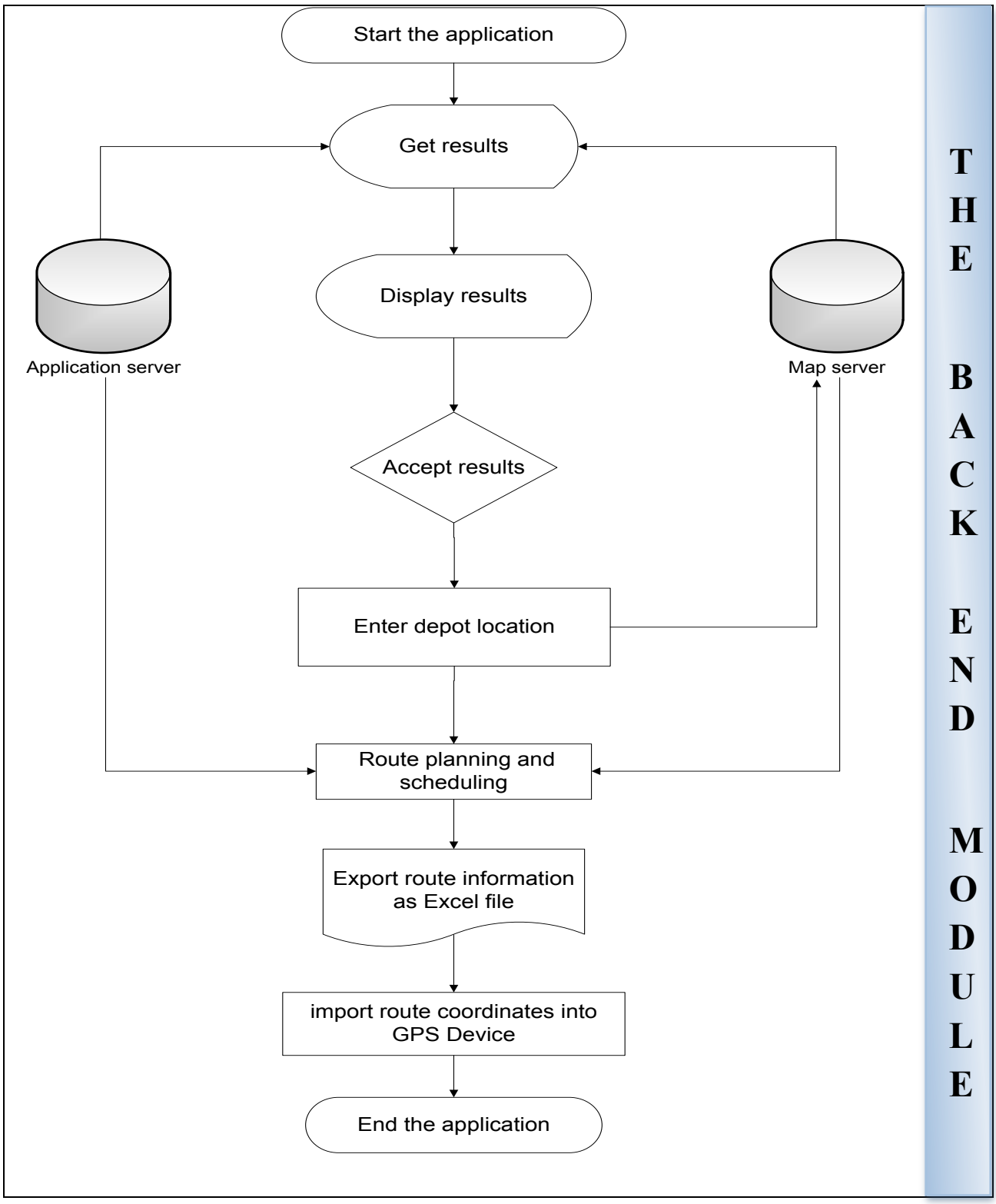

Figure 5. 1: The Back-end Module Flowchart Model

5.2.2 SYSTEM ARCHITECTURE

The design phase of the system has been started by further reading of the available literature about online shopping and home delivery service problems and solutions. In addition, technologies used for resolving the problem of home delivery service by delivery couriers were understood. Thenceforth, as in the former chapter, three questionnaires were circulated among the involved people in Jordan (i.e. Consumers, retailers, and delivery couriers). Customers' questionnaire investigated the problems they face when buy something from online shopping websites and the problems of the delivery service they face. Retailers' questionnaire investigated the barriers that hinder their determination to adopt online shopping as a business as well as the problems they face when delivering their customers' orders. Delivery couriers' questionnaire investigated the problems they face when delivering a customer's order and the technology they use for detecting customer's address location. The distributed questionnaires helped in understanding the problem of home delivery service from Jordanian consumers' retailers' and delivery couriers' perspective. In addition, it helped in collecting the requirements of the system in order to start in the design process. The scheme comprises a map to enable the consumers to look and check off their house position and submit it to the retailer/delivery courier. This sort of arrangement is picked out due to the lack of developed ICT infrastructure, and lack of transportation infrastructure in Jordan. Likewise, mandatory textual fields were employed to enable the consumer to supply more precise information about the delivery address location. This is imputable to the lack of decent data that can support maps application programming interfaces (APIs) that include the geographic location information (i.e. Home/Flat name and number). According to Chow T. Edwin. (2008), maps API is "a source code interface that grants web developers access to a program library and to request services in generating a map over the internet". Map APIs are uploaded

to map servers that provide spatial data for geographic locations on the earth's surface and include the Internet map data (e.g. Road network). Also, map APIs enable the web developer to request spatial data for a selected geographic region through the hypertext transfer protocol (HTTP) and embed the resulting map as an object in any external website(Chow, 2008).

The system is mainly divided into two platforms: Desktop and smart phone platforms and both of them combine a map and textual fields; the system architecture is as Figure (4.3).

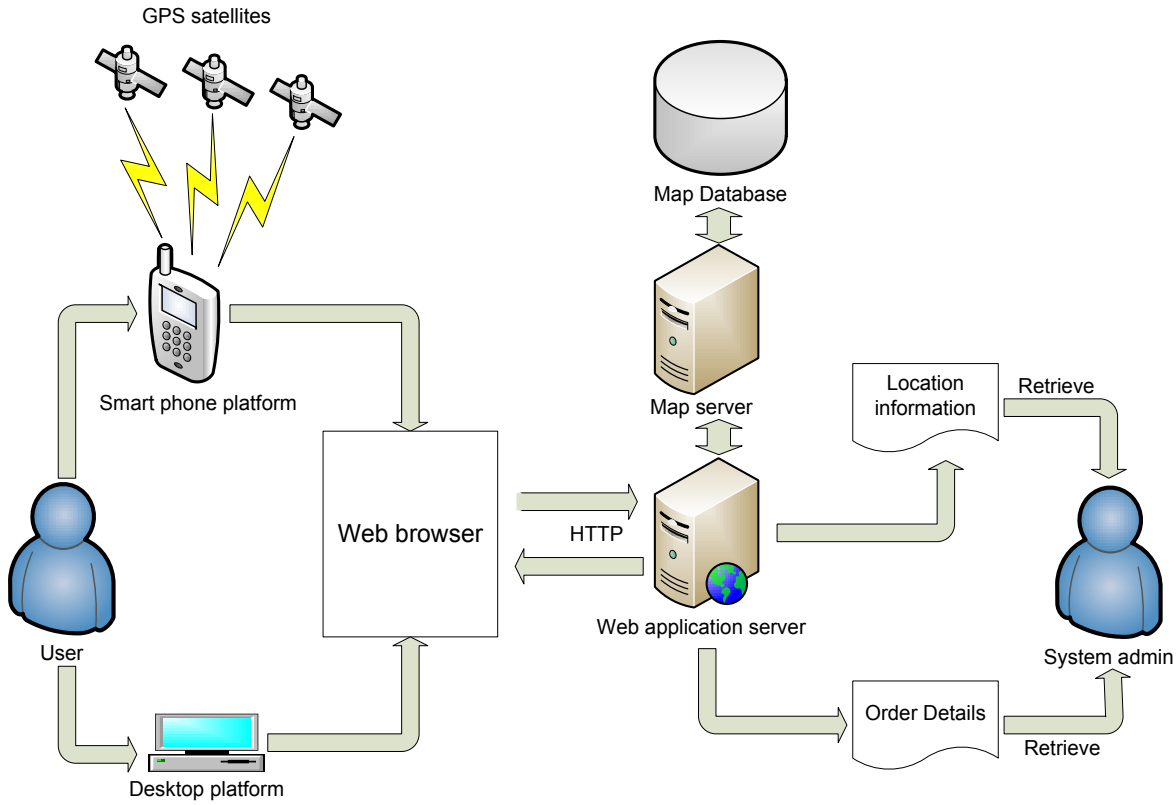

Figure 5. 2: The Designed System Architecture

5.2.2.1 DESKTOP PLATFORM

The designed system desktop platform adopts Browser/Server (B/S) architecture. In addition, the system uses thick client-server to carry on operations, inquiry analysis and so on. The thick client - server offers multimedia support and high performance in displaying maps. In addition, having the users conduct over many intuitive decisions of network routing and location modelling. These processes can operate on the server side efficiently due to the complicated calculations and algorithms applied. Application procedures will be installed along the server end and the number of the system users will be limitless. The designed system code can be written by the most suitable programming languages such as PHP, JAVA SCRIPT, XML, AJAX, XHTML, etc. also, The proposed system application can be integrated with small and medium enterprises (SMEs) websites as plug-ins to enable their customers to access this application through web browsers to perform the basic functions over WWW. Moreover, Plug-ins extends the capabilities of performing more functions on the browser and enhances map client functionality. These functions include: manipulating map data performs searches on the map, map data representation and control the map view. The browser can launch plug-ins automatically whenever data are retrieved(Abel *et al.*, 1998).

5.2.2.2 SMARTPHONE PLATFORM

The designed system mobile terminal platform adopts the same architecture of desktop platform Client/Server architecture. The client-side includes the web browser that is installed on the end-user mobile devices that can display maps and provide analytical results of GIS operations, and GPS receiving modules. The server-side includes online shopping website, the services of web service and GPS coordinate transformation modules that perform GIS operations based on requests from the client-side.

The communication networks between the customer and the server are essential part to build a connection between the GPS receiver and the map server. Such communications technologies are: wireless communications (Wi-Fi, 3G, and 4G).

5.2.3 SYSTEM USERS

System users are divided into two sets of users: online shoppers and retailers. Both are considered as the end-users of this system as discussed as follows:

5.2.3.1 ONLINE SHOPPERS

Online shoppers use this system to submit their delivery address location information to the retailer when they shop online. As noted previously, the front-end module incorporates desktop and smart phone applications. Online shopping customers can use these two applications where the system application can be launched along with online shopping websites to enable consumers to supply their delivery address details to the retailer/system administrator.

5.2.3.2 E-RETAILERS

E-retailers such as small and medium enterprises (SMEs) who use this system application as a subsystem along with their website and considered as the system administrators who receive customers' delivery address location details through this system. When retailers get these details, he will be able to plan the delivery route between his delivery depot location and the customer's delivery address location. In addition, logistics companies can use this system application in case the retailer does not have his own delivery fleet and uses third-party logistics (3PL) for delivering customers' orders.

5.2.4 SYSTEM FUNCTIONS

The system is mainly divided into two functional modules: the front-end module and the back-end module. The front-end module composed of the two platforms: customers' desktop platform and customers' smart phone platform. The back-end module is for the purpose of the system admin (retailer) to manage the delivery operations such as route planning and scheduling. The system functional structure is shown in Figure (5.4).

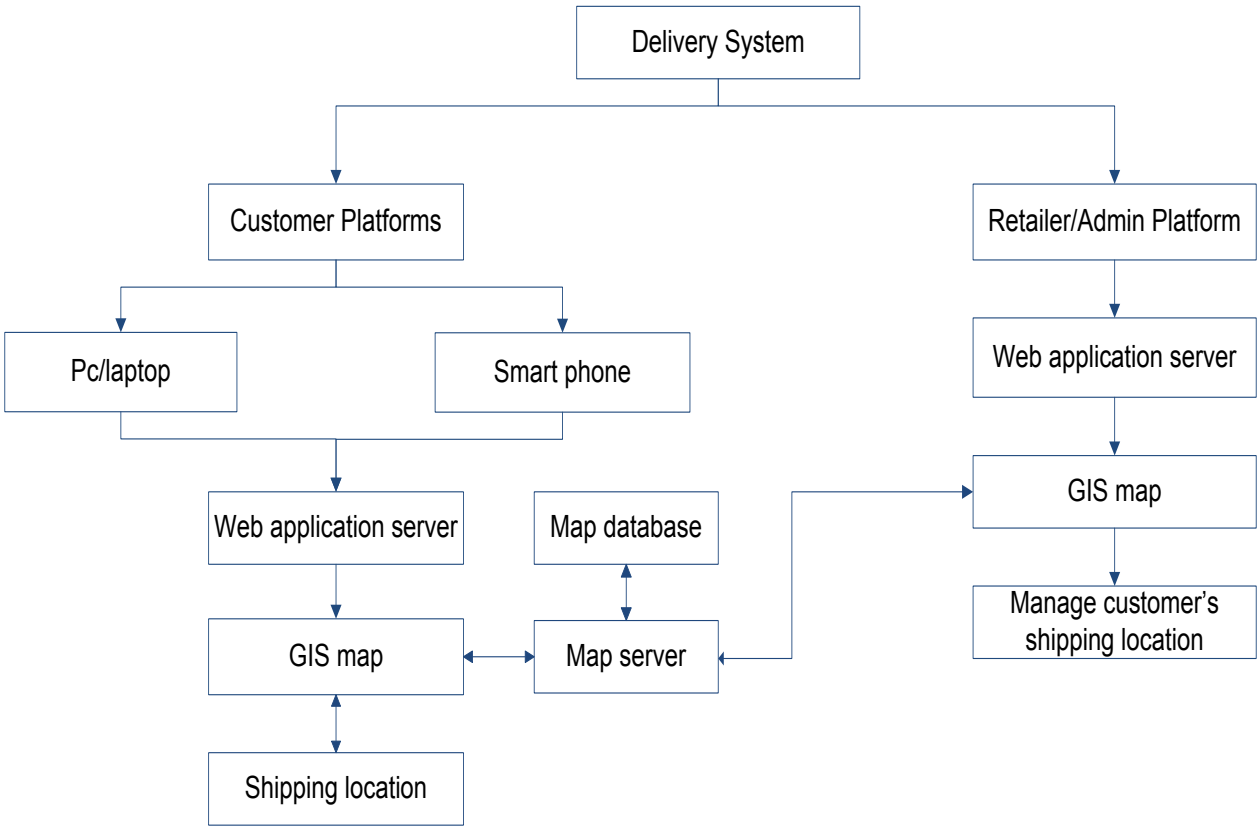

Figure 5. 3: Designed System functional structure

5.2.4.1 THE FRONT-END MODULE

5.2.4.1.1 CUSTOMERS' DESKTOP PLATFORM

This system application can be used by PCs and laptop users to enable them to identify their shipping address (e.g. House or work) location for delivering online purchased items. As mentioned previously, the system platforms have been developed and deployed as a trial system alongside of online shopping website for system evaluation purposes. In addition, the system can be used by online shoppers for providing e-retailers with their own delivery address location information for delivering their online orders. This platform allows the clients to use it after registering with retailer online shopping website over the net.

Figure (5.5) shows the prototype of the developed shopping website which include the system trial. The developed shopping website will ask the customers to create an account (As in Figure 5.6) with the system either before selecting their products or after to save their details such customer name, order history, order number, delivery address details, etc.

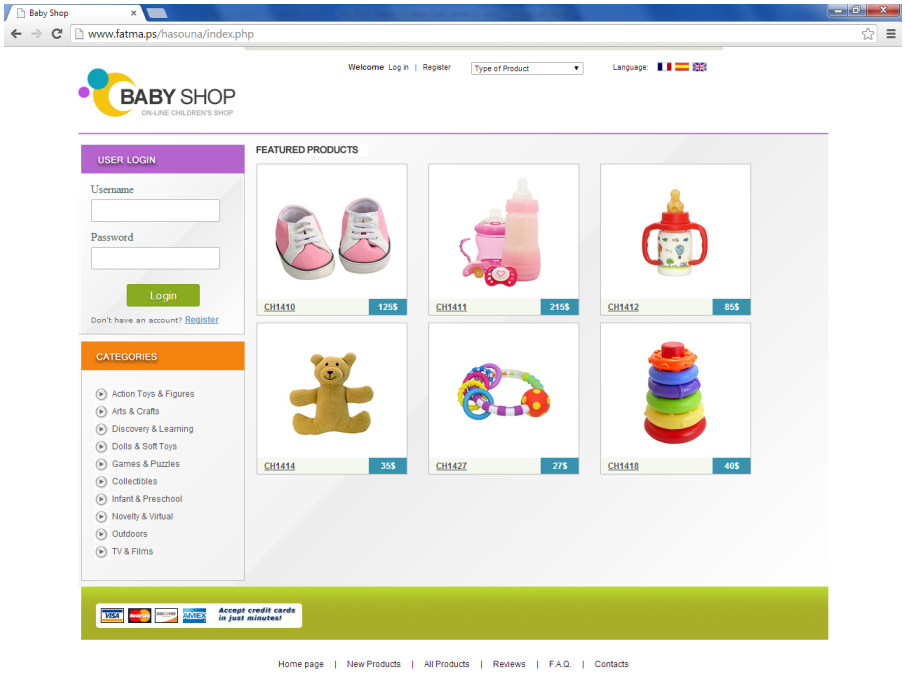

Figure 5. 4: The home page of the developed shopping website

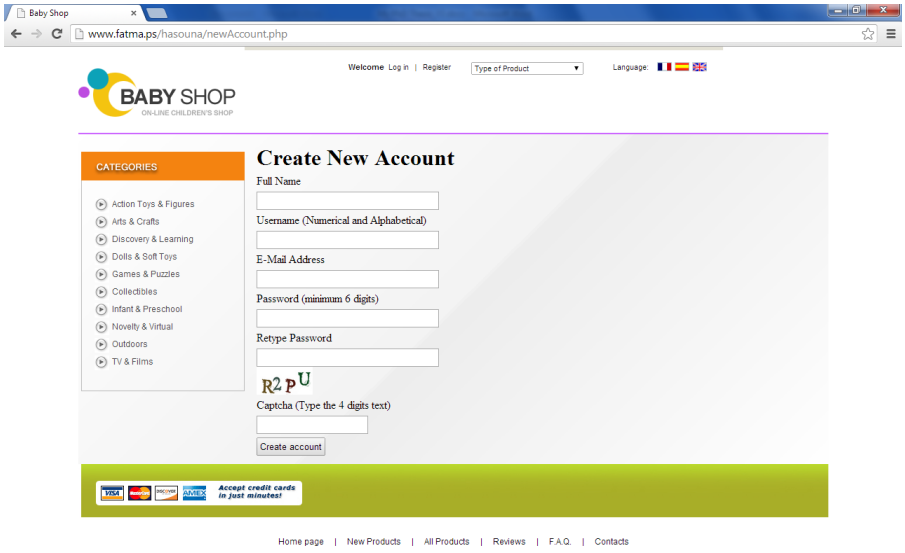

Figure 5. 5: Registration page on the developed shopping website

As shown in figure (5.7) customers' desktop platform is composed of a map, search box to enable the customer to search for the nearest street address to their house location on the map using the provided search box and mandatory text fields to provide the retailer with more accurate information about the delivery address location. Thenceforth, a marker will come along on the searched street name where customers' have to move the mark onto their house location on the map. In addition, the system contains a text field such as house and flat number, street name, area name and the mobile number of the customer. This data will be supplied to the retailer or delivery courier along with the positioning coordinates to enable the delivery driver to determine the required address easily and accurately.

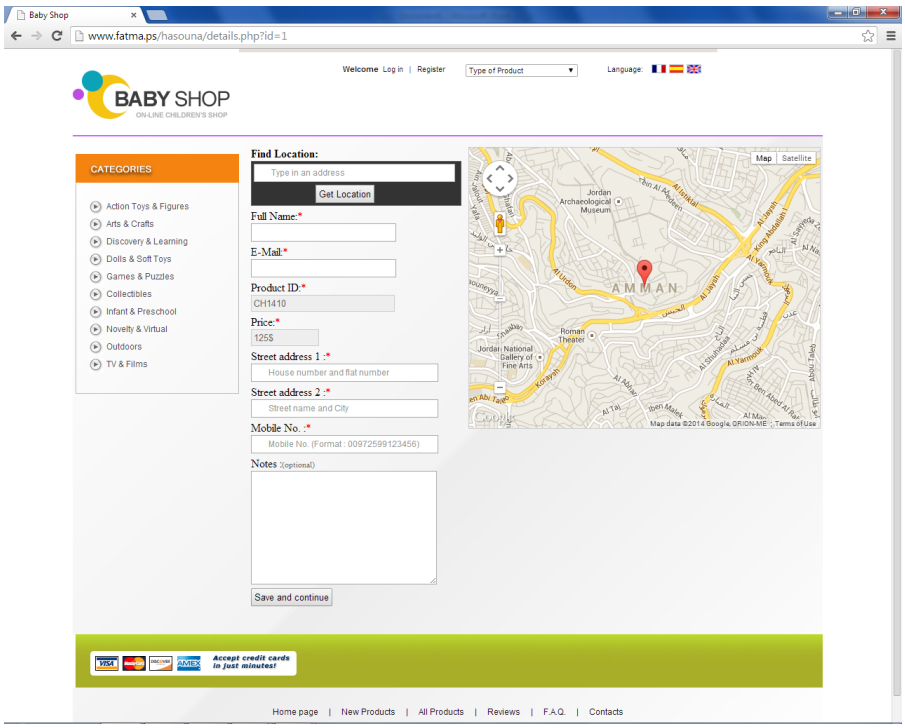

Figure 5. 6: Consumers' desktop platform

The next screens shots represent the steps required from the customer to go through to identify his delivery address location using the system are as follows:

1. As depicted in Figure (5.8), a registered customer with the shopping site has chosen a product from the product list and moved to the delivery address details page. The figure shows the first step of identifying the delivery address location using this system either by starting to fill in the required text fields or searching and marking the delivery address on the map.

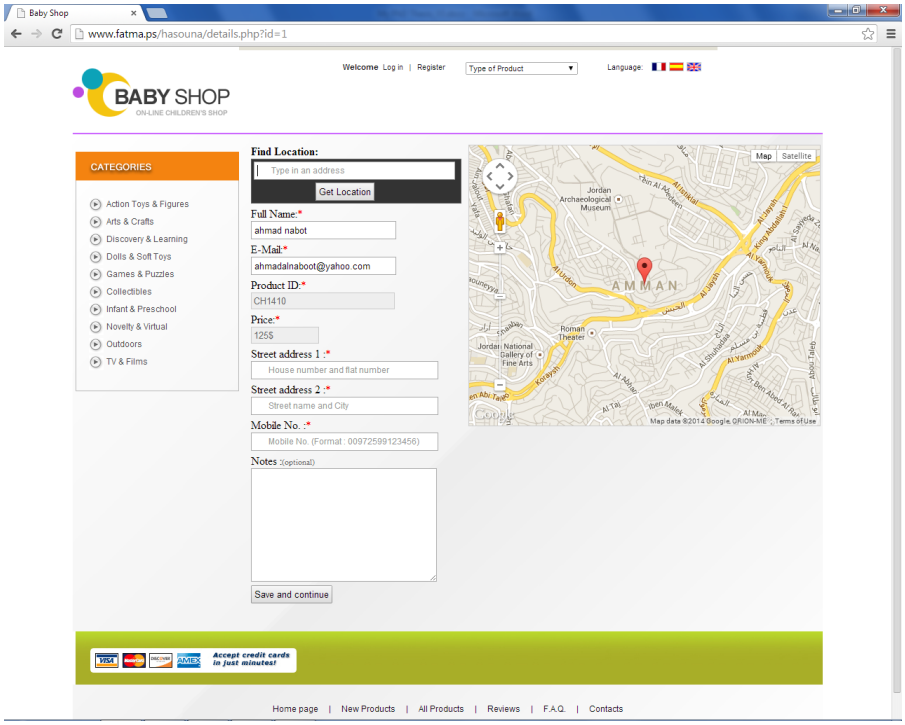

Figure 5. 7: The first step of identifying the delivery address using desktop platform

2. As shown in Figure (5.9), the marker location on the map after searching for the nearest street address due to the lack of support of electronic maps that contain house numbers in Jordan. Therefore, customers have to move the marker into their house location manually.

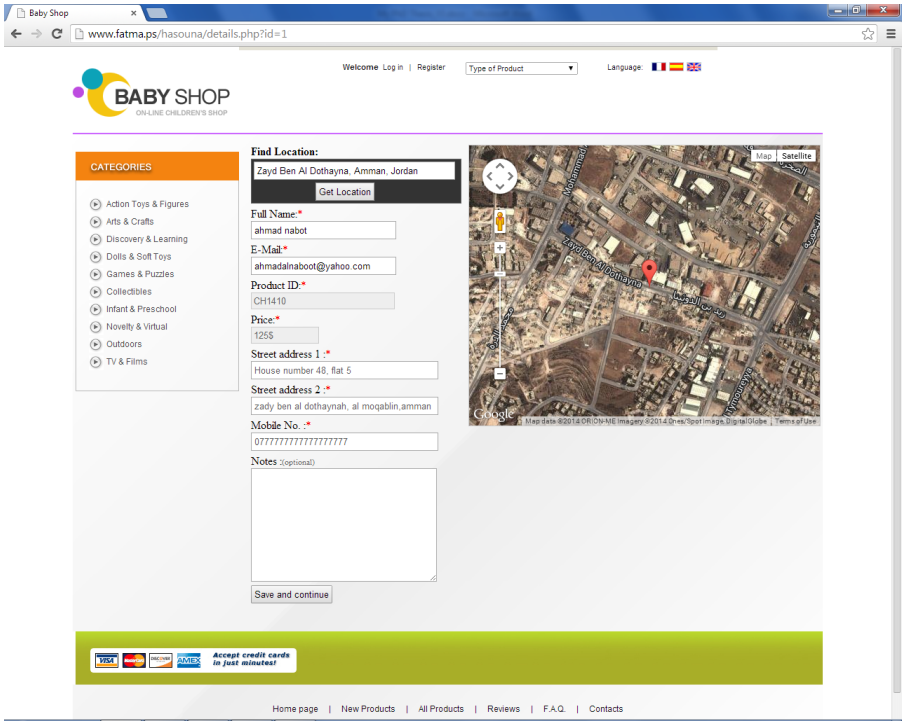

Figure 5. 8: The second step of identifying the delivery address before moving the marker using desktop platform

3. Figure (5.10) shows the third step of identifying the delivery address; the figure shows the marker location after moving it into the customer's house location on the map. This step is a continuation step for the previous one. The last step is filling in the required text fields and submits this information to the retailer/delivery courier.

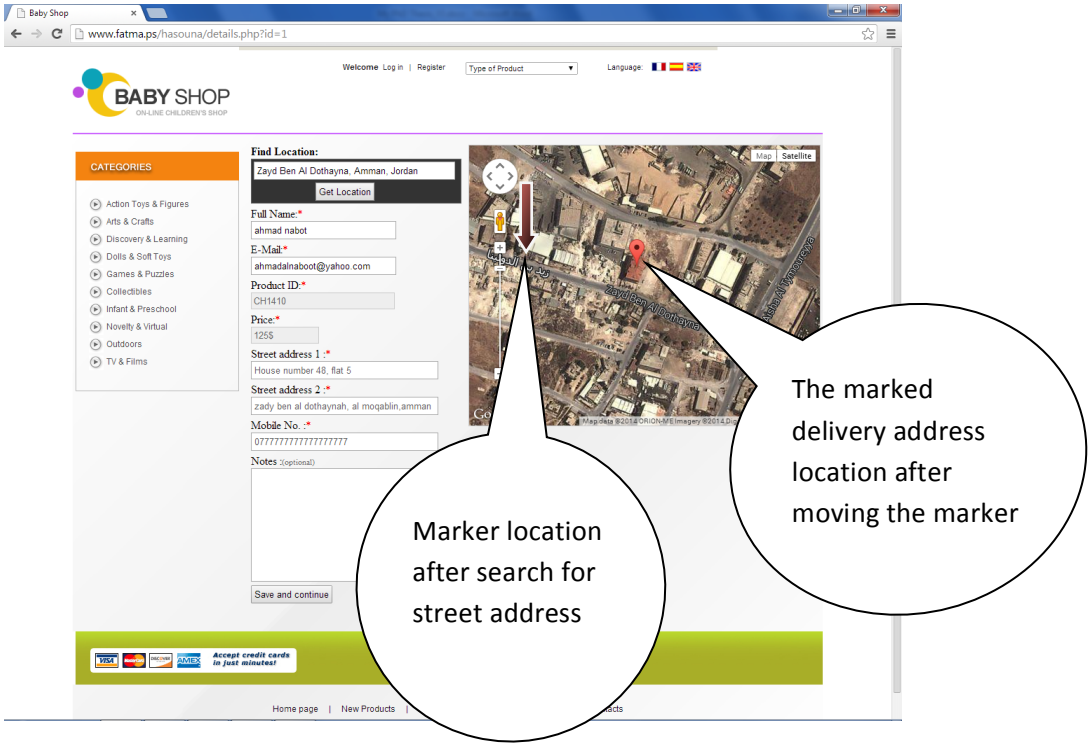

Figure 5. 9: Cont'd after moving the marker into the delivery address location

Figure (5.11) shows the marked delivery address location and the required text fields are filled where the customer is ready to submit his delivery address location details into the retailer/delivery courier.

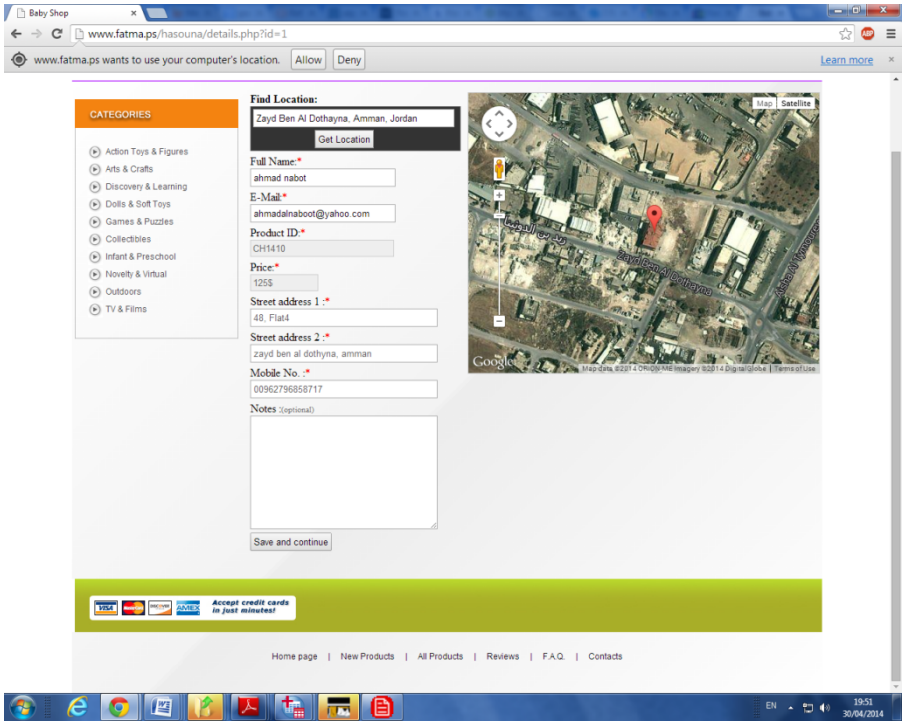

Figure 5. 10: The full address location details required by the system

5.2.4.1.2 CUSTOMERS' SMART PHONE PLATFORM

This platform is a subsystem of the online shopping website as well, which is intended to be used by handheld devices (i.e. Smart phones and tablets) user. The platform does the same as the desktop platform, but the difference between them that smart phones contains GPS receivers which calculate the current position of the user automatically and show it on the map; while in the first one the customer must move the marker to the house location on the map manually after searching about the nearest street of the intended shipping location using the provided search box. In addition, if the customer wants to deliver online purchased goods into another delivery address instead of his current location, he/she will be able to choose another delivery address by pressing on the "cancel" button in the message that appear when the customer comes to the delivery information page and identify the delivery address by searching and moving the marker manually as in the desktop application.

Figure (5.12) shows the home page of the developed shopping website as smart phone version. This version goes through the same steps in the desktop platform for registration.

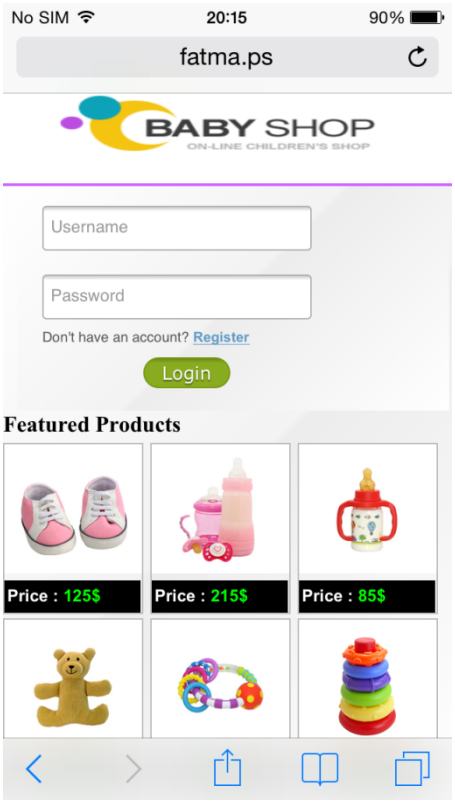

Figure 5. 11: The developed shopping website as a smart phone platform

Figure (5.13) shows the system on smart phone platforms where the customer chosen a product from the products list and moved to provide his delivery address details. When the consumer moves to the phase of providing his delivery address details, a message will appear asking “Would you like to use your current location?” if the customer chosen his current location as the delivery address location the GPS receiver will read the coordinates of this location. Otherwise, the customer must move the marker manually as in the desktop platform.

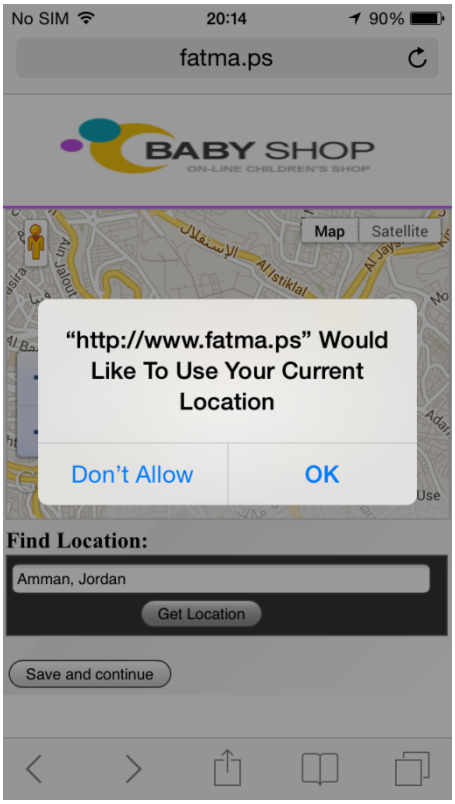

Figure 5. 12: The first step of identifying the delivery address using smart phone platform

Figure (5.14) shows the next step after identifying the delivery address on the map. The figure shows the required textual fields that need to be filled in. When the customer fills these text fields, he will be ready to submit his delivery address location details to the retailer/delivery courier.

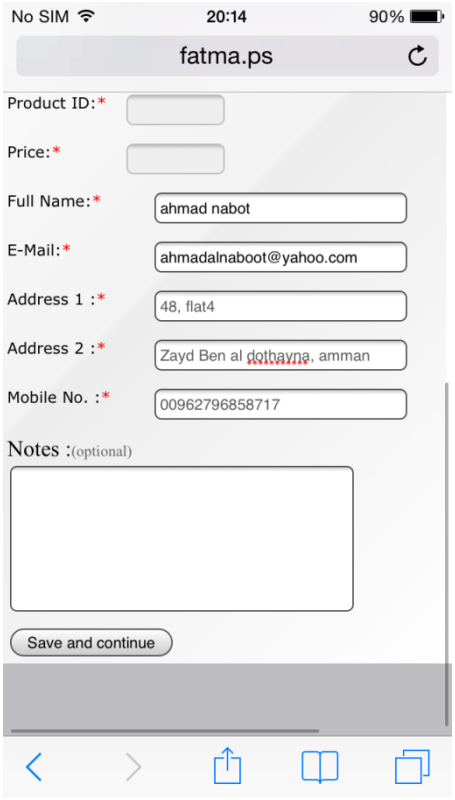

Figure 5. 13: The second step of identifying the delivery address using smart phone platform

5.2.4.2 THE BACK –END MODULE

This module is designed for system administrators (retailers) to enable them to manage their customers' delivery location. The application allows retailers to plan delivery routes on the map, get delivery route directions to a specific location and download customers' order details including delivery address location in an excel sheet. In addition, retailers will be able to import delivery route coordinates to the handheld/in car GPS device. The main components of the back-end module as follows:

5.2.4.2.1 ELECTRONIC MAP

The main function of the map is to enable the system administrator to retrieve the submitted customers' shipping address details through the server and show the shipping location on the map. Thus, system admin will be able to plan delivery routes on the map to deliver the customer's order to the provided location.

The functions of the map include:

- Map panning, scaling, viewing, zooming and changing between the map views such as satellite and hybrid.
- Marking the house position on the map to get the location coordinates.
- Plan delivery routes.

5.2.4.2.2 SERVER-SIDE FUNCTIONS

The server is the main side of the system that adopts B/S architecture and provides platforms for desktop/Smart phone users and retailers/delivery couriers for communicating with each other and information exchange. Customers who are registered with the online shopping website, either desktop or smart phone users can use this system to submit their location information through the system to the retailer/delivery courier. The developed system back-end module platform prototypes are shown below.

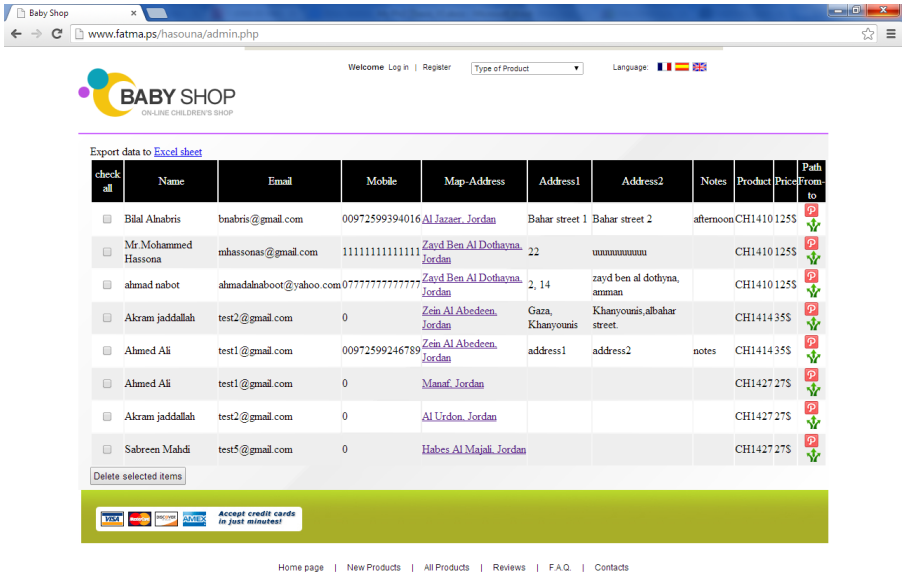

Figure 5. 14: System administrator platform

Figure 5.15 shows the system administrator platform that contains customers' placed orders, including delivery address details for each customer. When the retailer clicks the link under "Map address" section, the retailer will navigate into an electronic map (i.e. Google map) to get the submitted delivery address location details as in Figure 5.16. Moreover, retailer will be able to plan the delivery route between his depot and the customer's delivery address location on the map as in Figure 5.17. Thenceforth, the retailer will be capable to get delivery route directions of the planned delivery route and export them as excel sheet in order to import this data into the handheld/in car GPS device as in Figure 5.18.

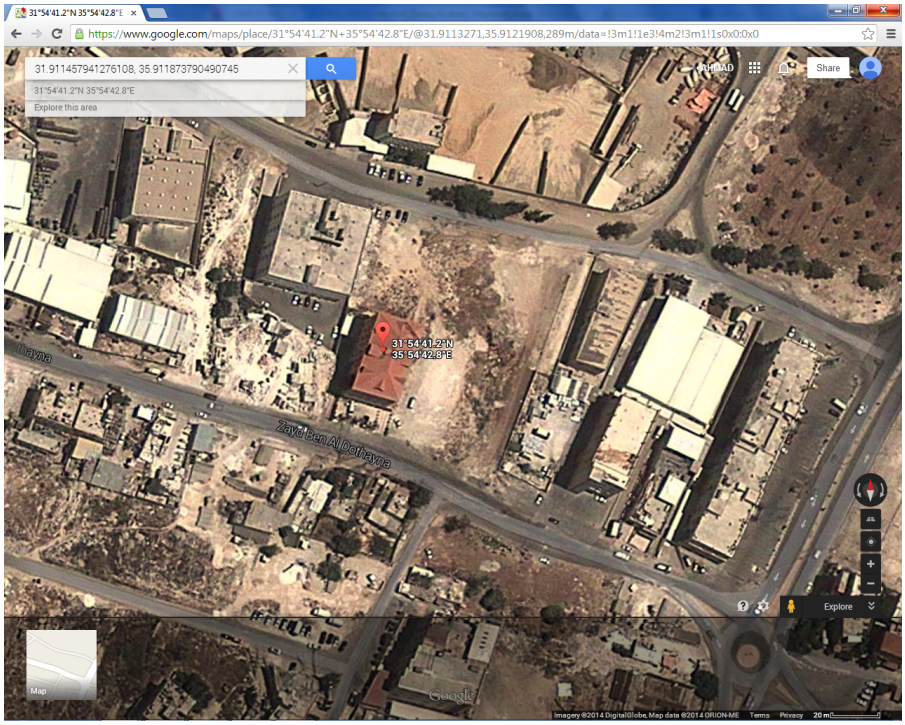

Figure 5. 15: Submitted delivery address location

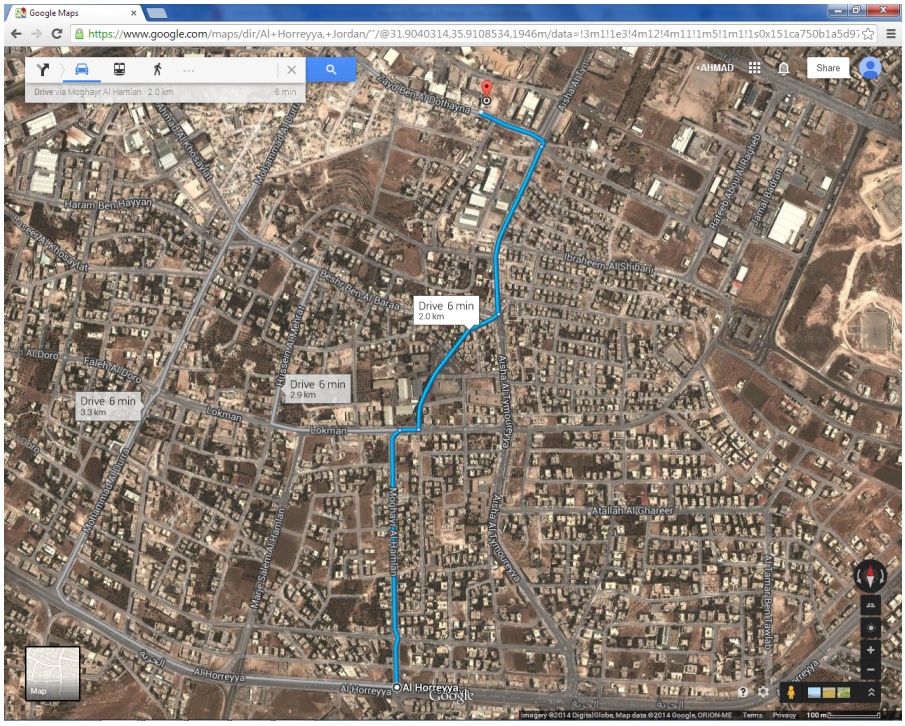

Figure 5. 16: Delivery route between retailer's depot and customer's house

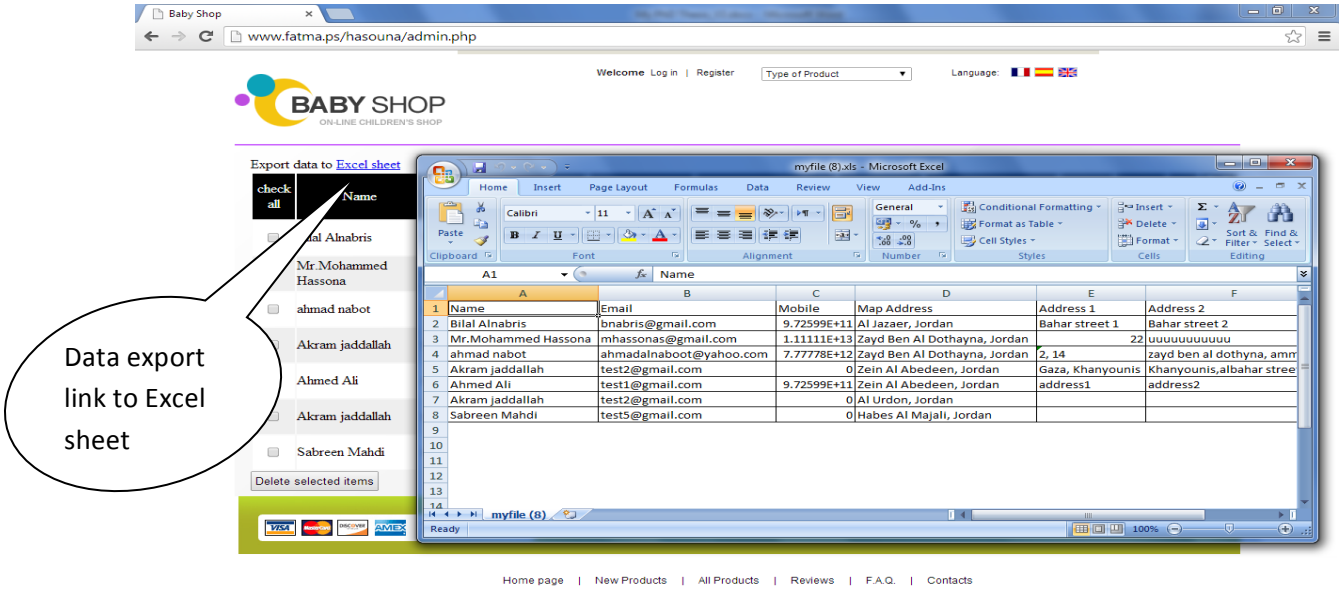

Figure 5. 17: Excel sheet containing the exported data

5.3 SUMMARY

This chapter presented the designed system architecture, functions and models for both front-end and back-end modules. Also, the system presented the designed system screen shots of both modules' platforms. As mentioned previously in this chapter, the system has been developed and deployed along a shopping website that have been built for the purpose of evaluating the usability of the system modules. The next chapter provides information about the approach used for evaluating the system, method and pilot study. In addition, the results of the conducted studies were presented and discussed.

CHAPTER 6

RESULTS AND DISCUSSION

6.1 INTRODUCTION

This chapter presents the evaluation results of the designed system modules. The test process was done by deploying the system along with shopping website to make the process of the evaluation easy. Firstly, the system was tested by conducting two experimental sessions based on laboratory environment settings. The first experimental session was conducted to test the front-end module platforms by deploying a number of participants in the role of online shoppers; Whilst the second experimental session was conducted to test the back-end module platform by deploying a number of participants in the role retailer/delivery courier as the system administrator. Thereafter, a subjective satisfaction questionnaire was distributed among the participants of each experimental session to measure their satisfaction of using the designed system.

An overview of the evaluation process, method, pilot study of before conducting the main study is presented.

6.2 SYSTEM EVALUATION

Designing a system that can be used in real life must be evaluated by the system users in order to assess the validity of this system. This evaluation can be done by running experimental tests based on the system trial in order to assess the usability of the system (Turaif, 1999). The term usability defined as the effectiveness, efficiency, and satisfaction of

users toward using a certain application and the ability of achieving the required goal (Howarth, Smith-Jackson and Hartson, 2009). Moreover, usability factors include ease-of-use, usefulness, efficiency, functionality, and users' satisfaction. To examine the functionality of the system, several experiments should be conducted.

In order to assess the validity, the proposed system trial was developed and deployed for the purpose of experimental tests. In addition, to make the experimental test easier for the participants, the system trial utilised along with shopping website where participants have had to sign up as a first step to be able to use the system. When participants sign up with the shopping website, they will be required to choose a product from the provided products list like the other shopping websites and thus, they will move to the checkout. The first thing to finish in the checkout is the delivery address. Thus, the system will navigate the participants to the delivery address information page that contains the designed system. Then, consumers will interact with the system and input the required system parameters. When the customers submit their delivery address information to the retailer, the retailer will be able to acquire their customers' delivery address locations on a map and plan delivery routes to these locations. In addition, the text fields will provide the retailer with more accurate information about the delivery address (i.e. House/Flat number) of the customer.

6.2.1 METHOD

To evaluate the designed system, a laboratory experimental simulation took place depending on laboratory experiment principles.

Two separated sessions of experimental tests were conducted. The first session of experiments was conducted to test the designed system; front-end module desktop and smart phone platforms are designed for online shoppers use. This is done by enabling the

participants in the role of online customers to use the system on both platforms by selecting a product from the products list provided, then, users would be moved into the delivery information page that includes the designed system. When consumers move to the delivery address information page, they will be asked to enter their delivery address information in the provided text fields, then, they will search for the nearest street address to their home using the provided search box and move the marker to their home location on the map. Ultimately, consumers will submit their delivery address information by pressing "submit and continue" button to submit this data to the retailer/system administrator. After completing the first experimental session, the second session of experiments was conducted to test the designed system back-end module. The back-end module tested by enabling the participants to login to the administrator page to see the placed customers' order (participants of the first experimental session) details including the delivery address location for each order. After login, the system administrator will be able to see their customers' delivery address locations on the map and start planning, delivery routes by identifying their delivery depot location on the map at the start point of the route. Then, the system administrator will be able to export delivery route information as an Excel file in order to import them into the handheld/in car GPS device.

6.2.2 PARTICIPANTS

6.2.2.1 THE FRONT-ENDMODULE PARTICIPANTS

In order to evaluate the usability of the front-end module, the proposed system model has been evaluated by two groups of participants. The first group (G1) includes participants such as academic staff (17 participants); the second group (G2) includes university students (15 participants). The sum of the participants who took part in the evaluation process was 32 participants.

The questionnaire consists of three parts: the first part was asking the participants general questions about their experience in internet usage, online shopping, smart phones use in daily life activities and the use of digital maps. The second part included the main questions that evaluate the usability of the designed system. The last part covered the participants' demographic information.

32 participants in this study were selected randomly from undergraduate and postgraduate students from different schools based at Brunel University and academic staff based at different universities in Jordan. As shown in Table (6.1), 81.3% of the participants were males and 18.8% females. The majority of the participants (62.5%) were aged 18-28, and (37.5%) in the age range 29-49. The highest education level of the participants consists of three groups, with 53.1% for BSc. degree holders, 28.1% for PhD degree holders, and 18.8% for MSc. degree holders. Finally, the job title of the participants consists of two groups, with 68.8% for students, and 31.3% of academic staff (respectively).

Demographic Variable		Participants	Percent	Total
Gender	Male	26	81.3	32
	Female	6	18.8	
Age range (yrs.)	18-28	20	62.5	32
	29-49	12	37.5	
Educational level	PhD	9	28.1	32
	MSc	6	18.8	
	BSc	17	53.1	
Job Title	Students	22	68.8	32
	Academic staff	10	31.3	

Table 6. 1: Participants' Demographics

As shown in Table (6.2), the participants asked about their level of internet experience where the majority of the participants, 62.5% have excellent experience, 15.6% have a good

experience, 15.6% have fair experience, and 6.3% have a poor experience. Also, participants were asked if they use a smart phone in their daily life. Most of the participants are using smart phones, 62.5% always, 15.6% sometimes, 9.4% rarely and 8.3% never used smart phone. In addition, the percentages of the participants, who are using Internet on their smart phones were 59.4% always, 18.8% rarely, 15.6% sometimes, and 6.3% never used the Internet on their smart phones. The online shopping experience of the participants was 50.0% poor experience, 18.8% excellent experience, 18.8% good experience, and 12.5% fair experience in online shopping (respectively).

		Percent
Internet experience	Excellent	62.5
	Good	15.6
	Fair	15.6
	Poor	6.3
Smart phone use	Always	62.5
	Sometimes	15.6
	Rarely	9.4
	Never	8.3
Internet on smart phone	Always	59.4
	Sometimes	15.6
	Rarely	18.8
	Never	6.3
Online shopping experience	Excellent	18.8
	Good	18.8
	Fair	12.5
	Poor	50.0

Table 6. 2: Participants' experience in Internet and smart phones

6.2.2.2 THE BACK-ENDMODULE PARTICIPANTS

In order to evaluate the usability of the back-end module, the proposed system model has been evaluated by two groups of participants. The first group (G1) includes participants such as retailers (13 participants); the second group (G2) includes delivery couriers (10 participants). The total of the participants who took part in the evaluation process was 23 participants.

The questionnaire consists of three parts: the first part was asking the participants general questions about their experience in online shopping, home delivery service, and positioning technologies in use. The second part included the main questions that evaluate the usability of the designed system. The last part covered the participants' demographic information.

23 participants in this study were selected randomly from retailers and delivery couriers in Jordan. As shown in Table (6.3), 91.3% of the participants were males and 8.7% females. The majority of the participants (47.8%) were aged 29-49, and (30.4%) were aged 18-28, and 21.7% in the age range 50-60. The highest education level of the participants consists of three groups, with 56.5% for BSc. Degree holders, 30.4% of Diploma degree holders, and 13.0% of GCSE degree holders. Finally, the job title of the participants consists of two groups, with 43.5% of retailers, and 31.3% for delivery couriers (respectively).

Demographic Variable		Participants	Percent	Total
Gender	Male	21	91.3	23
	Female	2	8.7	
Age range (yrs.)	18-28	7	30.4	23
	29-49	11	47.8	
	50-60	5	21.7	
Educational level	BSc	13	56.5	23
	Diploma	7	30.4	
	GCSE	3	13.0	

Job Title	Retailer	13	43.5	23
	Delivery courier	10	31.3	

Table 6. 3: Participants' Demographics

As shown in Table (6.4), the participants asked if they experienced online shoppingeither to sell or buy goods. 34.8% of the participants sometimes use online shopping, 26.1% rarely use online shopping, 21.7% never used online shopping, and 17.4% always use online shopping. Also, participants were asked if they have experienced a home delivery service or delivered customer's order.39.1% of the participants have an excellent experience in home delivery service, 21.7% have good experience, 21.7% never delivered customer's order, and 17.4% have a poor experience in home delivery service. In addition, the percentages of the participants, who are using positioning technologies during the delivery service of the customers' orders were 39.1% never used positioning technologies for delivering customers' orders, 30.4% sometimes, 21.7% rarely, and 8.7% always using positioning technologies for delivering customers' orders (respectively).

		Percent
Online shopping business experience	Always	17.4
	Sometimes	34.8
	Rarely	26.1
	Never	21.7
Home delivery service experience	Excellent	39.1
	Good	21.7
	Poor	17.4
	Never	21.7
Positioning technologies use	Always	8.7
	Sometimes	30.4
	Rarely	21.7
	Never	39.1

Table 6. 4: Participants' experience

6.2.3 PILOT STUDY

In this study, to ensure high reliability among scale items, a pilot study took place, which helped in refining the questionnaires into its final form prior to conducting the final study. Before distributing the pre-questionnaire, an experimental test took place on the system prototype, which helped in understanding the system work behaviour. The pilot study was conducted on 10 Jordanian students based at Brunel University who were acting as consumers and system administrator. Some comments were obtained from the participants during the pilot study regarding the questionnaire items; where some of them were not clear enough and not providing a full meaning. In addition to, some questions were omitted from the questionnaires due to its unimportance and do not have any purpose that make the questionnaire long and time consuming. Thus, the questionnaires were refined into its final form by reviewing the ambiguous questions and correct them before distributing the final questionnaire on the participants. The pilot study questionnaire "pre-questionnaire" is shown in (Appendix E) Afterwards, reliability analysis was done to all items that make up the scale using Cronbach's Alpha test to ensure that there is no items affect the reliability of the questionnaire.

6.2.4 PROCEDURE

A total of 55participants voluntary agreed to take part in the experimental sessions for both system modules, 32 participants were in the role of consumers were used the system front-end module desktop and Smart phone platforms. Notably, 23 participants of retailers and delivery couriers took part in the experiments for testing the back-end module in the role of system administrators. Before the experiments start, all participants were given training and a written sheet of the work behaviour of the system in order to assist them to understand how to

utilize the system and make sure that all required information were delivered in the same way.

After completing the experimental sessions, two separate questionnaires "post-questionnaire" were handed out to the participants (copy for the first experimental session participants and copy for the second experimental session participants) (Appendix F, Sections 1 and 2) in order to evaluate the usability of the trial system on both modules at their level of satisfaction. Most of the questionnaire items were measured using 5-point Likert scale ranging from 1 ('strongly agree') to 5 ('strongly disagree') for each question. Furthermore, the primary purpose of the research was introduced in the cover page of the questionnaire and the determinations of the previously conducted studies were explained.

6.3 RESULTS

Once the experimental sessions were completed and all the distributed questionnaires collected from the participants, the data entered into SPSS to be calculated using the appropriate techniques. Usability for both modules: front-end and back-end were evaluated. Desktop and smart phone platforms of the front-end module and the system admin platform of the back-end module usability evaluation, including system ease of use, usefulness, efficiency, and participants' satisfaction of using this system were measured. Participants of both experimental sessions were split into two groups in each session; academic staff (G1), and university students (G2) in the first session; and retailer employees (G1), and delivery couriers (G2) in the second session. The overall experience of the first session, participants such as experience in online shopping, and internet experience were considered as important factors for evaluating the designed system. Also, the overall experience of the second session participants, such as experience in online shopping, home delivery experience, and experience in using positioning technologies were considered. However, users' general

experience with computer, with the system, and with the task domain has an impact on user interface design (Sears and Jacko, 2007; Nielsen, 1994). Thus, participants of the front-end module were chosen randomly from Jordanian universities. This is because university students and young professionals have been found to be the most frequent users of the Internet and its related activities in terms of online purchases in the developing countries (Delafrooz *et al.*, 2009a). To ensure the validity and reliability of the questionnaire items, Cronbach's Alpha test took place. The reliability scale test result of the front-end module questionnaire was 0.952, and reliability scale test result of the back-end module questionnaire was 0.978.According to Uma Sekaran (2006), Cronbach's Alpha should be at least 0.7 whereas a value of 0.7 is acceptable, and a value of 0.8 and higher is preferable(Sekaran, 2006). Afterward, Independent sample t-test analysis was used to analyse both copies of distributed questionnaires to compare the mean values of each two groups of participants in each session and see if there is any statistical significant difference between the groups.

6.3.1 USABILITY RESULTS OF THE FRONT-ENDMODULE

As mentioned previously, the front-end module of the system consists of desktop and smart phone platforms; both platforms' usability was evaluated by 2 groups of participants in the role of consumers. The analysis results are shown as follows:

6.3.1.1 EASE OF USE

Table (6.5) shows the mean values (marked as M) and standard deviations (marked as SD) of the two groups for ease of use elements on the front-end module platforms.

Ease of use elements of the front-end module		G1	G2
Ease of use on desktop platform	M	2.29	3.27
	SD	0.849	1.033
Ease of use of smart phone platform	M	2.24	3.20
	SD	0.752	1.014

Table 6. 5: Mean values and standard deviation of ease of use elements of the front-end module platform

- Desktop platform ease of use

Table (6.6) illustrates the results of the Independent-samples t-test analysis; the results show that there is a statistically significant difference between the groups in the ease of use whilst using the system on the desktop platform ($t = 2.923$, $P = 0.007<0.01$).

Factor	t-value	Sig. (2-tailed)
Ease of use on desktop	2.923	0.007

Table 6. 6: Independent-samples t-test result of ease of use on desktop

- Smart phone ease of use

Table (6.7) illustrates the results of the Independent-samples t-test analysis; the results show that there is a statistically significant difference between the groups in the ease of use whilst using the system on smart phone platform ($t = 3.080$, $P = 0.004<0.01$).

Factor	t-value	Sig. (2-tailed)
Ease of use on smart phone	3.080	0.004

Table 6. 7: Independent-samples t-test result of ease of use on smart phone

6.3.1.2 USEFULNESS

Table (6.8) shows the mean values (marked as M) and standard deviations (marked as SD) of the two groups that represent the usefulness elements of the front-end module platforms.

Usefulness elements of the front-end module		G1	G2
Solve the problem of home delivery	M	2.29	3.13
	SD	0.772	0.915
Improve online shopping	M	2.24	3.07
	SD	0.752	1.163
Enhance consumers' decision to adopt online shopping	M	2.12	2.93
	SD	0.781	1.033
Enhance the effectiveness of home delivery service	M	2.35	3.07
	SD	0.702	0.961

Table 6. 8: Mean values and standard deviation of usefulness elements of the front-end module

- Solve the problem of home delivery

Table (6.9) illustrates the results of the Independent-samples t-test analysis; the results show that there is a statistically significant difference between the groups for solving the problem of the home delivery service ($t = 2.814$, $P = 0.009<0.01$).

Factor	t-value	Sig. (2-tailed)
Solve the problem of home delivery	2.814	0.009

Table 6. 9: Independent-samples t-test result of solving the problem of home delivery service

- Improve online shopping

Table (6.10) illustrates the results of the Independent-samples t-test analysis; the results show that there is a statistically significant difference between the groups forimproving online shopping ($t = 2.430$, $P = 0.021<0.05$).

Factor	t-value	Sig. (2-tailed)
Improve customers' attitude toward online shopping	2.430	0.021

Table 6. 10: Independent-samples t-test result of improving online shopping

- Enhance customers' decision to adopt online shopping

Table (6.11) illustrates the results of the Independent-samples t-test analysis; the results show that there is a statistically significant difference between the groups for enhancing customers' decision to adopt online shopping ($t = 2.538$, $P = 0.017<0.05$).

Factor	t-value	Sig. (2-tailed)
Enhance customers' decision to adopt online shopping	2.538	0.017

Table 6. 11: Independent-samples t-test result of enhancing customers' decision to adopt online shopping

- Enhance the effectiveness of home delivery service

Table (6.12) illustrates the results of the Independent-samples t-test analysis; the results show that there is a statistically significant difference between the groups forenhancing the effectiveness of home delivery service ($t = 2.419$, $P = 0.022<0.05$).

Factor	t-value	Sig. (2-tailed)
Enhance the effectiveness of home delivery service	2.419	0.022

Table 6. 12: Independent-samples t-test result of enhancing the effectiveness of home delivery service

6.3.1.3 EFFICIENCY

- Task completion time

Table (6.13) shows the average time taken to complete the task using the designed system for both desktop and smart phone platforms.

Platform/Time	1-30 Seconds	31-60 Seconds	1-2 Minutes	3-4 Minutes	Total
Desktop	2	10	19	1	32
Smart phone	7	15	9	1	32

Table 6. 13: Average task completion time on both platforms

6.3.1.4 SATISFACTION

Table (6.14) shows the mean values (marked as M) and standard deviations (marked as SD) of the two groups satisfaction that used the designed system front-end module platforms.

Satisfaction elements of the front-end module		G1	G2
Overall, I am satisfied with the designed desktop application	M	2.06	3.00
	SD	0.827	1.069
Overall, I am satisfied with the designed smart phone application	M	1.94	3.07
	SD	0.659	1.100

Table 6. 14: Mean values and standard deviation of satisfaction elements of the front-end module

- Participants' satisfaction on both platforms

Table (6.15) illustrates the results of the Independent-samples t-test analysis; the results show that there is a statistically significant difference between the groups for satisfaction whilst using the system on the desktop platform ($t = 2.804$, $P = 0.009<0.01$) and smart phone platform ($t = 3.561$, $P = 0.001<0.01$).

Factor	t-value	Sig. (2-tailed)
Overall, I am satisfied with the designed desktop application	2.804	0.009
Overall, I am satisfied with the designed smart phone application	3.561	0.001

Table 6. 15: Independent-samples t-test result of participants' satisfaction on both platforms

6.3.2 USABILITY RESULTS OF THE BACK-END MODULE

The back-end module consists of one platform that can be used by system administrator/retailers; the back-end module usability was also tested by the 2 groups of participants in the role of system administrators. The analysis results are presented as follows:

6.3.2.1 EASE OF USE

Table (6.16) shows the mean values (marked as M) and standard deviations (marked as SD) for the two groups in the ease of use of back-end module platform elements.

Ease of use of the back-end module elements		G1	G2
Ease of use for delivery route planning	M	3.00	1.90
	SD	1.00	0.568
Ease of use of exporting customer's order information as excel sheet	M	3.08	2.10
	SD	1.038	0.568

Table 6. 16: Mean values and standard deviation of the back-end module elements ease of use

- Ease of use for route planning

Table (6.17) illustrates the results of the Independent-samples t-test analysis; the results show that there is a statistically significant difference between the groups for ease of use for delivery route planning ($t = 3.105$, P-value = $0.005<0.01$).

Factor	t-value	Sig. (2-tailed)
Ease of use for delivery route planning	3.105	0.005

Table 6. 17: Independent-samples t-test result of ease of use for delivery route planning

- Ease of use of exporting customer's order information as excel sheet

Table (6.18) illustrates the results of the Independent-samples t-test analysis which show that there is a statistically significant difference between the groups for ease of use for exporting customer's order information as excel sheet (t = 2.676, P-value = 0.014<0.05).

Factor	t-value	Sig. (2-tailed)
Ease of use of exporting customer's order information as excel sheet	2.676	0.014

Table 6. 18: Independent-samples t-test result of ease of use for exporting customer's order information as excel sheet

6.3.2.2 USEFULNESS

Table (6.19) shows the mean values (marked as M) and standard deviations (marked as SD) of the two groups of usefulness elements of the back-end module platform.

Usefulness elements of the back-end module		G1	G2
Solve the problem of home delivery	M	3.00	2.10
	SD	1.00	0.568
Enhance retailers' decision to adopt online shopping	M	2.92	2.00
	SD	1.115	0.667
Enables retailers/delivery courier from finding delivery address location easily	M	3.00	2.00
	SD	1.080	0.667
Enabling retailer/delivery courier from route planning	M	3.00	2.10
	SD	1.080	0.738
Import delivery route information into GPS device	M	3.08	2.10
	SD	1.115	0.738

Table 6. 19: Mean values and standard deviation of usefulness elements of the back-end module

- Solve the problem of home delivery service

Table (6.20) illustrates the results of the Independent-samples t-test analysis; the results show that there is a statistically significant difference between the groups for solving the problem of home delivery service ($t = 2.540$, P-value = $0.019<0.05$).

Factor	t-value	Sig. (2-tailed)
Solve the problem of home delivery service	2.540	0.019

Table 6. 20: Independent-samples t-test result of solving the problem of home delivery service

- Enhance retailers' decision to adopt online shopping

Table (6.21) illustrates the results of the Independent-samples t-test analysis; the results show that there is a statistically significant difference between the groups for enhancing the retailers' decision to adopt online shopping as a business (t = 2.312, P-value = 0.031<0.05).

Factor	t-value	Sig. (2-tailed)
Enhancing retailers' decision to adopt online shopping as a business	2.312	0.031

Table 6. 21: Independent-samples t-test result of enhancing retailers' decision to adopt online shopping as a business

- Finding delivery address location easily

Table (6.22) illustrates the results of the Independent-samples t-test analysis; the results show that there is a statistically significant difference between the groups forenabling retailer/delivery courier to find the delivery address location easily (t = 2.568, P-value = 0.018<0.05).

Factor	t-value	Sig. (2-tailed)
Enables delivery courier to find delivery address location easily	2.568	0.018

Table 6. 22: Independent-samples t-test result of enabling retailer/delivery courier to find the delivery address location easily

- Route planning

Table (6.23) illustrates the results of the Independent-samples t-test analysis; the results show that there is a statistically significant difference between the groups for enabling the retailer/delivery courier to carry out route planning (t = 2.255, P-value = 0.035<0.05).

Factor	t-value	Sig. (2-tailed)
Enabling retailer/delivery courier to carry out route planning	2.255	0.035

Table 6. 23: Independent-samples t-test result of enabling retailer/delivery courier from route planning

- Import route information into GPS device

Table (6.24) illustrates the results of the Independent-samples t-test analysis; the results show that there is a statistically significant difference between the groups for enabling the delivery courier to import delivery route information into a GPS device (t = 2.391, P-value = 0.026<0.05).

Factor	t-value	Sig. (2-tailed)
Importing delivery route information into a GPS device	2.391	0.026

Table 6. 24: Independent-samples t-test result of enabling delivery courier from importing delivery information into GPS device

6.3.2.3 EFFICIENCY

Table (6.25) shows the mean values (marked as M) and standard deviations (marked as SD) for the two groups measuring usefulness elements of the back-end module platform.

Efficiency elements of the back-end module		G1	G2
The new system will save me time in finding delivery address location	M	2.92	2.00
	SD	1.115	0.667

Table 6. 25: Mean values and standard deviation of efficiency elements of the back-end module

- Task completion time

Table (6.26) shows the average time taken to complete the task of the system administrator back-end module for the planning of each route.

Platform/Time	1-30 Seconds	31-60 Seconds	1-2 Minutes	3-4 Minutes	Total
Desktop	1	4	15	3	23

Table 6. 26: Average task completion time of the back-end module

- Save time in finding delivery address location

Table (6.27) illustrates the results of the Independent-samples t-test analysis; the results show that there is a statistically significant difference between the groups for enabling the delivery courier to save time in finding delivery address location ($t = 2.312$, P-value = $0.031<0.05$).

Factor	t-value	Sig. (2-tailed)
The new system will save me time in finding delivery address location	2.312	0.031

Table 6. 27: Independent-samples t-test result of enabling delivery courier from saving time in finding delivery address location

6.3.2.4 SATISFACTION

Table (6.28) shows the mean values (marked as M) and standard deviations (marked as SD) for the two group satisfaction elements of using the back-end module platform.

Satisfaction elements of the back-end module		G1	G2
I am satisfied with the designed system administrator platform	M	3.00	1.90
	SD	1.080	0.568

Table 6. 28: Mean values and standard deviation of participants' satisfaction for using the back-end module platform

- The back-end module participants' satisfaction

Table (6.29) illustrates the results of the Independent-samples t-test analysis; the results show that there is a statistically significant difference between the groups for satisfaction in using the system on both platforms ($t = 2.915$, P-value = $0.008<0.01$).

Factor	t-value	Sig. (2-tailed)
I am satisfied with the designed system administrator platform	2.915	0.008

Table 6. 29: Independent-samples t-test result of participants' satisfaction for using the back-end module platform

6.4 DISCUSSION

The results found in this study has shed the light on the usability issues of the system's front-end and back-end modules by testing them with two groups of participants on each module according to their context of use. The front-end module desktop and smart phone platform usability were tested by two groups of participants (academic staff and university students) depending on their overall experience of Internet and online shopping. Also, the back-end module platform (system administrator) usability was tested by two groups of participants (retailers and delivery couriers) depending on their overall experience of online shopping as a business and home delivery service.

The front-end module usability test results were analysed using Independent-samples t-test to compare the mean values of ease-of-use between the two groups on both platforms. Table

(6.5) shows the mean values and standard deviations of the two groups of participants for the system ease-of-use on both platforms. The mean values of ease-of-use on desktop show a significant difference between group1 (M = 2.29, SD = 0.849) and group2 (M = 3.27, SD =1.033). Also, the mean values of ease-of-use on the smart phone show a significant difference between group1 (M = 2.24, SD = 0.752) and group2 (M = 3.20, SD = 1.014). As shown in Table (6.6), the results of the Independent-samples t-test of ease-of-use for desktop application show that there is a statistically significant difference among the groups in terms of ease-of-use of the system on a desktop (t (32) = 2.923, P-value = 0.007). The difference between the groups for ease-of-use of the system on the desktop is attributed to the process of search for the house location on the map, which is considered as slightly difficult and may require experience in using digital maps. Consequently, due to the process of identifying a house location on the map using desktop platform, the procedure is supposed to be done manually because GPS receivers are not embedded in the desktops and subsequently this is considered as a technological shortcoming. This means that customers may be afraid from making mistakes when identifying their house location on the map, as well as the process of identifying the house location on the map is solely based on the customer's responsibility. Accordingly, the desktop system application contains mandatory textual fields that enable the customer to provide the retailer with more accurate information about the delivery address location. Thus, the error percent made by the customer will be decreased when the retailer receives this information and checks them by comparing the location on the map with the provided information in the text fields. However, the process of searching for house location on the map is easy because most people have experienced using digital maps due to the recent developments of electronic maps, where most people depend on the digital maps to plan their journey route, find nearest petrol station or shop, etc. Also, Desktops have large size displays that help the user to control the map by zooming in and out and switch between different

views of the map (i.e. Hybrid and satellite views). In addition, the mouse cursor and keyboard are easy to control, which make the process of filling the required text fields and moving the marker on the map easier and comfortable(Jones *et al.*, 2005; Schilit *et al.*, 2002; Trevor *et al.*, 2001).

As shown in Table (6.7), the results of the Independent-samples t-test of ease-of-use for smart phone application show that there is a statistically significant difference among the groups in terms of ease-of-use of the system on a smart phone (t (32) = 3.080, P-value = 0.004). The results indicate that the process of identifying a house location on the map using a smart phone will be easier than using the desktop because it will be done automatically, in a circumstance where the customer want to use his current location as the delivery address. However, smart phones have a GPS receiver embedded which make the process of location identification on the map easy and comfortable with regardless to the limitations of smart phones (i.e. Limited size display, battery life, inability to view and interact with large amount of information, etc.) (Chittaro, 2006; Yee, 2003). Also, if the user does not want to use his current location as a delivery address; the process of moving the marker on the map, zooming in and out, and map view switch will be more difficult than desktops due to the screen size and unavailability of the mouse cursor. According to the results, the system is easy-to-use on both platforms regardless of the limitations and the required functions on each platform.

The Perceived ease-of-use plays an important role in the system perceived usefulness, whereas both measurements are considered as determinants of the user behaviour (Davis, 1989). In addition, ease-of-use is a determinant of the system usefulness that has a positive impact when users consider a system effort-free (Yi and Hwang, 2003).

The usefulness results of the designed system were analysed in order to continue testing the system's usability. Table (6.8) shows the mean values and standard deviations of the two

groups of participants for the system usefulness elements of the front-end module. The mean values of solving the problem of home delivery service show a difference between group1 (M = 2.29, SD = 0.772) and group2 (M = 3.13, SD =0. 915), with a difference in the mean values of improving the online shopping between group1 (M = 2.24, SD = 0.752) and group2 (M = 3.07, SD = 1.163). Also, there is a difference in the mean values of enhancing the consumers' decision to adopt online shopping between group1 (M = 2.12, SD = 0.781) and group2 (M = 2.93, SD = 1.033), and a difference in the mean values of enhancing the effectiveness of the home delivery service between group1 (M = 2.35, SD = 0.702) and group2 (M = 3.07, SD = 0.961).

As shown in Tables (6.9, 6.10, 6.11 and 6.12), Independent-samples t-test results of usefulness elements show that there is a statistically significant difference amongst the groups in terms of solving the problem of home delivery service (t (32) = 2.814, P-value = 0.009), improving online shopping (t (32) = 2.430,P-value = 0.021), enhancing consumers' decision to adopt online shopping (t (32) = 2.538,P-value = 0.017), and enhancing the effectiveness of the delivery service (t (32) = 2.419, P-value = 0.022).

The significant differences between the groups for the usefulness of the designed system are resulted from their overall experience in online shopping and the importance of such systems for the delivery service of online purchased goods. However, the designed system solves the problem of home delivery service for online purchased goods, whereas most of the retailers/delivery couriers do not have an efficient and reliable delivery system which makes the online shopping immature, unsatisfying, and distrusted. In Jordan, online consumers indicate their delivery addresses by providing the street name and house/flat number to the retailer/delivery courier. Then, the delivery courier enquires about the delivery address location by phone, which makes the process of home delivery more expensive and time consuming. By applying this system, the delivery service of online purchased goods will be

time-efficient and cost-effective. Also, the designed system will improve online shopping by improving the quality of service, which enhances consumers' decision to adopt such shopping mode. In addition, it enhances the performance of the provided home delivery service thatcan be considered as an important factor for evaluating delivery logistics, performance-related efficiency in delivering the customers' orders (Lai, Ngai and Cheng, 2002). Thus, performance is measured by effectiveness and efficiency for achieving specific goals of a given task. Performance-related effectiveness measures the performance of delivering the customers' orders and the quality of the provided service that relates to the customers. Performance-related efficiency measures the efficiency of the delivery service provided to the customers that is related to the delivery company and can be achieved by the effectiveness of the used resources to create customer value (Lai, Ngai and Cheng, 2002). In this section, the interest is in the first measure of performance that is related to the customers and the second measure of performance that is related to the delivery company will be discussed later in the back-end module section. In relation to the usefulness results, the system's usefulness helps in improving the effectiveness of home delivery service provided to the customers by making the delivery service faster and cheaper.

Efficiency refers to the system ease-of-use, system performance of processing its operations and the time taken to accomplishing the job. Efficiency results of task completion time on both platforms are indicated in Table (6.13). The results illustrate the average time taken to complete the process of marking the delivery address on the map and completing all the required text fields on both platforms. As shown in the table, the time taken to complete the task of location identification on the desktop was as follows: 2 participants have completed their task within the time average 1-30 seconds using desktop platform, 10 participants finished within the time averaged 31-60 seconds, 19 participants finished within the time average 1-2 minutes, and 1 participant finished within the time average 3-4 minutes.

Simultaneously, the time taken to complete the task of location identification on a smart phone was as follows: 7 participants finished their task within the time average 1-30 seconds, 15 participants finished within the time averaged 31-60 seconds, 9 finished within the time average 1-2 minutes, and 1 participant finished within the time average 3-4 minutes. By comparing the time needed to finish the task of location identification on each platform, we note that there is a divergence in the time required to complete task on both programs. As shown in the results, using the smart phone application takes less time than the desktop application to complete the task of marking the delivery address location on the map because of the embedded GPS receiver as mentioned earlier. In addition, the search box on both platforms helps the participants to find the nearest street to their house, locating it quickly with less-effort and time which increases the efficiency of searching for the house location on the map. This is an indication to the flexibility and ease-of-use of the system on both platforms which due to following Nielsen's (1994) design heuristics of matching between systems and the real world and efficiency and flexibility. Participants stated that using the mobile application is easier for them than using the desktop application. This is due to the marking the of the house location on the map using the desktop application, which can only be done manually and takes more time.

Finally, participants' subjective satisfaction was measured to make sure that they were satisfied for using the new system in the future. Table (6.14) shows the mean values and standard deviations of the two groups of participants in the system satisfaction. The mean values of satisfaction on a desktop platform show a difference between group1 (M = 2.06, SD = 0.827) and group2 (M = 3.00, SD =1. 069). Also, the mean values of participants' satisfaction on smart phone platform show a difference between group1 (M = 1.94, SD = 0.659) and group2 (M = 3.07, SD =1. 100).

As shown in Table (6.15), Independent-samples t-test results of satisfaction show that there is a statistically significant difference among the groups for using the new system on the desktop (t (32) = 2.804, P-value = 0.009), and smart phone (t (32) = 3.561, P-value = 0.001). The results show that the participants were satisfied in using the system on both platforms.

Participants explained that the system on both platforms is a new idea in Jordan and it is easy to use. Also, they mentioned that it was easy to interact with, in order to complete the required tasks of location identification. In addition, they said that the system would save them time in describing their delivery address to the delivery courier over the phone. According to Nielsen's (1994) heuristics of flexibility and efficiency of use, match between systems and the real world as well as the system status visibility contributing to the overall user satisfaction with the system.

The back-end module usability test results were analysed using Independent-samples t-test to compare the ease-of-use between the two groups of the back-end module platform. Table (6.16) shows the mean values and standard deviations of the two groups of participants for the system ease-of-use on the platform. The mean values of ease-of-use for delivery route planning using the system show a difference between group1 (M = 3.00, SD = 1.00) and group2 (M = 1.90, SD = 0.568). Also, there is a difference in the mean values of ease-of-use for exporting customers' order information including delivery route information as excel sheet between group1 (M = 3.08, SD = 1.038) and group2 (M = 2.10, SD = 0.568). As shown in Table (6.17), Independent-samples t-test results of ease-of-use for the system back-end module platform show that there is a statistically significant difference among the groups in terms of ease-of-use for delivery route planning (t (23) = 3.105, P-value = 0.005). As well as indicated in Table (6.18), Independent-samples t-test results of ease-of-use for the system back-end module platform show that there is a statistically significant difference amongst the

groups in terms of ease-of-use for exporting customers' order information including delivery route information as excel sheet (t (23) = 2.676, P-value = 0.014).

The difference between the two groups of participants for ease-of-use for using the designed system is attributed to the low experience in using such systems; specifically, amongst retailers. Likewise, the lack of awareness of online business benefits among retailers with low knowledge of using digital maps in general led to the statistical difference in their answers. In Jordan, delivery couriers and retailers depend on the delivery driver experience in the roads, traffic, and the area of delivery in general. This is mean that they do not have a delivery system for delivering their customers' orders and they do not use the handheld/in car GPS devices for planning the delivery routes. However, this system is considered as the first system that enables Jordanian e-shoppers from assigning their address on the map and submits it to the retailer in order to be able to find this location easily by planning the delivery route on the map and import it into the GPS device to get the directions of the required destination easily.

Usefulness results of the system back-end module platform were analysed in order to continue testing system usability. Table (6.19) shows the mean values and standard deviations of the two groups of participants for the system back-end module platform usefulness elements. The mean values of solving the problem of home delivery service show a difference between group1 (M = 3.00, SD = 1.00) and group2 (M = 2.10, SD =0. 568), with a difference in the mean values of enhancing retailers' decision to adopt online shopping between group1 (M = 2.92, SD = 1.115) and group2 (M = 2.00, SD = 0.667). Also, a difference in the mean values of enabling delivery courier to find the delivery address location easily between group1 (M = 3.00, SD = 1.080) and group2 (M = 2.00, SD = 0.667), with a difference in the mean values of enabling retailer/delivery courier from route planning between group1 (M = 3.00, SD = 1.080) and group2 (M = 2.10, SD = 0.738), and a difference

in the mean values of importing delivery route information into GPS device between group1 (M = 3.08, SD = 1.115) and group2 (M = 2.10, SD = 0.738).As shown in Tables (6.20, 6.21, 6.22 4.23 and 6.24), Independent-samples t-test results of usefulness elements show that there is a statistically significant difference amongst the groups in terms of solving the problem of home delivery service (t (23) = 2.540, P-value = 0.019), Enhancing retailers' decision to adopt online shopping as a business (t (23) = 2.312, P-value = 0.031), Enables delivery courier from finding delivery address location easily (t (23) = 2.568, P-value = 0.018), route planning (t(23) = 2.255, P-value = 0.035), and Import delivery route information onto GPS device (t(23) = 2.391, P-value = 0.026).

The significant differences between the groups for the usefulness of the designed system are attributed to the low experience in online shopping as a business, home delivery service, and positioning technologies use. In Jordan, The lack of reliable delivery system is caused by the lack of postcode system that requires a developed addressing and mapping infrastructure. Also, the ignorance of the government of developing such infrastructure led to the lack of such systems. However, the lack of awareness among retailers and delivery couriers about the benefits of online shopping business application led to the lack of having a reliable and efficient delivery system for delivering their customers' orders. Furthermore, the lack of such system hinders the delivery service efficiency, which therefore affects the retailers' decision to adopt online shopping as a business(Kapurubandara, 2009; Almeida, G., Avila, A., & Boncanoska, V., 2006). However, the designed system solves the problem of home delivery service for online purchased goods, which supports the retailers' decision towards adopting online shopping business in the future. As well, the designed system, enabling retailer/delivery courier to plan delivery routes and exporting them as excel sheet to import them into handheld/in car GPS device to make the process of finding customers' delivery address location easier and more efficient. In addition, this enhances the performance

measure of efficiency in delivering the customers' orders by making the process of finding the customers' delivery address location easier, which leads to a fast and cost-effective delivery service. The efficiency of the back-end module in terms of task completion time for planning delivery routes and time in finding delivery address location was also measured. Table (6.26) illustrates the average time taken to complete the process of planning a delivery route for each customer on the map using the back-end module platform. Most of the participants (15 participants) took 1-2 minutes for planning the delivery route for each customer, 4 participants completed their task within the time averaged 31-60 seconds, 3 participants completed their task within the time average 3-4 minutes, and 1 participant completed his task within the time average 1-30 seconds. The results show that most of the participants took 1-2 minutes for planning the route for each customer using the designed system. This is due to the low experience in using such systems and digital maps between both groups of participants. However, the process of route planning using the designed system is easy and efficient.

Table (6.25) shows the mean values and standard deviations of the two groups of participants for the system back-end module platform efficiency. The mean values of saving time in finding delivery address location show a difference between group1 (M = 2.92, SD =1. 115) and group2 (M = 2.00, SD =0. 667). As indicated in Table (6.27), Independent-samples t-test results of efficiency show that there is a statistically significant difference amongst the groups in terms of saving time in finding delivery address location (t (23) = 2.312, P-value = 0.031). Thus, we can conclude that the system increases the efficiency of the delivery process by saving the time in finding the customers' house location. Furthermore, efficiency is considered as the performance measure of the provided service to the customers, which play an important role in customers' satisfaction.

Finally, the participants' subjective satisfaction was measured to make sure that they were satisfied in terms of using the new system in the future. Table (6.28) shows the mean values and standard deviations of the two groups of satisfaction for using the system. The mean values of satisfaction of using the back-end module platform show a difference between group1 (M = 3.00, SD = 1.080) and group2 (M = 1.90, SD =0. 568). As shown in Table (6.29), Independent-samples t-test results of satisfaction show that there is a statistically significant difference among the groups with in using the system (t (23) = 2.915, P-value = 0.008). In other words, the two groups were satisfied about using the system in the future due to the benefits of this system in solving the problem of home delivery service by enabling retailer/delivery courier to plan a delivery route and import it to the GPS device in order to find their customers' delivery address location easily. Furthermore, participants explained that the system was useful for e-business, which gives the Jordanian retailers the chance to get involved in online shopping in the future.

6.5 SUMMARY

This chapter presented the results of the conducted study to evaluate the usability of the two modules' platforms. The study, carried out in the final stage of the PhD project, was based on experimental sessions that were performed based on laboratory conditions.

The first experimental session was aiming to evaluate the usability of the front-end module desktop and smart phone platform between two groups of people who had an experience in online shopping, Internet use, and smart phone use.

The findings of this experimental session allow for the conclusion to be made that people with higher experience in online shopping, internet, and smart phone use are capable of

achieving the required task of the system on both platforms more efficiently than people who have a low level of experience. Also, the system smart phone platform was easier to use than system desktop platform due to the process of location identification on the map.

As for the system main goal, the system was useful for solving the problem of home delivery service by enabling the participants who were acting as consumers to identify their delivery address location on the map and submit this information to the retailer/delivery courier. Nonetheless, home delivery is considered as an important factor for the success of online shopping, therefore, any improvement in the delivery service will be considered as advancement in online shopping which leads to increase the level of satisfaction of the consumers and attract people to shop online. In addition, the system improves the performance of the delivery service by allowing retailers/delivery courier to deliver their customers' orders more efficiently, which increases the quality of the provided services and create customers' value.

In relation to the first experimental session results, it was clear that the participants generally were satisfied about the system and stated that it was easy to use, and interacts with. In addition, the system was found to be useful because it solves the problem of home delivery service by enabling them to identify their house location easily without the need to contact the retailer/delivery courier to provide their house location.

The second experimental session was aiming to evaluate usability of the back-end module platform between two groups of people such as retailers and delivery couriers who have an experience in online shopping as a business and home delivery service. In addition, the back-end module platform is considered as the second part of this system that enables system administrators from performing the required tasks to get the submitted information from the customers' side.

The findings of this experimental session allow the conclusion to be made that people with higher experience in home delivery service are capable of achieving the required task of the system more efficiently than people who have a low level of experience in home delivery.

The main goal of the back-end module platform is to enable the retailer/delivery courier to get the submitted delivery address details by consumers. These details contain all the required information about the delivery address of the customer as well as the submitted delivery address location coordinates. The importance of the delivery address coordinates which are provided by the system lie in enabling the delivery courier to plan the delivery route on the map. In addition, it allows the delivery courier from exporting the delivery route information as an excel sheet and then import them into handheld/in car GPS device to get the driving directions to the required destination. The process of importing delivery route information into handheld/in car GPS device increases the performance of the delivery service, which leads to cost-effective and efficient delivery service.

In relation to the second experimental session results, it was clear that the participants generally were satisfied about the system and stated that it was easy to use, interact with and reliable because it provides them with the exact location of the customers' house location. In addition, the system was found to be useful because it solves the problem of home delivery service in the absence of postcode system and reliable delivery system that enables them to find the customers' delivery address location easily and to deliver their orders efficiently.

CHAPTER 7

CONCLUSIONS AND RECOMMENDATIONS FOR FUTURE WORK

7.1 CONCLUSION

The general purpose of this PhD project is to improve the delivery service of online purchased goods, as it is considered as the main success driver of business application. The importance of home delivery has raised retailers/delivery couriers toward having a reliable and efficient delivery system for delivering their customers' orders successfully. In Jordan, the low diffusion of online shopping is caused by the lack of a delivery system that is consequently due to the lack of postcode system. The non-existence of postcode system is caused by the deficiency in Information and communication technology (ICT) and Lack of prepared transportation and mapping infrastructure. Moreover, the high costs of implementing technologies and strategies related to e-commerce and other demographic barriers has led to worries among consumers and retailers to adopt online shopping for buying and selling. Online shopping has potential benefits and advantages which centre on the concept that Internet shopping is more convenient, offers competitive prices, offers wide selection of products, 24/7 availability, price comparison, and delivery service available. Nonetheless, the customers' attitude toward online shopping in Jordan (and many developing countries) remain sceptical, due to concerns about the quality of the product and the provided service, security of personal information and payment details and delivery service. Retailers also get benefited from the business of online shopping as it leads to achieve high profits and

operational cost reductions by extending their communication network with other retailers who have long experience in such business globally.

Home delivery service is one of the most important and complex stages in the process of online shopping especially in the countries that do not have a postcode system to enable online shoppers to identify their delivery address easily and retailer/delivery courier to find the location of this delivery address efficiently. Therefore, as mentioned in the introductory chapter, a study was conducted to investigate the attitude of consumers as well as retailers toward online shopping and the provided delivery service. In addition, the attitude of the delivery couriers about the existing delivery service and the problems they face when delivering their customers' orders were investigated. The study findings showed that Jordanian consumers and retailers are willing to shop online and adopt such mode of shopping as an alternative way for conventional shopping. From the consumers' perspective, low prices are the most motivational factor that motivate them to adopt online shopping, the trust in e-retailers and payment security are the most influential factors that affect their decision negatively to shop online due to uncertainty avoidance and lack of financial system for processing online payments. In addition, the most concern they face toward home delivery service of the purchased goods is the problem of describing their home location to the deliveryman due to the lack of postcode system. From a retailers' perspective, extending communication network with consumers and other retailers locally and globally is the most beneficial way of online shopping; whilst, the main barrier that hinders their decision to adopt online shopping as a business is the less popularity of online shopping among Jordanian people. In addition, the lack of reliable delivery system was a major concern of the retailers and delivery couriers toward the delivery service.

Also, this PhD project has introduced a system that enables online shoppers to identify their delivery address location easily and retailer/delivery courier to find this address location

efficiently. In addition, a trial of the system was developed and a evaluated by conducting an experimental sessions for the purposes of usability evaluation of the system by distributing a questionnaire amongst three samples of people (consumers, retailers, and delivery couriers) depending on their overall experience in the internet use, online shopping, and home delivery service.

The findings of the conducted experiments used to evaluate the usability of the system front-end module showed differences between the groups on the two platforms in terms of ease of use, usefulness, efficiency of use, and satisfaction. Also, there were differences between the groups on the back-end module platform in terms of ease of use, usefulness, efficiency of use, and satisfaction. The results of the conducted evaluation of the system indicated that it was easy to use on both front-end and back-end module platforms, useful in solving the problem of home delivery service for online purchased goods, efficient in the time required to accomplish the required tasks on both modules' platforms. In addition, the participants were satisfied for using the system on both modules' platforms in the future. Eventually, it can be concluded that this system is an ideal solution for the problem of home delivery service with the limited available ICT infrastructure in Jordan.

7.2 MEETING THE RESEARCH OBJECTIVES

The research objectives were formulated at the start of this PhD research and presented in section 1.3. These objectives are revisited and discussed below to demonstrate how they have been achieved.

Objective 1:*Conduct a comprehensive literature review to cover all aspects related to online shopping and home delivery service in the developed and developing countries*. This objective was achieved in Chapter 2 through out providing a literature review about online

shopping and home delivery status in the developed and developing countries. In addition to, the benefits of online shopping and home delivery service barriers in developing countries, specifically Jordan. Moreover, two models explaining the whole process of online shopping and home delivery service and the required steps that both consumers and retailers will go through. Eventually, a background of the recent technologies that deployed to solve the problem of home delivery service has been provided followed by a critical review of the designed system in this research and the current delivery system in developing countries, specifically Jordan.

Objective 2:*Investigate the attitudes and perceptions of Jordanian consumers and retailers toward online shopping and home delivery service benefits and concerns.* This objective was achieved in chapters 2 and 4. In chapter 2, an overview of the barriers and perceived benefits of online shopping and home delivery that affect the attitude of consumers and retailers to adopt online shopping was provided. In chapter 4, two questionnaires were distributed to investigate the attitudes and perceptions of consumers and retailers toward online shopping and home delivery service perceived benefits and concerns in Jordan. Eventually, the analysis results of the collected data from the three questionnaires were presented followed by discussion of these results.

Objective 3:*Investigate the attitudes and perceptions of retailers and delivery couriers toward home delivery service problems and concerns in Jordan.* This objective was achieved in chapters 2 and 4. In chapter 2, an overview of the barriers and perceived benefits of online shopping that affect the attitudes and perceptions of retailers was provided. In chapter 4, a questionnaire was distributed to investigate the barriers and perceived benefits of online shopping that affect the attitudes and perceptions of retailers in Jordan. In addition to, the concerns of home delivery service that faces retailers and delivery couriers when delivering

their customers' orders. Eventually, the analysis results of the collected data from the distributed questionnaire were presented and followed by discussion of these results.

Objective 4: *Develop and conduct initial testing of the postcode alternative system that will help in improving online shopping business by solving the problem of home delivery service.* This objective was achieved in chapters 5 and 6. In chapter 6: system models were designed followed by the design of the front-end and back-end modules. The front-end module consisted of two platforms: desktop and smart phone platforms to be used by online shoppers. The back-end module consisted of one platform to be used by retailers/delivery couriers as system administrator. After designing the system models of desktop and smart phone platforms, the prototype of the system modules were designed for conducting the initial testing of the system. In chapter 6, the pilot test (initial test) of the system prototype was presented.

Objective 5: *Assess the validity of the system modules by performing set of experiments and analyse the collected data to get the results.* This objective was achieved in chapter 6through out testing the system after the development for usability evaluation. The system was tested by conducting two experimental sessions for both modules. Thereafter, subjective questionnaires were distributed to each session participants to measure their satisfaction of using the system. In addition, the test results of the system usability evaluation and the discussion were presented.

7.3 RESEARCH LIMITATIONS

While conducting this research, a number of limitations were found which could influence the findings of the conducted studies. These limitations are as follows:

For the first study reported in chapter three, the survey was conducted among university students as consumers, retailers and delivery company employees; the results should be interpreted precisely with respect to the generalisation of the research findings of Jordanian consumers as a whole. Next, the sample size of the three samples of participants was small (130 participants for consumers, 15 participants for retailers, and 10 participants for delivery companies' employees); to accurately evaluate the attitude of Jordanian consumers, retailers, delivery companies' employees toward online shopping and home delivery service, a larger sample size is desirable. Additionally, the research was conducted in Amman, which is the capital city of Jordan. Although this is a representative of the Jordanian urban population as a whole and of comparable cities in the Middle East, it could not encompass the many people living in rural or provincial areas, which are affected by different infrastructural and cultural factors. Another limitation to the study is the omission of an important variable, for example, customer reviews could be added as additional antecedent of trust that affect customers' attitude toward online shopping. In addition, customer reviews play an important role in building a retailer reputation.

For the second study reported in chapter four, there were some limitations related to the system front-end and back-end module platforms. The first limitation of the front-end module desktop platform was the inability of the users to identify their delivery address location automatically due to the unavailability of GPS receivers embedded in comparison to smart phones. Next, limitations of the front-end module smart phone platform are the limited size display, battery life, and unavailability of mouse cursorisconsidered as technological shortcomings. Also, there were some limitations related to the back-end module platform; these limitations lie in the inability of the retailer/delivery courier to plan delivery routes for all the consumers who placed their orders once where retailer/delivery courier has to plan each route for each customer alone. Next, route planning must be done through Google maps.

Another potential limitation of the system is the lack of enough maps (i.e. Google, Yahoo, and Bing) APIs data in the Middle East countries due to the lack of developed mapping infrastructure, particularly in Jordan. Also, one of the limitations that faced the researcher is the unavailability of literature for solving the problem of lack of postcode system where most of the worlds' countries do not have such a system. Another potential limitation of the study is common method bias; the experimental sessions and the subjective satisfaction survey for evaluating the usability of the system front-end module platforms were conducted among academic staff and university students who were acting as consumers, as well as the back-end module platform participants as retailers and delivery couriers who were acting as system administrators. The experimental sessions of the front-end module platforms were biased to those two samples of people due to their experience in online shopping and Internet use, therefore, the experimental session should include a larger sample of people with different experiences in online shopping in order to generalise to research findings of Jordanian consumers as a whole. Next, the sample size of the three samples of participants was small (32 participants from consumers, 13 participants for retailers, and 10 participants for delivery couriers); to accurately evaluate the system front-end and back-end modules' platforms usability, a larger sample is desirable.

7.4 FUTURE WORK

To improve the limitations of this study, further research is needed to confirm the findings of the conducted studies by recruiting a larger number of participants with the original participants who are already involved in these studies and to provide a broader view of Jordanians' attitude toward online shopping and home delivery service. In addition, a larger sample size encompasses people who are living in rural or provincial areas would be better in terms of the findings because it covers all the aspects of infrastructural and cultural factors.

Consequently, a relevant future study would be better if conducted using qualitative interviews to understand the attitude of customers, retailers, and delivery couriers toward online shopping and home delivery service problems in more depth.

For the designed system, further research is needed to improve the system by adding more facilities for both consumers and retailers. Firstly, the system must be developed to enable the retailer to provide shipping address information to third-party logistics (3PL) in case the retailer does not have delivery fleet or is not providing delivery service to his customers. Second, enable retailer/delivery couriers from providing their customers with the delivery charges depending on the house location. Third, enable retailer/delivery couriers to provide consumers with delivery time windows to make the process of online shopping and home delivery service more comfortable, flexible, cost-effective, and efficient. Forth, adding the tracking service would be very important for consumers to track their deliveries, and for retailers and delivery couriers to track their delivery fleet and update them with information about deliveries. Fifth, enable retailer/delivery couriers to plan delivery routes for all the consumers and assign delivery time windows for each route in order to optimise the delivery routes. Sixth, develop a mechanism to enable the system from transmitting an email or SMS automatically to the consumer to confirm the stated delivery address information. This would be an advantage for both consumers and retailers to preserve their rights in case if there was an error in the provided address or the retailer/delivery courier missed or delivered the customers' order to some other address. Seventh, developing the system to become a real postcode system, constructing map layers that will contain all street names, all houses geographical locations and a designated unique number for each house as this will be useful for all governmental institutions and citizens. Finally, the future system experiments should include a larger sample of participants, regardless of their experience in online shopping and Internet use.

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APPENDIX A: LIST OF PUBLICATIONS

- Journal Papers

  - **A. Nabot,** V. Garaj, and Balachandran. W, 2013.**Consumer attitudes toward online shopping: An exploratory study from Jordan.** International Journal of Social Ecology and Sustainable Development (IJSESD), (Accepted on July 2013).

  - **A. Nabot,** V. Garaj, and Balachandran. W, 2014. **Postcode alternative system for solving "last mile" logistics issue for home delivery in Jordan using web GIS.** International Journal of Logistics Research and Applications (IJLRA), in Press.

- Conferences

  - **Location Identification: A System Model for solving Location Identification Problem in Jordan.** ResCon conference in Brunel University, 2013.

  - **Effect of Online Purchased Goods Delivery Service on Environment.** The Second International Conference on Green Computing, Technology, and Innovation (ICGCTI), 2014. Kuala Lumpur, Malaysia.

- Posters

  - **Consumers' attitude toward online shopping in Jordan.**ResCon conference in Brunel University, 2012.

APPENDIX B: CONSUMER, RETAILER AND DELIVERY COMPANIES ATTITUDES TOWARD ONLINE SHOPPING AND HOME DELIVEY SERVICE IN JORDAN

1. Reliability test results for customers' study

Variable	Cronbach's Alpha	N
Do you intend to adopt online shopping	0.762	50
Online Shopping Perceived Benefits		
Convenience	0.762	50
Low prices	0.756	50
Wider selection	0.725	50
Price comparison	0.737	50
24/7 availability	0.739	50
Information availability	0.738	50
Delivery service availability	0.758	50
Online Shopping Concerns		
Trust	0.722	50
Payment security	0.704	50
Personal information privacy	0.694	50
Lack of technological skills	0.705	50
Quality of Service (QoS)	0.733	50
Social issues	0.713	50
Home Delivery Service Concerns		
Delivery costs	0.658	50
Delivery time slots	0.656	50
Delivery first attempt failure	0.670	50
Order accuracy	0.670	50
Problems in describing home location	0.686	50

Table B.1: Cronbach's Alpha test results for customers' attitudes toward online shopping

2. Customers' attitude toward online shopping analysis results

2.1 Online shopping perceived benefits

	Variables	1	2	3	4	5	6	7	8
1	Attitude	1	0.656**	0.758**	0.373*	0.364*	0.535**	0.486**	0.523**
2	Convenience		1	0.536**	0.304*	0.282**	0.390**	0.277**	0.260**
3	Low prices			1	0.536**	0.304**	0.282**	0.390**	0.277**
4	Products wider selection				1	0.435**	0.272**	0.401**	0.383**
5	Price comparison					1	0.469**	0.456**	0.583**
6	24/7 availability						1	0.489**	0.371**
7	Information availability							1	0.472**
8	Delivery service availability								1

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

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

Table B.2: Pearson's correlation coefficients between customers' attitude toward online shopping and online shopping perceived benefits

2.2 Online shopping concerns

	Variables	1	2	3	4	5	6	7
1	Attitude	1	-0.702**	-0.582**	-0.507**	-0.519**	-0.633**	-0.306**
2	Trust		1	0.362**	0.381**	0.348**	0.417**	0.306**
3	Payment security			1	0.601**	0.518**	0.408**	0.292**
4	Personal information privacy				1	0.572**	0.464**	0.410**
5	Lack of technological skills					1	0.411**	0.362**
6	Quality of service						1	0.285**
7	Social issues							1

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

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

Table B.3: Pearson's correlation coefficients between customers' attitude toward online shopping and online shopping concerns

2.3Home delivery service concerns

	Variables	1	2	3	4	5	6
1	Attitude	1	-0.618**	-0.428**	-0.634**	-0.473**	-0.730**
2	Delivery costs		1	0.734**	0.789**	0.685**	0.721**
3	Delivery time slots			1	0.737**	0.704**	0.705**
4	Delivery first attempt failure				1	0.645**	0.782**
5	Order accuracy					1	0.705**
6	Problems in describing delivery address location						1

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

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

Table B.4:Pearson's correlation coefficients between customers' attitude toward online shopping and home delivery concerns

3. Reliability test results for retailers' study

Variable	Cronbach's Alpha	N
Do you intend to adopt online shopping for products selling?	0.855	10
Online Shopping Adoption Benefits		
Convenience	0.836	10
Attract customers	0.847	10
Reap more profits	0.837	10
Extend communication network	0.802	10
Online Shopping Adoption Barriers		
Lack of awareness	0.804	10
Lack of technological skills	0.812	10
Lack of banking system	0.773	10
Less popularity of online shopping among people	0.807	10
Governmental issues	0.783	10
Social issues	0.793	10
Home Delivery Concerns		
Lack of reliable delivery system	0.788	10
Lack of postcode system	0.803	10
Delivery costs	0.802	10

TableB. 5: Cronbach's Alpha test results for retailers' attitudes toward online shopping

4. Retailers' Attitude toward adopting online shopping

4.1Online shopping adoption benefits

	Variables	1	2	3	4	5
1	Attitude	1	0.513	0.605	0.320	0.348
2	Convenience		1	0.369	0.705*	0.292**
3	Attract customers			1	0.311*	0.479
4	Reap more profit				1	0.425
5	Extend communication network					1

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

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

Table B.6: Pearson's correlation coefficients between retailer' attitude toward adopting online shopping and its benefits

4.2 Online shopping adoption barriers

	Variables	1	2	3	4	5	6	7
1	Attitude	1	-0.547	-0.593	-0.326	-0.678*	-0.484	-0.501
2	Lack of awareness		1	0.271	0.597	0.465	0.620	0.535
3	Lack of technological skills			1	0.702*	0.471	0.471	0.580
4	Lack of financial system				1	0.555	0.802**	0.718*
5	Less popularity of online shopping					1	0.846**	0.829**
	Governmental issues						1	0.829**
	Social issues							1

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

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

Table B.7:Pearson's correlation coefficients between retailer' attitude toward adopting online shopping and its barriers

4.3 Home delivery service concerns

	Variables	1	2	3	4
1	Attitude	1	-0.508	-0.602	-0.538
2	Lack of reliable delivery system		1	0.843**	0.629
3	Lack of postcode system			1	0.587
4	Delivery costs				1

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

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

Table B.8: Pearson's correlation coefficients between retailer' attitude towardadopting online shopping and home delivery concerns

5. Reliability test results for delivery companies

Variable	Cronbach's Alpha	N
Have you failed to deliver packages to the customers?	0.945	15
Home Delivery Failure Reasons		
Nobody at home	0.654	15
Could not find customers' house location	0.678	15
Lack of reliable delivery system	0.673	15
Lack of postcode system	0.696	15

Table B.9:Cronbach's Alpha test results for delivery couriers' attitudes toward home delivery service

6. Delivery companies participants' attitude toward home delivery analysis results

6.1 Delivery failure reasons

	Variables	1	2	3	4	5
1	Attitude	1	-0.496	-0.663	-0.644	-0.528
2	Nobody at home		1	0.831	0.898	0.809
3	Could not find customer's house location			1	0.840	0.785
4	Lack of reliable delivery system				1	0.738
5	Lack of postcode system					1

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

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

Table B.10:Pearson's correlation coefficients between delivery couriers' attitude toward home delivery service and home delivery failure reasons

APPENDIX C: FIRST STUDY PARTICIPANTS' PRE-QUESTIONNAIRE

1. Consumers' pre-questionnaire

Dear participant,

This survey is designed to collect your feedback about your experience in online shopping and home delivery service provided by retailer/delivery courier such as DHL, ARAMEX, TNT and Jordan post office through your online shopping. This survey will be used to improve home delivery service provided to online consumers. Based on your experience in this field, please tick the appropriate box that fit your answer.

What is the main purpose of the study?

This study aims to improve home delivery service for online purchased goods in Jordan due to the lack of postcode system. This can be done be exploring and discovering the main issues and reasons that affect your decision to adopt online shopping.

Why I have been invited?

You have been invited because you are a person aged over 18 and you may need this service in the future when shop online.

Do I have to take part in this survey?

Taking part of this survey is optional, but if you decided to take part in this survey you will assist the researcher in gathering data about the situation of online shopping and home delivery service in Jordan. If you feel not satisfied, you can withdraw from this survey at any time without giving any reason.

What are the benefits of this research?

The information gathered from this study survey may lead to the development of an appropriate delivery service for the customers in the future and improve online shopping business.

Pledge

The collected data in this survey will be destroyed after finishing this PhD study; also these data will not be used for commercial purposes and will not harm the companies that took part in this survey.

PART 1: ONLINE SHOPPING BEHAVIOUR

1. Are you using Internet shopping websites for shopping?

☐ Yes ☐ No

2. How did you get know about online shopping websites?

☐ TV ☐ Radio ☐ Newspapers

☐ Friends

☐ Other please explain……

3. How often do you use Internet shopping websites?

☐ Daily ☐ Every few days ☐ Once a week
☐ Once a month

☐ Other please explain.....

4. Have you bought anything from online shopping websites?

☐ Yes ☐ No

5. Which kind of goods you buy online usually?

☐ Foods ☐ Clothes ☐ Electronics

☐ Other please explain……

6. How often do you shop online?

☐ Daily ☐ Every few days ☐ Once a week

☐ Once a month ☐ Once a year

☐ Other please explain……..

7. When buying something online how you usually pay for bought goods?

☐ Cash on delivery ☐ Cheque ☐ Credit or debit card

☐ Gift card ☐ Postal money order

☐ Other please explain……

8. Would you like to shop online again?

☐ Yes ☐ No

9. Would you like to recommend your friends to use online shopping websites?

☐ Yes ☐ No

10. How did you find the procedures of buying a product online?

☐ Very hard ☐ Hard ☐ Average

☐ Easy ☐ Very easy

11. .....Out of 100%, how much the percentage of your online purchases?

PART 2: ONLINE SHOPPING ATTITUDE

12. Have you found it difficult to use online shopping websites?

☐ Strongly agree ☐ Agree ☐ Neutral

☐ Disagree ☐ Strongly disagree

13. Do you trust online vendors?

☐ Strongly agree ☐ Agree ☐ Neutral

☐ Disagree ☐ Strongly disagree

14. Do you have any concerns regarding online payment?

☐ Yes ☐ No

PART 3: HOME DELIVERY SERVICE

15. Does home delivery service an important when shopping online?

☐ Strongly agree ☐ Agree ☐ Neutral

☐ Disagree ☐ Strongly disagree

16. Have you received a delivery package/letter to your doorstep?

☐ Yes ☐ No

17. Have you faced problems in describing your home address when shopping online?

☐ Strongly agree ☐ Agree ☐ Neutral

☐ Disagree ☐ Strongly disagree

18. What would you consider a bout home delivery service?

☐ Delivery costs ☐ Waiting time ☐ Delivery flexibility

☐ Order accuracy

☐ Other please explain……

19. Do you prefer to arrange the date and time with the carrier to deliver your package?

☐ Yes ☐No

20. Which time is preferred to you for the delivery?

☐ 8am-12am ☐ 12 noon-6pm ☐ 6pm-10pm

☐ On the weekend

21. How do you get your online bought goods usually?

☐ Wait for delivery at home ☐ Give alternative address

☐ Pick up at store ☐ Pick up at collection point

☐ Other please explain……

PART 4: PERSONAL DETAILS

22. Your gender is?

☐ Male ☐ Female

23. Your age is?.....

24. Your educational qualification is?

☐ PhD ☐ Master's Degree ☐ Bachelor's Degree

☐ GCSE ☐ No formal qualification

☐ Other please explain……

25. Your job title is?

☐ Manager ☐ Employee ☐ Student

☐ Academic staff

☐ Other please explain……

2. Retailers' pre-questionnaire

PART 1: WORK BEHAVIOUR

1. Which kind of business do you own?

☐ Corporation ☐ Partnership ☐ Individual store

☐ Other please explain……..

2. How long you have been into this business?

☐ 1-5 Years ☐ 6-10 Years ☐ 11-15 Years

☐ 16-20 Years ☐ 21-30 Years ☐ 31-40 Years

3. How do you sell your products usually?

☐ In store ☐ By phone ☐ Online

☐ Other please explain ……

4. Do you have shopping website for selling your products online?

☐ Yes ☐ No

5. How long you have been into online business?

☐ 1-5 Years ☐ 6-10 Years ☐ 11-15 Years

☐ 16-20 Years ☐ 21-30 Years ☐ 31-40 Years

PART 2: ONLINE SHOPPING BUSINESS

6. Do you think online shopping web sites are good way to sell your merchandise?

☐ Strongly agree ☐ Agree ☐ Neutral

☐ Disagree ☐ Strongly disagree

7. Why online websites are good way to sell your products? Please indicate to what extent you agree or disagree the following statements regarding on scale of 5 (1=strongly agree, 2=Agree, 3=Neutral, 4=disagree and 5=strongly disagree)

   A. Convenient way to sell products?

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

Any Suggestions……

B. Attract more customers locally and globally?

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

Any Suggestions……

C. Reap more profit?

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

Any Suggestions……..

8. If you are intending to sell your products online, what barriers don not affect your decision to adopt e-business? Please indicate to what extent you agree or disagree the following statements regarding on scale of 5 (1=strongly agree, 2=Agree, 3=Neutral, 4=disagree and 5=strongly disagree)

A. Lack of awareness in using e-business technologies

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

Any Suggestions……

B. Lack of technological skills

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

Any Suggestions……

C. Lack of banking system for processing customers' payments

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

Any Suggestions……

D. Lack of reliable delivery system

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

Any Suggestions……

E. Less popularity of online shopping among people

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

Any Suggestions……

F. Political issues (no governmental support and lack of e-business regulations)

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

Any Suggestions……

G. Social issues (lack of information)

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

Any Suggestions……

9. The average of your annual online sales?

……%

PART 3: HOME DELIVERY SERVICE

10. Do you offer delivery service to your customers?

☐ Yes ☐ No

11. How usually you delivery your customers' orders?

☐ Via my own delivery fleet ☐ Via third party delivery company

☐ Other please specify……

12. Are you satisfied with the provided delivery service to the customers, either by your own delivery fleet or third party logistics?

☐ Yes ☐ No

13. According to your experience in the delivery service, what concerns do not affect your satisfaction with the provided delivery service? Please indicate to what extent you agree or disagree the following statements regarding on scale of 5 (1=strongly agree, 2=Agree, 3=Neutral, 4=disagree and 5=strongly disagree)

A. Lack of reliable delivery system

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

Any Suggestions……

B. Lack of postcode system

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

Any Suggestions……

C. Delivery costs

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

Any Suggestions……

14. What would be your suggestion to cut down the problems of home delivery service?

……
……

PART 4: PERSONAL DETAILS

15. Your gender is?

☐ Male ☐ Female

16. Your age is? …….

17. Your educational qualification?

☐ PhD ☐ Master's Degree ☐ Bachelor's Degree

☐ GCSE ☐ No formal qualification

☐ Other please explain……

18. Your job title?

☐ Manager ☐ Employee ☐ Student

☐ Other please explain…….

3. Delivery couriers' pre-questionnaire

PART 1: WORK BEHAVIOUR

1. What is the type of merchandise you handling?

   ☐ Letters ☐ Packages ☐ Both

2. How the merchandise is handled?

   ☐ According to the size ☐ According to the weight ☐ Both

3. What is the kind of the delivery service you provide to the customers?

   ☐ 1st Class ☐ 2nd Class ☐ Standard delivery

   ☐ Recorded ☐ Special delivery

   ☐ Other please explain……

4. Do you have vehicle routing and scheduling system?

   ☐ Yes ☐No

5. Do you use the positioning technologies to get the driving directions to the customer's house location?

   ☐ Yes ☐No

6. Do you have a system to detect the customer's address?

   ☐ Yes ☐ No

   If (yes) please explain……

7. How do you detect customer's address usually?

   ☐ Google maps ☐ Asking customers about their address by phone

   ☐ By using the GPS ☐ By Email

   ☐ Other please explain……

PART 2: PRODUCTS DELIVERY

8. Are you delivering bought goods from online retailers?

☐ Yes ☐ No

9. Have you received products from the retailers to deliver it to the customer's house?

☐ Yes ☐ No

10. What is the type(s) of the product(s) you have received from these retailers?

☐ Foods ☐ Clothes ☐ Electronics

☐ Furniture ☐ Accessories & cosmetics

☐ Letters ☐ CD/DVD ☐ Nothing

☐ Other please explain……

11. Have you failed to deliver a customer package/parcel?

☐ Yes ☐ No

12. What kind of problems makes the delivery process difficult? Please indicate to what extent you agree or disagree to the following statements regarding on scale of 5 (1=strongly agree, 2=Agree, 3=Neutral, 4=disagree and 5=strongly disagree)

A. Nobody at home at the delivery time

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

Any Suggestions……

B. Wrong items were sent

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

Any Suggestions……

C. Could not find customer's house

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

Any Suggestions……

D. Wrong home address

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

Any Suggestions……

E. Lack of reliable delivery system

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

Any Suggestions……

F. Lack of postcode system

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

Any Suggestions……

G. Lack of routing and scheduling system

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

Any Suggestions……

H. Delivery costs are high

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

Any Suggestions……

PART 3: PERSONAL DETAILS

13. Your gender is?

☐ Male ☐ Female

14. Your age is? …….

15. Your educational qualification?

☐ PhD ☐ Master's Degree ☐ Bachelor's Degree

☐ GCSE ☐ No formal qualification

☐ Other please explain……

16. Your job title?

☐ Manager ☐ Employee ☐ Student

☐ Other please explain…….

APPENDIX D: FIRST STUDY PARTICIPANTS' POST-QUESTIONNAIRE

1. Consumers' post-questionnaire

Dear participant,

This survey is designed to collect your feedback about your experience in online shopping and home delivery service provided by retailer/delivery courier such as DHL, ARAMEX, TNT and Jordan post office through your online shopping. This survey will be used to improve home delivery service provided to online consumers. Based on your experience in this field, please tick the appropriate box that fit your answer.

What is the main purpose of the study?

This study aims to improve home delivery service for online purchased goods in Jordan due to the lack of postcode system. This can be done be exploring and discovering the main issues and reasons that affect your decision to adopt online shopping.

Why I have been invited?

You have been invited because you are a person aged over 18 and you may need this service in the future when shop online.

Do I have to take part in this survey?

Taking part of this survey is optional, but if you decided to take part in this survey you will assist the researcher in gathering data about the situation of online shopping and home delivery service in Jordan. If you feel not satisfied, you can withdraw from this survey at any time without giving any reason.

What are the benefits of this research?

The information gathered from this study survey may lead to the development of an appropriate delivery service for the customers in the future and improve online shopping business.

Pledge

The collected data in this survey will be destroyed after finishing this PhD study; also these data will not be used for commercial purposes and will not harm the companies that took part in this survey.

PART1: ONLINE SHOPPING EXPERIENCE

1. Are you using the Internet shopping websites for shopping?

   ☐ Yes ☐ No

2. Which kind of goods you buying online usually?

   ☐ Foods ☐ Clothes ☐ Electronics

   ☐ Furniture ☐ CD/DVD ☐ Magazines

   ☐ Cosmetics & perfume ☐ Accessories ☐ Nothing

   ☐ Other please explain……

3. How often do you shop using Internet shopping sites?

   ☐ Daily ☐ Every few days ☐ Once a week
   ☐ Once a month ☐ when needed
   ☐ I never use the Internet websites for shopping

   ☐ Other please explain.....

4. When buying something online how you usually pay for the bought goods?

   ☐ Cash on delivery ☐ Cheque ☐ Credit card

   ☐ Gift card ☐ Postal order ☐ Nothing

   ☐ Other please explain……

5. When you shop online, do you get afraid from making online payments?

   ☐ Yes ☐ No

6. .....Out of 100%, how much the percentage of your purchases online?

PART 2: ONLINE SHOPPING PERCEIVED BENEFITS

7. What are the benefits of online shopping that affect your decision positively to shop online? Please indicate to what extent you agree or disagree the following statements regarding on scale of 5 (1= Strongly disagree, 2= Disagree, 3= Neutral, 4= Agree and 5= Strongly agree).

   A. Online shopping is a convenient way for shopping?

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

Any Suggestions……

B. Online shopping provides low prices of the products?

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

Any Suggestions……

C. Online shopping provides a wide selection of products?

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

Any Suggestions……

D. Online shopping websites provide consumers with price comparison?

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

Any Suggestions……

E. Online shopping is available 24/7?

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

Any Suggestions……

F. Online shopping provide all the information about the products, how to return a product and payment policies?

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

Any Suggestions……

G. Online shopping provides delivery service for online bought goods?

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

Any Suggestions……

PART 3: ONLINE SHOPPING CONCERNS

8. What are the concerns of online shopping that do not affect your decision negatively to shop online? Please indicate to what extent you agree or disagree the following statements regarding on scale of 5 (1= Strongly disagree, 2= Disagree, 3=Neutral, 4= Agree and 5= Strongly agree).

   A. Trust?

Strongly disagree	Disagree	Neutral	Agree	Strongly agree

1 2 3 4 5

Any Suggestions……

B. Payment security

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

Any Suggestions……

C. Personal information privacy

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

Any Suggestions……

D. Lack of Technological

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

Any Suggestions……

E. Quality of service

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

Any Suggestions……

F. Social issues

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

Any Suggestions……

PART 4: PERSONAL DETAILS

9. Your gender is?

☐ Male ☐ Female

10. Your age is?.....

11. Your educational qualification is?

☐ PhD ☐ Master's Degree ☐ Bachelor's Degree

☐ GCSE ☐ No formal qualification

☐ Other please explain……

12. Your job title is?

☐ Manager ☐ Employee ☐ Student

☐ Academic staff

☐ Other please explain……

2. Retailers' post-questionnaire

PART 1: WORK BEHAVIOUR

1. Which kind of business you own?

   ☐ Corporation ☐ Partnership ☐Individual store

   ☐Other please explain……

2. How long you have been into this business?

   ☐ 1-5 Years ☐ 6-10 Years ☐11-15 Years

   ☐ 16-20 Years ☐ 21-30 Years ☐31-40 Years

3. How you selling your products usually?

   ☐ In store ☐By phone ☐Online

   ☐ Other please explain ……

4. Do you have a shopping website for selling your products online?

   ☐ Yes ☐ No

5. How long you have been into online business?

   ☐ 1-5 Years ☐ 6-10 Years ☐11-15 Years

   ☐ 16-20 Years ☐ 21-30 Years ☐31-40 Years

PART 2: ONLINE SHOPPING BUSINESS

6. Do you think online shopping websites are good way to sell your products?

   ☐ Strongly disagree ☐ Disagree ☐ Neutral

   ☐ Agree ☐ Strongly agree

7. Why online websites are good way to sell your products? Please indicate to what extent you agree or disagree the following statements regarding on scale of 5 (1= Strongly disagree, 2= Disagree, 3=Neutral, 4= Agree and 5= Strongly agree).

A. Convenient way to sell products?

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

Any Suggestions……

B. Attract more customers locally and globally?

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

Any Suggestions……

C. Reap more profit?

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

Any Suggestions……

D. Extend relationships network with other retailers locally and globally?

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

Any Suggestions……

8. If you are intending to sell your products online, what are the barriers of online shopping that donot affect your decision to adopt e-business? Please indicate to what extent you agree or disagree the following statements regarding on scale of 5 (1= Strongly disagree, 2= Disagree, 3= Neutral, 4= Agree and 5= Strongly agree).

   A. Lack of awareness in using e-business technologies?

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

Any Suggestions……

   B. Lack of technological skills?

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

Any Suggestions……

   C. Lack of banking system for processing customers' payments?

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

Any Suggestions……

   D. Lack of reliable delivery system

Strongly disagree	Disagree	Neutral	Agree	Strongly agree

1 2 3 4 5
Any Suggestions……

E. Less popularity of online shopping among people

Strongly disagree Disagree Neutral Agree Strongly agree
1 2 3 4 5
Any Suggestions……

F. Political issues (e.g. No governmental support and lack of e-business regulations)?

Strongly disagree Disagree Neutral Agree Strongly agree
1 2 3 4 5
Any Suggestions……

G. Social issues?

Strongly disagree Disagree Neutral Agree Strongly agree
1 2 3 4 5
Any Suggestions……

9. What is the average of your annual online sales?

……%

PART 3: HOME DELIVERY SERVICE

10. Do you offer home delivery service to your customers?

☐ Yes ☐ No

11. How usually you delivery your customers' orders?

☐ Via my own delivery fleet ☐ Via third party delivery company

☐ Other please specify…….

12. Are you satisfied with the provided delivery service to the customers, either by your own delivery fleet or by the delivery company?

☐ Yes ☐ No

13. According to your experience in the delivery service, what are the concerns of home delivery service that donot affect your satisfaction with the provided delivery service? Please indicate to what extent you agree or disagree the following statements regarding on scale of 5 (1= Strongly disagree, 2= Disagree, 3= Neutral, 4= Agree and 5= Strongly agree).

A. Lack of reliable delivery system?

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

Any Suggestions……

B. Lack of postcode system?

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

Any Suggestions……

C. Delivery costs?

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

Any Suggestions……

D. What would be your suggestion to cut down the problems of home delivery service?

……
……

PART 4: PERSONAL DETAILS

14. Your gender is?
☐ Male ☐ Female

15. Your age is?.....

16. Your educational qualification is?
☐ PhD ☐ Master's Degree ☐ Bachelor's Degree

☐ GCSE ☐ No formal qualification
☐ Other please explain……

17. Your job title is?
☐ Manager ☐ Employee ☐ Student

☐ Other please explain……

3. Delivery companies' post-questionnaire

PART 1: WORK BEHAVIOUR

1. What is the type of merchandise you handling?

   ☐ Letters ☐Packages ☐Both

2. How the deliveries are handled?

   ☐ According to the size ☐According to the weight ☐ Both

3. What is the kind of the delivery service you provide to the customers?

   ☐ 1st Class ☐ 2nd Class ☐ Standard delivery

   ☐ Recorded ☐ Special delivery

   ☐ Other please explain……...

4. Do you have vehicle routing and scheduling system?

   ☐ Yes ☐No

5. Do you use the positioning technologies to get the driving directions to the customer's house location?

   ☐ Yes ☐ No

6. Do you have a system to detect the customer's address?

   ☐ Yes ☐ No

   If (yes) please explain……

7. How do you detect customer's address usually?

   ☐ Google maps ☐ Asking customers about their address by phone

   ☐ By using the GPS ☐ By Email

   ☐ Other please explain……..

PART 2: PRODUCTS DELIVERY

8. Are you delivering bought goods from online retailers?

   ☐ Yes ☐ No

9. Have you received products from the retailers to deliver it to the customer's house?

☐ Yes ☐ No

10. What is the type(s) of the product(s) you have received from these retailers?

☐ Foods ☐Clothes ☐Electronics

☐ Furniture ☐Accessories & cosmetics

☐ Letters ☐ CD/DVD ☐Nothing

☐ Other please explain……

11. Have you failed to deliver a customer's package/parcel?

☐ Yes ☐ No

12. What are the problems that do not affect the success of the delivery service? Please indicate to what extent you agree or disagree to the following statements regarding on scale of 5 (1=Strongly disagree, 2= Disagree, 3=Neutral, 4= Agree and 5= Strongly agree).

A. Nobody at home at the delivery time?

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

Any Suggestions……

B. Could not find customer's house?

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

Any Suggestions……

C. Lack of reliable delivery system?

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

Any Suggestions……

D. Lack of postcode system?

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

Any Suggestions……

PART 3: PERSONAL DETAILS

13. Your gender is?
☐ Male ☐ Female

14. Your age is?**.....**

15. Your educational qualification is?
☐ PhD ☐ Master's Degree ☐ Bachelor's Degree

☐ GCSE ☐ No formal qualification
☐Other please explain……

16. Your job title is?
☐ Manager ☐ Employee ☐ Student

☐ Other please explain……

APPENDEX E: SECOND STUDY PARTICIPANTS' PRE-QUESTIONNAIRE

1. Consumers' pre-questionnaire

Dear Participant,

The main aim for this research is to improve the delivery service for purchased goods online by finding an alternative solution for the problem of lack of postcode system in Jordan. However, the growth of the online shopping activities is hindered by the lack of postcode system - which makes home delivery inefficient and in some cases impossible, as home locations are difficult to find.
The research started by conducting customers' attitudes toward online shopping in Jordan and the delivery problems they face when shop online. Also, retailers' and couriers' attitudes toward delivery service in Jordan have been investigated to build a clear overview about the status of online shopping and the delivery service, and find the best solution that fit their requirements.

This questionnaire aims to validate this system model by collecting your feedback about it in order to adopt it as a final solution for this research problem. Your cooperation will be highly appreciated and the provided information will be confidential and will only be used for this research.

Note: The participation in this survey is voluntary and you have the right to withdraw at any time without giving the reasons.

PART 1: GENARAL INFORMATION

1. Do you use computer in your daily life activities? Please indicate to what extent of the following statements suit you (1= Almost never, 2= Never, 3= rarely, 4= Sometimes, 5= Always).

Almost never				Always
1	2	3	4	5

2. Perceived daily use of computers? Please indicate to what extent of the following statements suit you (1= almost never, 2= never, 3= sometimes, 4=1 hour/day, 5= 2 hours/day, 6= 3 hours/day, 7= more than 4 hours/day).

Almost never						More than 4 hours/day
1	2	3	4	5	6	7

3. Perceived frequency of use of computers? Please indicate to what extent of the following statements suit you (1= once a month, 2= 2-3 times a month, 3= once a week,

4= 2-3 times a week, 5= more than 4 times a week, 6= once a day, 7= several time a day).

Once a month Several times a day
1 2 3 4 5 6 7

4. Do you use theInternet in your daily life activities? Please indicate to what extent of the following statements suit you (1= almost never, 2= never, 3= sometimes, 4=1 hour/day, 5= 2 hours/day, 6= 3 hours/day, 7= more than 4 hours/day).

Almost never More than 4 hours/day
1 2 3 4 5 6 7

5. How often do you use the Internet? Please indicate to what extent of the following statements suit you (1= once a month, 2= 2-3 times a month, 3= once a week, 4= 2-3 times a week, 5= more than 4 times a week, 6= once a day, 7= several time a day).

Once a month Several times a day
1 2 3 4 5 6 7

6. Do you use smart phone in your daily life activities? Please indicate to what extent of the following statements suit you (1= Almost never, 2= Never, 3= rarely, 4= Sometimes, 5= Always).

Almost never Always
1 2 3 4 5

7. Do you use Internet on your smart phone? Please indicate to what extent of the following statements suit you (1= Almost never, 2= Never, 3= rarely, 4= Sometimes, 5= Always).

Almost never Always
1 2 3 4 5

8. How do you describe your level of Internet use experience? Please indicate to what extent of the following statements suit you (1= Very poor, 2= Poor, 3= Fair, 4= Good, 5= Very good, 6= Excellent, 7= Expert).

Very poor Expertise
1 2 3 4 5 6 7

9. Do you use digital maps (e.g. Google maps)for searching for a specific location on the map using desktop? Please indicate to what extent of the following statements suit you (1= Almost never, 2= Never, 3= rarely, 4= Sometimes, 5= Always).

Almost never Always

1 2 3 4 5

10. Do you use digital maps (e.g. Google maps)for searching for a specific location on the map using smart phone? Please indicate to what extent of the following statements suit you (1= Almost never, 2= Never, 3= rarely, 4= Sometimes, 5= Always).

Almost never Always
1 2 3 4 5

PART 2: SYSTEM MODEL USAGE

- Ease of use

11. Does using the proposed model is easy to use to search and identify your home location on the map using desktop application? Please indicate to what extent of the following statements suit you (1= Strongly agree, 2= Agree, 3= Agree somewhat, 4= Undecided, 5= Disagree somewhat, 6= Disagree, 7= Strongly disagree).

Strongly agree Strongly disagree
1 2 3 4 5 6 7

12. Does using the proposed model is easy to use to search and identify your location on the map using smart phone application? Please indicate to what extent of the following statements suit you (1= Strongly agree, 2= Agree, 3= Agree somewhat, 4= Undecided, 5= Disagree somewhat, 6= Disagree, 7= Strongly disagree).

Strongly agree Strongly disagree
1 2 3 4 5 6 7

- Usefulness

13. Does using the proposed model solve the problem of home delivery when shop online? Please indicate to what extent of the following statements suit you (1= Strongly agree, 2= Agree, 3= Agree somewhat, 4= Undecided, 5= Disagree somewhat, 6= Disagree, 7= Strongly disagree).

Strongly agree Strongly disagree
1 2 3 4 5 6 7

14. Does using the proposed model increase the chance of improving the process of online shopping and therefore improve trust and satisfaction? Please indicate to what extent of the following statements suit you (1= Strongly agree, 2= Agree, 3= Agree somewhat, 4= Undecided, 5= Disagree somewhat, 6= Disagree, 7= Strongly disagree).

Strongly agree Strongly disagree
1 2 3 4 5 6 7

15. Does using the proposed system model enhance my decision to adopt online shopping instead of conventional shopping? Please indicate to what extent of the following statements suit you (1= Strongly agree, 2= Agree, 3= Agree somewhat, 4= Undecided, 5= Disagree somewhat, 6= Disagree, 7= Strongly disagree).

Strongly agree Strongly disagree
1 2 3 4 5 6 7

- Efficiency

16. How long the process of identifying your house location on the map using desktop took?

Please specify ……..

17. How long the process of identifying your house location on the map using smart phone took?

Please specify…….

- Satisfaction

18. Overall, I am satisfied with the designed desktop application? Please indicate to what extent of the following statements suit you (1= Very satisfied, 2= Satisfied, 3= Neither satisfied nor dissatisfied, 4= Dissatisfied, 5= Very dissatisfied).

Very satisfied Very dissatisfied
1 2 3 4 5

19. Overall, I am satisfied with the designed Smart phone application? Please indicate to what extent of the following statements suit you (1= Very satisfied, 2= Satisfied, 3= Neither satisfied nor dissatisfied, 4= Dissatisfied, 5= Very dissatisfied).

Very satisfied Very dissatisfied
1 2 3 4 5

20. Do you recommend the others to use this system application to identify their location on the map using desktop? Please indicate to what extent of the following statements suit you (1= Strongly agree, 2= Agree, 3= Agree somewhat, 4= Undecided, 5= Disagree somewhat, 6= Disagree, 7= Strongly disagree).

Strongly agree Strongly disagree
1 2 3 4 5 6 7

21. Do you recommend the others to use this model to identify their location on the map using smart phones? Please indicate to what extent of the following statements suit you (1= Strongly agree, 2= Agree, 3= Agree somewhat, 4= Undecided, 5= Disagree somewhat, 6= Disagree, 7= Strongly disagree).

Strongly agree Strongly disagree
1 2 3 4 5 6 7

PART 3: PERSONAL INFORMATION

22. Your Gender is?

☐ Male ☐ Female

23. Your age is?.....

24. Your educational qualification?

☐ PhD ☐ Master's Degree ☐ Bachelor's Degree

☐ GCSE ☐ No formal qualification

☐ Other please explain……...

25. Your job title?

☐ Manager ☐ Employee ☐ Student

☐ Academic staff

☐ Other please explain……...

2. Retailers' and delivery couriers' pre-questionnaire

PART 1: GENARAL INFORMATION

1. Do you use computer in your daily life activities? Please indicate to what extent of the following statements suit you (1= Almost never, 2= Never, 3= rarely, 4= Sometimes, 5= Always).

Almost never				Always
1	2	3	4	5

2. Perceived daily use of computers? Please indicate to what extent of the following statements suit you (1= almost never, 2= never, 3= sometimes, 4=1 hour/day, 5= 2 hours/day, 6= 3 hours/day, 7= more than 4 hours/day).

Almost never						More than 4 hours/day
1	2	3	4	5	6	7

3. Perceived frequency of use of computers? Please indicate to what extent of the following statements suit you (1= once a month, 2= 2-3 times a month, 3= once a week, 4= 2-3 times a week, 5= more than 4 times a week, 6= once a day, 7= several time a day).

Once a month						Several times a day
1	2	3	4	5	6	7

4. Do you use theInternet in your daily life activities? Please indicate to what extent of the following statements suit you (1= almost never, 2= never, 3= sometimes, 4=1 hour/day, 5= 2 hours/day, 6= 3 hours/day, 7= more than 4 hours/day).

Almost never						More than 4 hours/day
1	2	3	4	5	6	7

5. How often do you use the Internet? Please indicate to what extent of the following statements suit you (1= once a month, 2= 2-3 times a month, 3= once a week, 4= 2-3 times a week, 5= more than 4 times a week, 6= once a day, 7= several time a day).

Once a month						Several times a day
1	2	3	4	5	6	7

6. Do you use smart phone in your daily life activities? Please indicate to what extent of the following statements suit you (1= Almost never, 2= Never, 3= rarely, 4= Sometimes, 5= Always).

Almost never				Always
1	2	3	4	5

7. Do you use Internet on your smart phone? Please indicate to what extent of the following statements suit you (1= Almost never, 2= Never, 3= rarely, 4= Sometimes, 5= Always).

Almost never				Always
1	2	3	4	5

8. How do you describe your level of Internet use experience? Please indicate to what extent of the following statements suit you (1= Very poor, 2= Poor, 3= Fair, 4= Good, 5= Very good, 6= Excellent, 7= Expert).

Very poor						Expertise
1	2	3	4	5	6	7

9. Do you use digital maps (e.g. Google maps)for searching for a specific location on the map using desktop? Please indicate to what extent of the following statements suit you (1= Almost never, 2= Never, 3= rarely, 4= Sometimes, 5= Always).

Almost never				Always
1	2	3	4	5

10. Do you use digital maps (e.g. Google maps)for searching for a specific location on the map using smart phone? Please indicate to what extent of the following statements suit you (1= Almost never, 2= Never, 3= rarely, 4= Sometimes, 5= Always).

Almost never				Always
1	2	3	4	5

PART 2: SYSTEM MODEL USAGE

- Ease of use

11. Does using the proposed model is easy to use to search and identify your home location on the map using desktop application? Please indicate to what extent of the following statements suit you (1= Strongly agree, 2= Agree, 3= Agree somewhat, 4= Undecided, 5= Disagree somewhat, 6= Disagree, 7= Strongly disagree).

Strongly agree						Strongly disagree
1	2	3	4	5	6	7

12. Does using the proposed model is easy to use to search and identify your location on the map using smart phone application? Please indicate to what extent of the following statements suit you (1= Strongly agree, 2= Agree, 3= Agree somewhat, 4= Undecided, 5= Disagree somewhat, 6= Disagree, 7= Strongly disagree).

Strongly agree						Strongly disagree
1	2	3	4	5	6	7

- Usefulness

13. Does using the proposed model solve the problem of home delivery when shop online? Please indicate to what extent of the following statements suit you (1= Strongly agree, 2= Agree, 3= Agree somewhat, 4= Undecided, 5= Disagree somewhat, 6= Disagree, 7= Strongly disagree).

Strongly agree						Strongly disagree
1	2	3	4	5	6	7

14. Does using the proposed model increase the chance of improving the process of online shopping and therefore improve trust and satisfaction? Please indicate to what extent of the following statements suit you (1= Strongly agree, 2= Agree, 3= Agree somewhat, 4= Undecided, 5= Disagree somewhat, 6= Disagree, 7= Strongly disagree).

Strongly agree						Strongly disagree
1	2	3	4	5	6	7

15. Does using the proposed system model enhance my decision to adopt online shopping instead of conventional shopping? Please indicate to what extent of the following statements suit you (1= Strongly agree, 2= Agree, 3= Agree somewhat, 4= Undecided, 5= Disagree somewhat, 6= Disagree, 7= Strongly disagree).

Strongly agree						Strongly disagree
1	2	3	4	5	6	7

- Efficiency

16. How long the process of identifying your house location on the map using desktop took?

    Please specify ……..

17. How long the process of identifying your house location on the map using smart phone took?

    Please specify ……..

- Satisfaction

18. Overall, I am satisfied with the designed administrator interface? Please indicate to what extent of the following statements suit you (1= Very satisfied, 2= Satisfied, 3= Neither satisfied nor dissatisfied, 4= Dissatisfied, 5= Very dissatisfied).

Very satisfied				Very dissatisfied
1	2	3	4	5

PART 3: PERSONAL INFORMATION

19. Your Gender is?

☐ Male ☐ Female

20. Your age is?.....

21. Your educational qualification?

☐ PhD ☐ Master's Degree ☐ Bachelor's Degree

☐ GCSE ☐ No formal qualification

☐ Other please explain……...

22. Your job title?

☐ Manager ☐ Employee ☐ Student

☐ Academic staff

☐ Other please explain……...

APPENDEX F: SECOND STUDY PARTICIPANTS' POST-QUESTIONNAIRE

1. Consumers' post-questionnaire

Dear Participant,

The main aim for this research is to improve the delivery service for bought goods online by finding an alternative solution for the problem of lack of postcode system in Jordan.However, the growth of the online shopping activities is hindered by the lack of postcode system - which makes home delivery inefficient and in some cases impossible, as home locations are difficult to find.

The research started by conducting customers' attitudes toward online shopping in Jordan and the delivery problems they face when shop online. Also, retailers and couriers' attitudes toward delivery service in Jordan have been investigated to build a clear overview about the status of online shopping and the delivery service, and find the best solution that fit their requirements.
Now, the idea behind this research is to develop a system model which enables the customers to identify their house location on the map (e.g. Google map) after creating an account with retailer website. The designed system model works on both platforms desktop and smart phone. Desktop platform works as follows: when the customer passes to the checkout process he will be entitled to identify his house location on the map by searching about his address by entering his street name in the provided search box; after that a marker will appear on entered street location. Then, the customer will be required to move the marker on the map to his house exact location. In addition, the customer will be required to provide extra information about the delivery address (e.g. house/flat number, street name and area name). Smart phone platform works as follows: when the customer passes to the check out process, he will be entitled to identify his house location on the map. Smart phone users will not be required to search about their house location on the map; the embedded GPS receiver will identify the current location of the mobile device user. If the customer wants his goods to be delivered to his current location he just has to confirm the delivery address as his current location on the map and fill the required information fields that mentioned before. Otherwise, he must search for the other delivery address on the map and go through same steps in the desktop platform. Finally, the provided information will be submitted to the retailer/courier to enable them to create the route from their depot/shop location to the customer house location and import it to their GPS device.

This questionnaire aims to validate this system model by collecting your feedback about it in order to adopt it as a final solution for this research problem. Your cooperation will be highly appreciated and the provided information will be confidential and will only be used for this research.

Note: The participation in this survey is voluntary and you have the right to withdraw at any time without giving the reasons.

PART 1: GENARAL INFORMATION

1. Do you use the Internet in your daily life activities? Please indicate to what extent of the following statements suit you (1= almost never, 2= never, 3= sometimes, 4=1 hour/day, 5= 2 hours/day, 6= 3 hours/day, 7= more than 4 hours/day).

Almost never						More than 4 hours/day
1	2	3	4	5	6	7

2. How often do you use the Internet? Please indicate to what extent of the following statements suit you (1= once a month, 2= 2-3 times a month, 3= once a week, 4= 2-3 times a week, 5= more than 4 times a week, 6= once a day, 7= several time a day).

Once a month						Several times a day
1	2	3	4	5	6	7

3. Do you use smart phone in your daily life activities? Please indicate to what extent of the following statements suit you (1= Almost never, 2= Never, 3= rarely, 4= Sometimes, 5= Always).

Almost never				Always
1	2	3	4	5

4. Do you use Internet on your smart phone? Please indicate to what extent of the following statements suit you (1= Almost never, 2= Never, 3= rarely, 4= Sometimes, 5= Always).

Almost never				Always
1	2	3	4	5

5. How do you describe your level of Internet use experience? Please indicate to what extent of the following statements suit you (1= Poor, 2 = Fair, 3 = Good, 4 = Very good, 5 = Excellent).

Poor				Excellent
1	2	3	4	5

6. Have you bought anything from online shopping websites? Please indicate to what extent of the following statements suit you (1= Almost never, 2= Never, 3= rarely, 4= Sometimes, 5= Always).

Almost never				Always
1	2	3	4	5

7. How often do you use the Internet for shopping? Please indicate to what extent of the following statements suit you (1= Daily, 2= Every two days, 3= Every four days, 4= Every week, 5= Every two weeks, 6= Every month).

Daily					Monthly
1	2	3	4	5	6

8. How do you describe your level of online shopping experience? Please indicate to what extent of the following statements suit you (1= Poor, 2 = Fair, 3 = Good, 4 = Very good, 5 = Excellent).

Poor				Excellent
1	2	3	4	5

PART 2: SYSTEM MODEL USAGE

- Ease of use

9. Does using the proposed model is easy to use to search and identify your home location on the map using desktop application? Please indicate to what extent you agree or disagree to the following statements regarding on scale of 5 (1=Strongly agree, 2= Agree, 3=Neutral, 4= Disagree and 5= Strongly disagree).

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

Any Suggestions…….

10. Does using the proposed model is easy to use to search and identify your location on the map using smart phone application? Please indicate to what extent you agree or disagree to the following statements regarding on scale of 5 (1=Strongly agree, 2= Agree, 3=Neutral, 4= Disagree and 5= Strongly disagree).

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

Any Suggestions…….

- Usefulness

11. Does using the proposed model solve the problem of home delivery when shop online? Please indicate to what extent you agree or disagree to the following statements regarding on scale of 5 (1=Strongly agree, 2= Agree, 3=Neutral, 4= Disagree and 5= Strongly disagree).

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

Any Suggestions…….

12. Does using the proposed model increase the chance of improving the process of online shopping? Please indicate to what extent you agree or disagree to the following statements regarding on scale of 5 (1=Strongly agree, 2= Agree, 3=Neutral, 4= Disagree and 5= Strongly disagree).

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

Any Suggestions…….

13. Does using the proposed system model enhance my decision to adopt online shopping instead of conventional shopping? Please indicate to what extent you agree or disagree to the following statements regarding on scale of 5 (1=Strongly agree, 2= Agree, 3=Neutral, 4= Disagree and 5= Strongly disagree).

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

Any Suggestions…….

14. Does using this system model enhance the effectiveness of home delivery service? Please indicate to what extent you agree or disagree to the following statements regarding on scale of 5 (1=Strongly agree, 2= Agree, 3=Neutral, 4= Disagree and 5= Strongly disagree).

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

Any Suggestions…….

- Efficiency

15. How long the process of identifying your house location on the map using desktop took?

Please specify ……..

16. How long the process of identifying your house location on the map using smart phone took?

Please specify ……..

- Satisfaction

17. Overall, I am satisfied with the designed desktop application? Please indicate to what extent of the following statements suit you (1= Very satisfied, 2= Satisfied, 3= Neither satisfied nor dissatisfied, 4= Dissatisfied, 5= Very dissatisfied).

Very satisfied Very dissatisfied
1 2 3 4 5

18. Overall, I am satisfied with the designed Smartphone application?Please indicate to what extent of the following statements suit you (1= Very satisfied, 2= Satisfied, 3= Neither satisfied nor dissatisfied, 4= Dissatisfied, 5= Very dissatisfied).

Very satisfied Very dissatisfied
1 2 3 4 5

PART 3: PERSONAL INFORMATION

19. You're Gender?

☐ Male ☐ Female

20. Your age is?.....

21. Your highest educational qualification?

☐ PhD ☐ Master's Degree ☐ Bachelor's Degree

☐ GCSE ☐ No formal qualification

☐ Other please explain……...

22. Your job title?

☐ Academic staff ☐ Student

☐ Other please explain……...

2. Retailers' and delivery companies' post-questionnaire

PART 1:GENARAL INFORMATION

1. Do you have online shopping website for selling you products?

   ☐ Yes ☐ No

2. Have you sold anything online? Please indicate to what extent of the following statements suit you (1= Almost never, 2= Never, 3= rarely, 4= Sometimes, 5= Always).

   Almost never Always
   1 2 3 4 5

3. How long you have been selling your products through online channel?

   Please specify……..

4. How do you describe your level of experience in online shopping as a business? Please indicate to what extent of the following statements suit you (1= Poor, 2 = Fair, 3 = Good, 4 = Very good, 5 = Excellent).

   Poor Excellent
   1 2 3 4 5

5. Are you delivering orders bought online to its consumers? Please indicate to what extent of the following statements suit you (1= Almost never, 2= Never, 3= rarely, 4= Sometimes, 5= Always).

   Almost never Always
   1 2 3 4 5

6. Do you have a delivery system for delivering you customers' orders? Please indicate to what extent of the following statements suit you (1= Almost never, 2= Never, 3= rarely, 4= Sometimes, 5= Always)

   Almost never Always
   1 2 3 4 5

7. Do you use positioning technologies such as in-car/handheld GPS device to get the delivery directions to the customer's house?

   Almost never Always
   1 2 3 4 5

8. How do you describe your level of experience of home delivery service? Please indicate to what extent of the following statements suit you (1= Poor, 2 = Fair, 3 = Good, 4 = Very good, 5 = Excellent).

Poor				Excellent
1	2	3	4	5

PART 2:SYSTEM MODEL USAGE

- Ease of use

9. Does using the proposed system is easy to use for delivery routes planning? Please indicate to what extent you agree or disagree to the following statements regarding on scale of 5 (1=Strongly agree, 2= Agree, 3=Neutral, 4= Disagree and 5= Strongly disagree).

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

Any Suggestions…….

10. Does using the proposed model enable mefrom exporting customer's order information as excel sheet including delivery address details? Please indicate to what extent you agree or disagree to the following statements regarding on scale of 5 (1=Strongly agree, 2= Agree, 3=Neutral, 4= Disagree and 5= Strongly disagree).

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

Any Suggestions…….

- Usefulness

11. Does using the proposed model solve the problem of home delivery of online shopping? Please indicate to what extent you agree or disagree to the following statements regarding on scale of 5 (1=Strongly agree, 2= Agree, 3=Neutral, 4= Disagree and 5= Strongly disagree).

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

Any Suggestions…….

12. Does using the proposed system model enhance my decision to adopt online shopping as a business? Please indicate to what extent you agree or disagree to the following statements regarding on scale of 5 (1=Strongly agree, 2= Agree, 3=Neutral, 4= Disagree and 5= Strongly disagree).

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

Any Suggestions…….

13. Does using the proposed model enables me to find delivery address location easily? Please indicate to what extent you agree or disagree to the following statements regarding on scale of 5 (1=Strongly agree, 2= Agree, 3=Neutral, 4= Disagree and 5= Strongly disagree).

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

Any Suggestions…….

14. Does using the proposed model enables me to plan the delivery route to the customer house? Please indicate to what extent you agree or disagree to the following statements regarding on scale of 5 (1=Strongly agree, 2= Agree, 3=Neutral, 4= Disagree and 5= Strongly disagree).

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

Any Suggestions……..

15. Does using the proposed model enables me to import the delivery route information into GPS Device to get the driving directions to the required destination? Please indicate to what extent you agree or disagree to the following statements regarding on scale of 5 (1=Strongly agree, 2= Agree, 3=Neutral, 4= Disagree and 5= Strongly disagree).

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

Any Suggestions…….

- Efficiency

16. Does using this system saves me time to find customers' house location? Please indicate to what extent you agree or disagree to the following statements regarding on scale of 5 (1=Strongly agree, 2= Agree, 3=Neutral, 4= Disagree and 5= Strongly disagree).

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

Any Suggestions……

17. How long the process of planning delivery routes took?

Please specify ……..

- Satisfaction

18. Overall, I am satisfied with designed system administrator platform?

Very satisfied						Very dissatisfied
1	2	3	4	5	6	7

PART 3:PERSONAL INFORMATION

19. You're Gender?

☐ Male ☐ Female

20. Your age is?.....

21. Your highest educational qualification?

☐ PhD ☐ Master's Degree ☐ Bachelor's Degree

☐ GCSE ☐ No formal qualification

☐ Other please explain……...

22. Are you?

☐ Retailer employee ☐ Delivery logistics employee

23. Your job title?

☐ Manager ☐ Employee

☐ Other please explain……...

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