Electronic Commerce Logistics in Developing Countries: The Case of Online Grocery Shopping in Jordan

A Thesis submitted for the degree of Doctor of Philosophy

By

Mohammed Khaled Al-Nawayseh

School of Engineering and Design

Brunel University

London, United Kingdom

June 2012

ABSTRACT

Online grocery shopping is one of the Internet business applications that received much attention in the last few years. Online grocery shopping has grown at a fast scale in the developed countries, where customers and retailers have benefited from it. However, this service remains in its infancy stage in developing countries.

Groceries are one of the most difficult objects to sell online mainly, because of sensory and delivery issues. Online customers still worry about product quality, and they demand optimum logistical services, convenience, reliability and timely delivery service. Therefore, retailers have to respond to these expectations by developing convenient logistical services while keeping this process cost-efficient as much as possible.

The main aim of this research is to design an e-commerce logistical decision support system for grocery retailers in Jordan as a case study of applying online grocery shopping in a developing country. Grocery retailers will be exposed to this model, and will be able to determine the most suitable logistical delivery system in the future.

In order to achieve this aim, the designed system incorporates a web ordering system to collect customer orders, embedded map source (Google Maps) and a database system. The collected data then exported to one of the available routing and scheduling online solutions in order to identify, analyze and statistically compare the cost efficiencies of the available delivery alternatives.

Moreover, two specially designed questionnaires were distributed among a group of customers and grocery retailers in Jordan, asking about their attitudes towards online grocery shopping and its delivery service. The results from analyzing the questionnaires data statistically were also used as input parameters for the designed system evaluation process.

The findings from the questionnaires data statistical analysis indicated that Jordanian customers and retailers have positive attitudes towards online grocery shopping. The results also showed that customers and retailers have serious concerns towards the delivery service in Jordan. Customers are mainly worried about the availability of a suitable delivery service, while retailers are worried about the market size for the delivery service.

The findings from implementing and statistically testing the proposed model over three delivery alternatives showed that there are differences between the mean values of the delivery alternatives among their key performance indicators (cost, distance and time). The questionnaire respondents indicated that they both prefer the pickup point service after home delivery for customers and after shop pickup for retailers. Depending on the level of investments that grocery retailers would like to implement and according to the experiment results, it could be concluded that pickup point solution is the best logistical strategy for retailers to start with.

ACKNOWLEDGEMENTS

First of all , I would like to express my appreciation to my sponsor 'Jerash Private University' in Jordan for giving me the opportunity to complete my PhD.

I would like also to express my sincere appreciation to my supervisor Prof.Wamadeva Balachandran for his support and guidance during this research.

I would like to thank Dr.Vanja Garaj and Dr.Ziad Hunaiti for their useful comments.

Finally , my deepest appreciations to my family , friends in UK and Jordan.

LIST OF ABBREVIATIONS

3PL	Third Party Logistics.
E-Commerce	Electronic Commerce.
GPS	Global Positioning System.
ICT	Information and Communication Technology.
ISP	Internet Service Provider.
IT	Information Technology.
KPIs	Key Performance Indicators.
MNC	Multi-National Corporation.
OGS	Online Grocery Shopping.
ROI	Return of Investments.
SCM	Supply Chain Management.
SDLC	System Development Life Cycle.
SMEs	Small and Medium Enterprises.

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND

In the last decades, information and communication technology (ICT) has been spread around the globe driven by its achieved benefits. ICT played an important role in bridging the gap between the developed and the developing countries as it lead to a rapid increase in wealth as well as several improvements in numerous countries in terms of social and personal welfare (Mofleh, 2008). During this era, the Internet has been increasingly used to facilitate business transactions, not only between different business entities, but also between business entities and customers (Kurnia & Chien, 2003).

Online grocery shopping is one of the Internet business applications that received much attention in the last few years (Kurnia & Chien, 2003).Online grocery shopping means ordering groceries online; the websites of the grocery stores offer an electronic ordering interface for the customers, then the retailer takes care of the processes of goods packaging and delivery to the customer (Kurnia, 2008).

Online grocery shopping has many potential benefits to customers, mainly in terms of better prices, large selection, convenience and time-savings (Darian, 1987; Burke, 1997; Ghazali, Mutum & Mahbob, 2006). However, customers' attitudes towards online grocery shopping remain sceptical, mainly because of worries about product quality, product delivery, and security and privacy issues (Ghazali et al., 2006; Scott & Scott, 2008).

However, grocery retailers ultimately obtain significant benefits from online grocery shopping, as it leads to producing revenues as well as reducing cost (Van Akkeren & Cavaye, 1999; MacGregor & Vrazalic, 2005). However, groceries are one of the most difficult objects to sell online; material flows are different from information flows, the number of frequent customers is large, the shopping basket may contain many items and delivery systems are critically important (Kurnia & Chien, 2003). Furthermore, groceries present a more difficult form of electronic commerce than products such as books or clothes, because of low value-to-weight ratio of groceries, limited delivery time windows and the shelf-time limitations of perishable goods (Kurnia & Chien, 2003).

The growth of online grocery shopping has increased the importance of direct delivery to customers. However, product delivery logistics or last mile logistics are considered to be one of the most challenging issues in online grocery retailing, and delivery problems have led to the failure of many online grocery pioneers (Punakivi & Saranen, 2001; Boyer, 2005, 2009). Frazer (2000) identified that time constraints, poor service quality and lack of suitable delivery modes were

influential factors that make order fulfilment the most important, expensive and critical operation for online retailers.

In the traditional grocery shopping environment, customers' products selections are fulfilled by self-logistics activities (Ingene, 1984; Casper, 2006). Customers come to the supermarket or shop, pick up their groceries, pay at the check-out, and carry their purchases home. This logistical plan has been changed with the rise of online grocery shopping. The retailer now takes responsibility for fulfilling online customer orders (Yousept and Li, 2004; Boyer, 2005). This responsibility includes a group of activities beginning in the grocery store and terminating in the home (or other delivery location), including activities such as planning, organizing and product dispatching (Yousept and Li, 2004; Fishman, 2005; Xiangyang et al., 2010). However, online grocery customers are expecting high logistical services, demanding convenience, high reliability and timely delivery service (Boyer, 2009). Therefore, retailers have to respond to these expectations with convenient logistical services. Retailers must have a balancing strategy that is cost-effective and that meets customers' expectations where the last mile challenge arises (Delaney-Klinger et al., 2003; Fishman, 2005; Xiangyang et al., 2010).

While online grocery shopping adoption has been steady in developed countries, there is still doubt about its capabilities in developing countries. This could be explained by the differences between these countries in terms of ICT readiness levels, transportation infrastructure, social and cultural environments, political environments, business conditions and consumers' attitudes (Kurnia, 2008).

Developing countries are often conceptualised as the newly emerging economies of Asia, Africa, South America and the Pacific region (Efendioglu et al., 2004).

These countries are associated with negative indices of poverty, instability and insecurity (Efendioglu et al., 2004). They are also at the receiving end of technological developments in the areas of information technologies.

Jordan is a developing, middle income country with limited natural resources. However, it is considered as a liberal and modern economic regional model for developing countries (MOP, 2011). This is due to its highly educated population, strong leadership and active private sector, which interact to embrace novelties in many fields, especially ICT (Al-Qirim, 2010).

In Jordan, nearly all registered grocery retailers are considered to be small and medium-sized enterprises (SMEs), with under 100 employees (Department of Statistics, 2010; Jordan Small Businesses and Human Development Report, 2011). SMEs in general have a limited market share, a narrow range of products or services and limited resources (financial, time, personnel and technical) (Kartiwi & MacGregor, 2007). These characteristics and many others might affect SMEs operations if they decide to adopt online service and its delivery logistics.

1.2 MOTIVATIONS

Online grocery shopping is one of the Internet business applications that have received most attention in the last few years. Online grocery shopping has many potential benefits for customers, mainly in terms of better prices, large selection, convenience and time-saving (Darian, 1987; Burke, 1997; Ghazali, Mutum & Mahbob, 2006). Grocery retailers ultimately obtain significant benefits from online grocery shopping as it generates revenue while reducing costs (Van Akkeren & Cavaye, 1999; MacGregor & Vrazalic, 2005). However, groceries purchases are one of the most difficult transactions to conduct online, for both customers and retailers (Kurnia & Chien, 2003; Ghazali et al., 2006; Scott & Scott, 2008). Problems arise due to the gap between material flows and information flows; customers have worries regarding quality and security issues. For grocery retailers, the perishable nature of many goods, the low value-to-weight ratio of most groceries, and limited delivery time windows make online selling much more problematic than for products such as books or clothes (Kurnia & Chien, 2003).

The growth of online grocery shopping has increased the importance of direct delivery to customers. However, product delivery logistics or last mile logistics are considered as one of the most challenging issues in online grocery retailing, as it lead to the failure of many online grocery pioneers (Punakivi & Saranen, 2001; Boyer et al., 2005, 2009).

While online grocery shopping and its delivery service have grown at a fast scale in the developed countries, it is still in its infancy stage in the developing countries.

In Jordan nearly all the registered grocery retailers are considered as being small and medium-sized enterprises (SMEs) with a number of employees ranging from (1-99) (department of statistics, 2010; Jordan Small Businesses and Human Development Report, 2011).

The importance of the SMEs comes from their significant contribution to the national economies of developing nations in terms of revenue generation, innovation and technological advancement, as well as extensively providing employment, services and products (Raman & Yap, 1996). Moreover, SMEs are flexible, adaptive and innovative businesses compared to larger companies, which might be slowed by bureaucracy and stricter staffing hierarchies (Kotey & Meredith, 1997). However, SMEs in general have a limited market share, narrow range of products or services and limited resources (financial, time, personnel and technical) (Kartiwi & MacGregor, 2007). These characteristics and many others might affect SMEs operations if they decided to start online service and its delivery logistics.

Due to the lack of research about online grocery shopping and its delivery services in developing countries, this research will study the attitudes of customers and retailers towards this service. Moreover, due to the nature of grocery retailers in Jordan as SMEs with limited resources and intuitive decision making processes, a logistical decision support system was suggested to help them

due to the lack of cost efficient logistical modelling solutions. Grocery retailers can use this model in order to select the most the suitable delivery operating system in the future.

The results from this research will benefit different groups like logistical companies and grocery retailers who are willing to invest in this kind of retailing. Moreover, the research findings also assist the Jordanian Government and local authorities by presenting a group of guidelines to help and support grocery SMEs to adopt this service.

It is hoped that, learning from the previous experience and advancements of others, Jordanian SMEs, which form an intrinsic part of Jordanian life, can adapt to the realities of the modern globalised world and generate indigenous solutions to enhance their business capabilities, and ultimately to facilitate easier exchange of goods and services among Jordanians, pioneering the successful adoption of e-commerce for developing and regional countries.

1.3 RESEARCH AIM AND OBJECTIVES

The main aim of this research is to design an e-commerce logistical decision support system for grocery retailers in Jordan as a case study of developing countries. Grocery retailers can utilise this model in order to select the most suitable logistical delivery system for them in the future.

This aim was achieved by performing these specific objectives:

- Conduct a comprehensive literature review in order to investigate online grocery industry and its logistical concerns in developed and developing countries.
- Identify customers' and retailers' perceptions about online grocery shopping in Jordan.
- Identify customers' and retailers' concerns about online grocery shopping and its logistical services in Jordan.
- Investigate the design of the traditional grocery supply chain in Jordan.
- Design a specific online grocery ordering system incorporating with Google Maps and a database source to store customers' order data.
- Implement the designed system using one of the available online routing and scheduling logistical solutions in order to analyse and statistically compare the cost efficiencies of the alternative solutions in home delivery operations in Jordan.

1.4 RESEARCH METHODOLOGY

This research was carried out using primary and secondary research approaches:

- For the first objective, the secondary research approach was used. Using this approach, an extensive review was conducted on literature related sources such as books, journals and conference papers.
- For the second and third objectives, a primary quantitative research approach was used, in which two questionnaires were distributed among customers and grocery retailers in Jordan. The collected data then statistically tested using SPSS.15 package by formulating hypothesises in order to know customers and retailers perceptions toward online grocery shopping and home delivery service models in Jordan.
- For the Forth objective, the obtained results from the questionnaires, statistics from governmental and global sources and deep investigation about the Jordanian grocery industry were used in order to design the traditional grocery supply chain in Jordan and its materials flow.
- For the last two objectives of this research, the .NET package and Google Maps were used in order to design the online ordering system. One of the available online scheduling and routing logistical solutions 'My Online Route' was also used to implement the logistical system based on a real traditional grocery shopping point-of-sale data. The results then statistically evaluated using SPSS.15 package.

1.5 CONTRIBUTION TO KNOWLEDGE

This research will contribute to the body of knowledge about online grocery shopping and its logistical services in developing countries. These contributions can be found in the following fields:

- The investigated motivational and inhibiting factors of online grocery shopping as well as the delivery service concerns from customers' and retailers' perspectives in Jordan. These factors might be also applicable in other developing countries which share the same culture, infrastructure and ICT capabilities like the Arab countries.
- The designed traditional grocery supply chain structure in Jordan can be also used as a base structure for the grocery supply chain in other developing countries in order to help in the redesigning process to the new online grocery supply chain.
- The designed logistical decision support system for grocery retailers is considered a useful, cheap and easy solution for grocery retailers in Jordan and other developing countries. The purpose of this design is to give the service providers first-hand knowledge needed to select the suitable delivery service.
    - The designed online ordering system can be generalized for grocery retailers in Jordan and other developing countries. The checkout section of the ordering system, especially the delivery component, can also be considered to be a temporal solution for the lack of postal code system in the developing countries.

- The findings from testing the system over three different delivery alternatives suggested that the pickup point choice is the best initial delivery service for grocery retailers who want to adopt online grocery and its logistical services.

- The overall findings can be useful for different sectors interested in this area, like logistical companies, grocery retailers and local governments in Jordan and other developing countries.
- The research outcomes have been published in a number of international Journals and conferences (Appendix 1).

1.6 THESIS OUTLINES

The thesis consists of six chapters, including the introduction. The following section describes the remaining chapters:

- Chapter 2 presents the related literature review. In this chapter a critical investigation about online grocery shopping industry and its related logistical issues is presented in detail.
- Chapter 3 presents Jordanian customers' attitudes towards online grocery shopping and its related delivery service. The research methodology for this chapter is also presented, as well as the structure of the distributed questionnaire. The findings are also presented, followed by discussion of them, and finally a short summary about initial findings is drawn.
- Chapter 4 presents Jordanian retailers' attitudes towards online grocery shopping and its related delivery service. The research methodology for

this chapter was also presented here as well as the structure of the distributed questionnaire. The findings were also presented followed by their discussions and finally a short summary about these findings is drawn.

- Chapter 5 presents the designed system development processes. The evaluation stage was then presented in details followed by the results from testing the system on a real point-of-sale data. Finally a brief summary about the model and its results is presented.
- Chapter 6 presents the research conclusions, recommendations for governments and companies to build a successful online business models. Further research recommendations were also presented followed by the research limitations.

CHAPTER 2

BACKGROUND AND LITERATURE REVIEW

2.1 INTRODUCTION

Online grocery shopping is one of the Internet business applications that received much attention in the last few years. Online grocery shopping means ordering groceries online; the websites of the grocery stores offer an electronic ordering interface for the customers, then the retailer takes care of the processes of goods packaging and delivery to the customer (Kurnia, 2008).

Groceries are one of the most difficult objects to sell online mainly, because of sensory and delivery issues. Online customers still worry about product quality, and they demand optimum logistical services, convenience, reliability and timely delivery service. Therefore, retailers have to respond to these expectations by developing convenient logistical services while keeping this process cost-efficient as much as possible.

Online grocery shopping has grown at a fast scale in the developed countries, where customers and retailers have benefited from it. However, this service remains in its infancy stage in developing countries. This could be explained by the differences between these countries in terms of ICT readiness levels, transportation infrastructure, social and cultural environments, political environments, business conditions and consumers' attitudes (Kurnia, 2008).

2.2 ONLINE GROCERY SHOPPING

2.2.1 INDUSTRY BACKGROUND

Online Grocery Shopping was first offered in the United States in the late 1980s (Belsie, 1998; Kurnia, 2003) as many of US-based retailers such as Peapod, Streamline, Netgrocer entered the market. Since then European countries like Switzerland, Sweden, Denmark, Finland, UK and other developed nations such as Australia, Japan and Singapore followed the market trend and many big grocery retailers have also appeared in these countries such as Tesco, Sainsbury, Albert Heijn and Carrefour (O'connor, 1998). Table (2.1) gives examples from global leaders in the grocery market. Initially there was a great optimism about this industry to be amongst the fastest growing online businesses around the world. This was aided by High-volume with low-margins (such as food and logistics) and the net cost savings from automation (Tanskanen, Yrjölä & Holmström, 2002a; Chaudhry, 2006). However, optimism was replaced by scepticism when Webvan (the pioneer of online grocery business based in USA) decided to file for bankruptcy in July 2001 due to its inability to find an optimal and sustainable business model (Tanskanen, Yrjölä & Holmström, 2002a). After that various aspects of online grocery shopping have been studied to identify the characteristics that can contribute to building a successful online grocery business. Many of these studies have compared the successful and less successful companies in this industry and others related to the customer's attitudes and willingness towards online grocery shopping.

	Tesco UK	Sainsbury's UK	Webvan USA	Streamline USA	Peapod USA	Carrefour France	Ito-Yokado Japan
Background	The biggest supermarket chain in the UK	The second largest supermarket chain in the UK	Started as a pure e-grocer in1999	Started as a pure e-grocer in 1992	Started home delivery service before the Internet in 1989	The largest hypermarket chain in the world in terms of size	The largest supermarket chain in the Japan
Investments in e-grocer development (Approx. in US millions)	$58	$40	$120	$80	$ 150	$100	$140
Main operational mode	Industrialized picking from the supermarket	Picking from the supermarket or (DC) in London.	Highly automated picking in distribution centre (DC)	Picking from the distribution centre, reception boxes, value adding services	Picking from both (DC) and stores	Picking from the supermarket	Picking from the supermarket
Current status	The biggest e-grocer in the world. Expanding its operations outside the UK. Partnering with Safeway and Groceryworks.	53 stores occupying 73% of UK	Operations ceased July 2001 Bankrupt	Parts of operations were sold to Peapod in September 2000. The rest of operations ceased in November 2000.	Bought by global grocery retailer Royal Ahold. Second biggest e-grocer in the world.	announced that it was "highly likely" that it would dispense with its Champion fascia, with all stores expected to be rebranded under the Carrefour name	There are 174 Ito-Yokado stores operating in Japan. Expanded to China, where they formed a joint venture with Wangfujing Department Store and China Huafu Trade & Development Group Corp

Table (2.1): Leading retailers in the grocery market (Goldman, 1993;Tanskanen, Yrjola and Holmstrom, 2002, Chaudhry, A. ,2006.)

2.2.2 ONLINE GROCERY SHOPPING IN THE DEVELOPING COUNTRIES

In the developing countries, retailers are still at the fancy stage about this kind of retailing. A few successful online grocery retailers have appeared, especially in china and Indonesia such as Suguo and Carrefour as a kind of foreign and national investments (Kurnia, et al., 2007).

These companies are facing significant barriers to implement their online business models due to poor national infrastructure, weak legal framework, lack of timely and reliable systems for the delivery of physical goods and many other challenges which are all hindering the diffusion of e-commerce technologies in developing countries (Kurnia & Chien, 2003). On the other hand, only a few identifiable e-grocery shopping driving forces were found such as cost reduction, trading partner demands and telecommunication privatization (Kurnia, et al., 2007; Kurnia, 2008).

The myriad challenges to online retailing of groceries outlined above, which proved to be significant barriers to the successful adoption of this medium of grocery shopping even in more developed countries, make its adoption even more challenging for retailers in developing countries.

The challenges involved can be ascertained from studying the most successful online grocery retailer, Tesco PLC. It began online retailing as early as 1996, but it took many years of investment to achieve its current success, particularly in IT infrastructure, and the real breakthrough came a decade after the foundation of the

online service in 2006, when Tesco Direct was launched, based on Microsoft BizTalk Server 2006, an ordering system capable of processing 5,000 orders per hour (Microsoft, 2007). Tesco Direct averages 30% growth per year in the UK, Ireland and South Korea, and it generated over £1 billion revenue in the UK alone in 2007, with over 250,000 orders per hour (Microsoft, 2011).

However, Tesco is a massive Multi-National Corporation (MNC) employing hundreds of thousands of people; as previously observed, the Jordanian grocery market is chiefly dominated by SMEs, without the vast logistical networks and research and development capabilities of MNCs.

2.2.3 ONLINE GROCERY SHOPPING CONCERNS

There are many challenges for e-grocers to overcome. Issues to address include sensory, substitution, handling, temperature, and delivery complexity.

- Sensory Concerns

Groceries are tangible and perishable products which are difficult to evaluate their quality online, especially non packaged items like fruit (Boyer et al., 2005). Customers usually prefer to touch and feel their groceries before buying; this feature unfortunately is unavailable with online retailing.

However, retailers should attract customers to buy by vouchers as well as more product information (Jelassi et al., 2001).

- Substitution Concerns

Sufficient demand with limited capacity would result with out of stock items problem (Jelassi et al., 2001); these items need to be substituted as a service by retailers. Moreover, return rates for groceries are relatively low comparing to other products (Carrins, 2005) . Retailers have developed strategies to overcome these issues like penalty charges in addition to the substitution process. However, retailers don't know what they should offer to their customers as a substitution for their online orders. Customers need to see their selected items and which substitution they would be satisfied with (Hoyt, 2001).

- Handling Concerns

Selling soft fruits, vegetables and fragile items would increase the operational complexity of online retailers (Boyer et al., 2005). These items need a special handling process managed by trained employees. This challenge is critical, since online retailers need to build customer loyalty by offering good packaged and packed items.

- Temperature Concerns

Groceries are temperature sensitive products and in order to fulfil them to customer home, controlled temperature trucks need to be used (Kirkpatrick, 2002; Hays et al., 2004). In traditional retailing, the challenge with such kinds of groceries is only in stores and inventories while with online retailing, the operational complexity will be increased.

- Delivery Concerns

Customers usually want their groceries as soon as possible after making their online purchase. Unlike other products, grocery is characterised by its quick delivery with narrow time windows. In general, delivery concerns like time, place and mode are challenging online retailers and increasing the operational cost (Kirkpatrick, 2002; Boyer et al., 2005). Online grocery market with insufficient demand and far deliveries will add more cost over both retailers and customers (Jelassi et al., 2001). Customers expect their orders to be home on time and without failed risks, otherwise they won't buy again.

2.2.4 THE FALL OF E-GROCERS

Many pure play internet grocery retailers have failed to build a successful business due to many factors, only three of them seem to be significant (Tigert, 2001; Tarnowski, 2006).

First, they did not achieve the needed competitive advantages over the traditional grocery retailers from the distribution channel dimensions.

Second, they did not develop a profitable online business model regardless what was the used logistical model. The most three surviving business models in the online grocery businesses are: fulfilment from stores model, such as Tesco and Safeway; fulfilment from distribution centres model, such as Fresh Direct and hybrid fulfilment model such as Sainsbury's (Punakivi & Saranen, 2001; Boyer., 2002; 2004; 2005; Scott. et al., 2006).

Third, they have overestimated the home delivery market size.

- With the all efficient logistical solutions, why online grocers have failed?

The reasons behind this failure are identified:

- Over-investment in picking automation.
- Expensive home deliveries.
- Weak negotiation and purchasing power with suppliers.
- Customer acquisition.
- Low ordering frequency.
- Lack of services.

2.2.5 GUIDELINES FOR PROFITABLE E-GROCERY BUSINESS

In order to setup a profitable online grocery business, grocery retailers have to follow a group of directions (Tanskanen, et.al, 2002; CEllis, 2003):

- Focus on the local customer density, copy the traditional business and paste it online to make it big.
- Build and maintain trust as online grocery is a loyalty business. This means high quality customer service on top of retailer's priorities.
- The buying power should be at least as strong as supermarkets have, acquire a traditional grocery shopping then expand the business by developing an online service.
- Provide a high service levels by taking care of the operational efficiency, start with store based services, when business volumes are being satisfied switch to the hybrid then the distribution centres fulfilment services.

- Design a good ordering interface and provide more information about the products.
- Enlarge the range of products offered to high margin non-grocery items when an effective logistics system to households is built and there is a base of loyal customers.

2.3 ONLINE GROCERY SHOPPING MOTIVATING FACTORS

Online grocery shopping is one of the Internet business applications that received much attention in the last few years, customers and retailers have benefited from adopting this service (Kurnia & Chien, 2003; Ghazali et al., 2006)

2.3.1 MOTIVATING FACTORS FOR CUSTOMERS

Online grocery customers mainly benefit from convenience and time saving offered by this service followed by physical considerations that made traditional grocery shopping difficult for elderly and disabled customers (Ghazali et al., 2006; Morganosky & Cude, 2000b; Pechtl, 2003).

Online shopping convenience gives customers the ability to:

- Carry out transactions at any time of the day since online grocery stores are supposed to operate 24/7 hours (Ghazali et al., 2006; Tanskanen, Yrjölä, & Holmström, 2002a).
- Select among product and service according to the brand, prices and others by advanced web searching (Balasubramanian, & Bronnenberg, Peterson, 1997).

- Receive more attractive coupons and sales promotional offers over the internet (Peterson et al., 1997; Scott & Scott, 2008).
- Receive more information about the products such as nutritional information and expiry dates (Fishman, 2005) cited in (Scott & Scott, 2008).
- Enjoy the facilities offered by the store website such as: shopping lists, Email lists, and comments (Fishman, 2005) cited in (Scott & Scott, 2008).
- Access the broad shopping services especially for people who living in rural areas (Ghazali et al., 2006; Scott & Scott, 2008).

Furthermore, according to (Burke, 1997; Darian, 1987) online grocery shopping saves consumers' time by avoiding several processes in traditional shopping such as planning time, parking time, waiting and carrying time and transportation time.

This hassle free experience will absolutely encourage busy and relatively wealthy consumers who are willing to pay for the delivery service (Salste, 1996); they will also have more time to shop their special or luxurious items from traditional stores (Ghazali et al., 2006).

2.3.2 MOTIVATING FACTORS FOR GROCERY SMES

SMEs adoption of the Internet is driven by the potential business benefits and opportunities that e-commerce offers to them in terms of producing revenues and reducing cost (Keeling et al., 2000). The external pressures from competitors, customers, business or industry partners, media and local governments also force firms to adopt e-commerce (Bellaaj et al, 2008).

Significant benefits have been achieved by SMEs that adopt e-commerce (Van Akkeren & Cavaye, 1999; MacGregor & Vrazalic, 2004). According to (Payne; Hutt & Speh, 1998) the perception of the e-commerce benefits would not be equal among SMEs from different sectors, e-commerce is most likely to benefit sectors that have information-intensive activities and products that can be used or delivered electronically. Other factors may also influence the degree of benefits perception among SME's are: types of businesses (governmental, local or foreign organisations), sizes of the businesses, characteristics of products, number of product categories etc. (Filiatrault & Huy, 2006).

- Benefits Classifications

Researchers have identified various categorizations/classifications of e-commerce benefits. (Poon & Strom, 1996; Poon & Swatman, 1997) categorized e-commerce benefits into direct or indirect, readily quantifiable or not easily quantifiable and short term or long-term benefits. Direct benefits or quantifiable benefits are easily measured using data analysis techniques, e.g. the number of new customers as a result of e-commerce implementation. Indirect benefits are not easily measured

but rather have a positional effect on the business, e.g. customer loyalty and acceptance as a result of added value and services provided online. Short-term benefits should be realised within months, whereas long-term benefits may take longer to be achieved and are unpredictable.

(Abell & Lim, 1996) also categorized e-commerce benefits into tangible and intangible benefits. (Kurnia, 2007) divided e-commerce benefits into three main areas of: time- savings, cost savings, and quality improvements. Furthermore, (Syed et al., 2005) categorized e-commerce benefits into technological, operational and relationship related benefits. While technology benefits refer to the improvements done due to the automation of manual processes, operational benefits refer to the quality of information flow and customer service derived from the automated processes and relationship-related benefits refer to positive past experiences of the firms with their trading partners and consumers. Moreover, (Liew, 2004) categorized electronic commerce benefits to three categories: benefits related to improved searching capabilities , benefits related to improved order processing and benefits related to cost savings. (Zhuang et al.,2003) suggested that electronic commerce benefits could be fitted into these categories: market expansion, customer service, back-end efficiency and cost reduction.

- E-commerce Benefits for SMEs

In general, electronic commerce offers many potential benefits to SME's mainly by boosting productivity gains and reducing transaction costs and time (Kurnia et al., 2001; Turban et al., 2006).

By utilising the information technology, e-commerce can give SME's the ability to expand their business, to reach new markets and have a competitive position in the marketplace (Piris et al., 2005; Ziad et al., 2009). Furthermore SME's can take advantage of e-commerce technologies to improve their operational efficiency (Wen et al., 2001; Kalakota & Whinston, 2008), customer service and internal coordination as well as reducing distribution cost and cycling time (Cloete et al., 2002; Bolongkikit et al 2006). The use of E-commerce technologies also provides SMEs by a cost effective ways to market themselves, launch new products, improve communications with business partners and customers, and gather information about their market in order to make a good business decisions (Turban et al., 2000; Syed et.al, 2005; AL-Hunaiti et al. ,2009).

Furthermore e-commerce benefits include global connectivity, high accessibility, scalability, interoperability and Interactivity (Bolongkikit et al 2006; Kalakota, R. & Whinston, 2008).

The rapid dissemination of information, the digitization of record keeping, and the networking capability of the Internet has improved flexibility and responsiveness of SMEs in the face of competition, encouraged new and more efficient intermediaries, increased the use of outsourcing, expanded market access and reduced time to markets by linking orders to production (Qureshi, & Davis, 2005; Piris et al., 2005; Al-Hunaiti et al., 2009). Electronic commerce helps SMEs to reduce the cost of operations and decrease the costs of creating, processing, distributing, storing, and retrieving paper-based information (Syed et al., 2005).

Furthermore excessive inventories and delivery delays can be also minimized with e-commerce (Piris et al., 2005). Finally, all of these benefits could be summarized in to five main benefits specific to retailing: back-end efficiency, market expansion, inventory management, cost reduction, and customer service benefits.

- E-commerce Benefits for SMEs in the Developing Countries

Electronic commerce has been promoted as a method of bridging economic and digital divide between developed and developing countries by numerous international development organisations such as the United Nations and the World Trade Organisation (Qureshi & Davis, 2007). In the developing countries, electronic commerce has contributed towards removing barriers of cultural and national boundaries that face firms. This leads to a globalized and unified society in a new era of knowledge economy (Piris et al., 2005; Al-Hunaiti et al., 2009). Furthermore, many studies have emphasized the previous mentioned benefits of e-commerce over the developing countries stating that electronic commerce will help business by: giving easy access to global market, adequate and efficient market research, removal of business intermediaries, reduced transaction costs and value creation (Qureshi & Davis, 2005; Piris et al., 2005; Syed et.al, 2005; Al-Hunaiti et al., 2009). It is then widely accepted that electronic commerce contributes to the advancement of businesses in the developing countries.

2.4 ONLINE GROCERY SHOPPING INHIBITING FACTORS

Groceries are one of the most difficult objects to sell online mainly because of sensory and delivery issues. Online customers still worried about the product quality, they are also expecting high logistical services, demanding convenience, high reliable and on time delivery service. Therefore, retailers have to respond to these expectations by convenient logistical services while keeping this process cost effective and efficient as much as possible.

2.4.1 INHIBITING FACTORS FOR CUSTOMERS

Customers' attitudes towards online grocery shopping are skeptical, since it is difficult to convince them to change their traditional grocery habits (Pechtl, 2003; Scott & Scott, 2008). In order to provide customers with the added value of online grocery shopping, difficulties and problems in online grocery shopping have to be handled carefully and seriously (Ghazali et al., 2006).

The most overwhelming barriers that Customers are worried when they start buying groceries online are security and privacy issues (Ghazali et al., 2006; Kaur, 2005; Pechtl, 2003). Customers are usually sensitive towards using their credit cards as well as their personal information over the internet, because they thought that this information may misused by unauthorized persons (Cheah, 2001; Scott & Scott, 2008).

The uncertainty of product quality is another factor that affects customers' decision to buy groceries on the internet (Dornbusch, 1997) cited in (Ghazali et al., 2006).

Groceries are one of the high-touch products were customers always prefer to see, check and smell them before buying (Ghazali et al., 2006).In certain cultures such as Middle Eastern one, it is necessary to touch the product prior to purchasing it (Ghazali et al., 2006; Pechtl, 2003). Therefore, online grocery retailers should add more information about the products such as nutritional information and expiry dates, trying to encourage customers to touch the product features instead of touching the product itself (Pechtl, 2003).

Online grocery customers are also worried about after sale services provided by the online retailers as an added value to their customers (Ghazali et al., 2006). Hence, customers have a great concerns about the delivery service in terms of accuracy and cost as well as concerns about the return or exchange policies (Kurnia, 2003). Furthermore, more complexity maybe added by home delivery service, since it requires the customer to be at home waiting for the delivery and sometimes the available time window will not be suitable for the customer (Pechtl, 2003; Verhoef & Langerak, 2001).

Social needs including experiences and communication with other people in conventional purchasing affect also the customer decision to shop online (Ghazali et al., 2006; Verhoef & Langerak, 2001). Online shopping partly limits the enjoyment of traditional shopping, since customers cannot communicate with others and cannot bargain (Darian, 1987; Ghazali et al., 2006; Verhoef & Langerak, 2001).

2.4.2 INHIBITING FACTORS FOR GROCERY SMES

SMEs in general, have a centralised management with poor skills and short-range perspectives as well as an intuitive decision making process (Kartiwi & MacGregor, 2007). They also have limited resources (financial, time, personnel and technical) (Kartiwi & MacGregor, 2007). Furthermore SMEs have a limited market share and therefore they have a narrow range of products and services and they are unable to compete with large organizations.

- Barriers Classifications

Several studies investigated the adoption barriers of e-commerce amongst SMEs; researchers have grouped these barriers in to several categories:

E-commerce barriers for organizations and individuals have been analyzed in terms of three categories of negative feedback systems: economic, socio-political and cognitive (Kshetri, 2007). While economic and socio-political factors focus primarily on the environmental characteristics, the cognitive component reflects organizational and individual behaviours.

Other researchers came up with four barriers categories: lack of resources and knowledge, skills levels of employees, security concerns and e-readiness of the small businesses (Stockdale & Standing, 2004).

These barriers have also been categorised into technical and social barriers (Lawson, et al., 2003). (MacGregor & Vrazalic, 2005a) grouped the barriers into two groups: too difficult and unsuitable, indicating that e-commerce is too difficult to adopt for potential adopters and it is unsuitable for the business of non-

adopters such as a corner shop selling basic groceries where the customers want to feel, smell and taste the products. Similarly, they also grouped these barriers into four categories: education, time management, economic concerns and technical.

Furthermore, (MacGregor & Vrazalic, 2004) identified other three categories of barriers: company, personal and industry barriers. Furthermore, (Kapurubandara, 2006; 2009; Ihlstrum et al, 2003) grouped the barriers into two main groups: internal and external barriers as shown in Figure (2.1).

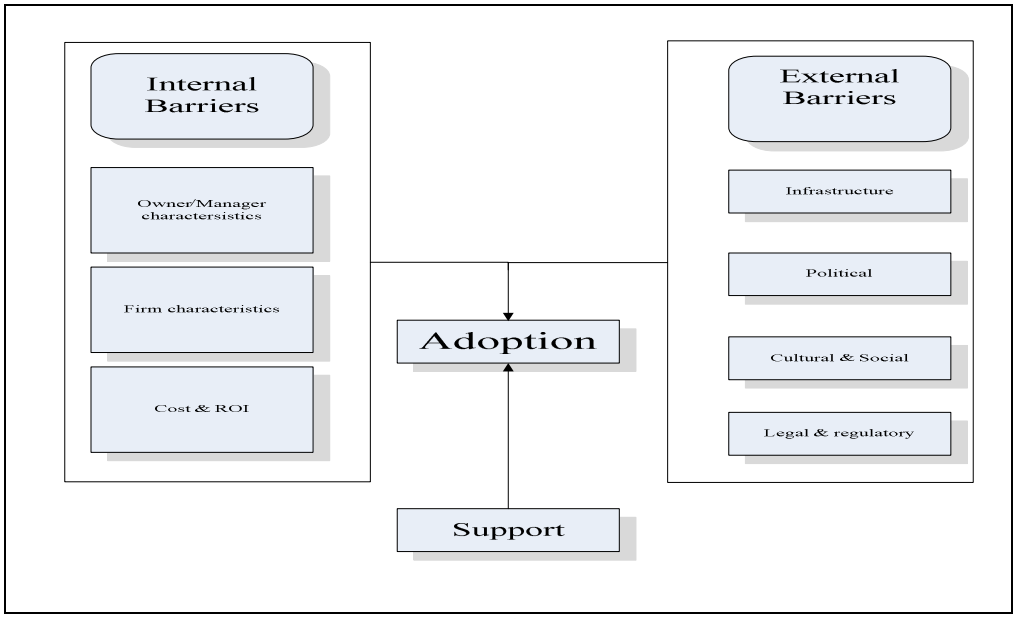


Figure (2.1): E-commerce barriers for SMEs (Kapurubandara, 2009)

Internal barriers are the ones from inside the organisation influence sphere and can be further categorized into resources and systems barriers or organizational, owner/manager and cost / return on investment barriers, while External barriers come from outside the organization influence sphere and can be subdivided into

supply, demand and environmental barriers or infrastructure (technological, economic), political, legal, social and cultural barriers.

Numerous authors (Jacovou et al., 1995; Mehrtens et al., 2001; Cloete et al., 2002; Chen, 2003) grouped the factors that may affect SMEs e-commerce adoption into three major categories: owner/manager characteristics, firm/organisation characteristics, and Contextual/cost and return on investment. (Jacovou et al. 1995; Knol & Stroeken, 2001) found that the owner's lack of knowledge and awareness about the technology and its perceived benefits is a major barrier that impedes take up of e-commerce. Lack of IT industry trust and lack of time are also two other factors that affect the owner's decision to adopt e-commerce (Akkeren & Cavaye, 1999). SME's owners are sometimes reluctant to make investments in this sector especially when they are aware about its short-term returns (Anigan, 1999). (Jacovou et al., 1995) also found that the current level of technology usage within the organization affects the process of adoption.

- E-commerce Barriers for SMEs

SMEs low penetration of e-commerce use can be explained by the high costs of e-commerce technologies implementation and development, unsuitability of products/services, limited knowledge about e-commerce business models, lack of e-commerce standards, and lack of awareness about e-commerce perceived benefits (Courtney & Fintz, 2001; EPEG, 2002; MacGregor & Vrazalic, 2005; Stockdale & Standing, 2006; Kartiwi & MacGregor, 2007).

In addition, SMEs have concerns about e-commerce security and confidentiality as well as concerns about legal and liability aspects needed for such technologies.

- E-commerce Barriers for SMEs in the Developing Countries

Studies of e-commerce issues in developing countries (Odera-Straub, 2003; Qureshi & Davis, 2007; Sherah Kurnia, 2007; Sabah et al., 2011) indicate that the issues and difficulties faced by SMEs in developing countries can be totally different from those faced by SMEs in the developed countries because of various differences between them including available infrastructure, socio-economic, cultural and political conditions.

Organisations adopting ICT and e-commerce in developing countries face problems such as: Lack of telecommunications infrastructure including poor Internet connectivity, lack of fixed telephone lines for end user dial-up access, and the undeveloped state of Internet Service Providers (ISPs) (Kshetri, 2008; Kurnia, ,2007; Kapurubandara, 2009).

In addition, other infrastructural barriers are also considered to be obstacles to the growth of e-commerce in the developing countries, such as Lack of access to computers, lack of software/hardware and affordable telecommunications and unreliable electricity supply (Kshetri, 2008; Kurnia, 2007; Kapurubandara, 2009).

The high cost to implement e-commerce technologies and internet makes this service inaccessible by customers and business (Kapurubandara, 2006).

The poor state of educational systems in most developing countries is perceived as a reason for the lack of ICT skills among customers and retailers, this also will lead to the lack of qualified staff to develop and support e-commerce technologies (Alemayehu, 2005; Kshetri, 2008).

Logistical challenges such as low e-commerce use by customers and supply chain partners and the lack of timely and reliable systems for delivery of physical goods are also affecting SMEs decision to adopt e-commerce technologies. Inefficient postal services and inadequate transportation and delivery networks add more difficulties for developing countries to attract 3PL providers like FedEx and UPS to provide delivery services (Almedia et al., 2006).

Furthermore , low income rate, limited availability of banking services, low bank account and credit card penetration, lack of online payment processes and concerns about privacy, security and fraud issues are directly inhibiting e-commerce adoption among SMEs in the developing countries (Kapurubandara, 2009).

Studies in South Africa, Argentina, Egypt, Sri Lanka and China revealed that the key factors affecting e-commerce adoption in developing countries in addition to the above mentioned are: unsuitability of e-commerce to the traditional economic sectors (e.g., agriculture), lack of awareness about e-commerce perceived benefits, legal and regulatory systems, the government's role and support, political, social and cultural factors such as language and preferences to face-to-face contacts (Kurnia, 2007; Kapurubandara, 2009).

2.5 E-COMMERCE IN JORDAN

2.5.1 COUNTRY BACKGROUND

The Hashemite Kingdom of Jordan is located at the heart of the Middle East. The latest estimate of its population in 2010 was 6,407,085 (Jordanian Department of Statistics (DOS), 2010). Jordan covers an area of 89,342 km^2, its capital is Amman and the official language of Jordan is Arabic (English is also widely spoken as a second language). Jordan is a developing country, with limited natural resources but highly educated human resources (Mofleh, 2008).

2.5.2 ICT ENVIRONMENT

During the last decade, Jordan has witnessed improvements in the information and communication technology (ICT) and e-services sectors according to the e-readiness rankings from the Economist Intelligence Unit (2007). This report covers the following topics: connectivity, technology infrastructure, business environment, social and cultural environment, legal environment, government policy and vision and consumer and business adoption. Furthermore, Jordan in general has adequate and efficient e-commerce facilities (technology and telecommunication infrastructure, institutional and governmental support and organizational readiness and support) to reach the required level of e-commerce readiness (Al-Debei & Shannak, 2005).

The telecommunication services in Jordan have witnessed improvements due to increased competition among Internet Service Providers (ISPs), of which there are at least ten in Jordan.

This has resulted in reducing the prices of internet services (ADSL) provided by the ISPs and broadening the range of services offered by them, such as wireless connection services (e.g. WiMAX). ADSL is the most widely used Internet communication method in Jordan, as the percentage of the Jordanian families who have an ADSL subscription represents 51% of total Internet subscriptions.

The other Internet communication methods are either using prepaid cards (especially in rural areas) or cellular phones (WIMAX) in urban areas. Mobile penetration at the end of 2009 was at a high percentage from the whole population according to TRC data from the DOS 'Survey of IT at Home' (2008) (Hasan, 2009).

These improvements were due to large efforts to improve competition and foreign investment policies. Jordanian government lunched several initiatives and strategies supported by the private sector aiming to achieve the social and economic development that ICT is believed to deliver, such as Reach Initiative (2000-2004) and the National Strategy for Electronic Trade (2008-2012) (Hasan, 2009).

Due to these national initiatives and strategies, the number of internet users and internet penetration rates in Jordan has increased significantly since 2002. The number of internet users grew from around 238,000 in 2001 to more than 1,500,000 in 2008 (Jordanian Telecommunications Regulatory Commission, 2008). Business technology usage has been improved significantly as well, with a usage growth from 39% in 2007 to 69% in 2008 , It is also ranked 41 out of 122 countries in 2007 (Meddeh, 2008).

The main reasons for Internet use were to access several types of services, including searching for information, viewing films and television programs, listening to music, reading electronic newspapers and magazines, e-mail and e-government services (DOS 'Survey of IT at Home', 2008); and for social activities such as chatting - there were 1,402,440 Facebook users in Jordan in March, 2011 (DOS, 2011).

2.5.3 E-COMMERCE SECTOR IN JORDAN

In Jordan, taken here as a case study of developing countries, e-commerce in general is not popular among customers and retailers, and it is in a very early stage of development. Although the local language of Jordan is Arabic, the majority of retailers' websites are written in English; this makes Internet users uncomfortable with browsing and using the sites (Hasan, 2009; Al-Qirim, 2010). Furthermore, these websites are not strategic and are used mostly as brochures for the company's products and services (Al-Qirim, 2010); however, there are a few websites that offer merchandise that can be bought online with the use of credit cards.

The following are four examples of E-Commerce websites:

- http://www.zalatimosweets.com .
- http://www.mazaiic.com .
- http://www.jormall.com .
- http://www.buyfromjordan.com.

The ICT initiatives in Jordan were very simple, thus affecting the diffusion of e-commerce use among businesses in Jordan. According to Al-Qirim (2010), the most important drivers of e-commerce adoption among small business could be classified according to technological, organizational and environmental factors. Technological factors include the relative advantages of e-commerce and the image of the organization; organizational factors include the size, central decision-making power of the CEO (owner), quality of internal IT resources (infrastructure and skills), and CEO's championship and attributes; and environmental factors chiefly consist of pressures from suppliers

Jordan, like other developing countries, faces challenges which affect the diffusion of e-commerce and influence the growth of households or organizations who own a PC or have a subscription to the Internet.

Examples of these challenges include over-simplistic e-commerce initiatives (due to lack of support from the government, as well as lack of cooperation between the public and private sectors), lack of awareness about e-commerce perceived benefits, lack of IT skills, knowledge and training, lack of e-commerce standards supported by e-commerce companies and weaknesses in promoting e-commerce efficiently (Obeidat 2001; Al-Qirim, 2010). The lack of online payment systems and concerns about trust, security and privacy are also challenges that affect the diffusion of e-commerce.

More challenges are also faced in developing countries such as the high cost of e-commerce technologies, non-integrated IT infrastructure linked with e-commerce,

cultural and social resistance, and the absence of legislation and regulations that govern e-commerce transactions (Hasan, 2009).

2.6 TRADITIONAL GROCERY SUPPLY CHAIN IN JORDAN

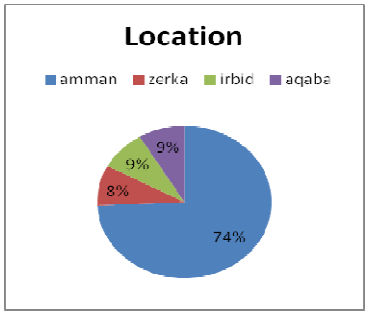
2.6.1 THE GROCERY MARKET

During the last decade, Jordanian food retail sector has been rapidly expanding and it has witnessed a boom by establishing mass retailers that only appeared in urban areas and big cities, for example: C-TOWN and SAFEWAY (U.S. franchise) also CARREFOUR (French franchise) (Salem Al-Oun, 2008). They are all multinational superstores that are currently operating in Amman the capital of Jordan. Also American style Malls started to appear in Amman and other big cities like Irbid such as Al Mukhtar and Al Baraka Malls in Amman and Al Radaideh mall in Irbid. Other local grocery supermarkets also scattered in suburbs of Amman and other cities of Jordan such as Cozmo, Abbadi and Al-Farid supermarkets, Table (2.2) gives examples of these stores.

Shopping at supermarkets and superstores re-shape the retail sector and enforce the local traditional retailers to reinvent themselves in response to the raise of consumers' expectations of products standards (Goldman, 1993; Chaudhry, 2006).

This trend also become a leisure activity for the urban Jordanian consumers, consumers start depend less on neighbourhood and convenience stores except for some items such as bakery and meat , and for last minute food needs.

Retailer Name	Ownership	No. of Outlets	Location(City)
C-Town	Multinational	4	Amman
Safeway	Multinational	9	5 Amman 1 Irbid 1 Aqaba 2 Zerka
Abbadi	Local	1	Amman
Cosmo	Local	1	Amman
Zanbaka	Local	2	1 Amman 1 Irbid
Plaza	Local	1	Amman
Fuad	Local	1	Amman
Noman Mall	Local	1	Amman
Al Farid	Local	1	Amman
Rainbow	Local	1	Amman
Stop & Shop	Local	1	Amman
Top & Top	Local	1	Amman
Sweet	Local	1	Amman
Abdoun	Local	1	Amman
University Mall	Local	1	Amman
Grand	Local	1	Amman
Al Madina	Local	1	Amman
Sameh	Local	1	Amman
Badran	Local	2	1 Amman 1 Zerka
Zamzam	Local	1	Irbid
Abu Thahab	Local	1	Aqaba
Marhaba	Multinational	1	Aqaba



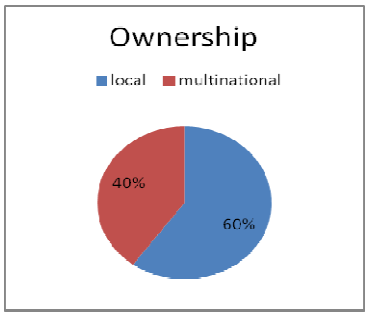


Table (2.2): Examples for grocery retailers' in Jordan

(Chaudhry, 2006; Salem Al-Oun , 2008; FAO, 2010; JMIT, 2011)

In small cities and villages, small grocery stores (bakalahs) and mini markets still play the main role in the retail business. These stores are fragmented between small and mini markets, non-family and family-owned shops, specialist's shops such as bakeries and butchers.

In addition open markets (mainly for fruits and vegetables) and organized chains of governmental civil and military consumption corporations' start play an

important role in the food retailing sector (Chaudhry, 2006; Salem Al-Oun, 2008; FAO, 2010; JMIT, 2011).

Furthermore, the traditional grocery retailing system in Jordan involves one or more shopping line. One consumer may; for example, buy some of his grocery needs from the supermarket and continue to purchase the others such as meat or bakery products from the neighbourhood traditional small stores while another may buy all of his food needs from the Mall.

2.6.2 THE GROCERY SUPPLY CHAIN STRUCTURE

Figure (2.2) illustrates the structure of the traditional grocery supply chain in Jordan. Here, the grocery products go through their supply chain from industries to the end consumers. Consumers are responsible for picking the products from the retailers or supermarkets and transporting them to home. Product exchange, as well as storage, takes place in every part of this chain. Product suppliers for wholesale markets are mainly from industries or importers (Chaudhry, 2006; Luai, 2010).

The wholesale market is considered as a primary supplier for supermarkets and retailers. On this level as well, supermarkets and retailers may also be supplied by the industry itself. Consumers may buy their groceries from retailers or supermarkets as primary suppliers. They also can buy groceries directly from the wholesalers as a secondary supplier or from specific industries such as bakeries or meat industries.

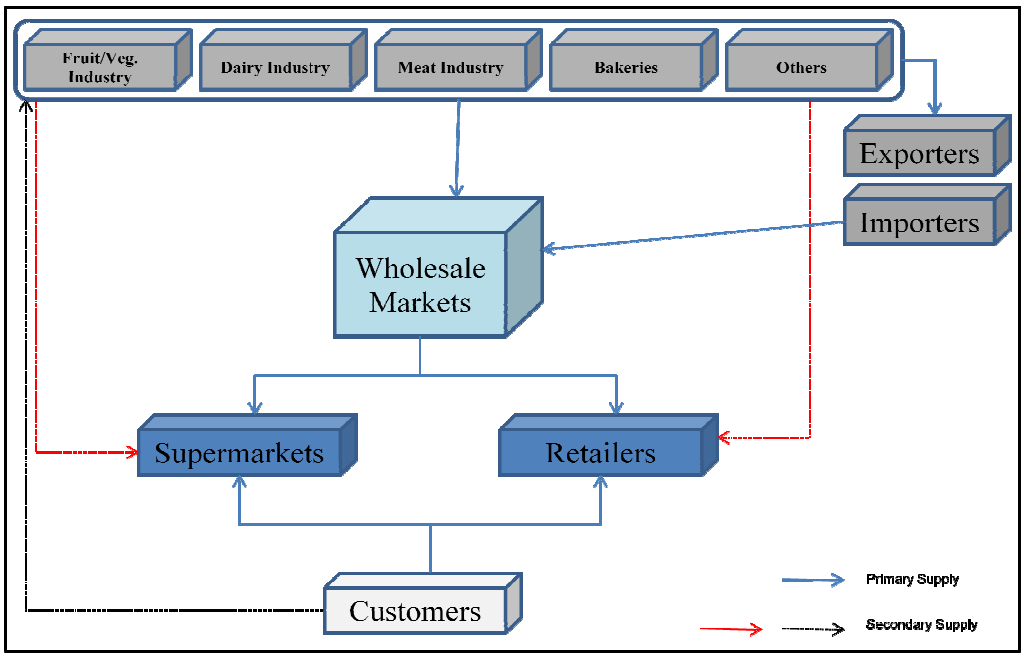


Figure (2.2): Traditional grocery supply chain in Jordan

2.6.3 SUPPLY CHAIN MANAGEMENT AND TECHNOLOGY TRENDS

Governments and retailers all over the world have started to be aware of the need to enhance the efficiency of SCM as a way to develop their economies. The Jordanian government is one of the developing governments which found the importance of improving the SCM in almost every aspect of life. It also found that technology improvements are needed in order to develop their economy and to achieve the national goals (Shwawreh, 2006). According to the United Nation reports, a lot of efforts have been spent in Jordan to develop the technology sectors (UN, 2010). Also, regarding the CIA global information technology report (2009-2010) (WorldEconomicForum, 2010), Jordan starts competing with the developed countries and its ranking was (44). Jordan by its geographical location in the heart of the Middle East and its strong technology infrastructure plays an

important role to attract investors from all over the world to expand their businesses there. These factors also affect the response time to develop an efficient SCM system in most of the sectors.

2.6.4 THE DELIVERY SYSTEM

The postal delivery system in Jordan is mainly dominated by the de facto monopoly, Jordan posts, which provide a complete national coverage (Chaudhry, 2006; Salem Al-Oun, 2008). Jordan's post offices usually provide variety of services for their customers like postal, financial and e-services (Jordanpost, 2011). However, compared with developed countries, Jordan's post services are usually need longer time to be delivered with poor service quality, particularly in rural and remote areas.

Express postal delivery services by Jordan's post are often available in urban and big cites, while they are infrequent in other areas like rural and remote areas (Chaudhry, 2006; Al-Haraizah, 2010). International services are available by Jordan-posts and other foreign carriers such as TNT, DHL, and UPS. Cargo services are also offered by airlines, trucking carriers and boat shipping companies.

With the highly expected diffusion of e-commerce services in Jordan, delivery service providers have the chance to grow and develop. However, e-commerce retailers in Jordan are usually hiring or establishing their own delivery services especially in urban areas. In order to facilitate e-commerce services, delivery service providers still need to be improved.

2.7 E-GROCERY LAST MILE LOGISTICS

In the traditional grocery shopping environment, customers' products are fulfilled by self-logistics activities (Ingene, 1984; Casper, 2006). Customers come to the supermarket or shop, pickup the groceries and carry them back home. Customers' self-logistics activities cover a series of management functions, such as, transportation, picking, inventory and information seeking , shown as Figure (2.6) (Granzin et al., 1989; Granzin et al., 1996).

2.7.1 CONSUMERS LOGISTICS

With the rise of electronic grocery shopping, this logistical plan has been changed. The retailer takes the fulfilling responsibility and customers' logistics are now considered as an extension for business logistics (Yousept & Li, 2004; Boyer, 2004). Therefore, e-grocery customers' logistics refer to the retailer's series of activities to fulfil customer orders. These activities start from the grocery store to home or any delivery location, such as planning, organizing and dispatching , as seen in Figure (2.3) (Yousept & Li, 2004; Fishman, 2005; Xia et al., 2010). However, online grocery customers are expecting high logistical service, demanding convenience, high reliable and on time delivery service (Boyer et al., 2009). Therefore, retailers have to respond to these expectations by convenient logistical services.

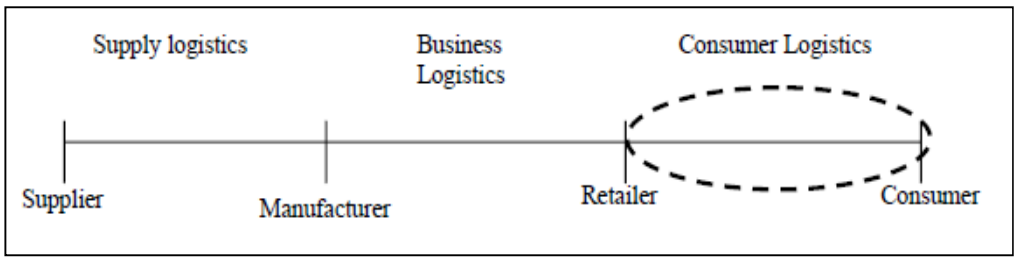


Figure (2.3): Consumers' Logistics (Yousept & Li, 2004)

Retailers must have a balancing strategy between customer convenience and delivery cost, here the last mile challenge arises (Delaney-Klinger et al, 2003; Fishman, 2005; Xia et al., 2010).

2.7.2 DELIVERY LOGISTICAL TRADEOFFS

The last mile logistics is considered as one of the most challenging issues in online grocery supply chain (Punakivi & Saranen, 2001; Boyer et al., 2005; 2009). Orders fulfilment process involves several tradeoffs, the most important ones are the following (Boyer et al., 2009):

First of all, the delivery is often failed due to not-at-home problem (Punakivi & Tanskanen, 2002; Boyer et al., 2009; Xia et al., 2010). Customers have long working hours and sometimes may be no at home to receive orders. This implies extra cost for both retailers and customers and consequently customer satisfaction becomes low. In order to deal with this problem, there are a few solutions as following. Firstly, add flexible and overlapped receiving time windows or more than one delivery time choice (Boyer et al., 2009). Secondly, build a receiving box outside homes and start unattended delivery service (Kämäräinen, 2001; Weltevreden, 2008).

Thirdly, customers pick up their online orders from the shop when they are free (Boyer et al., 2009).

The second problem is the delivery speed and time, customers logistics requires fast and shortened delivery time (Xia et al., 2010). Therefore, retailers must fulfil these orders and face the empty run challenge which resulting from less demand and unorganized delivery time windows. In order to deal with this problem, retailers must offer a convenient delivery time windows by cutting down the lead time or by offering night and next day deliveries (Boyer et al., 2009). The use of logistics management information systems tools might also help to improve the delivery accuracy (Xia et al., 2010).

The third important problem is related with delivery security issues when customer signature is needed or when using unattended delivery boxes (Madlberger, 2005; Gevaers et al., 2009; Xia et al., 2010).

The forth problem is the demand uncertainty for some regions; too small product demand is not enough to generate profitable online business solutions (Gevaers et al., 2008; Boyer et al., 2009; Xia et al., 2010).

The fifth problem is the implications on traffic jams and environment pollution (Punakivi et al., 2001; Madlberger, 2005; Boyer et al., 2009; Xia et al., 2010). Home delivery service logistics is characterized by its wide distribution, small quantities and small delivery vans etc., which will increase the traffic jams and the carbon footprint per kg.

In order to solve this problem, retailers should decrease the unnecessary deliveries and enforce the use of technologies which designed for such purposes.

The sixth problem arises when customers want to return their products (RIEC org., 2009; Xia et al., 2010). With home delivery products may also reach damaged with the need to exchange. This makes a great inconvenience for customers, meanwhile, retailers should manage this reverse logistics process resulting with extra delivery cost.

The seventh problem is regarding the lack of support from industries and governments (Weltevreden, 2008; Boyer et al., 2009; Xia et al., 2010). Competence on market share forced retailers to outsource consumer's logistics to third party service providers. With the entrance of many small 3PL providers to the market, the industry development process is affected. Therefore, governments must draw guidelines to help retailers and for controlling and managing the market (Gevaers et al., 2009; Xia et al., 2010).

2.7.3 DELIVERY LOGISTICS STRUCTURE

In order to design a logistical structure best suited to the online market needs, retailers have to consider a group of principal logistical elements. The use of these elements is critical to design a cost-efficient home delivery service while keeping customer's convenience needs.

- Critical Variables to Plan an Optimal Logistics Structure:

Last mile logistics design in e-commerce consists of the following elements (Grando & Gosso, 2006):

- Elements related to the order; delivery information (time, place, mode and charge), order size and value.
- Elements related to the products range; offered products and value density.
- Elements related to the market demand; demand predictability, service area and customer density.
- Elements related to the logistical structure; fleet characteristics and delivery place characteristics.
- Elements related to the logistical infrastructure; transportation and communication infrastructures.

- Home Delivery Computer Model

A logistical framework that studies the use of the logistical elements for home delivery service has been introduced as shown in Figure (2.4).

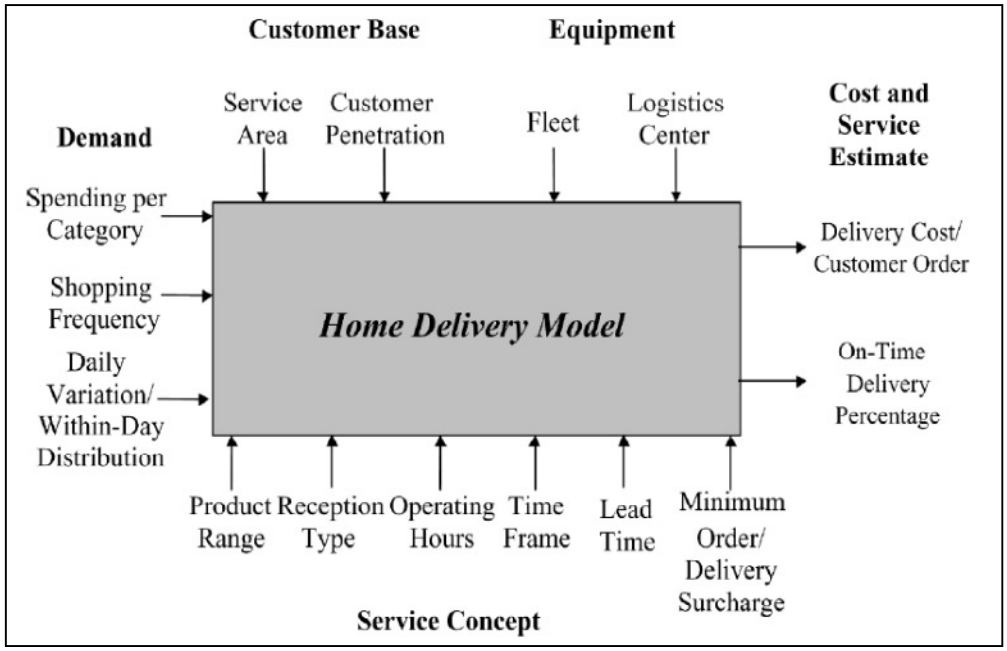


Figure (2.4): Home Delivery Framework (Kämäräinen et al., 2000b)

This framework grouped these elements into input variables like service concepts and output variables like delivery cost. Input variables are used as requirements for orders which are then manipulated using one of the routing and scheduling solutions. Output results from this framework are used to testify the operational efficiency of home delivery service.

In order to fulfil a certain level of operational cost, retailers have to select the suitable delivery mode (home delivery, collection or delivery points) and their service geographical domain. Since delivery cost is directly linked with the number of vehicles and the used time windows, retailers have to choose the best delivery time windows and the efficient logistical information technologies. Finally, retailers have to develop their own pricing model for logistical services since delivery fees are considered as the key issue of last mile logistics.

2.7.4 HOME DELIVERY ALTERNATIVES

With the rise of online grocery services, home delivery becomes a major cost driver for last mile logistics operations (YrjoÈla, 2001; Auramo et al., 2002).Grocery products are more demanding than other products with respect to their perishability and preservation issues (Boyer & Hult, 2005). Various types of delivery models have been developed in order to make this service convenient for customer needs. Figure (2.5) (Boyer & Hult, 2005; 2006) , provide a good classifications of home delivery models :

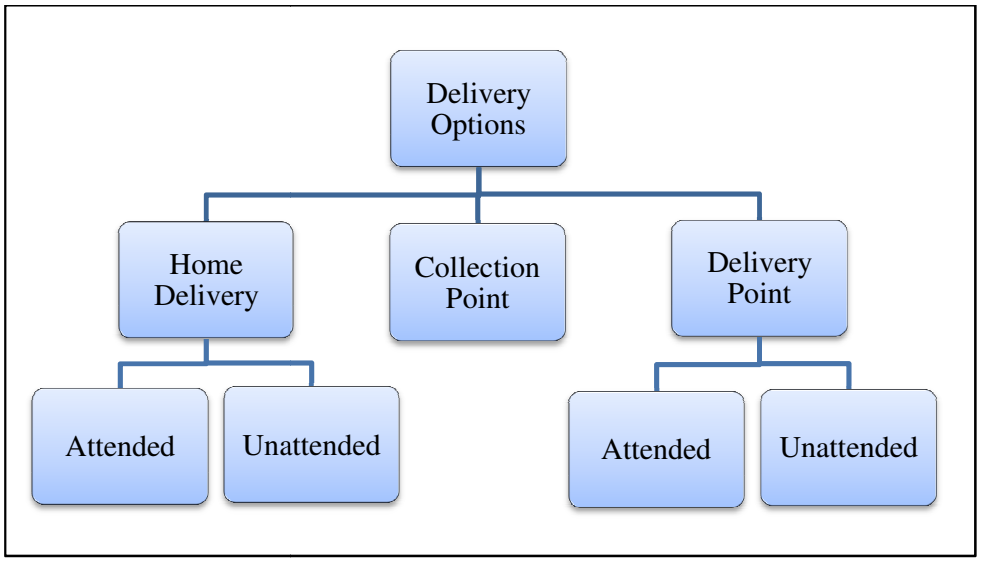


Figure (2.5): E-grocery Delivery Options (Boyer & Hult, 2005; 2006)

- Attended home delivery

Attended home reception of ordered groceries where customers usually choose the delivery place (home, office etc.) and time windows to receive their delivery within it (Punakivi et al., 2001; 2003; Boyer & Hult, 2005). For e-grocers, high

demand on certain time windows might complicate this service. Retailers need to meet customers' place and time windows expectations while keeping delivery low cost ratios. In order to deal with this issue, they need to use advanced information technology systems.

- Unattended home delivery

Ordered products are delivered to customer home or place by boxes concept. Reception boxes are used either home fixed or shared boxes (Punakivi & Saranen, 2001; Punakivi et al., 2001; Punakivi & Tanskanen, 2002). These boxes are usually refrigerated and customer locked to keep the products reserved and secured. Shared boxes maybe placed, for example, in flats, offices or any common service location. Another mode of unattended delivery boxes is the delivery boxes where the retailers used to deliver products to customer homes using their own delivery boxes and come back later to collect the empty boxes.

- Pickup points

Customers can pick up their online orders from retailer's stores or local supermarket (Hannu et al., 2001; Kämäräinen, 2003). Traditional retailers who recently joined the e-market, lack leverage assets to provide home delivery service. They usually start using this mode of delivery from their own stores or from third party pickup delivery providers.

- Delivery points

Retailers can use a common delivery points to serve their online customers (Punakivi et al., 2001; Punakivi, 2003; Boyer & Hult, 2005). These facilities can

be placed close to customer home or work like bus stations, service stations and any other convenient delivery place.

2.7.5 CHARACTERISTICS/DETERMINANTS OF INNOVATIONS IN THE LAST-MILE LOGISTICS

When retailers want to optimize their logistical services in order to avoid the previously mentioned inefficiencies, they should implement a group of innovation concepts. These concepts are focusing on the main characteristics of last-mile part of the supply chain. For the last-mile, there are five generalized characteristics: consumer service levels, security & type of delivery/reception, geographical area & market penetration, fleet & technology and the environment (Carins, 2005; Niels et al., 2007; Boyer, Prud'Homme & Chung, 2005; 2009). This section outlines the results of various research projects that have studied the logistical impacts of these characteristics over the innovation process. The details of various modelling parameters used in previous researches for online grocery home delivery are shown in Table (2.3).

Source	Calrns (1996)	Palmer (2001)	Punakivi Team (2001-03)
Software	TransCAD	CAST-dpm	RoutePro
Scale	Witeny ,UK (Town of 7000 people)	UK (richest 40% of households)	89000 Households in part of Helsinki ,Finland
Demand	Varying proportions of households using the town centre supermarket	Varying proportions of total UK grocery sales	All shopping of more than €25 done by households at one retail chain (with five stores in the area)
Supply	Deliveries from town centre supermarket	Deliveries from : 1. Four major retailers, from existing stores. 2. Four major retailers, From mix of stores and fulfilment centres	Deliveries from a distribution centre next to one of the stores of the retail chain
Other variables / assumptions	Other variables : 1. Van capacity 2. Distribution of demand	Assumptions : 1. 2-h time slots 2. 10 min for drop-off per house 3. Van capacity is six loads 4. Fulfilment centre van capacity is 70 loads	Assumptions : 1. 20min for loading and 2 min for drop-off per house 2. Van capacity of 60 orders and 3000 litres 3. Max. 5-h per delivery route and 11-h per van

Table (2.3): Modelling parameters in other last miles logistics researches, (Carins , 2005)

- Customer service levels / Customer density.

Customer service level characteristics like delivery time window, lead time, delivery and return policies can have important effects on the operational efficiencies of retailers logistical services. For example, narrow time windows can have a significant impact on the logistical operations efficiencies. Boyer, Prud'Homme & Chung (2005, 2009) did some modelling experiments to test the effect of using different time windows over the routing process.

Figures (2.6, 2.7) illustrates the routing map for the delivery vehicle with and without using delivery time windows. It can be noticed that how the use of time windows is affecting the efficiency of the routing process by increasing the driven distance as well as the operational cost of this service.

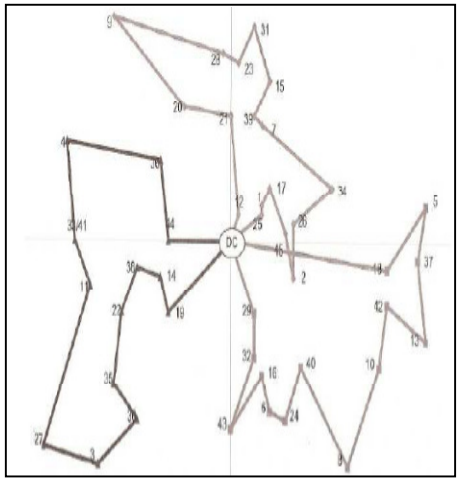


Figure (2.6): Routing without time windows

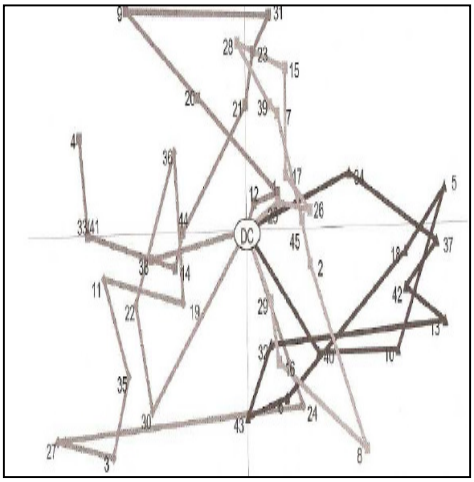


Figure (2.7): Routing with time windows

Boyer, Prud'Homme & Chung (2005, 2009)

Figures (2.8, 2.9) also illustrate the effects of customer density and tightening time windows on the routing process expressed by the total driven mileage per customer. A clear descending relationship between time window length and delivery cost while an ascending one between customer density and cost per delivery. This means when the time window become tighter, the mileage per customer will increase and the delivery cost as well. While with more customer density in the service area the mileage per customer will decrease and the delivery cost as well.

Kämäräinen (2001) used a set of data from the Finnish market to compare between reception box without time windows and delivery modes with time windows in terms of driven distance. The results showed that the delivery cost with time windows is higher than the delivery cost without time windows.

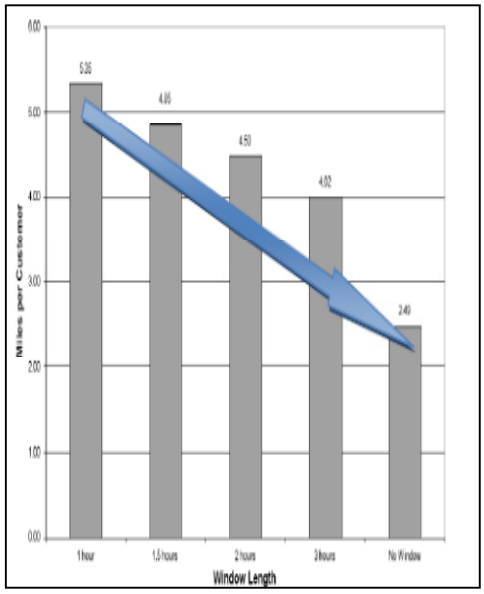


Figure (2.8): Effects of delivery window length

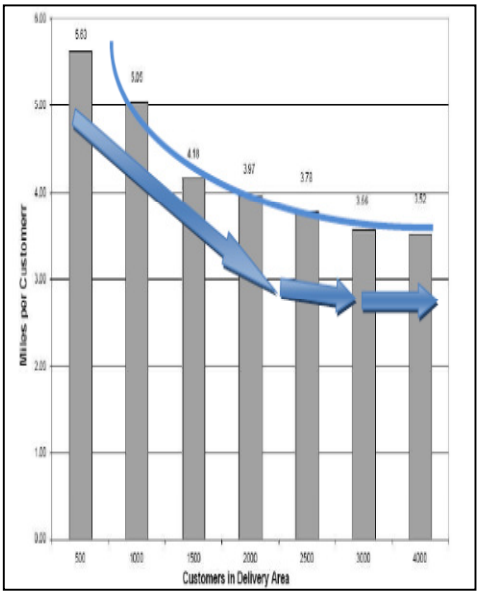


Figure (2.9): Effects of customer density

Kämäräinen (2001)

- Security, type of delivery/reception and fleet technologies.

The type of delivery mode and its related security characteristics is also considered as an important factor which affecting the efficiency of the delivery service. Home deliveries might take place either by handling the products to customers in home or work with a specific time window or might be based on a reception box concept.

Punakivi & Saranen (2001) analyzed the differences between those two delivery modes from different angles and present concrete modelling results representing several delivery service levels. The modelling has been done using 'RoutePro', routing software from CAPS logistics.

They used a group of service parameters like number of vehicles used, vehicle capacities and types as well as waiting and loading time parameters. In addition to the previous mentioned inefficiency factors, delivery vehicle types can directly affect the cost efficiency. The type of the delivery vehicle will affect the fuel consumption, loading capacity and safety.

The analysis results indicated that the cost per attended delivery is almost 2.5 times higher than the cost of the unattended delivery as shown in Figure (2.10).

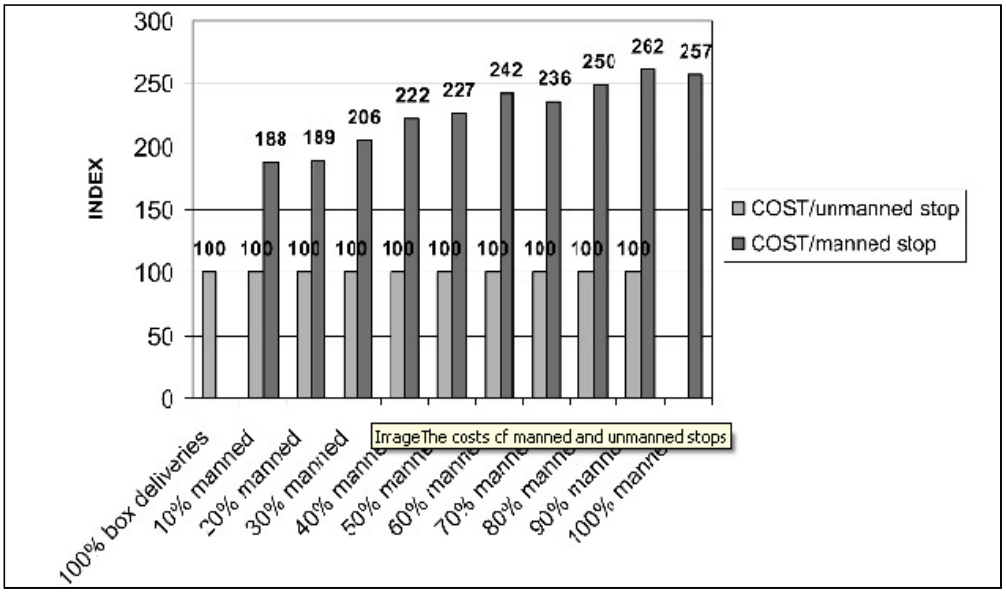


Figure (2.10): Delivery alternatives costs (Punakivi & Saranen, 2001)

The results also indicated that, the level of security related with delivery mode is also affecting the customer decision toward this service. From retailer's point of view, failed deliveries when using attended home deliveries imply an increase in the cost efficiency of this service.

2.8 SUMMARY

In this chapter, a critical investigation about online grocery shopping industry and its related logistical issues was presented in details. The first section from this chapter presented a background about online grocery shopping industry in the developed and developing countries. Afterwards, the focus was driven to the challenges that may face e-grocers, the reasons behind the fallen of many e-grocers in the world then guidelines for e-grocers to overcome these challenges were considered.

The chapter also presented the factors that may affect customers and retailers perceptions towards online grocery shopping in the developed and developing countries.

Additionally, a brief introduction was presented about Jordan as a case study from the developing countries. The described information was about e-commerce status in Jordan, grocery market and the delivery service.

In the light of the previous review, it can be found that the logistical services are the most important challenging issues in online grocery retailing. Therefore, a detailed review was also presented about grocery logistics in terms of delivery tradeoffs, delivery logistics structure and characteristics.

The main conclusion that can be drawn from this review is that there is gab in the literature about online grocery shopping and its logistical services in the developing countries. In order to address this gab, this research was based on distributed surveys among customers and grocery retailers in order to identify

their perception about online grocery shopping and its logistical services. The findings from the statistical analysis of their concerns indicated that there is a need to build a logistical decision support system for grocery retailer in order to select the best delivery service for their customers.

CHAPTER 3

ONLINE GROCERY ADOPTION FROM THE JORDANIAN CUSTOMERS' POINT OF VIEW

3.1 INTRODUCTION

In this chapter, the expected customer willingness towards online grocery shopping in the Jordanian context as a case of the developing countries was investigated. It seeks to explore the customers' general attitudes towards buying grocery on the internet with respect to promoting and inhibiting factors as well as their delivery concerns. Online grocery shopping has grown at a fast scale in the developed countries and the customers there have benefited from it. Unfortunately, this service in the developing countries is still in the infancy stage. This study was conducted by formulating hypotheses. These hypotheses were investigated by designing appropriate questionnaire, and then the collected data analyzed using SPSS. The data analysis clearly showed that customers' attitudes are almost favourable toward online grocery shopping for the long term. Moreover, the majority of respondents agreed with the statements used to identify the promoting factors as well as the inhibiting factors of online grocery shopping. Customers also have serious concerns regarding the delivery services for online grocery shopping mainly about the availability of a suitable delivery mode.

3.2 STUDY METHODOLOGY

The study was carried out using the survey approach. This section provides a description bout the research instrument design, the sampling procedure and data collection technique. A specially designed questionnaire was distributed among 200 grocery customers with or without experience in online grocery shopping. Since it is impossible to include the entire population in our study, a convenience sampling technique was used, which is the most common sampling technique (Fink, 1995). Out of 200 distributed questionnaires only 178 were returned and a total of 150 responses were used for the final analysis. The others were discarded, mainly due to missing values. The survey was carried out in three major cities in Jordan; Amman, Irbid and Karak, because they are the highly populated areas in the Middle, North and south of Jordan respectively. In order to reduce misinterpretations, the questionnaire was made bilingual, using Arabic and English. The original English version was translated into Arabic using the back-to-back translation method (Zikmund, 1997). Also a pilot study was conducted before the questionnaire was sent out. It was conducted with 10 respondents and helped in refining the questions and the layout of the questionnaire. In addition, Cronbach alpha test was used to assess the reliability of the used scales. Cronbach alpha values for the main survey constructs were (0.843, 0.880, 0.796) for online grocery benefits, barriers and delivery concerns scales respectively. These values are considered to be acceptable because they are above (0.7) according to (Hair et.al, 2006).

The questionnaire (Appendix 2) was divided into five parts; the first part was asking about the respondents demographic variables such as gender, age, etc., as shown in Table (3.1).

Item		Frequency	Percent
Gender	Male	91	60.7
	Female	59	39.3
Age (Year)	18-29	79	52.7
	30-50	57	38
	>50	14	9.3
Education level	Lower education	7	4.7
	High school	22	14.7
	Graduate	100	66.7
	Post Graduate	21	14
Income level (JD)	<300	21	14
	300-500	100	14.7
	>500	29	66.7
Access to credit cards	Yes	112	74.7
	No	38	25.3
Employment Type	Public sector	105	70
	Private sector	45	19.3
Area of living	Rural	58	38.7
	urban	92	44.7

Table (3.1): Respondents demographics (Customers)

The second part was asking about the ICT skills and the internet access (how, where and how often). The third part was asking about the traditional way of grocery shopping including the frequency of shopping, time of shopping and the type of shops in order to analyze the respondents' answers. The forth part was asking about customer concerns regarding to grocery delivery in terms of receive time, delivery slot and delivery mode preferences. In the same part, eight statements were used to ask about customer delivery concerns using the 5-point likert scale ranging from 1 ('strongly disagree') to 5 ('strongly agree') for each item. The last part, which is the main core of this paper was asking about the expected benefits and barriers of online grocery shopping using the 5-point likert

scale ranging from 1 (‘strongly disagree’) to 5 (‘strongly agree’) for each item . Fourteen statements were used to measure if the Jordanian consumers are favourable to the idea of purchasing grocery online or not. We used the statistical analysis tool SPSS to test the validity of our main hypothesizes.

3.3 RESULTS AND DISCUSSIONS

3.3.1 ONLINE GROCERY SHOPPING INTENTION

As seen in Table (3.2), among 150 respondents, (44.7%) of them accept the idea to start buying grocery over the internet, while (32.7%) don’t accept this idea, and (22.6%) from this sample said maybe. According to these results, if the respondents who said maybe were counted as likely to accept this idea but in the long term, it can be obtained that customers’ attitudes are almost favourable toward online grocery shopping in the long term.

Would you like to start buying groceries online?	**Number**	**Percentage**
Yes	67	44.7
No	49	32.7
Maybe	34	22.6
Total	150	100

Table (3.2): online grocery shopping intention

Customers were asked about their attitudes towards online grocery shopping and its delivery services. The findings from this study were discussed in the following sections.

3.3.2 BENEFITS FROM ONLINE GROCERY SHOPPING

Table (3.3) includes the possible benefits from adopting online grocery shopping (OGS). From the answers of the respondents we can see that the majority of them agreed with the statements that identify the potential benefits from adopting online grocery shopping. The results also show that online shopping will save time get the highest average which means it is the most expected benefit from shopping online.

Benefits	Mean	Rank
Online shopping provides me with enjoyment and fun.	3.97	8
Online shopping provides me with good price, comparison, brand and quality.	4.19	2
Online shopping provides me with the ability to shop at any time of the day 24/7.	4.13	5
Online shopping provides me with broader supply and far shopping.	4.01	7
Online shopping provides me with more information about the products such as nutritional information and expiry dates.	4.14	4
Online shopping save my time.	4.21	1
Online shopping reduces transport cost.	4.17	3
Online shopping is convenient for people with specific considerations (female, elders and physical).	4.09	6
All paragraphs	4.11	

Table (3.3): Benefits from adopting OGS.

According to Table (3.3), it was found that the overall Mean (4.11) is greater than mean of the scale which is (3). This gives an indication of a positive attitude from the respondents toward the benefits of OGS in general.

The decision here cannot be determined on the Mean value alone, a test is needed to ensure that the data is not concentrated in the neutral area and there is an actual existence for the benefits from OGS adoption. First, a hypothesis has to be formulated then a validity test is needed:

- H 1: Jordanian customers have positive attitudes towards online grocery shopping benefits.

According to one sample T-test results (t=20.496, p<0.05) as seen in Table (3.4), it can be seen that the respondents have a positive attitudes towards online grocery shopping benefits.

	Test Value = 3					
					95% Confidence Interval of the Difference	
	t-calculated	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
H1	20.496	149	0.000	1.113333	1.00600	1.22067

Table (3.4): One sample t-test for H1

H1		N	Mean	Std. Deviation	t-value	Sig. (2-tailed)
Employment Type	Public sector	105	4.04881	0.694781	-1.979	0.075
	Private sector	45	4.26389	0.569852		
Area of living	Rural	58	4.09914	0.719694	-0.201	0.841
	Urban	92	4.12228	0.632504		
Gender	Male	91	4.12363	0.645899	0.235	0.815
	Female	59	4.09746	0.699472		

Table (3.5): Independent sample t-test for H1

Referring to Table(3.5), since more than 85% of the respondents are working either for the public or the private sectors, the most cited reason to start buying groceries over the internet is that, this service will reduce the hassle of traditional grocery shopping and therefore, it saves the customer's time.

Moreover, the respondents identified that online shopping provides them with good price, deal and quality or brand as the second most beneficial reason to start shopping online, this also agreed with Ghaniet.al(2001) cited in (Ghazali et al., 2006).

The respondents also indicate that this way of shopping will reduce the cost of the transportation since the traditional way of grocery shopping includes on average two weekly visits to more than one shopping line. These results agree with the findings of (Ghazali et al., 2006; Morganosky & Cude, 2000a; Pechtl, 2003) , who indicated that online grocery customers mainly benefits from time and cost savings.

Since the traditional Jordanian grocery industry usually don't give much nutritional information about their food, the respondents indicate that one of the most important benefits from shopping online is that it will enable them to have more nutritional information about their products.

The Jordanian community is a close-knit and conservative community, where people live in families that have one person who is responsible about the household needs including shopping. Therefore, one shopping list needs to be ready at day time and elderly people in their families have someone to take care of their shopping needs.

The respondents' answers towards convenience and enjoyment offered by online grocery shopping got the lowest degree in the benefits scale. These results agreed with the previous facts about the Jordanian traditional grocery shopping, however these results disagreed with the findings of (GVU, 1998; Keh and Shieh, 2001; Ghani et al., 2001; Grunert and Ramus, 2005) cited in (Ghazali et al., 2006), who indicated that convenience of online shopping is one of the main benefits that encourage customers to start shopping online. Moreover, the analysis results also indicate that customers have these positive attitudes towards online grocery shopping benefits regardless their demographical specifications, Table (3.5), includes results from running independent sample t-test to compare between respondents demographics according to their attitudes towards online grocery shopping benefits.

3.3.3 BARRIERS TO ONLINE GROCERY SHOPPING

Table (3.6) includes the possible barriers to adopt online grocery shopping (OGS). From the respondents' answers, it can be seen that the majority of them agreed with the statements that identify the possible barriers that affect their decision to start buying groceries using the internet. The results show that the uncertainty of product quality get the highest average which means it is the most expected barrier to adopt online grocery shopping.

Barriers	Mean	Rank
The website technical features such as usability and appearance will affect my decision to adopt the process of buying groceries over the internet.	3.58	5
I feel worried about the delivery service quality when buying my groceries online.	3.71	4
I feel sensitive towards security and privacy issues when buying my groceries over the internet.	3.80	2
I feel that my IT skills related to online shopping transactions will not help me buying my groceries over the internet.	3.72	3
I feel uncertain about the product quality when buying my groceries over the internet.	3.84	1
I feel that online grocery shopping will negatively affect my social relations with other people.	3.53	6
All paragraph	3.73	

Table (3.6): Barriers to adopt OGS

According to Table (3.6), it was found that the overall Mean (3.73) is greater than mean of the scale which is (3); this gives an indication of a negative attitude from the respondents toward the barriers of online grocery shopping (OGS) in general. The decision here cannot be determined on the Mean value alone, a test is needed to ensure that the data is not concentrated in the neutral area and there is an actual existence for the barriers to adopt OGS. First, a hypothesis has to be formulated then a validity test is needed:

- H2: Jordanian customers have negative attitudes towards online grocery shopping barriers.

According to one sample t-test ($t=9.134$, $p<0.05$) as seen in Table (3.7), it can be seen that the respondents have a negative attitudes towards online grocery shopping barriers.

	Test Value = 3					
					95% Confidence Interval of the Difference	
	t-calculated	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
H2	9.134	149	0.000	0.727556	0.57015	0.88496

Table (3.7): One sample t-test for H2.

H2		N	Mean	Std. Deviation	t-value	Sig. (2-tailed)
Employment Type	Public sector	105	3.76540	0.995867	0.724	0.470
	Private sector	45	3.63926	0.931418		
Area of living	Rural	58	3.71552	1.106885	-0.114	0.910
	Urban	92	3.73514	0.889285		
Gender	Male	91	3.81465	0.968749	1.362	0.175
	Female	59	3.59322	0.979068		

Table (3.8): Independent sample t-test for H2.

Referring to Table (3.6), the most important factor that affects the customers' decision to start buying groceries using the internet is the uncertainty about product quality. Jordanian customers like all the Middle Eastern customers always prefer to examine, touch and smell their perishable groceries even if they find better prices or more product information. These results are consistent with the findings of (Ghazali et al., 2006; Pechtl, 2003).

The second important barrier is the sensitivity towards security and privacy issues. This indicates that the people in the Jordanian context are afraid from using internet as an intermediate for their personal information or payments. This also agreed with the findings of (Ghazali et al., 2006; Morganosky & Cude, 2000a; Morganosky & Cude, 2002).This lack of trust could be due to the low penetration of credit cards caused by high degree of unemployment , lack of payment systems

or the absence of legislation and regulations that govern online transactions. Although the number of Internet users has grown to reach more than 1,500,000 in 2008 (The Jordanian Telecommunications Regulatory Commission), the results also shows that the respondents still have a lack in their IT skills that are necessary to deal with the online shopping transactions . According to the department of statistics ‘’survey of IT at home’’, 2008, the main reasons behind the use of Internet in Jordan are directed to browsing information while there are no real transactions happened. This also agreed with the findings of (Fahed et.al, 2010; Omid et.al, 2009) in Saudi Arabia and Iran.

Moreover, the respondents indicated that they have great concerns about the logistical capabilities of the online retailers. They are worried about the delivery services qualities in terms of cost, delivery time windows, return and exchange policies. These results agreed with the findings of (Ghazali et al., 2006; Fahed et.al, 2010; Omid et.al, 2009) who indicated that the delivery concerns are one of the important barriers towards online grocery shopping.

Developing countries in general face logistical challenges such as the lack of timely and reliable systems for grocery delivery services due to inadequate transportation and delivery networks (Kshetri, 2008) .

According to (Al-Qirim, 2010), the majority of stores websites in Jordan are not strategic and used mostly as brochures for the company’s products and services as well as they have been written in English while the local language in Jordan is

Arabic. This makes Internet users uncomfortable with browsing and using English sites (Meddeh 2008; Rochester 2009) cited in (Hasan, 2009).

Therefore, the respondents indicate that these technical issues may affect their decision to shop online. These results are consistent with the findings of (Omid et.al, 2009; Fahed et.al, 2010) who indicated that the web features including appearance, usability and other features affect the customers considerations towards online grocery shopping.

Finally, the respondents indicate that the least important inhibiting factor for online grocery shopping is social needs. While traditional grocery shopping let the customers to communicate with each other as well as they can bargain easily with the retailers, online grocery shopping can offer a new ways of socializing over the internet such as forums and chat spaces (Verhoef & Langerak, 2001). Moreover, the analysis results also indicate that customers have these negative attitudes towards online grocery shopping barriers regardless their demographical specifications. Table (3.8) includes results from running independent sample t-test to compare between respondents demographics according to their attitudes towards online grocery shopping barriers.

3.3.4 DELIVERY CONCERNS

Table (3.9) includes the possible customer's concerns regarding delivery service offered by online grocery retailers. From the answers of the respondents we can notice that the majority of them have serious concerns regarding the delivery service.

Delivery Concerns	Mean	Rank
Risk of failed delivery.	3.29	4
The availability of a convenient delivery mode.	4.20	1
Delivery time slots might be unsuitable and too vague.	2.74	7
The risk that goods might not arrive on time.	3.67	3
The additional cost of home delivery.	3.21	5
The shop return service might be Inconvenient.	2.87	6
The quality and freshness of the goods might be not good.	4.07	2
Can't easily find delivery information.	2.51	8
All paragraph	3.32	

Table (3.9): Customers' delivery concerns

The results also show that the availability of a suitable delivery mode got the highest average, which means it is the main delivery concern from customers' points of view. The goods quality and freshness also considered as a major concern according to the results. These findings are consistent with the facts about online grocery shopping delivery service concerns which state that groceries are one of the most difficult items to sell online with different delivery channels, customer demand and customer's freshness preferences (MacGregor & Vrazalic, 2005; Xu et al., 2008).

Delivery cost and risks in terms of failed delivery and lateness was also considered important, these results also agreed with other research findings (Madlberger, 2005; Xu et al., 2008). The least important delivery concerns are the suitability of delivery time windows and the shop return policy.

According to Table (3.9), it was found that the overall Mean (3.32) is greater than the scale mean which is (3). This gives an indication of serious concerns regarding the delivery service in general. The decision here cannot be determined on the Mean value alone, a test is needed to ensure that the data is not concentrated in the neutral area and there is an actual existence for these concerns.

- H3: Jordanian customers have serious concerns regarding the delivery service offered by online grocery retailers.

According to one sample t-test results ($t=7.782$, $p<0.05$) as seen in Table (3.10), it can be seen that the respondents have serious concerns regarding delivery service offered by online grocery retailers.

	Test Value = 3					
					95% Confidence Interval of the Difference	
	t-calculated	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
H3	7.782	149	0.000	0.320000	0.23874	0.40126

Table (3.10): One sample t-test for H3.

H3		N	Mean	Std. Deviation	t-value	Sig. (2-tailed)
Employment Type	Public sector	105	3.28333	0.486990	-1.366	0.174
	Private sector	45	3.40556	0.536426		
Area of living	Rural	58	3.40302	0.642963	1.447	0.152
	Urban	92	3.26766	0.386314		
Gender	Male	91	3.28709	0.576295	-1.091	0.277
	Female	59	3.37076	0.363299		

Table (3.11): Independent sample t-test for H3.

This can be explained by the sample nature, since the majority of our sample respondents are workers and they expect to receive their orders at any time after finishing their works. Moreover, those respondents are also used to buy their groceries from near shops and they definitely won't worry that much regarding the shops return policy. The results analysis also indicate that there are no significant demographic differences between respondents regarding their concerns about delivery service, as shown in Table (3.11). This can be explained by the Jordanian customers' concerns regarding the adoption process of online grocery shopping as it is not yet available in Jordan and those customers never tried it before.

3.4 SUMMARY

The preliminary findings from this survey indicated that the Jordanian customers have positive attitudes towards OGS. Therefore, they are willing to use this service in the future if they find a suitable environment where the hindering factors are almost rare and at the same time with a good delivery service.

According to the study results, the majority of the survey respondents are confident that there are benefits that promote the idea of online grocery shopping adoption. However, they are also worried about certain issues that affect their decision to adopt online grocery shopping like quality and delivery issues. The study showed that the main motivation factor for OGS from the customers' perspective is time saving while the main inhibiting factor is their concerns about the uncertainty of the product quality. Moreover, customers' responses regarding the delivery service showed that they are mainly worried about the availability of a suitable delivery mode. Further research needs to be done to explore the retailer's point of view about OGS in terms of inhibitors, benefits and the profitable logistics models.

CHAPTER 4

ONLINE GROCERY ADOPTION FROM THE JORDANIAN SMES' POINT OF VIEW

4.1 INTRODUCTION

In this chapter, the adoption of online grocery retailing in developing countries represented here by the case of Jordanian grocery industry where was assessed. Online grocery shopping is one of the electronic commerce applications that received much attention in the last few years (Belsie, 1998). In Jordan, nearly all the registered grocery retailers are considered as being small and medium-sized enterprises (SMEs) with a number of employees ranging from (1-99) (department of statistics, 2008; Jordan Small Businesses and Human Development Report, 2011). Despite e-commerce positive results among Small and medium enterprises (SMEs) in the developed countries, SMEs adoption of e-commerce technologies in the developing countries is still slow.

The expected benefits and barriers from adopting online grocery retailing among grocery SMEs in Jordan as well as the retailers concerns against the provided delivery service were identified.

A specially designed questionnaire (Appendix 3) was used to collect the data from a sample of 30 grocery SMEs who were listed in the latest official business directory of Ministry of Trade in Jordan and other resources.

The findings of this study indicated that the most expected benefit from adopting online grocery retailing is increasing sales while the least expected one is helping in decision making. The results also indicate that grocery retailers are worried about certain issues that affect their decision to adopt online grocery shopping such as security and trust concerns over internet payments as well as low popularity of online sales. Grocery retailers also indicated that they have serious concerns regarding the delivery service mainly because the unknown market size and customer demand.

The results of this study recommended that there is a necessity to provide support either from the government or other vendors for SMEs in order to help them to adopt e-commerce technologies in the future.

4.2 STUDY METHODOLOGY

The study was carried out using the survey approach. This section provides a description about the research instrument design, the sampling procedure and data collection technique. In order to explore the drivers and barriers that affect Jordanian grocery retailer's decision to adopt online grocery retailing, a specially designed questionnaire was distributed among 45 grocery retailers selected from a database provided by the ministry of industry and trade in Jordan and Jordanian

Chamber of Commerce. This sample composed 50% from the registered grocery retailers which have a websites. Out of which 34 store managers' responses were returned, only a total of 30 responses were used for the final analysis. The others were discarded, mainly due to missing values. The survey was carried out in three major cities in Jordan; Amman, Irbid and Karak, since they are the highly populated areas in the Middle, North and south of Jordan respectively. In order to reduce misinterpretations, the questionnaire was made bilingual, using Arabic and English. The original English version was translated into Arabic using the back-to-back translation method (Zikmund, 1997). Also a pilot study was conducted before the questionnaire was sent out. It was conducted with 4 respondents and helped in refining the questions and the layout of the questionnaire. In addition, Cronbach alpha test was used to assess the reliability of the used scales. Cronbach alpha values for the main survey constructs were (0.725) for the benefits scale and (0.781, 0.748) for the internal and external barriers scales respectively while the retailer's delivery concerns scale value was (0.736). These values are considered to be acceptable because they are above (0.7) according to (Hair et.al, 2006).

The questionnaire was divided into five parts; the first part asked about the respondents demographic variables such as type, location, etc., as shown in Figure (4.1). The second part asked about their current use of internet, as shown in Figure (4.2).

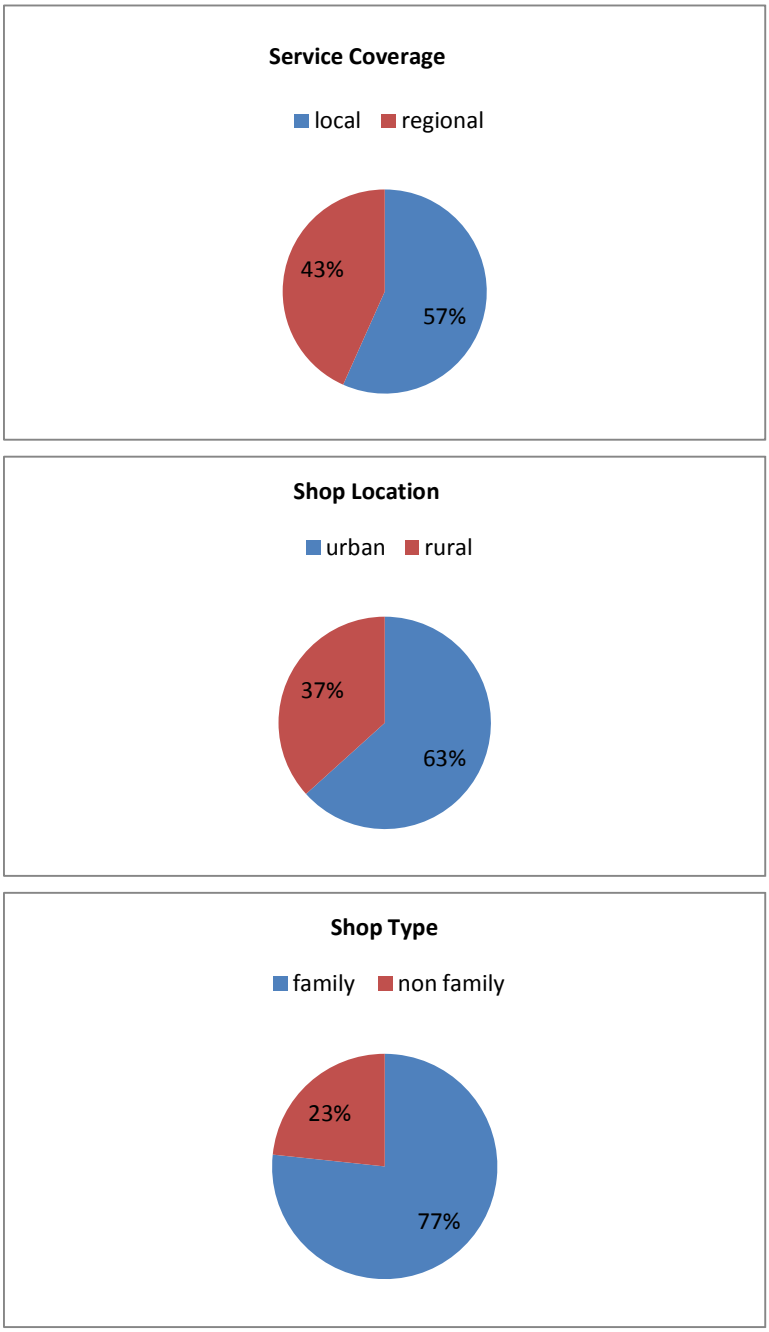


Figure (4.1): Respondents' demographics (Retailers)

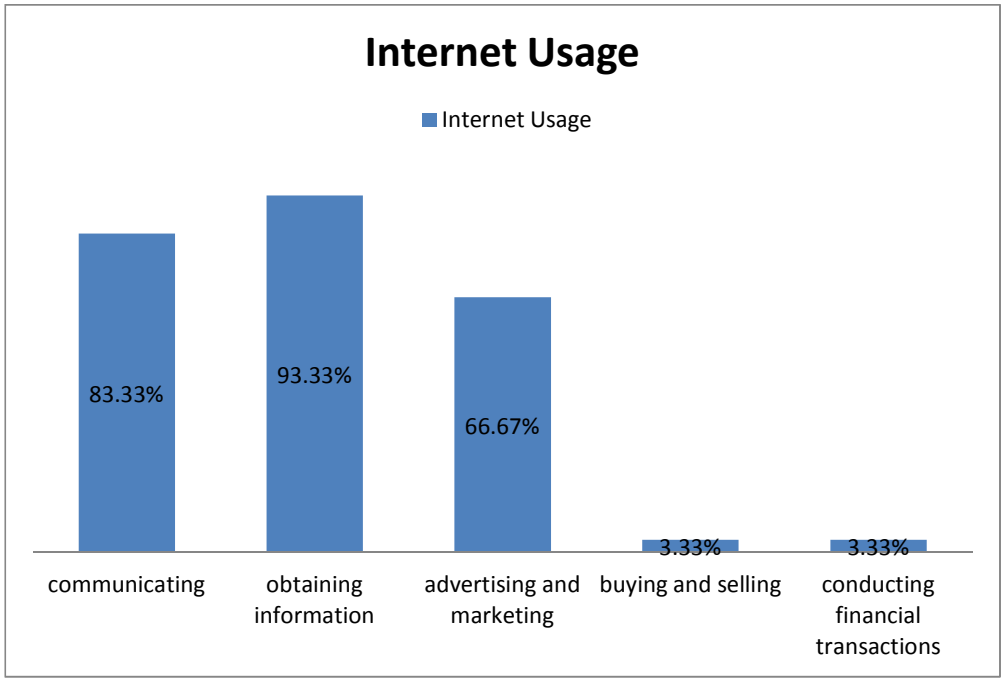


Figure (4.2): Current use of internet among the respondents

The third part was asking about the retailers' concerns regarding their delivery service and their delivery mode preferences. In this part, ten statements were used to ask about retailers' delivery concerns using the 5-point likert scale ranging from 1 ('strongly disagree') to 5 ('strongly agree') for each item.

The last part which is the main core of this survey asked about the expected benefits and barriers of online grocery shopping using the 5-point likert scale ranging from 1 ('strongly disagree') to 5 ('strongly agree') for each item .

Eleven statements were used to explore the expected benefits from adopting online grocery retailing. Moreover, nine statements were used to identify the internal barriers and another ten statements were used to identify the external barriers. Then we used the statistical analysis tool SPSS to test the validity of our main hypothesises.

4.3 RESULTS AND DISCUSSIONS

Grocery SMEs' managers in the major cities in Jordan were asked about their attitudes towards online grocery shopping and its logistical services. Their responses about OGS adoption benefits, barriers and delivery concerns were described in the following sections.

4.3.1 BENEFITS FROM ONLINE GROCERY SHOPPING

Table (4.1) includes the expected benefits from adopting e-commerce technologies in grocery retailing in Jordan as a case from the developing countries. The answers of the respondents showed that the majority of retailers agreed with the statements that identified the potential benefits from online grocery retailing. The results showed that the most expected benefit from adopting online grocery retailing is increasing sales while the least expected one is helping in decision making.

Benefits	Mean	Rank
Reduce cost and time of business operation.	3.93	3
E-commerce will increase sales.	4.10	1
Improve customer service.	3.80	5
Providing customers with more satisfying shopping experience.	3.50	7
Launch new products and Increase the availability of them.	3.47	8
Expand the market access by the accessibility to more customers.	4.03	2
Support linkage with suppliers.	3.63	6
Increase the ability to compete.	3.83	4
Help in making decisions.	2.90	10
Help in job creation/ employment opportunities	2.93	11
Improve collaboration and partnership among SMEs in order to increase the market share.	3.37	9
All paragraphs	3.59	

Table (4.1): Benefits from adopting OGS

According to Table (4.1), it was found that the overall mean value (3.59) is greater than mean of the scale which is (3); this gives an indication of a positive attitude from the respondents toward the benefits of online grocery retailing in general. The decision here cannot be determined by the value of mean value alone because we have to ensure that the data is not concentrated in the neutral area and there is an actual existence for the benefits from OGS adoption. Therefore, a hypothesis was postulated and tested as follows:

- H 1: Relative advantages have a positive influence on the adoption of online grocery retailing among Jordanian grocery retailers.

According to t-test results, which show that the value of t-calculated (6.126) is larger than the value of (t-value = 2.05, $p<0.05$) as seen in Table (4.2). This will prove the correctness of this hypothesis.

	Test Value = 3					
					95% Confidence Interval of the Difference	
	t-calculated	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
H1	6.126	29	0.000	1.630909	1.43363	1.82819

Table (4.2): One sample t-test for H1.

Most of the Jordanian grocery retailers in our sample reported that increase sale and expanding geographical reach as the most expected benefits from adopting e-commerce technologies. Moreover, respondents also cited that using e-commerce will help them to decrease cost and time of business operations and enhance customer services. They also agreed for more benefits such as competitiveness; improve collaboration and linkage with customers, business partners and suppliers. Existing literature supports these findings to be the major benefits from adopting e-commerce technologies (Akkeren & Cavaye, 1999; Morganosky & Cude, 2000; MacGregor & Vrazalic, 2004).

However, the majority of the respondents did not agree with the statements that link e-commerce technologies adoption with decision making process or job creation in the Jordanian grocery industry.

These findings also agreed with the findings of (Syed et.al, 2005; Filiatrault & Huy 2006; Kurnia , 2007; Qureshi, S. & A. Davis, 2007; Huniati et al., 2009), who indicated that the major benefits from adopting e-commerce technologies in

the developing countries are profit expansion and enhancement of supply chain effectiveness.

On the other hand, the findings from these studies also indicated that the least significant benefits from adopting e-commerce technologies were job creation and improving living standards, which are in agreement with the findings in this study.

The findings also indicated that there is no significant demographic difference among respondents with respect to their attitudes towards online grocery retailing benefits as shown in Tables (4.3) (t=1.727), (t=-1.356), (t=-0.367). In other words, respondents have positive attitudes toward online grocery retailing, regardless of their shop type, location and coverage area.

H1		N	Mean	Std. Deviation	t-value	Sig. (2-tailed)
Shop type	Family	23	3.67984	0.540521	1.727	0.095
	Non-family	7	3.29870	0.384673		
Location	City (urban)	19	3.49282	0.554898	-1.356	0.186
	village(rural)	11	3.76033	0.453221		
Service coverage	local	17	3.51337	0.617363	-0.917	0.367
	Regional	13	3.69231	0.383076		

Table (4.3): Independent sample t-test for H1.

4.3.2 BARRIERS TO ONLINE GROCERY SHOPPING

Based on the respondents' answers, Table (4.4) shows the possible internal barriers to adopt e-commerce technologies in the Jordanian grocery retailing industry. Table (4.5) then shows the possible external barriers that face this industry divided into cultural, infrastructure, political, social, and legal and regularity. These barriers have been categorized and addressed by (Tassabehji, 2003; Macgregor & Vrazalic, 2005; Alemayehu, 2005).

Internal Barriers	Mean	Rank
Lack of technical skills to implement and maintain an e-commerce project.	3.90	4
Trust and security concerns with payments over the internet.	4.53	1
E-commerce not suited to way our business is conducted.	3.57	7
Lack of time to initiate the project.	3.80	5
Inability to make and receive payments.	4.03	3
E-commerce not suited to our products and services.	3.07	9
Lack of awareness of e-commerce technologies and its perceived benefits.	3.77	6
E-commerce not suited to our customers and suppliers.	3.40	8
Lack of fund to finance the project requirements (computers, internet price, etc.).	4.40	2
All paragraphs	3.83	

Table (4.4): Internal Barriers to adopt OGS

External Barriers	Mean	Rank
Cultural	4.33	1
Online sales not popular.	4.33	
Infrastructure	3.21	4
Lack of telecommunications infrastructure in terms of speed and quality.	3.27	
Low Internet penetration in the country.	3.07	
Inadequate transportation infrastructure and delivery networks.	3.30	
Political	2.87	5
Unstable economic climate in the country.	2.83	
Changing regulations with each government change.	2.90	
Social	4.27	2
Lack of information on e-commerce.	4.27	
Legal and regulatory	4.14	3
Little support and policies for SMEs from government and industry associations.	4.17	
Inadequate legal framework for businesses using e-commerce.	4.13	
No simple procedures and guidelines.	4.13	
All paragraphs	3.64	

Table (4.5): External Barriers to OGS .

According to the respondents' answers, the internal barriers such as security and trust concerns over internet payments received higher average agreement comparing to the external ones such as popularity of online sales. This means, the respondents feel that the internal barriers that come from inside the organization sphere have larger negative power on their decision to adopt online retailing than the external ones. This can be also explained by the nature of our sample in addition to the internal barriers, since our sample is composed of SMEs which are grocery retailers usually characterized by their poor and centralized management and limited financial, time and personal resources (Kartiwi & MacGregor, 2007; Alqirim, 2010).

Referring to Table (4.5), it was found that the overall Mean value (3.83) is greater than mean value of the scale which is (3); this gives an indication of a negative influence for the internal barriers on the adoption of online grocery retailing among grocery retailers. In order to prove our results statistically we have to formulate hypothesises and test them:

- H 2: Internal barriers have a negative influence on the adoption of online grocery retailing among grocery retailers in Jordan.

According to t-test results, which show that the value of t-calculated (5.98) is larger than the value of (t-value = 2.05, $p<0.05$) as seen in Table (4.6). This will prove the correctness of this hypothesis.

Concerns about security of online payments and lack of funds to finance and maintain the project requirements are the most important internal barriers that affect the respondent decision to adopt online grocery retailing .this agreed with the findings of (Kapurubandara, 2009; Sabah et.al, 2011). In Jordan, business owners worry about the security of online transactions (Obeidat, 2001; Al-Qirim, 2010). The lack of trust could be due to the low penetration of credit cards caused by high degree of unemployment, lack of payment systems or the absence of legislation and regulations that govern online transactions (Sahawneh et al., 2002, 2003, 2005). However, (Al-Qirim, 2010) indicated that the cost to implement such a projects is an irrelevant factor for the adoption process of online retailing in Jordan. These results disagreed with our findings, which indicate that lack of

funds is one of the important barriers to adopt online retailing in the grocery industry.

Moreover, respondents also agreed that lacks of technical skills to implement and maintain the project as well as lack of e-commerce awareness are also internal barriers affecting their decision to adopt online grocery retailing.

On the other hand, the least significant internal barriers to adopt online retailing are the unsuitability of e-commerce either for products, customers, suppliers and business. These findings also agreed with the results of (Alemayehu, 2005; Sabah et.al, 2011).

Moreover, there is no significant difference between respondents shop types either family or non- family owned with respect to their attitudes towards internal barriers, as shown in Table (4.7). However, there are significant differences between respondents' locations as well as coverage areas with respect to the internal barriers. It appears that respondents who are localized in rural areas face more internal barriers than who are localized in the urban ones. It also indicates that respondents who have a regional service face more challenges than those who have a local one. These differences may be due to internal barriers such as trust concerns, lack of funds, lack of technical skills as well as lack of awareness about e-commerce and its benefits. These barriers are clearly noticed in the rural areas and become more important when the service goes a wider range.

	Test Value = 3					
					95% Confidence Interval of the Difference	
	t-calculated	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
H 2	5.982	29	0.000	1.870	1.59	2.15

Table (4.6): One sample t-test for H2.

H2		N	Mean	Std. Deviation	t-value	Sig. (2-tailed)
Shop type	Family	23	4.07	0.403	2.356	0.054
	Non-family	7	3.05	1.124		
Location	City (urban)	19	3.60	0.848	-2.309	0.029
	village(rural)	11	4.22	0.333		
Service coverage	local	17	3.52	0.862	-2.893	0.007
	Regional	13	4.24	0.286		

Table (4.7): Independent sample t-test for H2.

Referring to Table (4.5), it was found that the overall mean value of the statements that identify the external barriers (3.83) is greater than the mean value of the scale which is (3). This gives an indication of a negative influence for the external barriers on the adoption of online grocery retailing among grocery retailers. More details are also provided regarding cultural, infrastructure, social, legal and regularity barriers.

It was found that their mean values (4.33, 3.21, 4.27, and 4.14) are greater than the mean of the scale which is (3); this gives an indication of a negative influence for these barriers on the adoption of online grocery retailing. However, political barriers mean value (2.87). This is less than the mean value of the scale (3). This gives an indication that the political situation in Jordan do not have a negative effect on the adoption of online grocery retailing. In order to prove our results statistically, a group of hypothesises were postulated and tested as follows:

- H 3: External barriers have a negative influence on the adoption of online grocery retailing among grocery retailers in Jordan.

According to t-test results, which show that the value of t-calculated (6.288) is larger than the value of (t-value = 2.05, $p<0.05$) as seen in Table (4.8). This will prove the correctness of this hypothesis.

	Test Value = 3					
					95% Confidence Interval of the Difference	
	t-calculated	Df	Sig. (2-tailed)	Mean Difference	Lower	Upper
H3	6.288	29	0.000	.640000	0.43184	0.84816

Table (4.8): One sample t-test for H3.

- H 3.1: Cultural barriers have a negative influence on the adoption of online grocery retailing among grocery retailers in Jordan.

According to t-test results, which show that the value of t-calculated (9.103) is larger than the value of (t-value = 2.05, p<0.05) as seen in Table (4.9). This will prove the correctness of this hypothesis.

	Test Value = 3					
					95% Confidence Interval of the Difference	
	t-calculated	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
H 3.1	9.103	29	0.000	2.373	2.07	2.67

Table (4.9): One sample t-test for H 3.1.

- H 3.2: Infrastructural barriers have a negative influence on the adoption of online grocery retailing among grocery retailers in Jordan.

According to t-test results, which show that the value of t-calculated (0.989) is larger than the value of (t-value = 2.05, p>0.05) as seen in Table (4.10). This will reject the correctness of this hypothesis.

	Test Value = 3					
					95% Confidence Interval of the Difference	
	t-calculated	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
H 3.2	0.989	29	0.331	1.251	0.81	1.69

Table (4.10): One sample t-test for H 3.2.

- H 3.3: Political barriers have a negative influence on the adoption of online grocery retailing among grocery retailers in Jordan.

According to t-test results, which show that the value of t-calculated (-0.928) is larger than the value of (t-value = 2.05, p>0.05) as seen in Table (4.11). This will reject the correctness of our hypothesis.

	Test Value = 3					
					95% Confidence Interval of the Difference	
	t-calculated	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
H 3.3	-0.928	29	0.361	-0.1333	-0.427	0.161

Table (4.11): One sample t-test for H 3.3.

- H 3.4: Social barriers have a negative influence on the adoption of online grocery retailing among grocery retailers in Jordan.

According to t-test results, which show that the value of t-calculated (7.99) is larger than the value of (t-value = 2.05, p<0.05) as seen in Table (4.12). This will prove the correctness of this hypothesis.

	Test Value = 3					
					95% Confidence Interval of the Difference	
	t-calculated	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
H 3.4	7.99	29	0.000	2.307	1.98	2.63

Table (4.12): One sample t-test for H 3.4.

- H 3.5: legal and regularity barriers have a negative influence on the adoption of online grocery retailing among grocery retailers in Jordan.

According to t-test results, which show that the value of t-calculated (7.923) is larger than the value of (t-value = 2.05, $p<0.05$) as seen in Table (4.13). This will prove the correctness of this hypothesis.

	Test Value = 3					
					95% Confidence Interval of the Difference	
	t-calculated	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
H 3.5	7.923	29	0.000	2.184444	1.88902	2.47987

Table (4.13) : One sample t-test for H 3.5.

Referring to Table (4.5), the most significant external barriers to the adoption of online grocery retailing in Jordan are the lack of popularity and information about e-commerce. In Jordan, e-commerce faces cultural and social resistance among customers (Obeidat 2001; Sahawneh et al. 2002, 2003, 2005; Al-Qirim, 2010). Moreover, customers in the developing countries prefer to touch and feel their groceries before purchasing, also they prefer the traditional way of shopping because it allows them to socialize with others (Ghazali et al., 2006; Pechtl, 2003). Furthermore, retailers also agreed with the statements that indicate the legal and regularity system in Jordan will prevent them from adopting online retailing.

These findings agree with previously published literature results (Ihlstrum et al, 2003; Kurnia, 2007; Qureshi & Davis, 2007) which indicated that the government role and the regulatory environment did not exist in Jordan.

The least significant external barriers are political barriers such as an unstable economic climate and frequent changes in government regulations. Furthermore, the telecommunication and transportation infrastructure seems not making threats to the adoption process. These findings agree with (Akkeren & Cavaye, A.L.M., 1999; Kshetri, 2007; Kartiwi & MacGregor, 2007; Kapurubandara, 2006; 2009) who indicated that Jordan has adequate telecommunication and transportation infrastructure that can satisfy the required level of e-commerce readiness.

The study findings also indicated that there are no significant differences between respondents' demographic variables represented by shop type and coverage area with respect to their attitudes towards external barriers as shown in Table (4.14). However, significant differences appeared between respondents with different locations (t-value=0.092). The results indicated that the retailers in the rural areas face more external barriers than whom in the urban areas and this can be explained by the differences between them in terms of e-commerce readiness levels.

H3		N	Mean	Std. Deviation	t-value	Sig. (2-tailed)
Shop type	Family	23	3.66957	0.582654	0.520	0.607
	Non-family	7	3.54286	0.492805		
Location	City (urban)	19	3.74211	0.588138	1.336	0.092
	village(rural)	11	3.46364	0.473862		
Service coverage	local	17	3.60000	0.600000	-0.443	0.661
	Regional	13	3.69231	0.515528		

Table (4.14): Independent sample t-test for H 3.

4.3.3 DELIVERY CONCERNS

Table (4.15) includes the possible delivery service concerns from the retailers' point of view. From the answers of the retailers we can notice that the majority of them agreed that these concerns are important and might be serious hindering factors to initiate a delivery service for their online products.

The results show that unknown market size and customer demand got the highest average which means it is considered as the major delivery concern from the retailers' point of view. The lack of suitable postal address or post code system in Jordan is also considered as a major delivery concern. These concerns can be explained by the doubt about online grocery shopping positive expectations in the developing countries comparing to the developed ones.

Delivery Concerns	Mean	Rank
Inconvenient, unprepared transportation and road network in Jordan.	2.40	9
Unprepared global positioning systems and mapping infrastructure in Jordan.	3.20	6
Unsuitable postal addresses and postcode system in Jordan.	4.07	2
The cost to start, run and maintain the service requirements is too high.	3.70	3
Unknown market size, customer penetration and demand.	4.10	1
Our shop systems (ordering, warehousing, packaging, distribution (e.g. delivery vehicle), accounting (e.g. payment method), return and supply) don't have the capacity to fully back up with the delivery service.	3.00	8
The reliability of fulfilment.	3.63	4
Inability to offer a 24 hours service (night time, time window and congestion times).	3.07	7
Lack of vehicle scheduling and routing software standards.	3.00	8
The transportation companies and postal system in Jordan can't help us to manage this process.	3.51	5
Security barriers (e.g. theft crimes that related with some kind of the delivery modes (e.g. unattended home delivery: in an external box).	2.23	10
All paragraphs	3.28	

Table (4.15): Retailers' delivery concerns

The differences in ICT readiness levels, transportation, mapping and delivery infrastructures, social and cultural environments, political environments, business conditions and consumers' attitudes explained online grocery shopping gap between developed and developing countries (Kurnia, 2008). Developing countries in general and Jordan specifically lack to prepared transportation and mapping infrastructures and this will increase the retailers' worries toward a delivery service.

The majority of grocery retailers in Jordan are considered as SMEs retailers with limited resources (financial, time, personnel and technical) as well as poor and centralized management. Moreover, grocery delivery service logistics to customers is characterized by managed warehousing and packaging system, wide

distribution, various and small items and uncertain delivery times and frequencies (Boyer et al., 2009).

These factors will increase the delivery process complexity and this also explains the retailers concerns regarding delivery service in terms of capabilities and cost. The respondents also have concerns regarding the lack of support to initiate the delivery service from governments and consumer logistics companies (DHL, ARAMIX, and FedEx etc.). This can be in a form of lack of legal and regulatory systems to control this sector as well as the lack of logistical companies' capabilities.

The results analysis also shows that there are no significant demographic differences between respondents regarding their concerns about delivery service, as shown in Table (4.17). This can be explained by the relation between these concerns and the nature of SMEs retailing in general as well as the e-commerce readiness levels in the developing countries.

According to Table (4.15), it was found that the overall mean (3.28) is greater than the scale mean which is (3). This gives an indication of serious concerns regarding the delivery service in general. The decision here cannot be determined on the Mean value alone, a test is needed to ensure that the data is not concentrated in the neutral area and there is an actual existence for these concerns. First, a hypothesis has to be formulated then a validity test is needed:

- H 4: Jordanian grocery retailers have serious concerns regarding online grocery delivery service.

According to one sample t-test results (t=4.030, p<0.05), Table (4.16), it can be seen that the respondents have serious concerns regarding online grocery delivery service.

	Test Value = 3					
					95% Confidence Interval of the Difference	
	t-calculated	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
H4	4.030	29	0.000	0.275758	0.13580	0.41572

Table (4.16): One sample t-test for H 4.

H4		N	Mean	Std. Deviation	t-value	Sig. (2-tailed)
Shop type	Family	23	3.27807	0.351312	0.038	0.970
	Non-family	7	3.27273	0.418248		
Location	City (urban)	19	3.28485	0.406364	0.131	0.897
	village(rural)	11	3.26667	0.354540		
Service coverage	local	17	3.28342	0.380140	0.126	0.901
	Regional	13	3.26573	0.382938		

Table (4.17): independent sample t-test for H 4.

4.4 SUMMARY

In the Jordanian market, online shopping is not popular yet with grocery retailers where nearly all of them are considered as small and medium-sized enterprises (SMEs). The purpose of this survey was to investigate the factors that affected Jordanian grocery retailers' decision to adopt online grocery shopping as a case from the developing economies. The preliminary findings indicated that the respondents have positive attitudes toward online grocery retailing. Moreover, most of the grocery retailers in this sample reported that the most expected benefit from adopting online grocery retailing is increasing sales while the least expected one is helping in decision making. However, grocery retailers are also worried about certain issues that affect their decision to adopt online grocery shopping. According to the respondents' answers, internal barriers such as security and trust concerns over internet payments received a higher than average responses compared to the external ones such as popularity of online sales.

The results also indicated that the unknown market size, customer demand and the lack of convenient postal system in Jordan are considered as the major delivery concerns from the retailers' point of view. Moreover, the results showed that the retailers believe that the transportation network in Jordan is good enough to start a delivery service. They also believe that they can manage the delivery service logistics by their own vehicles as well as they have no worries about the security of the unattended delivery services.

However, due to their intuitive decision making process and limited resources (financial, time, personnel and technical), grocery retailers in Jordan still not aware of the type of delivery service they should offer for their online services.

In the light of the survey findings, the results recommended that , in order to have a healthy environment for OGS in Jordan , grocery retailers especially small ones '' bakalahs'' which constitute the major part of this industry need to have support from the government and the technology vendors. Moreover, further research needs to be done on delivery logistics business models for Grocery retailers in Jordan.

CHAPTER 5

E-COMMERCE LOGISTICAL DECISION SUPPORT SYSTEM FOR GROCERY RETAILERS IN JORDAN

5.1 INTRODUCTION

The growth of online grocery shopping has increased the importance of direct delivery to customers. However, product delivery logistics or last mile logistics are considered to be the most challenging issues in online grocery retailing, as discussed previously.

In the Jordanian market as a developing market, online grocery shopping is not popular yet among customers and grocery retailers. In Jordan, nearly all of the grocery retailers are considered as small and medium-sized enterprises (SMEs). Moreover, compared with the developed countries, Jordan's delivery system services are usually need long time to be delivered with poor service quality, particularly in rural and remote areas.

The findings from analysing the distributed questionnaires data indicated that Jordanian customers and retailers have positive attitudes towards online grocery shopping. Therefore, they are willing to use this service in the future if Jordan reached the required level of e-commerce readiness in terms of: ICT infrastructure, business logistics environment, social and cultural environments and government and legal environments.

The findings also indicated that online customers are expecting high logistical services, demanding convenience, high reliability and timely delivery.

Therefore, retailers have to respond to these expectations by having convenient logistical services while keeping this process as cost efficient as possible. Meanwhile, due to their intuitive decision making process and limited resources (financial, time, personnel and technical), grocery retailers in Jordan still not aware about the type of delivery service they should offer for their online customers.

In order to help grocery retailers in their logistical decision making processes, an e-commerce logistical decision support system was designed for grocery retailers in Jordan as a case study from the developing countries. Grocery retailers are supposed to use this system in order to select the most suitable delivery operating system in the future.

The system was tested with real point of sale data over three different delivery alternatives in order to evaluate and compare their cost efficiencies: home delivery, delivery point and pickup point. Moreover, questionnaires (Appendix 2 and 3) were distributed among a group of customers and retailers in order to ascertain their delivery preferences, including delivery time windows and delivery modes.

5.2 STUDY METHODOLOGY

As discussed with regard to previous literature, the decision to select the best delivery solution to start with is one of the main challenges that would face the grocery retailer who is willing to adopt online services.

Quantitative methodologies on e-commerce last mile logistics and the related factors affecting the adopted delivery solution are the most used methodologies in this field. Grocery retailers are advised to use this model in order to select the most suitable delivery operating system. In order to implement and evaluate this model, one of the online vehicle routing and scheduling (logistical) solutions ('My Route Online') (Myrouteonline, 2011) was used to identify, analyse and compare the cost efficiencies of the available alternative delivery solutions.

The system was tested over a dataset containing the retailer 'Albaha' online customer orders from 218 customers located in 'Amman' the capital of Jordan.

The retailer was selected according to the following rules: high density area, ICT infrastructure and voluntary participation in this experiment. The 'modelling tool' was also selected based on its cost and user friendly interface (additionally, it is the only available solution that gives the ability to import XY GPS coordinates from Google Maps).

From the retailer's point of view, the aim of using this system is to fulfil daily customers' online orders while minimizing the cost factors. Therefore, the collected one month data from 218 customers' orders was analysed while focusing on one planning day at a time. Each scenario consists of customers'

orders that need to be served in the same day with specific setups. This sample size provides sufficient statistical power and is similar to prior work in similar studies (Punakivi & Holmstrom, 2001; Smaros et al., 2003; Le Blanc et al., 2006; Sezen, 2006; Boyer et al., 2009).

5.3 MODEL ARCHITECTURE

5.3.1 MAJOR SYSTEM COMPONENTS

The main aim of this research is to design an e-commerce logistical decision support system for grocery retailers in Jordan as a case study from the developing countries.

Figure (5.1) shows the major components of the designed system. The system was designed and tested based on the Waterfall System Development Life Cycle Model (SDLC) (Avison & Fitzgerald, 2003). The Waterfall Model was chosen as it is widely used for commercial software development as well as its simplicity and clarity.

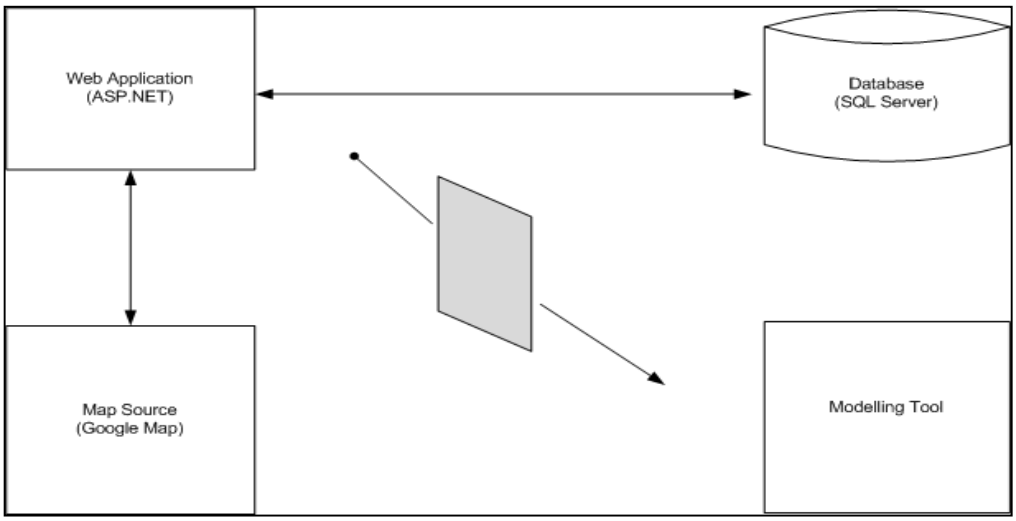


Figure (5.1): Major system's components

The designed system incorporates a web ordering system, embedded map source (Google Maps) and a database system. The web ordering system was designed in order to collect customer orders' from a real point of sale. The map source (Google Maps) is embedded within the designed ordering system and used to allow customers to store their XY GPS coordinates in the database source. The collected data mainly customers' location coordinates then exported to one of the available online logistical solutions (My Route Online) in order to identify, analyze and statistically compare the cost efficiencies of the available delivery alternatives.

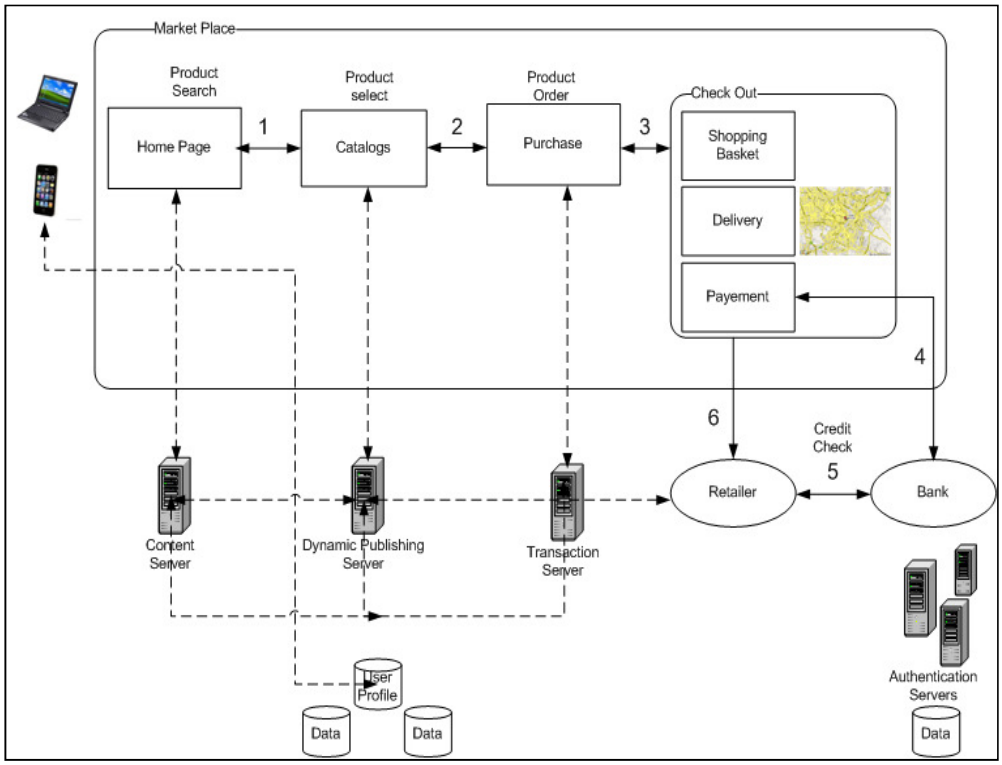
5.3.2 LOGISTICAL DECISION SUPPORT SYSTEM FOR GROCERY SMES

From the retailer's point of view, the aim of using this system is to fulfil daily customers' online orders while minimizing the cost factors. Therefore, the collected online customers' orders have to be imported to the logistical solution and then run this solution over the available delivery scenarios while considering their specific input parameters. The output from running the solution is the design of cost efficient vehicle routes, tables with needed time, distance and cost to fulfil customer orders for each delivery scenario. The final decision is left to the retailer decision makers to choose the most costly efficient scenario among the available delivery alternatives. Figure (5.2) illustrates the designed decision making process suggested to be used by the grocery retailers in order to select the most suitable delivery alternative.

Figure(5.2): Logistical decision support system for grocery SMEs

- Customers' data

This study was based on a dataset containing the retailer's 'Albaha' customer orders from 218 customers located in Amman, which were taken during 30 days of June, 2011. Customers were asked to login to the web ordering system and complete the online ordering transaction in order to store their location's coordinates in the database as shown in figure (5.3). Each customer order is defined by order ID, scheduled day, XY GPS coordinates, street name and estimated service and waiting times.



Figure(5.3): Web ordering system

Table (5.1) shows example of customer orders in one day, this data is stored on SQL server database.

ID	Scheduled Day	Street Name Amman, Jordan	X,Y Coordinates	Service Time (Min.)
1	Mon 6/July	Mohammad Sayel Al Hosban	31.98657, 35.87084	5
2	Mon 6/July	Abdallah Al Azab	31.99147, 35.87475	5
3	Mon 6/July	Al Mohammadeyya	31.99657, 35.85942	5
4	Mon 6/July	Al Lualuaiyya	32.00081, 35.85237	5
5	Mon 6/July	Mansour Ben Omayr	32.00081, 35.85237	5
6	Mon 6/July	Al Dahhak Ben Sufyan	31.9809, 35.86569	5

Table (5.1): customer orders in one day

Moreover, customers were asked about their time window and delivery slot preferences (Customer Survey, Appendix 2). Table (5.2) represents 150 customers' preferences for each of the three delivery time windows:

Time to receive	**Frequency**	**Percent**
Morning (8-12)	19	12.67
Midday (12-15)	54	36.00
End of day (15-22)	77	51.33
Total	150	100.00

Table (5.2): Time window preferences

It can be noticed that the most favourable delivery time window is end of day (15:00-22:00), with a percentage of 51%, followed by midday (12:00-15:00) with 36%; only 13% favoured morning delivery (8:00-12:00).

Among 150 customers asked about the slot of delivery they prefer, 69% preferred two hours of time to receive their order, while 17% preferred the one hour time slot; 9% preferred 12 hours, and 5% preferred 24 hours; as shown in Table (5.3).

Slot for delivery	Frequency	Percent
1 hour	26	17.33
2 hours	103	68.67
12 hours	13	8.67
24 hours	8	5.33
Total	150	100.00

Table (5.3): delivery slot preferences

- Retailer's data

In the selected retailer case, due to the lack of postal addresses or ZIP code systems in Amman, the XY GPS coordinates for 218 customers were imported from the designed ordering grocery website to the modelling tool.

The imported data then analysed while focusing on one planning day at a time. Each scenario consists of customers' orders that need to be served in the same day with specific setups.

Figure (5.4) visualise these orders on Google Maps after importing their coordinates from the website database to the modelling tool:

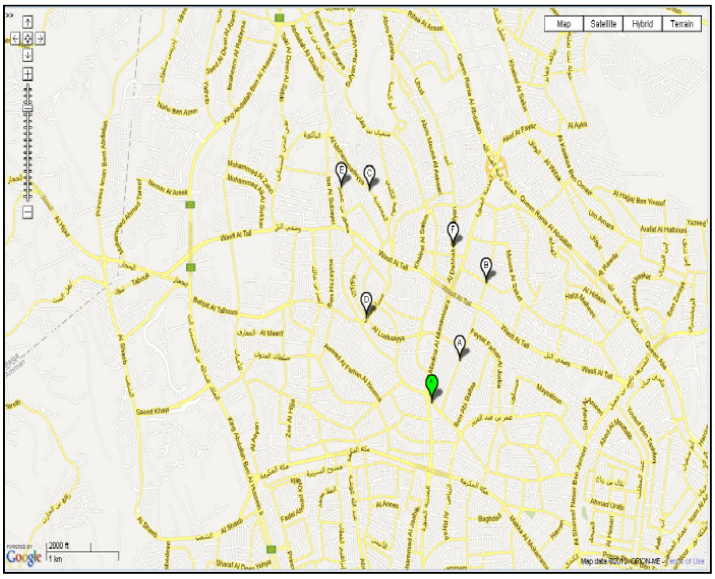


Figure (5.4): Customer orders for one day

Figure (5.5) shows a map visualization of the 218 customer's orders, retailer's location (green mark) and facility points during one month.

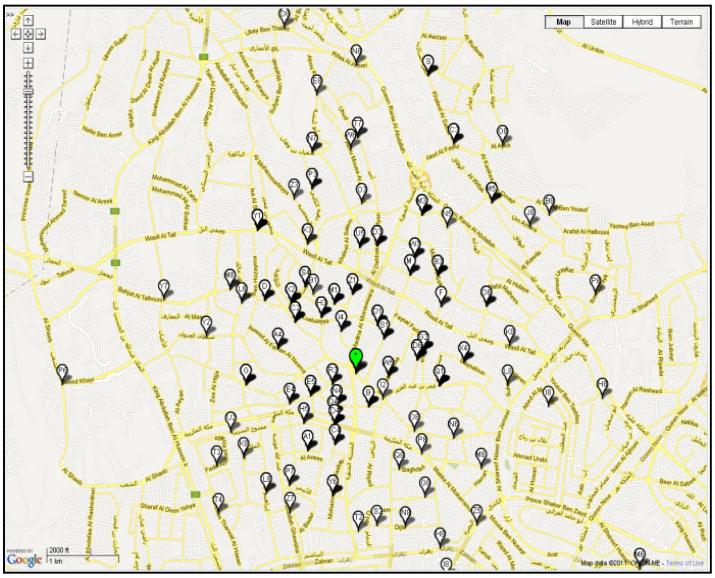


Figure (5.5): Customer orders for one month

The retailer's location and facility points were defined by their XY GPS coordinates and street names. From this Figure and since the retailer is considered

as a SME retailer, it can be recognized that most of the orders are from the local area.

Moreover, there is only one operating vehicle being owned by the retailer. This vehicle has one day shift from 8:00 am to 23:00 pm. However, from the respondents' answers in Table (5.3), it can be seen that the preferred delivery shift starts from 15:00 with a 2 hours time window. These results will be used as input parameters when running the logistical tool over the retailer 'Albaha' customers' orders.

Furthermore, there are no constraints set on the vehicle capacity; this would be true with regard to the low demand expectations. Road directions and speed limits are automatically taken into consideration by Google Maps.

The vehicle route was selected to begin by the nearest order. Moreover, this study was designed to have one delivery trip every day using one vehicle per route; Figure (5.6).

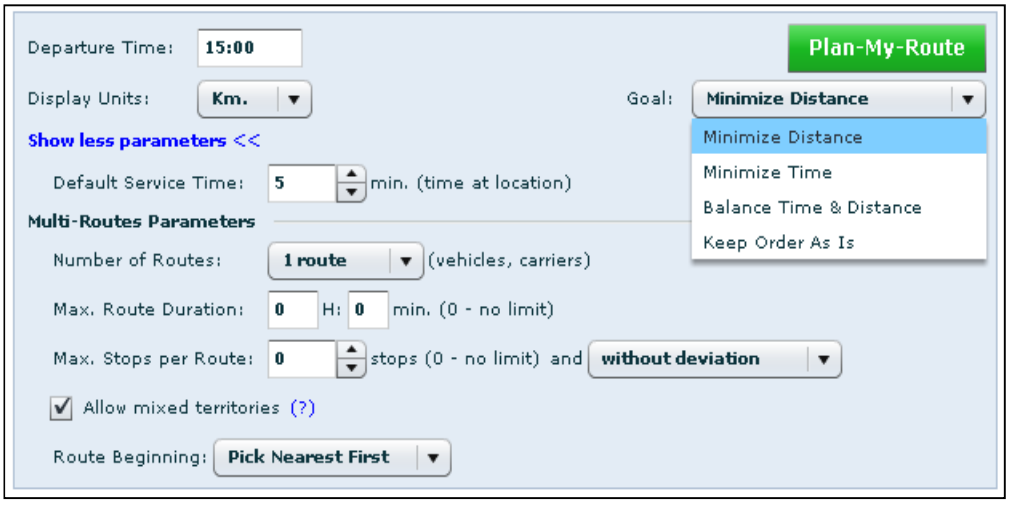


Figure (5.6): Vehicle setups

According to the retailer's data, the running cost of this vehicle is 0.05 dinar/km including fuel, maintenance, and registration. Meanwhile, the vehicle driver's wage was estimated at 1.5 dinar/hour.

The average service time per customer was set to be 5 minutes, while the average waiting time was 10 minutes per customer.

The time parameters were taken based on other research projects' modelling parameters (Kämäräinen, 2001; Punakivi & Saranen, 2001, 2003; Boyer, Prud'Homme & Chung, 2005, 2009).

- Optimization Goals

When using the modelling tool 'My Route Online', the decision was based on the following optimization goals as shown in Figure (5.6):

- **Minimize Distance**: the algorithm only tries to minimize the total driven distance to fulfil the orders.
- **Minimize Time**: the algorithm only tries to minimize the total time to fulfil the orders.
- **Balancing**: the algorithm tries to make a balance between distance and time to fulfil the orders.

In order to evaluate the model and compare the differences between the delivery scenarios, the following key performance indicators (KPIs) were used:

- **Total Distance**: the total distance driven per day order (km).

- **Total Time**: the total time spent on driving, waiting and service per day order (hr).
- **Total Cost**: the total costs (sum of all costs: start-up costs, distance related costs and time related costs) per day order (JD).

Since the main goal of this study is to compare between the alternative delivery solutions in terms of cost, time and distance efficiencies, the calculated average from the optimization goals results in every day for each scenario was used.

The final decision would be taken by the retailer based on their cost key factors (either distance or time).

- Cost Figures

In order to evaluate and compare the cost differences between delivery service alternatives, two different cost indicators were used: distance and time costs. The total cost for each planning day was calculated as the sum of total distance and total time costs. Therefore, for each scenario the total cost is calculated as:

Total cost = (Total Distance * Cost/km) + (Total Time * Cost/hour) …...(5.1)

However, due to different delivery alternatives cost setups, the following costing model was designed to compare between home delivery and brokered delivery costs (Grando & Gosso, 2006):

From Figure (5.7), direct home delivery cost is obtained from:

Home delivery cost = $\sum(Ddc_t)$ ……..…… (5.2)

While the brokered delivery cost is obtained from:

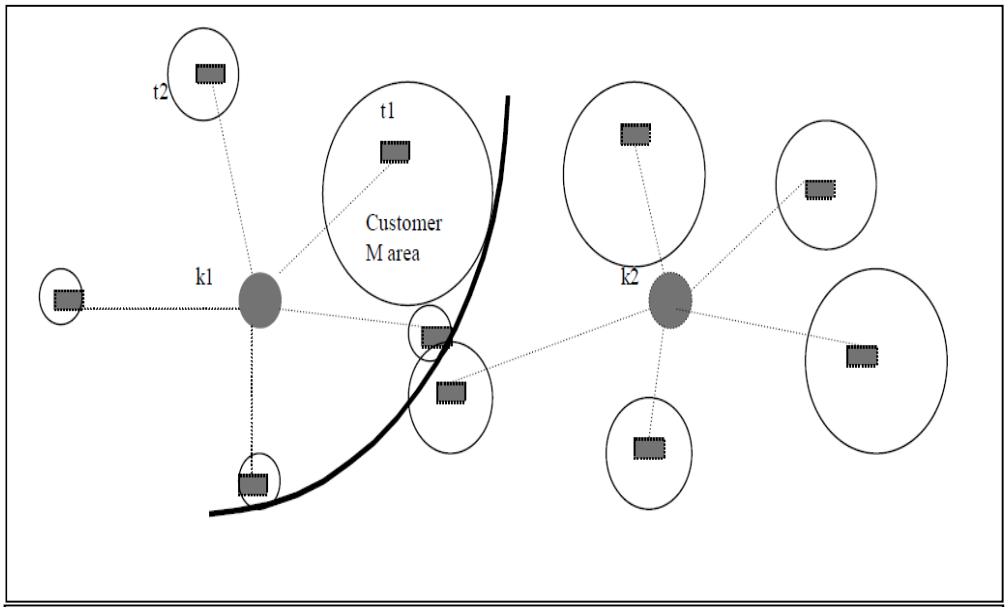
Brokered delivery cost = $\sum[C_{pt} + C_o]$ ……..….(5.3)

where:

($\sum Ddc_t$) is the direct delivery cost to make all the home deliveries of merchandise (q) ordered by customer (t), starting and ending the trip from the shop location.

(C_{pt}) is the cost to deliver the merchandise from the shop to the delivery or pickup points (pt).

(C_o) is the point fixed cost per order that includes inventory and insurance costs = 0.05 dinar/order.



T = Peripheral logistical nodes (delivery or pickup points) = t1, t2 … tn.
K = Retailer point = k1, k2 … kn.
M = End customers = m1, m2 … mn.
Q = Quantity of merchandise delivered = q1, q2 … qn.

Figure (5.7): Cost model

5.4 EXPERIMENTS

5.4.1 SIMULATION SCENARIOS

Three different delivery alternatives were tested in order to compare their cost efficiencies, home delivery, delivery point and pickup point. In order to clarify the simulation scenarios, a one day data and its related simulation results on the three delivery alternatives were presented. In the selected day, customer orders data as well as facility points' locations were imported from the database to the modelling tool, which directly appeared on the map as shown in Figure (5.8).

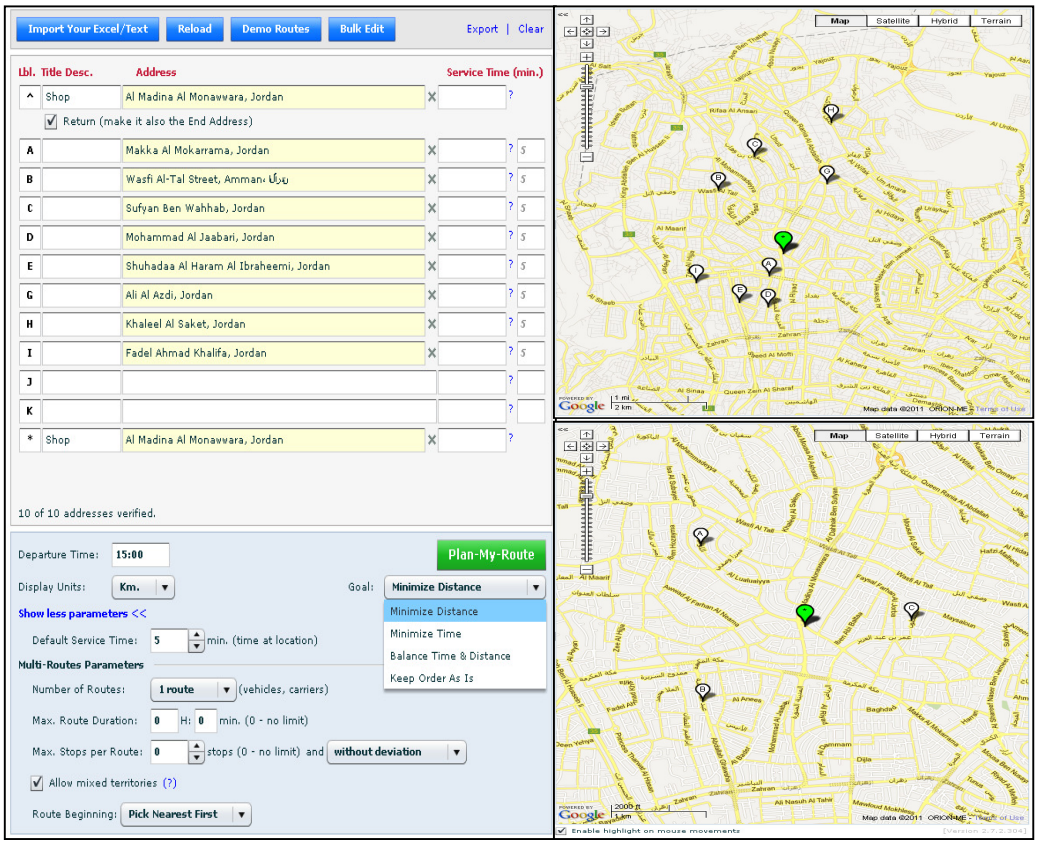


Figure (5.8): Modelling tool input parameters

The first selected delivery alternative was home delivery, where the number of customer orders was 8, the departure time was set to be at 15:00 pm and the service time was set to be 5 minutes per customer order. The modelling tool was run based on the three routing goals, minimizing distance, minimizing time and balancing between distance and time, as shown in Figure (5.9).

The calculated results from running the tool and the visualised routes are presented in Figure (5.8), illustrating the total distance and time needed to fulfil the customer orders in that day. These results also show the distance and time needed to serve each individual customer.

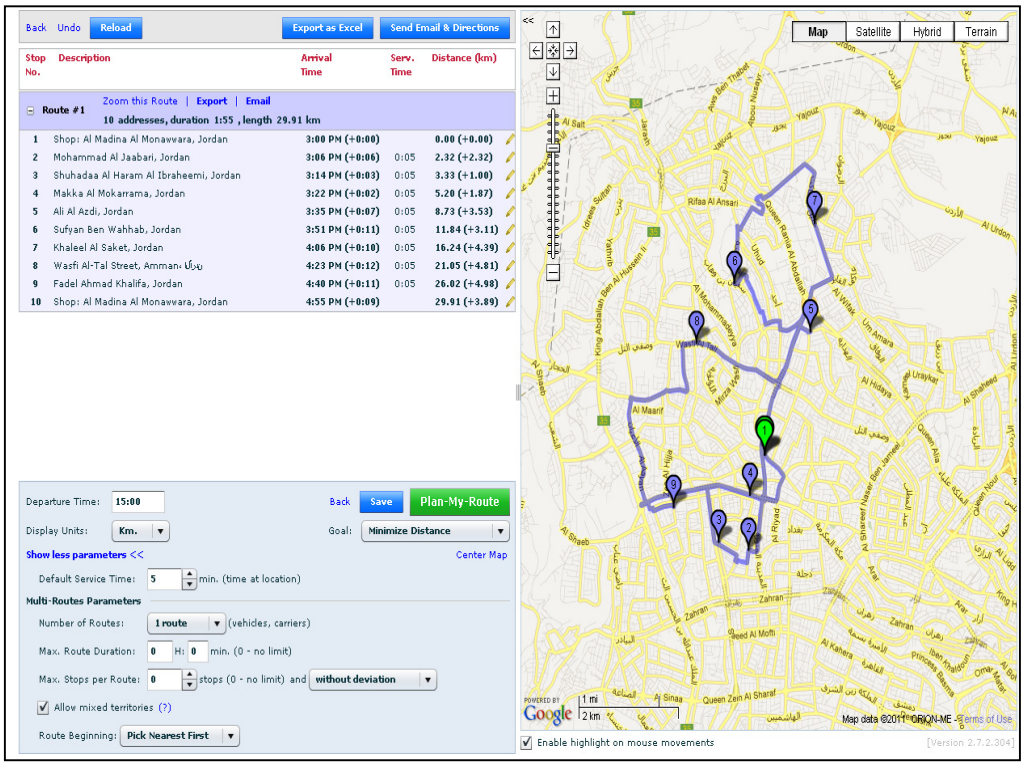


Figure (5.9): Home delivery scenario

The total cost then calculated using the previously mentioned cost model, formulas (1, 2) and Figure (5.7). The obtained results are shown in Table (5.4):

Goal / **KPI**	Min. Distance	Min. Time	Balance	Average
Distance (km)	29.91	27.48	29.91	29.10
Time (hour)	1.55	1.44	1.55	1.51
Cost (JD)	3.82	3.53	3.82	3.73

Table (5.4): Home delivery scenario results

For delivery points and pickup points alternatives, the same day customers' data input were used but with different simulation setups. For home delivery scenarios, the whole customer data files were imported while here the delivery and pickup points serving the same customers were only imported. The departure time remained the same (15:00 pm), while the service time was added to waiting time for the delivery point alternative. After that the modelling tool was run under the same scenarios. The calculated results and routes for both delivery and pickup points are shown in Figure (5.10).

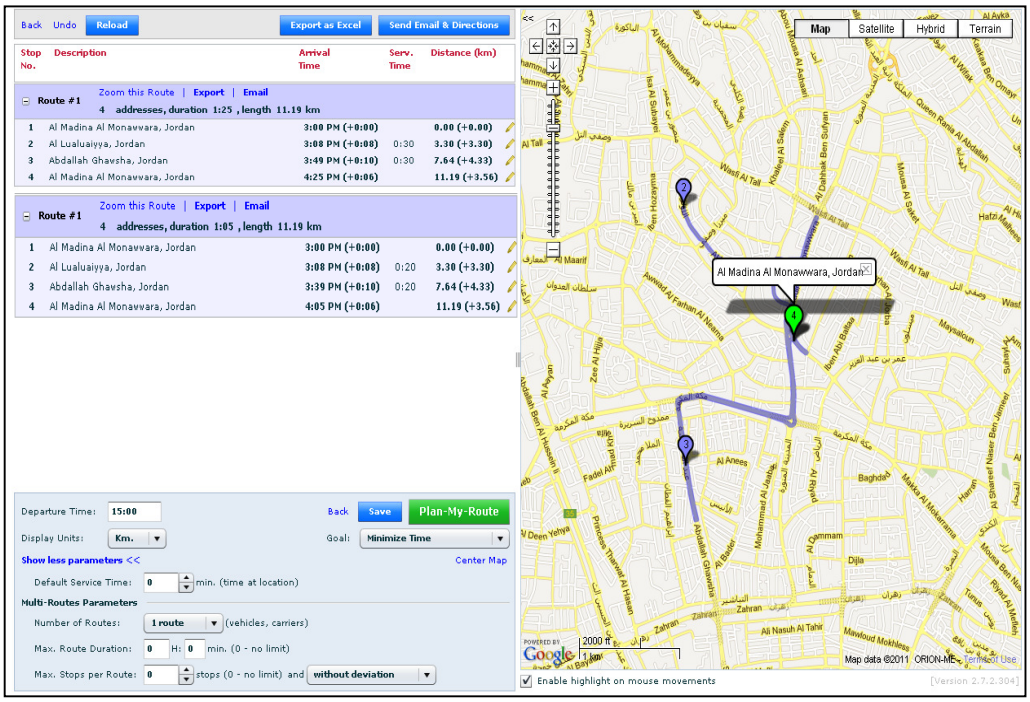


Figure (5.10): Delivery and Pickup point scenarios

The total cost then was calculated for both alternatives using the previously mentioned cost model, formulas (1, 3) and Figure (5.7). The final results obtained are shown in Tables (5.5, 5.6):

Goal / **KPI**	Min. Distance	Min. Time	Balance	Average
Distance (km)	11.19	11.19	11.19	11.19
Time (hour)	1.25	1.25	1.25	1.25
Cost (JD)	2.43	2.43	2.43	2.43

Table (5.5): Delivery point scenario results

Goal / KPI	Min. Distance	Min. Time	Balance	Average
Distance (km)	11.19	11.19	11.19	11.19
Time (hour)	1.05	1.05	1.05	1.05
Cost (JD)	2.53	2.53	2.53	2.53

Table (5.6): Pickup point scenario results

5.4.2 SIMULATION RESULTS AND DISCUSSIONS

The results from running the model over one month of customer data are presented in Figures (5.11, 5.12, 5.13). These results show the relation between the delivery cost with its time and distance factors in the three delivery scenarios.

The first column with its three Figures (5.11a, 5.12a, 5.13a) shows the distribution of the needed cost per day along driving distances in the three delivery alternative cases: home delivery, delivery points and pickup points.

In general, it can be noticed that the needed cost to fulfil customer orders unsurprisingly increases as the driving distance increases. However, at certain days in home delivery case, the cost decreases while the driving distance increases. This is due to the decreasing number of customer orders needed to be served in these days and this directly decreased the needed time to serve those customers.

On the other hand, in the delivery and pickup point's alternatives, the driving distance in some cases remains constant while the cost increases.These changes are due to the increased number of customer orders and the time needed to serve them while the retailer is using the same number of facility points for these orders.

The distribution of the needed cost per day along time periods is shown in the second column with its three Figures (5.11b, 5.12b, 5.13b). It can be also noticed here that the cost needed to fulfil customer orders is increasing as the time increases in the three delivery alternatives. Less unexpected changes are happening along time periods comparing to the driving distance, giving an indication that the effect of time over cost is stronger than the distance effects. For home delivery case, the main time factor is the driving time, while in delivery points and pickup points the main time factors are the waiting and service time.

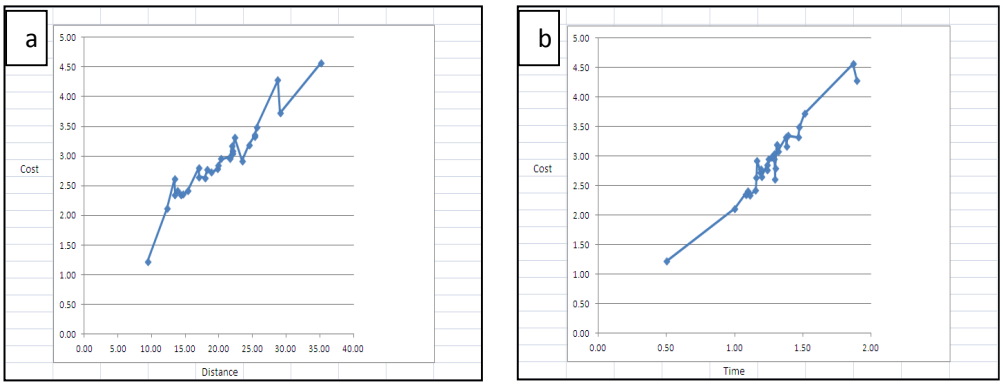


Figure (5.11): Home delivery scenario results

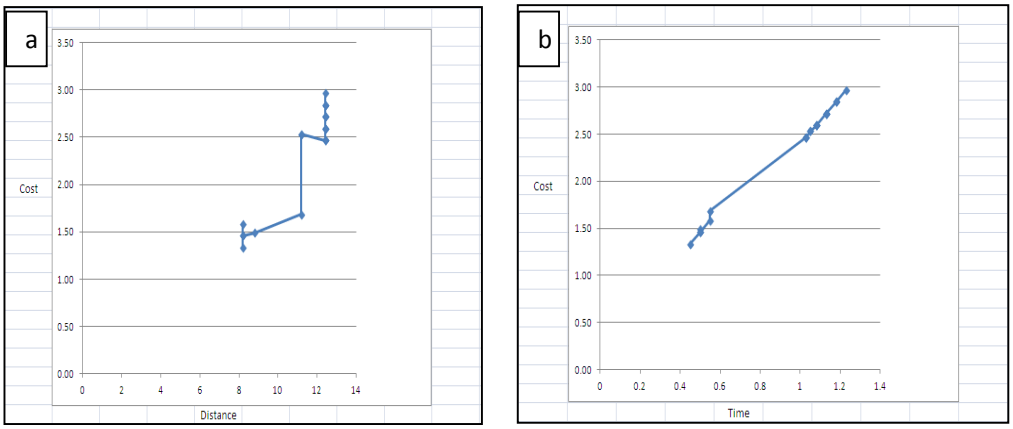


Figure (5.12): Delivery point scenario results

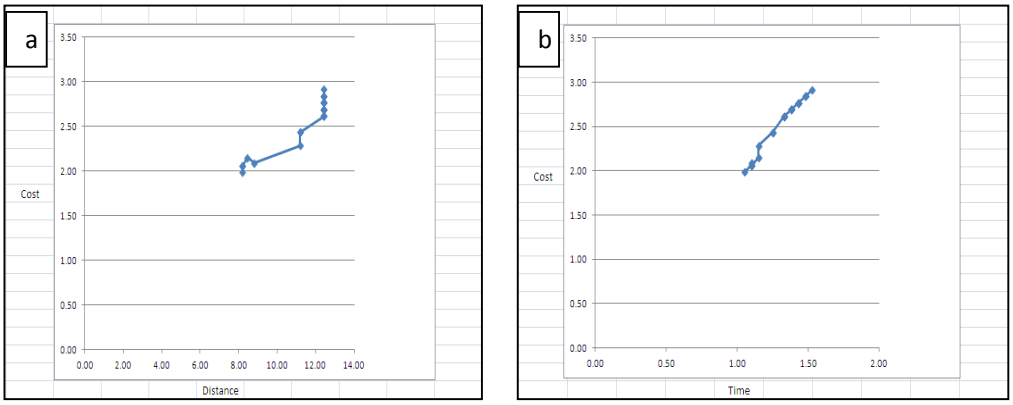


Figure (5.13): Pickup point scenario results

Moreover, when comparing the change effect of driving distance on the cost among the three delivery alternatives, it can be seen that the least change effect is taken by home delivery followed by delivery point then pickup point. As an example, to prove this statement, the home delivery case was considered where the driving distance changing from 10 to 35 km with cost change from 1.25 to 4.5 dinar with a change rate of 0.13 dinar per km, while the change rates were 0.2 and 0.35 dinar per km for delivery point and pickup point respectively. This means that the fulfilling cost in home delivery case is not affected by the increase in driving distance in a way it is affected in delivery and pickup points.

However, when using the time as the factor over cost, the least change effect is taken by home delivery and delivery point followed by the pickup point scenarios. For example, the same home delivery case with time changes from 0.5 to 2.0 hours had costs changing from 1.25 to 4.25 dinar with a change rate of 2 dinar per hour. The same change rate was taken by delivery point case, while it was 2.2 dinar per hour for pickup point case. This also means that the fulfilling cost in home delivery case is not affected by the increase in time in a way it is affected in pickup point case.

The time factor has a more powerful change effect on cost than the distance for each case from delivery alternatives. This is because of the time factor is affected directly by other cost factors such as the driving distance, driver cost and number of customer orders. This suggests that retailers who want to decrease the delivery cost should try to use the routing goal, which minimizes the delivery time.

The previous Figures (5.11,5.12,5.13), explain the relation between the deliveries KPIs. They show the relation between the driving distance, time and their corresponding fulfilling costs among the delivery alternatives. However, these graphs don't compare the results between the delivery alternative results per day. To do this SPSS.15 tool was used in order to analyze the differences between delivery alternatives in terms of cost, distance and time.

Table (5.7) shows the mean and standard deviation values for each delivery alternative along the delivery KPIs: distance, time and cost for 218 customer orders.

Delivery Mode	**Distance (km)**		**Time (h)**		**Cost (JD)**	
	Mean	**STD**	**Mean**	**STD**	**Mean**	**STD**
Home Delivery	20.18	5.68	1.27	0.25	2.91	0.63
Delivery Point	11.63	1.53	1.34	0.13	2.59	0.27
Pickup Point	11.62	1.55	0.98	0.25	2.42	0.48

Table (5.7): Simulation results

It can be seen that there are differences between the mean values of delivery alternatives among KPIs. Since the fulfilling cost depends on distance and time factors, home delivery cost mean value got the highest value among the mean values of delivery alternatives, with longest distance and time mean values as well. The delivery points came second and the least mean values are taken by pickup point delivery alternative. As an example to explain the preliminary results

shown in this Table (5.7), the mean value of home delivery cost is 2.91, which is higher than the cost mean values of delivery and pickup points. This means if the retailer's goal is to minimize the fulfilling cost and ignore customer delivery preferences, they should adopt the pickup point strategy.

However, the previous Table (5.7) result does not indicate if the differences between delivery alternatives mean values are significant. In order to find if these differences are statistically significant, Oneway Anova test was used, the results of which are shown in Table (5.8).

		Sum of Squares	df	Mean Square	F	Sig.
Cost (JD)	Between Groups	3.778	2	1.889	8.013	0.001
	Within Groups	20.507	87	0.236		
	Total	24.284	89			
Distance (km)	Between Groups	1463.476	2	731.738	59.373	0.000
	Within Groups	1072.223	87	12.324		
	Total	2535.700	89			
Time (h)	Between Groups	2.115	2	1.057	22.620	0.000
	Within Groups	4.067	87	0.047		
	Total	6.181	89			

Table (5.8): Oneway Anova test results

The results from Oneway Anova test show that the differences between delivery alternatives mean values are statistically significant (Sig. < 0.05). This means that there are significant differences between the delivery alternatives among their delivery KPIs; cost, distance and time. Moreover, in order to find where these differences occurred, a PostHoc/Sheffe test was conducted, the results of which are shown in Table (8.9).

Multiple Comparisons

Scheffe

Dependent Variat	(I) Delivery_Mo	(J) Delivery_Mo	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Cost	Home Delivery	Delivery Point	.32633*	.12536	.038	.0141	.6385
		Pickup Point	.49333*	.12536	.001	.1811	.8055
	Delivery Point	Home Delivery	-.32633*	.12536	.038	-.6385	-.0141
		Pickup Point	.16700	.12536	.415	-.1452	.4792
	Pickup Point	Home Delivery	-.49333*	.12536	.001	-.8055	-.1811
		Delivery Point	-.16700	.12536	.415	-.4792	.1452
Distance	Home Delivery	Delivery Point	8.55000*	.90644	.000	6.2925	10.8075
		Pickup Point	8.55833*	.90644	.000	6.3009	10.8158
	Delivery Point	Home Delivery	-8.55000*	.90644	.000	-10.8075	-6.2925
		Pickup Point	.00833	.90644	1.000	-2.2491	2.2658
	Pickup Point	Home Delivery	-8.55833*	.90644	.000	-10.8158	-6.3009
		Delivery Point	-.00833	.90644	1.000	-2.2658	2.2491
Time	Home Delivery	Delivery Point	-.06667	.05582	.493	-.2057	.0724
		Pickup Point	.28667*	.05582	.000	.1476	.4257
	Delivery Point	Home Delivery	.06667	.05582	.493	-.0724	.2057
		Pickup Point	.35333*	.05582	.000	.2143	.4924
	Pickup Point	Home Delivery	-.28667*	.05582	.000	-.4257	-.1476
		Delivery Point	-.35333*	.05582	.000	-.4924	-.2143

*. The mean difference is significant at the .05 level.

Table (5.9): POSTHOC/SHEFFE test results

The results from running PostHoc/Sheffe test on customer data indicate that the cost mean value of home delivery alternative (2.91) is higher than the delivery and pickup points mean values (2.59, 2.42). This difference is statistically significant, while there are no significant differences between delivery and pickup points cost mean values. This means that delivery and pickup points alternatives are better than home delivery alternative in terms of fulfilling costs per day orders.

Similar results appeared with the driven distance mean values, as home delivery driven distance mean value (20.18) is also higher than delivery and pickup points driven distance mean values (11.63, 11.62). This difference is considered statistically significant, while the differences between the driven distances mean

values of delivery and pickup points are statistically insignificant.This means that delivery and pickup points alternatives are better than home delivery alternative in terms of driven distance per day orders.

However, slight differences were observed between delivery alternatives in terms of journey time mean values. The results indicate that time mean value of pickup points (0.98) is less than home delivery and delivery points time mean values (1.27, 1.34) and the differences are considered statistically significant while the differences between home delivery and delivery points' time mean values are considered insignificant. This means that pickup point delivery alternative is better than other alternatives in terms of journey time. According to these results, it can be concluded that pickup point delivery solution is the best logistical strategy retailers should start with.

The experiment results agreed with those of previous studies by Kämäräinen (2001), Punakivi and Saranen (2001, 2003) and Boyer, Prud'Homme and Chung (2005, 2009), which analyzed the differences between delivery modes from different angles. Their results indicated that the cost per unattended delivery modes is less than the cost with attended delivery. They also showed that attended delivery types are good with high density areas and high customer expectations, which is not the case here. For time windows length they also indicated that the delivery cost will increase with tighter time windows.

The design of this model is expected to allow retailers to generate efficient vehicle routes in terms of cost, time or distance modelling goals under different conditions.

It is also a user-friendly and easy to use design for both decision makers and drivers. These findings also agreed with the design criteria adopted by Luís Santos et al. (2011).

The concluded previous results might seem obvious, but in fact the chosen delivery choice should include the contributed cost by customer in the process. Are customers willing to dedicate time and money to pick up the ordered products from logistical points? In this perspective, customers and retailers were asked about their delivery choice preferences. Home delivery choice was selected as number one choice from customers' perspectives as shown in Table (5.10). Pickup point's choice came second, followed by delivery point choice, while unattended delivery and store pickup choices were the least preferred choices, because of security and cost concerns. When customers accept the idea of online shopping, especially for their groceries, they need to have a good delivery service because they already scarified by their traditional grocery shopping preferences like freshness. The good delivery service from the customers' points of view is when their online orders come home; this explained why they preferred home delivery service.

Delivery Mode	**Mean**	**Rank**
Pickup from every shop/ store	2.61	5
Pickup from collection point	3.9	2
Pickup from a delivery point	3.78	3
Home delivery unattended	3.25	4
Home delivery attended	4.04	1

Table (5.10): Customers' mode of delivery preferences

However, from the retailers' point of view, shown in Table (5.11), home delivery service was not preferred, because it increases operational complexity, resulting in added costs. Instead of that they preferred pickup and delivery points to be alternative choices, while store pickup was on the top of their list.

Delivery Mode	Mean	Rank
Pickup from every shop/ store	3.93	1
Pickup from collection point	3.80	2
Pickup from a delivery point	3.57	3
Home delivery unattended	3.40	4
Home delivery attended	2.50	5

Table (5.11): Retailers' mode of delivery preferences

As discussed before, it was noticed that customers are worried about the availability of a convenient delivery mode as well as the quality of their orders while retailers are mainly worried about their fulfilment capabilities and the country logistical infrastructure.

Retailers' and customers' delivery service concerns and delivery mode preferences as well as the case study results, all recommend that the pickup point delivery alternative is the best choice to start with in Jordan. These results also agreed with the findings of Xu et al. (2008), who indicated that unattended delivery modes are unfavourable from the perspectives of both the customer and the retailer, but they have a great desire for picking up from local collection points.

5.5 SUMMARY

This study is aimed to design a logistical decision support system for grocery retailers in Jordan, a developing country. The purpose of this design is to give service providers the first-hand knowledge needed to select the suitable delivery service. Compared with developed countries, Jordan's system delivery services are usually need longer time with poor service quality particularly in rural and remote areas. Grocery retailers must utilise existing systems to conduct e-commerce, and must therefore identify, analyze and compare the cost efficiencies of the available alternative delivery solutions.

The findings from this experiment showed that there are differences between the mean values of the three delivery alternatives among their KPIs: cost, distance and time, and they also indicate that the time indicator has more powerful change effect on cost than the distance for each case from delivery alternatives. The findings from the statistical analysis of the results showed that the delivery and pickup points' alternatives were better than home delivery alternative in terms of fulfilling costs and driven distances. No significant differences were found between delivery and pickup points in terms of cost and distance. However, pickup point delivery alternative was better than other alternatives in terms of journey time. The survey respondents indicated that they both prefer the pickup point service after home delivery for customers and after shop pickup for retailers. Based on the level of investments that the grocery retailers would like to implement, and according to the experimental results, it could be concluded that pickup point solution is the best logistical strategy for retailers to start with.

CHAPTER 6

CONCLUSION AND RECOMMENDATIONS FOR FUTURE WORK

6.1 CONCLUSIONS

Online grocery shopping is one of the internet business applications that received much attention in the last few years. Online grocery shopping has many potential benefits to customers, mainly in terms of better prices, large selection, convenience and time-savings. However, Customers' attitudes towards online grocery shopping are still sceptical mainly because of worries about product quality, product delivery, and security and privacy issues. Grocery retailers also ultimately obtain significant benefits from online grocery shopping as it leads to producing revenues as well as reducing costs. However, groceries are one of the most difficult objects to sell online; material flows are different from information flows, the number of frequent customers is large, the shopping basket may contain many items and very critical delivery systems. Furthermore, it is more difficult than electronic commerce of many other products such as books or clothes, because of low value-to-weight ratio of groceries, limited delivery time windows and shelf time limitations of perishable goods.

The growth of online grocery shopping has increased the importance of direct delivery to customers. However, product delivery logistics or last mile logistics is considered as one of the most challenging issues in online grocery retailing as it lead to the failure of many online grocery pioneers.

Online grocery shopping has grown at a fast rate in the developed countries where customers and retailers have benefited from it. Unfortunately, this service is still in its infancy stage in the developing countries.

The main aim of this research is to design an e-commerce logistical decision support system for grocery retailers in Jordan as a case study from the developing countries. Grocery retailers are supposed to use this model in order to select the most suitable logistical delivery system in the future.

In order to achieve this aim, two specially designed questionnaires were distributed among a group of customers and grocery retailers in Jordan asking about their attitudes towards online grocery shopping and its delivery service. Moreover, to implement and evaluate the designed model, one of the available routing and scheduling online solutions was used to identify, analyze and compare the cost efficiencies of the available alternative delivery solutions on a real sale point data.

In the Jordanian market, online shopping is not popular yet among customers and grocery retailers where nearly all of them are considered as small and medium-sized enterprises (SMEs). Furthermore, Jordan as a developing country faces many challenges that affect the diffusion of online shopping and its logistics such

as lack of awareness about online shopping benefits, lack of IT skills, concerns about security and privacy issues, cultural and social resistance and others. Moreover, compared to the developed countries, Jordan's delivery system services are usually take long time to be delivered with poor service quality, particularly in rural and remote areas. However, Jordan during the last decade has witnessed huge improvements in the ICT and e-services sectors. These improvements appeared in technology and logistical infrastructures, business environment, social and cultural environment, legal environment and government policies and support.

The findings from the distributed questionnaires indicated that the Jordanian customers and retailers have positive attitudes towards online grocery shopping. Therefore, they are willing to use this service in the future if they find a suitable environment interms of e-commerce readiness levels where the hindering factors are almost rare. From customers' perspectives, the main motivation factor to adopt online grocery shopping was time saving while the main inhibiting factor was the uncertainty of the product quality. From the retailers' perspectives, the main motivation factor was profit increase while the main inhibiting was the security and trust issues towards online payments. The results also showed that customers and retailers have serious concerns towards the delivery service in Jordan. Customers mainly worried about the availability of a suitable delivery service while retailers are worried about the market size for the delivery service.

The findings from running the experiments over the suggested logistical decision support system showed that, there are differences between the mean values of the three delivery alternatives among their KPIs: cost, distance and time and it also indicated that the time indicator has more powerful change effect on cost than the distance for each case from delivery alternatives. The questionnaires respondents are also indicated that customers and retailers prefer the pickup point service after home delivery for customers and shop pickup for retailers. Depending on the level of investments that the grocery retailers would like to implement and according to the experiment results it can be concluded that pickup point solution is the best logistical strategy for retailers to start with.

6.2 RECOMMENDATIONS

In the light of the questionnaires findings, the results recommend that in order to have a healthy environment for OGS in Jordan, the grocery retailers especially small ones ''Bakalahs'', which constitute the major part of this industry, need to have support from the government and the technology vendors. This support could be in terms of technical and infrastructural advancements, provision of funds for SMEs and build a proper e-commerce education system. Efforts are also needed to get all the grocery supply chain parties to become integrated with e-commerce technologies. Furthermore, those parties planning to invest in this new retail format in the future should skip to a mobile version of this service as the penetration of mobile market is very high in Jordan.

6.3 FUTURE RESEARCH

Further research can focus on two main topics, questionnaires design and logistics modelling. Regarding customers' and retailers' attitudes towards online grocery shopping and its delivery service : First, improve the design of the distributed questionnaires in order to explore customers' and retailers' attitude towards online grocery shopping based on Information System's research theories. Second, further research needs to be conducted to explore each of the motivational and inhibiting factors each one separately on a larger sample in order to benefit more and to overcome the barriers in the developing countries. Third, the researchers should also try to compare these findings with those from other developing countries. Fourth, researchers should also examine the suitability and profitability business models for this type of retailing.

For the designed system : First, working with two different delivery alternatives, attended and unattended delivery operations and what is the more efficient supply chain that can be applied. Second, develop dynamic pricing models depending on time, distance and customer preferences. Third, developing new delivery alternatives like unattended shared delivery boxes for each flat complex or any service area like petrol or bus stations in the retailer's area. Forth, running the tool over different delivery time window's scenarios, a large area scale and high customer demands. Fifth, enhance the designed system by adding more privileges to retailers, drivers and customers like the tracking facility and mobile access as well as the use of LPS technologies. Sixth, develop and evaluate the system in order to work under B2B online grocery transactions. Seventh, it would be more

beneficial if we conduct a cross cultural research on it from different developing countries and over different industries to find to what extent our results would be precise.

Moreover, further research can focus on cloud-computing applications for SMEs use, whereby SMEs can share resources, software and information over the internet. In this area, researches can do more research on the opportunities that can be offered by implementing such technologies for SMEs in terms of applications scalability and reliability , business development and revenue generation. More research can also be done on the challenges to implement cloud-computing applications for SMEs use like cloud controling and security issues .

6.4 RESEARCH LIMITATIONS

The limitation of this research might be because of the questionnaires design, environment of the experiment itself and the used modelling tool.

Like other empirical studies, this study has a number of limitations including unavailability of time and resources as well as the questionnaires small sample size. This may limit the results generalizability leading to misleading findings and recommendations.

The experiment data were taken from one shop in one urban area ‘Amman city’, the absolute numerical results cannot be generalized over other developing counties especially for the rural areas there. Moreover, the exact cost level and KPIs values can be taken as an approximations and guidelines elsewhere. This

explained by the differences between many input parameters from area to area or even from retailer to other retailers. These input parameters like cost and time parameters for areas, retailers, customers and drivers. Other limitations related to the used modelling tools like the level of complexity of its optimization goals as well as the limited flexibility provided to the user in terms of running options like the vehicle and route data inputs. Briefly, the use of another modelling tool will increase the reliability and accuracy of the results.

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APPENDICES

Appendix 1: List of Publications

- **Journals**

  - **Al-Nawayseh** and Balachandran, W. (2011) "**Online Grocery Shopping In Developing Countries - Jordanian Consumers as Case Study**". International Journal of Social Ecology and Sustainable Development (IJSESD). (**In press**).

  - **Al-Nawayseh** and Balachandran, W. (2012) "**Online Grocery Shopping In Developing Countries - Jordanian Grocery Retailers as Case Study**". (**Ready to Submit**).

  - **Al-Nawayseh** and Balachandran, W. (2012) "**Online logistical Decision Support System for SMEs in Developing Countries - Jordanian Grocery Retailing as Case Study**". (**Ready to Submit**).

- **Conferences**

  - **Al-Nawayseh** and Balachandran, W. (2011) '' **Promoters and Inhibitors of Online Grocery Shopping in Developing Countries From The Consumers Perspective-Jordan as Case Study**''. IADIS International Conference on e-commerce, 20 July, Italy.

  - **Al-Nawayseh** and Balachandran, W. (2011) '' **Electronic Grocery Shopping Logistics in Developing Countries, Jordan as a Case Study ''.** ResCon'11, 4th Annual Research Conference, 20-22 June 2011, Brunel University, London, UK.

  - **Al-Nawayseh** and Balachandran, W. (2012) ''**Online Grocery Retailing in Jordan: Future Perspectives''.** 4th International Conference on Computer Engineering and Technology, ICCET, 14 May, Thailand.

Appendix 2: Customers Questionnaire

Demographics

- Gender
  ( ) M
  ( ) F

- Age
  ( ) 18 -29
  ( ) 30-50
  ( ) >50

- Education Level
  ( ) Lower education
  ( ) High school
  ( ) Bachelor
  ( ) Graduate

- Income Level (Households)
  ( ) <300
  ( ) 300-500
  ( ) >500

- Access to Credit/Debit Card (Households).
  ( ) Yes ( ) No

- Employment Status
  ( ) Public Sector
  ( ) Private Sector
  ( ) Not working (example, students)

- Location Of Respondent
  ( ) Rural
  ( ) Suburban
  ( ) Urban

Internet Access

- Do you have sufficient computer skills for internet exploring?
  ( ) Yes ( ) No

- Do you have internet Access?
  ( ) Yes ( ) No

- What main devise you use to access the internet?
  ( ) Personal computer
  ( ) Laptop
  ( ) PDA
  ( ) Phone

- Where do you usually access the internet?
  ( ) Home
  ( ) Work
  ( ) University/School
  ( ) Other (Specify ……..)

- How often do you access the internet?
  ( ) Daily
  ( ) Weekly
  ( ) Monthly

- Main use of internet
  ( ) Study
  ( ) Work
  ( ) News
  ( ) Shopping
  ( ) Entertainment (Chat, Communication, etc)

Traditional Grocery Shopping

- Frequency of Grocery Shopping?
  ( ) Daily
  ( ) Weekly
  ( ) More than once a week
  ( ) Monthly

- Do you prepare a list before shopping?
  ( ) Yes ( ) No

- At what time of the day?
  ( ) Morning (9am--noon)
  ( ) Midday (noon--4pm)
  ( ) End of day (After 5 pm)

- Where do you shop all your Grocery needs?
  ( ) One dedicated big Supermarket in your area
  ( ) Many shops (approximate How many shops ……..)
  ( ) Civil/Military consumer corporations
  ( ) Malls

- How far is the place of shopping from your home?
  ( ) Approximate in kilometres ……..

- How long it takes you to shop?
  ( ) Approximate in hours ……..

- How do you travel to shop?
  ( ) Walk
  ( ) Car
  ( ) Bus

- Do you think that this process of shopping is costing too much in terms of time and money?
  ( ) Yes ( ) No

- Who in your household decides what groceries to buy?
  ( ) Myself ( ) My husband ( ) My wife
  ( ) My son ( ) My daughter
  ( ) My father ( ) My mother

- Groceries :

  - Dairy products
  - Meat/Chicken
  - Bakeries
  - Vegetables/Fruits
  - Beverages
  - Crops
  - Cans/Compotes
  - Cosmetics items
  - Cleaning/Washing items

Online Shopping

- Have you ever bought something over the internet?
  ( ) Yes ( ) No

  <u>Assume you intend to shop online:</u>

- Which items would you wish to purchase :
  ( ) Grocery
  ( ) Electronics
  ( ) Furnishing and home décor
  ( ) Tickets to travel
  ( ) Clothes, Shoes
  ( ) Books, Movies, Music

- Which mode of payment do you prefer?
  ( ) Credit/Debit cards
  ( ) Cheque
  ( ) Prepaid cards
  ( ) Cash on delivery

For online Grocery Shopping

- Why do you prefer to shop online :

Strongly disagree	Disagree	Neutral	Agree	Strongly agree

( ) Customer service ( ) Enjoyment / Fun
( ) Good selection /availability ( ) Good price / deal / comparison
( ) Broader supply / far shops ( ) Ease of use (example: search)
( ) Time saving ( ) Transport
( ) Convenience (female, elders, physical considerations)
( ) Others (Specify ……)

- Why do you not prefer to shop online:

Strongly disagree	Disagree	Neutral	Agree	Strongly agree

( ) Service availability (website)
( ) Delivery issues
( ) Risk issues (privacy, security, legal system in Jordan)
( ) Technology factors (IT skills, web features)
( ) Product selection (brand, quality, freshness, taste)
( ) Social issues (talk to people)

- Would it be useful to have a common website shared between these local shops?

( ) Yes ( ) No

Delivery of purchased groceries

- Who in your household bring the needed groceries?
  ( ) Myself ( ) My husband ( ) My wife
  ( ) My son ( ) My daughter
  ( ) My father ( ) My mother
  ( ) Other (Specify ……..)

- Do you think that delivery concerns will prevent you from shopping online?
  ☐ Yes
  ☐ No

- Would you be happy to pay for timed delivery service?
  ☐ Yes
  ☐ No

- Is there normally anyone at home to receive the order?
  ☐ Yes
  ☐ No
  ☐ Some days

- Which type of reception mode do you prefer?
  ☐ Pick up from every shop / store
  ☐ Pick up from one shared store between multiple shops
  ☐ Pickup from a collection point (Work, Petrol station, Agent)
  ☐ Pickup from a delivery point (attended)
  ☐ Home delivery (unattended example: Neighbours, box, etc)
  ☐ Home delivery (attended with time window)
- Specify at what time of the day would you like to receive or pickup the order?

  ☐ Morning (9am--noon)
  ☐ Midday (noon--4pm)
  ☐ End of day (After 5 pm)

- What would you consider an acceptable time slot for your delivery?

  ☐ 1 hour
  ☐ 2 hours
  ☐ 3 hours
  ☐ More than 3 hours

- Why can delivery concerns prevent you from purchasing online?

Factor	Strongly Disagree	Disagree	Neutral	Agree	Strongly agree

☐ Risk of failed delivery (due to no one at home to receive the item).
☐ No convenient delivery option available.
☐ Delivery is too slow.
☐ Delivery time slots are Unsuitable and too vague.
☐ The risk that goods may not arrive on time.
☐ The additional cost of home delivery.
☐ Inconvenient return service of the shop.
☐ The quality of the goods may not good.
☐ Can't easily find delivery information.
☐ Delivery is limited to the card holder's address.
☐ Other , please specify

Appendix 3: Retailers Questionnaire

Demographics

- Name of your shop? ……

- What is the type of your shop?
  - ☐ Family
  - ☐ Non-Family

- Shop Location:
  - ☐ City (urban)
  - ☐ Village (rural)

- How many people work in your shop?
  - ☐ 1-5
  - ☐ 6-20
  - ☐ 21 +

- What is your shop annual turnover? ……..

- Categories we sell include:
  - ☐ Dairy products
  - ☐ Meat/Chicken
  - ☐ Bakeries
  - ☐ Vegetables/Fruits
  - ☐ Beverages
  - ☐ Crops
  - ☐ Cans/Compotes
  - ☐ Cosmetics items
  - ☐ Cleaning/Washing item

- What is the geographical range of your business?
  - ☐ Local
  - ☐ Regional
  - ☐ National (country)

ICT and Internet Adoption

- Does your shop use computers?
  - ☐ Yes
  - ☐ No

  If yes, for what purpose:
  - ☐ Printing
  - ☐ Accounting
  - ☐ Inventory
  - ☐ Pay roll
  - ☐ Sales
  - ☐ Production
  - ☐ Other: specify: ……

- How many computers are there in your shop?
  - ☐ Less than 5
  - ☐ 5 +

- Are computers in your shop networked?
  - ☐ Yes
  - ☐ No

- Does your shop use an Internet?
  - ☐ Yes
  - ☐ No

If yes, for what purpose:

- ☐ A tool for communicating
- ☐ A tool of obtaining information
- ☐ A tool for advertising and marketing
- ☐ A tool for buying
- ☐ A tool for selling
- ☐ A tool for conducting banking and financial transactions
- ☐ A tool for improving interaction within the company (processes/ organization)
- ☐ Other: specify: ……

- Have you heard about e-commerce before?
  - ☐ Yes
  - ☐ No

- Does your shop have a website?
  - ☐ Yes
  - ☐ No (why?)
    - ☐ Lack of funds / financial support to start and maintain it.
    - ☐ Not sure about its benefits for business needs.
    - ☐ Lack of IT skills for developing and maintaining it.
    - ☐ Lack of necessary infrastructures to develop e-commerce systems.
    - ☐ Others, specify ……

- If you have a website what does it do?
  - ☐ Contains information about the company's product
  - ☐ Allow buyers to place orders online
  - ☐ Enables tracking of sales order status
  - ☐ Use it for customers feedback on products and services
  - ☐ Others, specify ……..

- We believe our customers will
  - ☐ Shop offline and online
  - ☐ Offline
  - ☐ Online
  - ☐ Unsure

<u>If you decide to implement e-commerce on your business:</u>

- Communication methods you will use
  - ☐ Dial-up
  - ☐ Leased –line
  - ☐ ISDN
  - ☐ ADSL
  - ☐ Fiber Optics

- You will offer the use of:
  - ☐ Credit cards
  - ☐ Payment on delivery
  - ☐ Coupons
  - ☐ Internet , purchased cards

- Who will process your online payment :
  - ☐ Internally
  - ☐ Third party
  - ☐ Unsure

Internet Adoption Benefits

- Provide your views on the benefits that e-commerce adoption on M/SMEs has on the economy of developing countries especially Jordan.

Key benefit	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Reduce cost of business operation					
Increase sales					
Improve customer service					
Providing customer more satisfying shopping experience					
Increase the availability of products					
Increase the accessibility to more customers					
Support linkage with suppliers					
Increase the ability to compete					
Help in making decisions					
Support cooperative partnership in the industry					
Job creation / employment opportunities					
Improve collaboration and partnership among SMEs in order to increase the market share					

Internet Adoption Barriers

- Provide your views on issues and barriers affecting the adoption of e-commerce on M/SMEs in developing countries especially Jordan:

Factor	Strongly Disagree	Disagree	Neutral	Agree	Strongly agree
Internal Barriers					
Lack of technical skills to implement and maintain an e-commerce project.					
Lack of funding to finance the project requirements (Computers, Internet price, design a website).					
Lack of knowledge to choose an e-commerce standard for SME's.					
Lack of time to initiate the project.					
Inability to make and receive payments					
E-commerce not suited to our products and services.					
E-commerce not suited to way business is conducted.					
E-commerce not suited to our customers and suppliers					
Security concerns with payments over the Internet.					
External Barriers					
Cultural					
Online sales not popular.					
Infrastructure					
Inadequate speed and quality of telecommunication infrastructure.					

Low Internet penetration in the country.					
Political					
Unstable economic climate in the country.					
Changing regulations with each government change.					
Social					
Lack of information on e-commerce.					
Legal and Regulatory					
Little support and policies for SMEs from government and industry associations.					
Inadequate legal framework for businesses using e-commerce.					
No simple procedures and guidelines.					

Delivery Service Barriers

- Which type of delivery mode you can offer?

☐ Pickup from your shop
☐ Pickup from a shared store with other shops
☐ Pickup from a collection point near you (Work, Petrol station, Agent)
☐ Pickup from a delivery point (attended)
☐ Home delivery (unattended example: Neighbours, box, etc)
☐ Home delivery (attended with time window)

- Provide your views about the issues and the barriers that may affect your decision to offer the delivery service in the developing countries especially Jordan :

Factor	**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
Inconvenient, unprepared transportation and road network in Jordan.					
Unprepared global positioning systems and mapping infrastructure in Jordan.					
Unsuitable postal addresses and postcode system in Jordan.					
The transportation companies and the postal system in Jordan can't help us to manage this process.					
Unknown Market size, customer penetration and demand.					
Our shop systems (ordering, warehousing, packaging, distribution (e.g. delivery vehicle), accounting (e.g. payment method), return and supply) don't have the capacity to fully back up with the delivery service.					
The reliability of fulfilment.					
Inability to offer a 24 hours service (night time, time window and congestion times).					
Lack of vehicle scheduling and routing software standards.					
The cost to start, to run and to maintain the service requirement is too high.					
Cultural barriers (e.g. unattended home delivery: to neighbours).					
Security barriers (e.g. Theft crimes that related with some kind of the delivery modes (e.g. unattended home delivery: in an external box)).					