Effect of Online Purchased Goods Delivery Service on Environment

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ABSTRACT

Home delivery service is an essential service for online purchased goods. The need for reliable delivery system becoming necessary, especially in developing countries where e-shopping still in its early stages of development due to the lack of postcode system. Postcode system is necessary for both e-shopping users to identify their delivery addresses and retailers to find the location of the delivery address and plan delivery routes. This study aims to design a system to be used as an alternative for postcode system to enable e-shopping and improve the delivery service in Jordan. The system is based on using state-of-art positioning technologies such as GIS and GPS. These technologies have a significant role in reducing green house gas (GHG) emissions by reducing traffic and energy consumption. The designed system has been tested by distributing a questionnaire among 37 participants (retailer employees, delivery logistics employees, and university students & academic staff) whereas the collected data were analysed using SPSS. The findings indicates that there are statistically significant differences in terms of using the designed system as postcode alternative system, solving the problem of home delivery service, and improving e-shopping services and customers' attitude toward such business in Jordan.

KEYWORDS: e-shopping, home delivery service, GHG emission, Jordan, developing countries.

1. INTRODUCTION

The 21st century has witnessed dramatic sophistications of internet business models and its related services such as e-shopping. E-shopping identified as the process of buying goods and services directly over the internet [15] which considered as a form of e-commerce transactions. Since the internet is the only medium for e-shopping, it became one of the most attractive facilities for internet users where consumers place an online orders and the retailer is responsible for fulfilling their orders [27]. Xia, Huang and Zhu (2010), identified the process of order fulfilling as the process of planning, organizing and

dispatching consumers' orders and prepare them to be delivered to the consumer's doorstep or any other delivery location [26]. Home delivery service is one of the most important services which play a crucial role in the success of e-shopping [12]. Physical distribution of items bought online must be operated by the seller's delivery fleet or by third-party logistics (3PL) Company [4]. Therefore, retailers/3PL must meet their consumers' expectations by having a reliable and efficient delivery system that fill their needs in order to gain their trust and satisfaction [8], [17], [20]. Home delivery service also called "last mile" which play an important role in the preservation of the environment by generating less CO2 in comparison with conventional shopping and reducing energy consumption by reducing consumers trips into shops for shopping or collecting their items [10], [11]. In addition, it reduces the impact of traffic by delivering consumers' orders using one vehicle within specific time windows [5]. However, the development of the delivery service needs a developed addressing system to enable the consumers to provide their shipping address details to the delivery couriers to be able find this address. This system is called "postcode or ZIP code system" which consists of series of letters and digits to give each house a unique identifier for the purpose of mail sorting [9], [21]. Thus, retailers and 3PL will be able to plan their deliveries routes to the customers' house location which lead to reduce GHG emissions and energy consumption. This study aims to design a system that will improve the delivery service in Jordan and the other developing countries. The system is based on using positioning technologies such as web GIS and GPS as an application for desktop and Smartphone platforms. In addition, the system will help in saving energy and reduce green house gas (GHG) emission in these countries.

2. LITERATURE REVIEW
2.1 E- shopping in Jordan

E-shopping is an Internet application that has spread rapidly in the developed countries, but whose progress has been markedly slower in developing countries, due to some barriers. These barriers lie in infrastructural barriers (e.g. information technology hardware, Internet access, and internet bandwidth), cultural and social barriers (e.g. high uncertainty avoidance), and lack of required technologies to apply such transaction models (e.g. postcode system, delivery system, and financial system) [23]. E-shopping is defined as buying a basket of commodities and its related services (e.g. delivery service) over the Internet [6]. According to Shergill and Chen (2005), customers can be attracted to shopping websites depending on its commodity value, quality of service (QoS) and customer service, convenience, experience of using e-shopping websites, payment security and privacy, and finally home delivery service availability [13], [17], [24]. These factors affect customers' behaviour when shopping online. However, Jordan is one of the developing countries which faces problems affect retailers and consumers decision to adopt e-shopping phenomenon due to its less popularity among them. In the last few years, Jordan has witnessed improvements and developments in the information and communication technology (ICT) sector which offer a developed ICT infrastructure to reach the required level of ICT readiness to start initiating e-businesses [2]. ICT readiness has been identified by the ministry of information and communication technologies (MICTs) in Jordan as the developments of ICT infrastructure which attract the community to benefit from these developments [22]. On the one hand, Internet service providers (ISPs) number in Jordan has been increased which added more improvements on the internet services offered by those providers (e.g. WiMAX

and Wi-Fi) with lower subscription prices. On the other hand, internet penetration has been increased by the users since smart phones being connected to the internet and used in daily life activities [1]. These developments led to design the proposed system in order to improve e-shopping and home delivery service. Then, reduce GHG emissions by reducing traffic and energy consumption.

2.2 home delivery service in Jordan

The main operator for postal services is Jordan post company (JPC) which cover all the kingdom areas [7]. JPC provides a variety of services to the citizens, such as postal services (e.g. private post boxes, EMS and parcel mail service), financial services (e.g. bills collection, money order, etc.), E-services (e.g. bills payment, P.O. Box rent or renew, etc.), SMS services and finally ancillary services [16]. In addition, JPC provides the postal and financial services on behalf of institutions, departments and companies in the public and private sectors by collection of invoices as well as telegram and phone booth services [16]. However, JPC do not provide home delivery service for customers due to the lack of postcode system which leads to the lack of efficient and reliable delivery service system in the kingdom. Therefore, JPC is still providing poor delivery service quality especially in rural and remote areas, and the express delivery service is supplied by foreign couriers such as TNT, ARAMEX, DHL and UPS [6],[14]. Even those couriers do not have a delivery system for delivering customers' orders where house location detected by phone and depending on the driver's experience in the delivery area which increases energy consumption and thus lead to increase in GHG emissions.

2.3 Effect of e-shopping on GHG emissions

E-shopping home delivery service in Jordan was chosen as a case study because of the potential impact of e-shopping for reducing GHG emissions. The current imperfection of e-shopping home delivery service in Jordan has affected customers' and retailers' decision to adopt such services. In addition, this imperfection increased traffic and energy consumption which led to increase GHG emissions. However, the need for a successful home delivery model will improve e-shopping and its services, and influence consumers and retailers positively toward adopting e-shopping. Thus, the positive influence of consumers' behaviour could influence the whole supply chain and reduce GHG emissions [25]. Also, the use of positioning technologies play a significant role in reducing energy consumption and traffic which leads to lower GHG emissions [3],[18],[19].

3. METHODOLOGY

This section provides a description about research instrument design, sampling procedure and data collection technique. To test the designed system, a structured questionnaire was distributed among three groups of participants. The first group (G1) includes participants such as retailers' employees (10 participants), the second group (G2) includes delivery logistics employees (10 participants), and the third group (G3) includes university students and academic staff (17 participants). The total of the participants who took part in the evaluation process was 37 participants. Before the evaluation of the proposed model by the three mentioned groups, a draft of the formulated questionnaire was refined into the final form of the validation questionnaire. In addition, the main aim of the research was introduced in the cover

page of the questionnaire and the findings of the previously conducted studies were explained. Also, the cover page explained the work behaviour of the proposed system model.

3.1 Results and Discussion

After collecting the samples from the participants, data entered into SPSS to be calculated using the appropriate techniques. The three groups were asked, if the system can be used as a postcode alternative in the context of e-shopping, if the system solves the problem of home delivery and if the system improves e-shopping services and customers' attitude toward such business. The mean values for system usage as a postcode alternative in the context of e-shopping, solving the problem of home delivery and improving customers' attitude toward e-shopping for each group are presented in Table (1). The table illustrates the mean values (marked as M) and the standard deviation of the mean values (marked as SD) for usability achieved by participants in the three groups. To complete the analysis of this study, ANOVA and POST HOC analysis were carried out in order to find out the participants opinions toward using the proposed system.

Table 1: Mean values and standard deviation of the proposed system

Factor		G1	G2	G3
Postcode alternative in the context of e-shopping	M	2.60	2.20	1.76
	SD	0.966	0.632	0.562
Solving the problem of home delivery service	M	2.10	1.80	1.71
	SD	0.316	0.422	0.588
Improve e- shopping services and customers' attitude toward it	M	2.30	1.80	1.76
	SD	0.675	0.422	0.664

As shown in Table (2), the results of ANOVA analysis show that there is a statistically significant difference between the groups in terms of using the proposed system as a postcode alternative in the context of e-shopping (P = 0.019<0.05).

Table 2: ANOVA results for postcode alternative system

Factor	F	Sig.
Postcode alternative in the context of e-shopping	4.493	0.019

As shown in Table (3), POST HOC results for postcode alternative system.

The results show that there is a statistically significant difference between G1 & G3 in terms of using the proposed system as a postcode alternative in the context of e-shopping in Jordan, which means that the designed system can be used as postcode alternative system to enable e-shopping users to identify their delivery address location and submit it to the retailer.

Table 3: POST HOC results of postcode alternative system

Factor	Group	Other groups	Sig.
Postcode alternative system in the context of e-shopping	G1	G2	0.426
		G3	0.015
	G2	G1	0.426
		G3	0.284
	G3	G1	0.015
		G2	0.284

As shown in Table (4), the results of ANOVA analysis show that there is a statistically significant difference between the groups in terms of considering the system solves the problem of home

delivery service in Jordan (P = 0.006<0.05).

Table 4: ANOVA results for solving the problem of home delivery service

Factor	F	Sig.
Solve home delivery problem	5.968	0.006

As shown in Table (5), POST HOC results for solving home delivery service problem in Jordan.

The results show that there is a statistically significant difference between G1 & G3 in terms of using the proposed system as a solution for the problem of home delivery service in Jordan, which means that the designed system can solve the problem of home delivery service in Jordan. In addition, the system will eliminate the need for calling the customers to enquire about their delivery address location during delivery. In addition, it reduces energy consumption required to arrive into the final destination of the delivery courier.

Table 5: POST HOC results for solving the problem of home delivery service

Factor	Group	Other groups	Sig.
Solve home delivery service problem	G1	G2	0.249
		G3	0.004
	G2	G1	0.249
		G3	0.255
	G3	G1	0.004
		G2	0.255

As shown in Table (6), the results of ANOVA analysis show that there is a statistically significant difference between the groups in terms of improving e-shopping services and customers' attitude toward it (P = 0.005<0.05).

Table 6: ANOVA results for improving e-shopping services

Factor	F	Sig.
Improve e-shopping services and customers' attitude toward it.	6.340	0.005

As shown in Table (7), POST HOC results for improving e-shopping services and customers' attitude toward it in Jordan.

The results show that there is a statistically significant difference between G1 and G2 & G3 in terms of the proposed system will help in improving e-shopping services and customers' attitude toward e-shopping positively in Jordan. In addition, the system will help in reducing customers' travel to the conventional shops for shopping which lead to lower energy consumption and traffic, then reducing GHG emissions.

Table 7: POST HOC results for improving e-shopping services

Factor	Group	Other groups	Sig.
Improving e-shopping services and customers' attitude toward it.	G1	G2	0.004
		G3	0.045
	G2	G1	0.004
		G3	0.335
	G3	G1	0.045
		G2	0.335

4. CONCLUSION

The main purpose of this study was to solve the problem of lack of postcode system in Jordan in order to improve the delivery service of online purchased goods which lead to improvements in e-shopping its self. Thus, customers' and retailers' attitudes toward e-shopping will be affected positively toward adopting such

businesses as a channel for selling and buying goods online instead of traditional shopping. However, Adoption of e-shopping reduces traffic and energy consumption and then lead to lower CO2 emissions which lead to greener environment. The preliminary findings of the distributed survey indicate that most of the results are significant, which means that the proposed system solves the problem of home delivery service for online purchased goods and affect customers' and retailers' attitudes toward such businesses. In addition, the system could help in reducing GHG emissions caused by customers' travel for conventional shopping.

Further research required to explore e-shopping adoption factors that affect customers' and retailers' attitude to adopt such businesses by considering larger sample in the other developing countries. In addition, further research needed for optimizing delivery routes and providing customers with delivery time windows in order to make the process of home delivery more flexible and comfortable for both customers and retailers.

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