

Conference Paper

The Impact of Mobile Commerce in Kavala

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Abstract

The mobile commerce, as an integral and often dominant part of a broader technological, economic and social system, is closely linked to environmental conditions that affect; this affects their decisions and strategy implemented. Undoubtedly, in the current era, the competition is increased and dominant in the market, pushing their bodies and citizens to abandon traditional and time-consuming methods of business functions, practices and yet purchases.

The purpose of this study, it is the presentation and the penetration of mobile commerce to the citizens of Kavala. In particular, how they use their mobile devices in making purchases. The survey conducted in 2015 on a random sample of 220 people with criterion that the respondents have a mobile equipment. It was studied the use of wireless technologies in conjunction with the recognition and use of electronic commerce by both consumers and business world.

The questionnaire has 47 questions concerning the population distribution, the advanced technology of their mobile devices, the interest for products and services provided by m-commerce and the security they feel. Finally, the respondents were asked for the purchases made by their mobile equipments and whether they were satisfied.

For the measurement of the research factors which appear in the conducted study, the method of multiple determinants variables were used. The data analysis was carried out with the use of the statistical program SPSS Statistics 19.0. The conclusions of the survey is that despite the cost of use, the connection speeds, and security and misuse of personal data problems, the mobile commerce is in constant development due to the critical mass of the users who immediately and practically use their mobile devices.

Keywords: M-commerce, Impact, Kavala, questionnaire

1. Introduction

The phenomenon of "information revolution" has a significant impact on economic and social level. Therefore the rules of the market are changing and businesses are forced to follow new models and methods so they can reach the demands of new standards on the market [20].

New business models, new competition in the market, socio-geo impact of the mobile Internet, new regulatory structures and policies at national and European level on the one hand and the transformation of Greek society in a "post-industrial" society, characterized by the radical changes in the production process, economy and

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everyday life, forming new Technologies of Information and Communication (ICT) on the other, have formed a new environment [25]. Electronic commerce resulted from the need of obtaining business competitive advantage and is an integral part of world trade nowadays [21]. Electronic commerce gives flexible benefits and complete business promotion solutions to the desired markets, making the number of users growing rapidly day by day. The continuous progress of wireless technologies and mobile communications that is been seen in recent years, in combination with the widespread use of the Internet has led to the development of mobile e-commerce (mobile commerce, m-commerce) [30], (Tiwari et al., 2006). The appearance of this kind of trade has created new opportunities but also new challenges for the business community [27], (Siau et al., 2001).

The paper presents the penetration of mobile commerce in Greece and has the following organization. The second section describes the theoretical background. The third section describes the research methodology. The fourth section describes the results of the investigation. Finally the fifth section is discussing the results and provides conclusions.

2. Theoretical Framework

Below The features of m-commerce will be analyzed as far as possible, such as the characteristics, the advantages, the technology required, the security sector, mainly for trading and its applications. Finally will be explained how those features are offered by different companies in Greece.

2.1. Definitions

The electronic commerce can be defined as a set of business and inter-enterprise integration strategies and models that can support all business segments through the use of new technologies and the appropriate telecommunication infrastructure [5, 7].

The sharp fall of electronic commerce statistics in early 2004 led many organizations to take the advantage of the existing technology in the field of mobile telephony and promote their payments by the use of mobile devices [34].

Definitions they have been given to m-commerce are:

As m-commerce is defined any transaction, with a monetary value that is conducted via a mobile telecommunication network [6].

As m-commerce is defined the buying and selling of goods and services through wireless handheld devices such as cellular telephones and personal digital assistants (PDAs) and wireless networks around the world [37].

Mobile e-business is defined as the processing trade conducted over wireless telecommunications networks and include the use of mobile terminals. These commercial transactions include a wide range of services based on the current position

and the specific high-speed mobile users profiles and wireless networks around the world, such as providing information, entertainment, payments, etc. [38].

2.2. Features and Benefits

Two are the main features that make the services provided by the mobile ecommerce excellent [23, 40]:

- Mobility : The ability to access and transaction from wherever the user is located.
- Availability (or reach-ability): The network services and the owner of the mobile device are always available.

Some of the advantages of mobile e-commerce are the following [9, 20]:

- Access from anywhere: Use of mobile e-commerce services in real time, anytime and anywhere with the only requirement of a mobile device [12].
- Ease of use: Mobile devices have been simplified enough to provide the user with a user friendly operating environment [1]
- A greater range of products and services: When the user is a visitor in some online stores has the opportunity to choose the product or service of interest from anywhere without geographical boundaries (Siau et al., 2001).
- Economical products and services: Price reductions for the user/client as a result from reduced advertising costs, production, storage and even distribution of the product especially for those transferred through Internet (Siau et al., 2001).

2.3. Payments via Mobile Devices (Mobile Payment)

In purchasing of goods and services via mobile getting involved [8, 17]:

- The organization that approves the payment: It is an independent organization that takes care of the certification of consumer identity.
- The dispatch of the transaction: It could be a bank, a mobile phone company or even a credit card issuer [28].
- The payment service provider: It is the central entity in the transaction process, he accepts the message and then direct it to the provider authentication.
- The consumer: S/he has in his possession the mobile device and the one that proceeds to purchase content or services from the content provider.

2.4. Categories of Mobile Electronic Shopping

We can distinguish the following categories of mobile online shopping [18, 23]:

- Software electronic coins: In this case, the monetary value is stored on the mobile device and the client has full control of the money. As electronic coin is designated a file that contains, among other information, a "value", a serial number, a validity period and the signature of a bank.
- Hardware electronic coins: In this case the monetary value is stored in a hardware voucher, a "smart" card in the mobile device. In order to use the electronic money, the smart card of the consumer and the supplier of the service provider should exchange the appropriate credentials among them. In this scenario, a secure channel is being established, that allows the required connection and the money transfer.
- Background account: In this case, the money amount is stored in a third group that excels mutual trust. Depending on the payment system of the account that is applied, may be a credit card account, a bank account or even a bill from the network user. In this case the common characteristic with the other categories is that the consumer sends a transaction authentication and authorization message to the third group, in order to permit the use of the account.

2.5. The Infrastructure of the Mobile E-Commerce

2.5.1. Hardware

Mobile devices through which the mobile e-commerce carried out are, mobile phones, personal digital assistants (PDAs), smart-phones, that defined as phones that combine mobile phone technology with that of the PDA in a device, palm computers (hand-held PCs), notebooks, laptops computers and interactive pagers [31].

2.5.2. Software

- User Interface used by a mobile application (UI).
- Operating system suitable for the use in mobile devices (OS).
- Back-end legacy application software: Software that is installed on the central UNIX systems, which form the core of mobile commerce software applications.
- Micro browsers: Wireless navigation software adapted to the specifications of mobile devices.
- Wireless markup language: A writing language based on XML.
- Voice XML: An extension of XML that is designed to help voice communication.
- Application middleware: Software applications, that has the role of a communication bridge between the backend systems and web based application servers [31, 33].

2.5.3. Network

- Microwave (Microwaves): Carrying large amounts of data at a remote distance.
- Satellites (Satellites): The communications satellite provide Internet services to individual users in relatively high data speeds.
- Cellular radio network (Cellular Radio Technology): Based in creating cellular service areas.
- IR (Infrared): Widely widespread technology using the remote control of household appliances.
- Subscriber identification module (SIM): A removable storage card is used, among other features of the card is the recognition and execution of transactions.
- VoIP (Voice over IP): In recent years there is an enormous interest about the IP telephony, which is known as VoIP (Voice over IP) that enables two-way, synchronized voice communication and data traffic in real time [31].

2.5.4. Cellular Phone Technology

The WAP (Wireless Application Protocol) is an "open" international standard for developing applications in a wireless environment, such as wireless Internet access via mobile phone. Initially, the WAP is designed to provide similar services to those offered by a web browser application, and with the necessary modifications, make it possible to display information in digital devices within their very limited capacity [15].

The GPRS (General Packet Radio Service) system is a "non-voice" service of "added value", which allows the sending and the receiving of data via the GSM (Global System for Mobile communications) cellular network. The GPRS giving the users the ability to transfer, through the mobile devices, data through the Internet easily, quickly and being permanently on-line [23].

EDGE (Enhanced Data Rates for GSM Evolution) is the technology that enables in existing mobile networks the required capacity and "speed" to provide third-generation services. By using EDGE technology, infrastructure can served three times more subscribers than with GPRS, the data transfer rate is three times raised and just space freed for the improvement of the quality of voice. So it makes possible for services, such as video conferencing, video streaming and playback real Internet browsing established in particularly high speeds. During the download of small files (ringtones, wallpapers), or larger files, such as games or large music files, there is a noticeable difference in speed and stability that enables users to save much of the time spend in other protocols. Content services are another of the important tools of EDGE, and services that operate as market drivers and valuable aids in time needed. Regarding the navigation of Internet sites, users now can quickly see pages with

rich graphics and animations, something that using previous technologies was time consuming or completely impossible [31].

2.6. Mobile E-Commerce Security Measures

An electronic payment and transaction system should have the following characteristics in order to ensure greater safety for the user [10, 11, 22, 23]:

Authentication: It is the buyer's identity certification process in order the payment is approved. Ensuring that that he intended to make a purchase is actually the person who says so. Verification of authenticity is provided through a digital signature.

Integrity: Message Security Process from changes or eavesdropping, it also ensuring the protection of personal data of the transacting parties. Security achieved by disabling others from seeing the message sent in order to change it, e.g. the files that reaching the recipient. Moreover, the privacy of the traders will not be available to anyone, for any reason without their personal approval.

Confidentiality: Ensuring that no other than the merchant and the customer can see the message, prevents communication from unauthorized disclosure of sensitive information. Confidentiality is intertwined with preventing unauthorized modification of information provided through encryption. In an electronic environment should be certain that the content of the messages exchanged remain unchanged.

Non-repudiation: The system should apply appropriate methods of transactions in order to achieve that, instantly after the determination of the authenticity of the identity of the acting person, can be ensured, by means of evidence, the authenticity of the transaction. This is certified by the message asking the permission of the operator for acceptance and continuance of processing the transaction.

Availability: In this case the system should offer to the user, the effective transaction safety and instantaneous response time, in case of an outage for any reason should have rapid data recovery, for example: power failure, damage, lack of network (signal) etc. [19].

2.7. The Mobile E-Commerce Services

There are three service categories accessible via mobile devices [2, 3, 32]. More specifically:

- Connectivity services, communication (other than voice calls) and developing a community, including email, short message service (SMS) and conversations (chats) [35]. Based on Durlacher (1999) communications between two people alone are not considered an application of m-commerce. Considered the implementation of m-commerce communication between a Service Provider Information and a user, which has given way of billing.

- Personalized, real-time information, including news, music, video, alerts, games, and location information [14].
- Mobile commerce as various mobile markets (mobile shopping), information and entertainment through mobile (mobile information & entertainment), Mobile Games, Mobile Music, Videos Mobile and TV, Reservations Mobile (mobile reservations / ticketing), Banking (m -banking), mobile auction (m-auction), Wireless Telemedicine (mobiHealth) and mobile Security (m-security) [36].

2.8. The Mobile E-Commerce in Greece

The major companies in the mobile telephony sector in Greece are Vodafone (2012), [4, 16, 39]. There are substantial differences between the above companies regarding the services provided and there is only an impression war.

Based on communication companies declarations the subscribers market shares in 2009 were for Cosmote 44,4% (against 39.4% in 2008), for Vodafone 31,6% (versus 33%) and the Wind 24% (versus 27.6%). Approximate market shares, in terms of revenues from services in the previous year, was for Cosmote 45,1% (against 38.8% in 2007), the Vodafone 31,9% (versus 36.2%) and the Wind 23% (versus 25%) [24]. In 2012, the number of connections is expected to reach a more reasonable level. Greece has a population of about 11 million , appears to have , at the end of 2009, a total of 20.699 million of mobile telephony subscribers [24].

3. Research Methodology

The research which will be presented subsequently, was conducted during the first semester of 2012 to a random sample of 100 individuals aged over 16 years. The final selection of the individuals for the creation of the sample was made using the method of simple random sample. The collection of information became via a questionnaire, based on respondents who own a mobile phone. Data processing was performed with the statistical program SPSS v19.0. Furthermore, descriptive statistics as well as the test chi-square (χ^2) has been performed through the above package.

The questionnaire has 47 questions; the first five are related to the population distribution, while the next following examine how advanced technologically mobile devices of respondents are, if and how much they are interested in some products and services which are provided by m-commerce and whether they consider this way safe. At last, it is examined whether some of the respondents have completed purchases via their mobile phone, and if so how much the level of their satisfaction is.

The purpose of this research is the collection of analytical information on the use of mobile phones but more specifically in making purchases and general transactions through these. The results from the research are presented and shown below in tables and graphs per question, where each table provides the Frequency, the Percent, the Valid Percent and the Cumulative Percent. The statistical program SPSS Statistics 19.0

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Man	48	48.0	48.0	48.0
	Woman	52	52.0	52.0	100.0
	Total	100	100.0	100.0	

TABLE 1: Distribution of the sample regarding the gender.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 18	4	4.0	4.0	4.0
	18-40	70	70.0	70.0	74.0
	41-60	26	26.0	26.0	100.0
	Total	100	100.0	100.0	

TABLE 2: Distribution of the sample regarding the age.

(2012) was used for the production and the publication of the results. The current study addresses topics that are related to mobile e-commerce, that is to say, every online sale transaction is made via a mobile phone, using the Internet.

4. Analysis Results

The results obtained from the research are shown in tables per question, each table shows Frequency, Percent, Valid Percent and the Cumulative Percent. The statistical package SPSS Statistics 19.0. was used for processing and issuing of the results.

4.1. Distribution of the Sample

Tables 1, 2, 3 and 4 present the distribution of the sample based on demographic characteristics while table 5 on the perceived security of the respondents.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Secondary Education	28	28.0	28.0	28.0
	Post-secondary Education	10	10.0	10.0	38.0
	Higher education	48	48.0	48.0	86.0
	Postgraduate education	14	14.0	14.0	100.0
	Total	100	100.0	100.0	

TABLE 3: Distribution of the sample regarding the educational level.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 10,000	44	44.0	44.0	44.0
	10,000-20,000	32	32.0	32.0	76.0
	20,000-35,000	18	18.0	18.0	94.0
	Over 35,000	6	6.0	6.0	100.0
	Total	100	100.0	100.0	

TABLE 4: Distribution of the sample regarding the annual income.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	At all	44	44.0	44.0	44.0
	Little	36	36.0	36.0	80.0
	Enough	14	14.0	14.0	94.0
	Very	4	4.0	4.0	98.0
	Very much	2	2.0	2.0	100.0
	Total	100	100.0	100.0	

TABLE 5: How safe do you consider the transactions via mobile phone?

4.2. Correlation between Questions

The correlations of qualitative variables with the other questions are shown below.

4.2.1. Correlation Gender with other Questions

Beginning our analysis of the correlation of variables, "Gender" and other variables, initially we examine the correlation between "Gender" and the possibility of sending e-mails from their Mobile phone". The chi-square test gave a value of 10.117 with a 1 degree of freedom exceeding the limit value of 3.84 corresponding to significance level 5% (0.05) and p-value 0.001.

The "Gender" is then correlated with the question "Would you be interested immediate in finding shop addresses through your Mobile phone?", The chi-square test gave a value of 5.983 with 1 degree of freedom exceeding the limit value of 3.84 corresponding to a significance level of 5% (0.05) and p-value 0.05.

The "Gender" is correlated with the questions "Would you be interested in downloading Ringtones/Music on your Mobile phone?". The chi-square test gave a

Gender	Would you receive and sending e-mails from your Mobile phone?	
	YES	NO
Man	30%	18%
Women	16%	36%

TABLE 6: Correlation of Gender and possible use of (e-mail) through Mobile.

Gender	Would you be interested immediate in finding shop addresses through your Mobile phone?		
	YES	MAYBE	NO
Man	10	8	30
Women	20	12	20

TABLE 7: Correlation of Gender and interest for purchases through Mobile.

Gender	Would you be interested in downloading Ringtones/Music on your Mobile phone?		
	YES	MAYBE	NO
Man	6	16	26
Women	28	10	14

TABLE 8: Correlation of "Gender" and Interest for buying Music through Mobile.

value of 19,090 with 2 degrees of freedom exceeding the limit value of 5,99 corresponding to a significance level of 5% (0,05) and p-value 0,000.

The "Gender" in then correlated with the question "Would you be interested in downloading Wallpapers/ issues on your Mobile phone". The chi-square test gave a value of 29.143 with 2 degrees of freedom exceeding the limit value of 5.99 corresponding to a significance level of 5% (0.05) and p-value 0.000.

4.2.2. Correlation between Age and other Questions

Continuing the analysis of the correlation of variable "age" with any other specific variables we examine the relations between "age" and "Would you be interested in immediate finding of store addresses directly from your Mobile phone?", the chi-square test gave a value 14.659 with degrees of freedom surpassing the limit value of 9.49 corresponding to significance level of 5% (0.05) and P-value 0.005.

4.2.3. Correlation of Income with other Questions

Continuing the analysis of the correlation of variable "Income" with any other specific variables we examined the correlation "Income" and "Would you be interested in finding direct info about products through your Mobile phone?" The chi-square test

Gender	Would you be interested in downloading Wallpapers/ issues on your Mobile phone?		
	YES	MAYBE	NO
Man	4	16	28
Women	30	4	18

TABLE 9: Correlation between gender and interest for buying wallpapers through cell phone.

How old are you?	Would you be interested in immediate finding of store addresses directly from your Mobile phone?		
	YES	MAYBE	NO
Less than 18	4%	0%	0%
18-40	30%	28%	12%
41-60	8%	6%	12%
More than 60	0%	0%	0%

TABLE 10: Correlation between “Age” and “Interest in shop addresses through Mobile”.

How about is your annual income?	Would you be interested in finding direct info about products through your Mobile?		
	YES	MAYBE	NO
Less than 10.000	24%	10%	10%
10.000-20.000	10%	16%	6%
20.000-35.000	8%	8%	2%
More than 35.000	0%	0%	6%

TABLE 11: Correlation of income in finding products through mobile phone.

gave a value of 27.83 with 6 points of freedom surpassing the limit value of 12.59 corresponding to a significance level 5% (0.05) and p-value 0.0001.

5. Conclusions

Despite the fact that mobile telephony has great impact in Greece, however the fact that this is a relatively new mean which has not given the time, on the one hand, businesses to see how they will effectively take advantage of this new tool and on the other hand, to users of mobile devices to become familiar enough with this new type of transactions while gaining ultimately their trust.

The development of new technologies in telecommunications’ sector, especially wireless networks, offers a wide range of unprecedented possibilities and opportunities that upgrades the network of technological capabilities a company may use. It is worth mentioning: (a) the configuration of an effective regulatory framework, (b) the transactions’ security, (c) the provision of rich and interesting content to the end-user.

We can claim that in the past few years our country has participated in several efforts that led to exploitation of m-commerce and general business moves to this direction, which are not derived from the mobile telephony.

Financial transactions and entertainment services are the most important applications of mobile commerce in Europe. It is worth mentioning that the manufacturers of mobile telephony play also a crucial role. Technological restrictions may constitute a factor of interception. Another success factor is the “socialization” of new mobile commerce applications and not the consumers’ adaptation to a sterile techno-economic

model. Investments in young ages (<25) will have great benefits. Despite the existence of global strategies, there is a growing need to develop services and local interest [25].

Given the high impact as well as the expected expansion of services and capabilities, companies should implement plans in order to find ways of taking advantage of the mobile commerce to promote their products and services, always with a view of achieving the best possible results for themselves, without "vandalize" this tool, something that has happened to a certain level on television in the past.

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