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ANALYZING THE FACTORS AFFECTING E-COMMERCE IN TURKEY

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1. The material included in this thesis has not been submitted wholly or in part for any academic award or qualification other than that for which it is now submitted.
2. The program of advanced study of which this thesis is part has consisted of:
 - i) Research Methods course during the undergraduate study
 - ii) Examination of several thesis guides of particular universities both in Turkey and abroad as well as a professional book on this subject.

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ABSTRACT

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ANALYZING THE FACTORS AFFECTING E-COMMERCE IN TURKEY

Recently, e-commerce usage has been increasing in the world thanks to the rapid development of science and technology. Also in Turkey, it began to be used by the consumers and firms due to the various advantages.

The aim of this dissertation is to analyze the factors affecting e-commerce development in Turkey. The study consists of three parts. In the first part, general information about e-commerce has been given. In the second part, literature has been reviewed. In the third part, econometric analysis has been made. Factors affecting e-commerce in Turkey have been analyzed by using vector autoregressive (VAR) model. Monthly macro data for the period between 2010 and 2014 has been used for the analyses.

Empirical evidence shows that consumer price index, import and credit card usage are significant factors affecting e-commerce in Turkey.

Key words:

E-commerce, Time Series Analysis, Vector Autoregressive Models

KISA ÖZET

Canan PEKER

Mayıs 2015

TÜRKİYE’DE E-TİCARETE ETKİ EDEN FAKTÖRLERİN ANALİZİ

Son yıllarda bilim ve teknolojinin hızla gelişmesiyle, dünyada e-ticaret kullanımı artmaktadır. Ayrıca Türkiye’de de sağladığı çeşitli avantajlardan dolayı, hem tüketiciler hem de firmalar tarafından kullanılmaya başlanmıştır.

Bu tezin amacı Türkiye’de e-ticarete etki eden faktörleri analiz etmektir. Çalışma üç bölümden oluşmaktadır. Birinci bölümde e-ticaret hakkında genel bilgi verilmiştir. İkinci bölümde, literatür taraması yapılmıştır. Üçüncü bölümde ise, ekonometrik analiz yapılmıştır. Türkiye’de e-ticarete etki eden faktörler vektör otoregresif (VAR) model kullanılarak analiz edilmiştir. Analizlerde 2010 ve 2014 yılları arası aylık makro veriler kullanılmıştır.

Elde edilen bulgular, tüketici fiyat endeksi, ithalat ve kredi kartı kullanımının Türkiye’de e-ticarete etki eden faktörler olduğunu göstermektedir.

Anahtar Kelimeler

E-ticaret, Zaman Serisi Analizi, Vektör Otoregresif Modeller

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LIST OF ABBREVIATIONS

ATM	Automated Teller Machine
B2B	Business to Business
B2C	Business to Consumer
B2G	Business to Government
BKM	The Interbank Card Center
C2B	Consumer to Business
C2C	Consumer to Consumer
C2G	Consumer to Government
DPT	State Planning Organization
ECOM	Electronic Commerce Promotion Council of Japan
EDI	Electronic Data Interchange
EFT	Electronic Funds Transfer
ETKK	Electronic Commerce Coordination Committee
EU	European Union
G2B	Government to Business
G2C	Government to Consumer
G2G	Government to Government
GSM	Global System for Mobile Communications
ITU	International Telecommunication Union
METU	Middle East Technical University
NASDAQ	National Association of Securities Dealers Automated Quotations
NGO	Non-Governmental Organizations
OECD	Organization for Economic Co-operation and Development
SCST	The Scientific and Technological Research Council of Turkey
TUBISAD	Turkey Informatics Industry Association
TUENA	Turkey National Information Infrastructure Master Plan
TUIK	Turkish Statistical Institute
UNCTAD	United Nations Conference on Trade and Development
WAP	Wireless Application Protocol
WTO	World Trade Organization
WWW	World Wide Web

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INTRODUCTION

Buying and selling of goods and services over the internet is called e-commerce. In recent years, with the rapid development of science and technology, shopping on the internet has become widespread all over the world. Companies and consumers have begun to adopt e-commerce in addition to traditional commerce in a short time.

E-commerce has provided many conveniences to both companies and consumers. Companies had the opportunity to reach consumers more easily through e-commerce. Today, any e-commerce company can reach consumers in the other end of the world and can sell its products more easily. With e-commerce, operational costs can also be minimized. Companies that want to assess these advantages enter into e-commerce sector. Also, consumers can reach a wider range of products and find the opportunity to shop from home all day without the need to go to store and without distance limitation with a better quality of service.

E-commerce began to develop in the 90s with the birth of the web in the world and it has been improving rapidly. Today, internet has become preferred for many products such as apparel-accessories, accommodation, furniture, food, book etc. In the world, there were 3,035,749,340 internet users in 2014, while this value was 360,985,492 in 2000. Global e-commerce volume was 638 billion dollars in 2013 and it is expected that it will reach to 1,346 trillion dollars by 2018 (Afra, 2014).

Turkey has also started studies for e-commerce in 1997. Since then, many projects have been made to develop e-commerce usage in Turkey. When we come to 2014, Turkey's e-commerce transaction volume reached to 41 million TL and continues to develop rapidly. Also, the number of Internet users has exceeded 35 million and 48 per cent of internet users use internet with the purpose of banking transactions and online shopping in Turkey.

On the other hand, there are many barriers to e-commerce. Security problem is the most important barrier to e-commerce. Also, taxation problem, payment problem, legal barriers, infrastructure problem, privacy etc. are the other barriers to e-commerce. It is being tried to avoid these barriers with the development of science and technology.

Studies regarding e-commerce development and growth are increasing in recent years. In these studies, social, cultural and economic examinations are being made. There are many economic factors that affect e-commerce development and growth. Internet, inflation, GDP per capita, and communication infrastructure are some of these factors. The aim of this study is to analyze the factors affecting e-commerce in Turkey and to contribute to the existing literature.

This study consists of three parts.

The first section provides general information about e-commerce. The concept, history, types, tools, advantages-disadvantages, and effects of e-commerce, and problems encountered in e-commerce have been examined.

The second section contains the literature review. In this part, studies on factors affecting e-commerce in the world and Turkey have been investigated and the results of these studies have been analyzed.

The third section contains the econometric analysis. In this section, the model has been determined to analyze the factors affecting e-commerce in Turkey. Applications have been made by using vector autoregressive (VAR) model. Finally, the analyses' results have been discussed. The results are largely compatible with the literature.

CHAPTER I

1.1. CONCEPT OF E-COMMERCE

E-commerce which consists of a combination of electronic and commerce words, although generally means buying and selling goods or services electronically, it is defined by different people and organizations. According to the definition made by the OECD in 2009,

An e-commerce transaction is the sale or purchase of goods or services, conducted over computer networks by methods specifically designed for the purpose of receiving or placing of orders. The goods or services are ordered by those methods, but the payment and the ultimate delivery of the goods or services do not have to be conducted online. An e-commerce transaction can be between enterprises, households, individuals, governments, and other public or private organizations. To be included are orders made over the web, extranet or electronic data interchange. The type is defined by the method of placing the order. To be excluded are orders made by telephone calls, - facsimile or manually typed e-mail (OECD, 2011).

WTO defined e-commerce as “The advertising, sale, and distribution of product or services electronically”.¹

As defined by the European Commission in 1997,

Electronic commerce is about doing business electronically. It is based on the electronic processing and transmission of data, including text, sound and video. It encompasses many diverse activities including electronic trading of goods and services, on-line delivery of digital content, electronic fund transfers, electronic share trading, electronic bills of lading, commercial auctions, collaborative design and engineering, on-line sourcing, public procurement, direct consumer marketing and after-sales service (Jobodwana, 2009).

UNCTAD defined e-commerce in Conference of European Statisticians in 2010. According to UNCTAD definition;

E-commerce is sale or purchase/procurement of goods or services; electronic data interchange (EDI); mobile commerce; integration of ordering system with that of customers/suppliers; integrated invoicing and payment by

¹ Electronic Commerce. Retrieved May 18, 2015 from https://www.wto.org/english/thewto_e/whatis_e/tif_e/bey4_e.htm

customers; full integration with back-end systems; use of an extranet; secure transactions; automated payment of suppliers (UNCTAD, 2004).

According to the definition made by T.C. Ministry of Transportation in Turkey National Information Infrastructure Report in 1998: “E-commerce is all kinds of commercial business activities which the parties communicate electronically without the need to establish a physical connection or physical exchange” (TUENA, 1998).

ECOM defined e-commerce in 1996. According to this definition, “electronic commerce supports an entire range of activities, product design, manufacturing, advertising, commercial transactions, settlement of accounts, using a variety of kinds of computer networks” (OECD, 1997).

Schneider (2007) reported that “the term “electronic commerce” means shopping on the part of the internet called the World Wide Web“ (p. 5).

Laudon and Traver (2011) stated that “e-commerce is the use of the internet and the web to transact business. More formally, digitally enabled commercial transactions between and among organizations and individuals” (p. 47).

Considering the common elements of above definitions, e-commerce can be defined as follows;

E-commerce is individuals, private or public institutions to make their commercial activities in electronic form. These activities include production of goods or services, advertisement, sale and purchase, and distribution processes. These processes depend on the transmission of the digital data to the parties engaged in the trade electronically.

E-commerce covers all of the following operations that are made electronically.

- Trade of goods and services
- Processing and transmission of written text, audio and video
- Product design and manufacturing
- The marketing of the product directly to the consumer
- Monitoring production and delivery of product
- Promotion, advertising and informing works

- Ordering
- Forming a contract
- Banking and fund transfers
- Customs clearance
- Joint design development and engineering
- Public procurement
- Electronic stock exchange
- Auction
- Digital signature
- E-notary
- Taxation and tax collection
- Transferring and hiring of intellectual property rights.

1.2. HISTORY OF E-COMMERCE

1.2.1. History of E-commerce in the World

E-commerce is a new concept that emerged with the birth of the web in 1990s. However, laying foundation of the internet started around the 1960s.

In the 1960s, ARPANET computer network has been developed by The United States Defense Department in order to connect researchers and academicians. ARPANET was firstly used in four different universities in the United States, and then began to spread to other universities around the world.

In the 1970s and 1980s Internet provided its users to exchange information and banking transfers. In 1983, it became the main medium of data transmission (Mirescu, 2010).

The number of computers began to increase in the same years and became widespread. Internet commerce began with the emergence of the web in 1990s. Amazon was found in 1994, eBay and Yahoo was found in 1995, and many more companies entered into the online market.

Between the period of 1995 and 1999 is considered as a true golden era for the web (Mirescu, 2010).

In 2000, securities on NASDAQ lost a great value and the dot com crisis occurred. With this crisis, many companies that entered the market had gone bankrupt. However, big companies such as Amazon, eBay have survived.

Laudon and Traver (2011) expressed the evolution of e-commerce in three stages. These stages are innovation, consolidation and re-invention. Table 1.1 shows the evolution of e-commerce in the world.

TABLE 1.1. EVOLUTION OF E-COMMERCE

1995-2000	2001-2006	2006-PRESENT
INNOVATION	CONSOLIDATION	RE-INVENTION
Technology driven	Business driven	Audience, customer, and community driven
Revenue growth emphasis	Earnings and profits emphasis	Audience and social network growth emphasis
Venture capital financing	Traditional financing	Smaller VC investments; early small-firm buyouts by large online players
Ungoverned	Stronger regulation and governance	Extensive government surveillance
Entrepreneurial	Large traditional firms	Large pure Web-based firms
Disintermediation	Strengthening intermediaries	Proliferation of small online intermediaries renting business processes of larger firms
Perfect markets	Imperfect markets, brands, and network effects	Continuation of online market imperfections; commodity competition in select markets
Pure online strategies	Mixed “bricks-and-clicks” strategies	Return of pure online strategies in new markets; extension of bricks and clicks in traditional retail markets
Firs-mover advantages	Strategic-follower strength; complimentary assets	First-mover advantages return in new markets as traditional Web players catch up
Low-complexity retail products	High-complexity retail products	Services

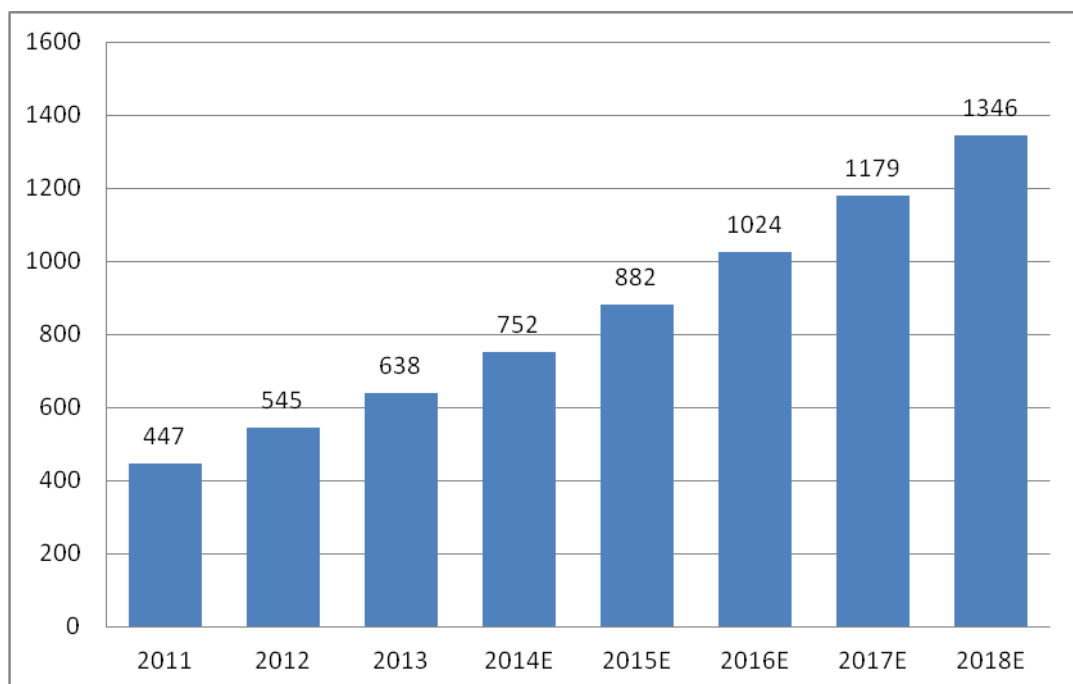
Source: Laudon & Traver, 2011

In the world, history of e-commerce is short, but continues to spread rapidly.

According to the latest data, in the world, there are 3,035,749,340 internet users in 2014, while this value was 360,985,492 in 2000.²

According to Goldman Sachs, global e-commerce volume is 638 billion dollars in 2013. And this value will increase to 1,346 trillion dollars at the end of 2018 (Afra, 2014). Figure 1.1 shows the past and estimated values of global e-commerce volume between 2011 and 2018.

FIGURE 1.1 GLOBAL E-COMMERCE VOLUME (BILLION \$)



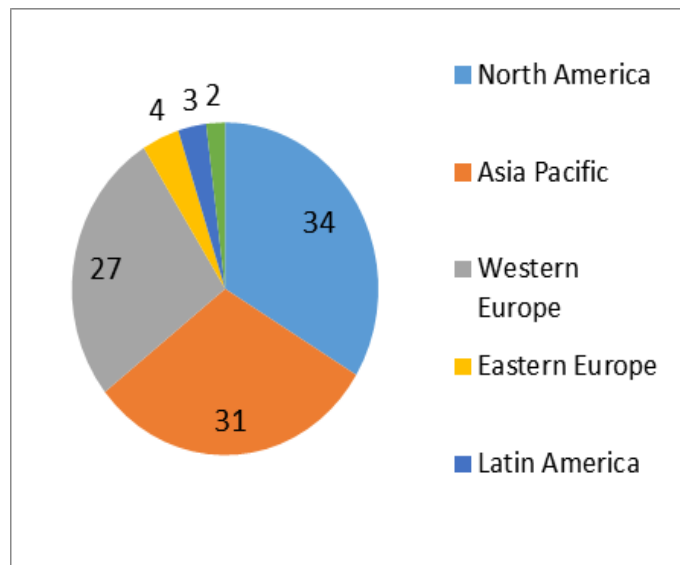
Source: Afra, 2014

The volume of global e-commerce is increasing constantly since 2011. Growth rate of global e-commerce volume is 26%, 22%, 17%, 18%, 17%, 16%, 15% and 14% respectively between 2011 and 2018 (Afra, 2014).

² Retrieved May 10, 2015, from <http://www.internetworldstats.com/stats.htm>.

Figure 1.2 shows the regional distribution of global e-commerce volume in 2012.

FIGURE 1.2 REGIONAL DISTRIBUTION OF GLOBAL E-COMMERCE CAPACITY (%) (2012)



Source: Sezgin, 2013

North America has the largest volume of e-commerce in the world in 2012 (Sezgin, 2013).

1.2.2. History of E-commerce in Turkey

22 years has passed since the acquaintance of Turkey with the internet. The first internet connection in Turkey was held at METU Information Processing Departments on April 12, 1993.

The topic of e-commerce firstly was brought up by the SCST at the meeting in August 1997. At the meeting, it was decided to create a working group to establish e-commerce network and to make it widespread in Turkey. After this decision, ETKK (Electronic Commerce Coordination Committee) was established. At ETKK meeting on February 16, 1998, legal, technical and financial working groups were formed.

In 1996, prime minister asked for the creation of an information infrastructure master plan to accelerate the transition to information society, and to develop information technology in Turkey. Therefore, a study was initiated in July 1997.

Coordination of this study was carried out by the ministry of transport and secretarial services were conducted by SCST.

With circular of the prime minister dated March 19, 1998, Public-Net Supreme Council and Public-Net Technical Council was established to evaluate and to monitor the activities which is made about public computer networks.

In 2000, e-Europe project has been completed by the 15 EU member countries. This project's issues were cheap communication and the spread of faster and more reliable internet use. Then, e-Europe+ initiative was launched for the candidate countries. According to this initiative, candidate countries needed to reach the targets that member countries reached until the end of 2003. Therefore, e-Turkey initiatives were launched by the prime minister in 2001. 13 working groups were created. ETKK continued to serve as an e-commerce working group which is one of these working groups. This group joined e-Europe+, e-Turkey I. Interim Report and e-Turkey initiative studies.

In 2003, e-Transformation Turkey work was initiated by the DPT Information Society Department. Working groups that established under e-Turkey attempt has been revised. Ministry of development was commissioned for this project. The aim of this project was to create a state structure which adopts having transparent, effective and simple business processes as a principle in order to provide better quality and faster public services.

On November 4, 2003, 2003-2004 Short-Term Action Plan was introduced. Later, 2005 Action Plan was prepared.

In 2007, Turkish e-Transformation Executive Board, Committee of Transformation leaders, and Advisory Committee was created.

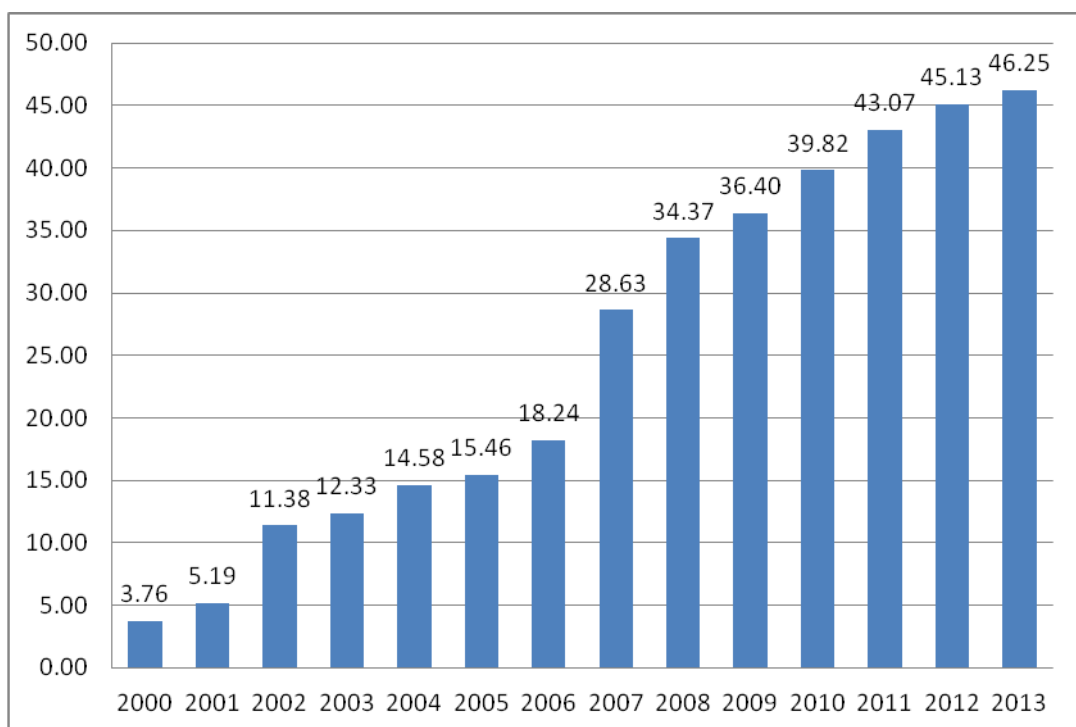
At the end of 2008, overseas e-commerce project was carried out by the undersecretariat of customs and undersecretariat of foreign trade.

2014-2018 Information Society Strategy and Action Plan is the last project that Ministry of Development carries out within the scope of its task about preparing strategy and action plan.

As a result of all works, with the development of technology, rapid and large increase in both the number of Internet users and the volume of e-commerce transactions have occurred.

Figure 1.3 shows the development of the percentage of internet users in Turkey between 2000 and 2013.

FIGURE 1.3 PERCENTAGE OF INTERNET USERS IN TURKEY

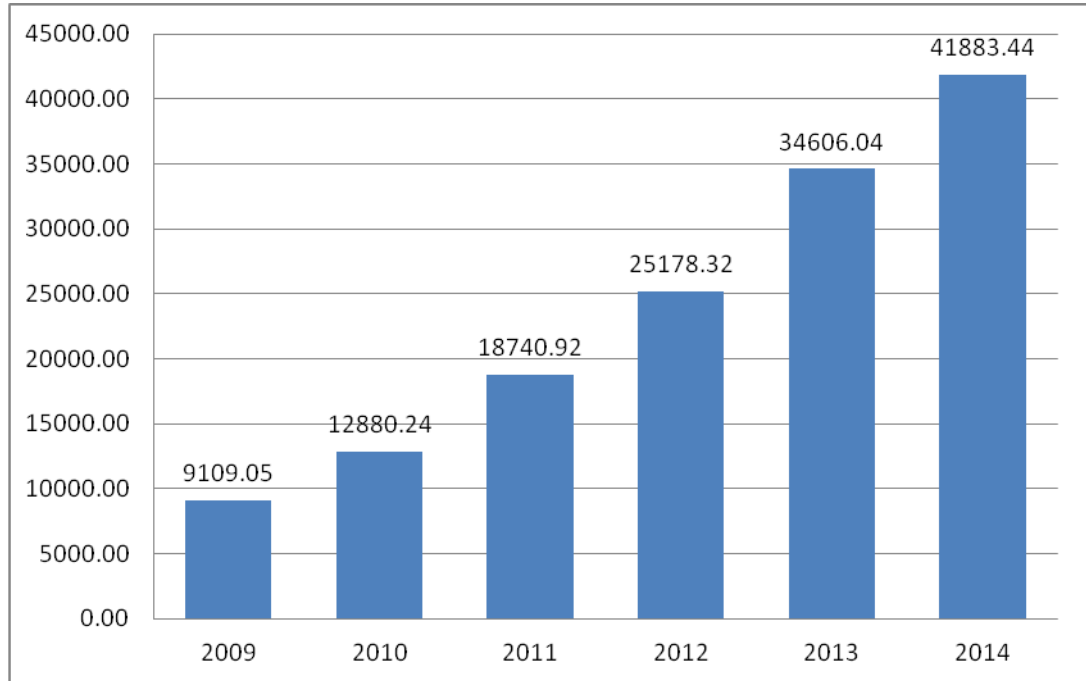


Source: ITU

While the percentage of internet users was 3.76 in 2000, it has been increased by 12 times and became 46.25 per cent in 2013.

Figure 1.4 shows the development of e-commerce volume in Turkey between 2009 and 2014.

**FIGURE 1.4 E-COMMERCE VOLUME DEVELOPMENT OF TURKEY
(MILLION TL)**



Source: BKM

As it is seen in the figure 1.4, e-commerce volume is increasing in Turkey. When e-commerce volume of Turkey is 9,109.05 billion TL in 2009, it increased to 25,178.32 billion TL in 2012 and 41,883.44 billion TL in 2014.

According to E-commerce Market Definition and 2013 Market Size Measurement Study in Turkey which was published by TUBISAD, 2013 e-commerce market size of Turkey is 14 billion TL.

While the share of the online retail in total retail is 1.3 per cent in Turkey in 2013, this value is an average of 5.5 per cent in developed countries and 3.5 per cent in developing countries. Table 1.2. shows e-commerce global comparison for 2013 (TUBISAD, 2013). There are 12 countries in the table except Turkey.

TABLE 1.2. E-COMMERCE GLOBAL COMPARISON, 2013

COUNTRY	THE SHARE OF THE ONLINE RETAIL IN TOTAL RETAIL
England	10.4%
United States	7.4%
Germany	6.0%
France	5.5%
Japan	4.2%
Spain	3.1%
Italy	1.8%
China	5.6%
Poland	5.3%
Brazil	3.1%
Russia	2.8%
India	0.7%
Turkey	1.3%

Source: TUBISAD, 2013

When we come to 2014, the biggest online shopping sector in Turkey is apparel-accessories sector. Table 1.3. shows the percentage distribution of online shopping sectors in Turkey in 2014.

TABLE 1.3. ONLINE SHOPPING SECTORS

SECTOR	SHARE (%)
Apparel-Accessories	64
Cook order	23
Airline-Travel Agencies	22
Electric-electronic goods, computers	18
Health-Health products-Cosmetics	17
Books-DVD	11
Market-Food	8
Accommodation	8
Furniture-Decoration	5

Source: BKM

1.3. DIFFERENCES BETWEEN ELECTRONIC COMMERCE AND TRADITIONAL COMMERCE

There are many differences between e-commerce and traditional commerce. These differences are noted in the table 1.4. Traditional commerce statement represents classic shop trade that is made without the use of e-commerce facility, while electronic commerce represents online shopping. Traditional trade provides the opportunity to meet face-to-face to the buyer and the seller when shopping. But, this is not possible in electronic commerce. All operations are carried out electronically.

TABLE 1.4. DIFFERENCES BETWEEN TRADITIONAL COMMERCE AND ELECTRONIC COMMERCE

FIRM THAT BUYS	TRADITIONAL COMMERCE	ELECTRONIC COMMERCE
Information Methods	Interviews, magazines, catalogs, ads	Web pages
Specifying demand Methods	Written form	e-mail
Request Approval	Written form	e-mail
Price Research	Catalogs, interviews	web pages
Ordering	Written form, fax	e-mail, EDI
SUPPLIER FIRM	TRADITIONAL COMMERCE	ELECTRONIC COMMERCE
Inventory Control	Written form, fax, telephone	EDI
Shipping Preparation	Written form, fax, telephone	Electronic database, EDI
Consignment Processes	Written form	Online database, EDI
Billing	Written form	e-mail, EDI
FIRM THAT ORDERS	TRADITIONAL COMMERCE	ELECTRONIC COMMERCE
Delivery Confirmation	Written form	e-mail, EDI
Payment Program	Written form	Online database, EDI
Payment	Bank Transfer, Postal, collector	Internet banking, Paypal, Credit Card, EDI, EFT

Source: Kucukyilmazlar, 2006, p. 14

1.4. INSTRUMENTS OF E-COMMERCE

The number of e-commerce instruments increasing day by day with emerging technology and also existing instruments are developing rapidly. Instruments used in e-commerce can be listed as follows;

- Internet
- Intranet
- Extranet
- WAP
- Electronic data interchange (EDI)
- Computer
- Electronic payment systems
- Electronic mail and messages
- WWW technology
- Telecommunication
- ATM

To increase the number of these instruments is possible.

1.4.1. Internet

The word internet is abbreviation of “interconnected networks” term. Internet is communication environment created by more than one communication network formed by computers.

Since it was firstly used, Internet usage has grown rapidly and continues to grow today. Statistics of internet usage in the world are shown in table 1.5. In the world, in total, there are 3,035,749,340 internet users by the end of June, 2014. Since 2000, the number of Internet users increased by 741 per cent.

**TABLE 1.5. WORLD INTERNET USAGE AND POPULATION
STATISTICS (JUNE 30, 2014)**

WORLD REGIONS	POPULATION (2014 EST.)	INTERNET USERS DEC. 31, 2000	INTERNET USERS LATEST DATA
<u>Africa</u>	1,125,721,038	4,514,400	297,885,898
<u>Asia</u>	3,996,408,007	114,304,000	1,386,188,112
<u>Europe</u>	825,802,657	105,096,093	582,441,059
<u>Middle East</u>	231,062,860	3,284,800	111,809,510
<u>North America</u>	353,860,227	108,096,800	310,322,257
<u>Latin America / Caribbean</u>	612,279,181	18,068,919	320,312,562
<u>Oceania / Australia</u>	36,724,649	7,620,480	26,789,942
<u>WORLD TOTAL</u>	7,181,858,619	360,985,492	3,035,749,340

Source: <http://www.internetworldstats.com/stats.htm>

Internet is the most basic tool of e-commerce. Internet is a versatile commerce tool. Thanks to the internet, all trade operations can be performed quickly in a computerized environment even if these trade operations are international.

For example, after reading an online advertisement, a customer in Switzerland can send a data request to the American owner of a databank stored in Canada. The computer of the United States company towards the data request to the databank for automatic retrieval. The retrieved data is then sent from Canada to The United States. The computer in The United States requests, receives and verifies the credit card payment or possibly the electronic money transfer from the Swiss client, and sends the requested data to Switzerland. In other words, advertising, production, purchase, payment and delivery of the service can be conducted electronically through just one instrument: the Internet (Marc at. al., 1998, p. 11).

Multimedia is also one of the benefits of internet. Internet users can receive information or documents as both voice and image thanks to internet.

The most important differences of internet from the other instruments of e-commerce are speed, and cost advantage.

For example, in the table 1.6, fees for a money transfer received by a bank via different channels are shown.

TABLE 1.6. FEES FOR A MONEY TRANSFER RECEIVED BY A BANK

PROCESSING CHANNEL	COST (TL)
Branch Office	20
ATM	4
Internet Banking	0

If money transfer is made from branch office, the bank receives 20 TL. If ATM is used, 4 TL is received. But, in the internet banking, the bank does not receive any money.

1.4.2. Intranet

Intranet is a private network used for communication within a company. There is no obligation to be connected to the internet for intranet. Intranet can take advantage of all the internet technology, but it only belongs to the company. Purpose of using intranet is to make the employees to communicate with each other in the company.

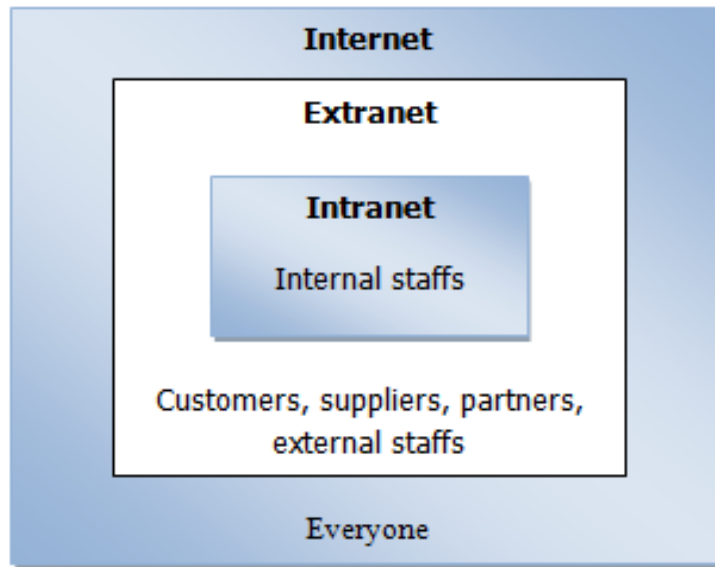
Intranet can be used for working groups, document sharing, orientation, supply and distribution relationships, shopping, support groups and common business programming fields.³

1.4.3. Extranet

We can define extranet as the network that connects companies. It allows internal communication in the company and also provides external communication between companies that are worked together. Customers can also benefit from the extranet. Figure 1.5 shows the difference between internet, intranet, and extranet more clearly.

³ Intranet nedir? (n.d). Retrieved May 16, 2015, from <http://intranet.nedir.com/>

FIGURE 1.5 USERS OF INTERNET, EXTRANET AND INTRANET⁴



Source: Wikipedia

1.4.4. WAP

WAP is abbreviation of the term of Wireless Application Protocol. It provides access to the internet via mobile phones and palmtop computers.

Thanks to WAP, users are having the opportunity to reach the information that they want without a computer.

1.4.5. Electronic Data Interchange (EDI)

EDI is a computer system that provides structured information and document exchange via networks between the two organizations who are trade partners (Canpolat, 2001). It uses technical standards of ANSI X12⁵ and EDIFACT⁶. The aim

⁴ Ekstranet. (2014). In wikipedia. Retrieved May 16, 2015, from <http://tr.wikipedia.org/wiki/Ekstranet>.

⁵ In 1979, the American National Standards Institute (ANSI) chartered the Accredited Standards Committee (ASC) X12 to develop uniform standards for inter-industry electronic exchange of business transactions, namely electronic data interchange. (Retrieved from <http://www.edibasics.com/edi-resources/document-standards/>)

⁶ Electronic Data Interchange for Administration, Commerce and Transport (EDIFACT) is the international standard. (Retrieved from <http://www.edibasics.com/edi-resources/document-standards/>)

of creating EDI was to reduce cost, delays and errors that are encountered in manual exchanges of data. It is one of the most important instruments of e-commerce. EDI is different from e-mail. Because e-mail are used to transfer unstructured messages, but EDI transfers structured messages. EDI is used in order to prepare commercial contracts and invoices, receive an order etc. in fields such as transport, customs, national trade, international trade, statistics, industry, manufacturing, finance, banking, and insurance.

1.4.6. Computer

Another instrument of e-commerce is computer. Computer is a device that can store the data received from the user and can give it back to the user when requested. According to the data of TUIK, in 2013, computer usage in households and individuals was 49.9 per cent and computer usage in enterprises was 92 per cent in Turkey. This ratio is much higher in the United States. According to American Community Survey Reports 2013, computer use for households in the United States was 83.8 per cent.

1.4.7. Electronic Payment Systems

Payment in e-commerce is made electronically. Electronic payment systems provide customers to pay for the goods and services online. Trust is a very important issue in e-commerce payment. Because, customers do not see the product and the seller while shopping.⁷

Payment systems that are used in e-commerce as follows;

Electronic Fund Transfer (EFT): EFT is one of the oldest payment systems. EFT is transferring the money from one bank to another bank electronically.

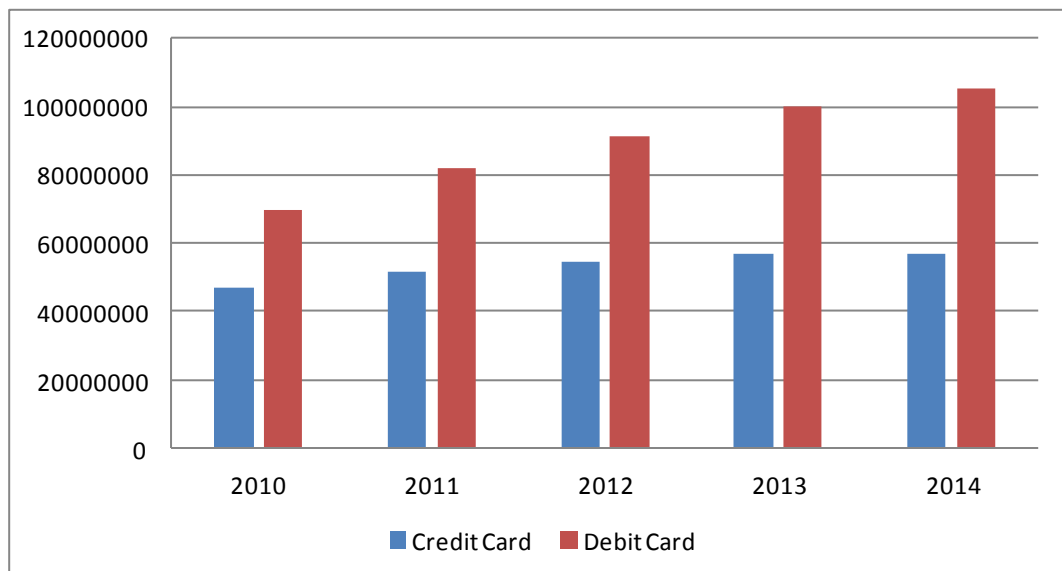
Payment cards: Payment cards are an inseparable part of e-commerce. Each plastic card that is used for buying goods or services is a kind of payment cards. Credit cards, debit cards and smart cards are kinds of payment cards. Credit card is a

⁷ Electronic payment systems. (n.d). Retrieved November 27, 2014, from <http://www.scribd.com/doc/240921529/Unit5-Ecom>

card that has spending limit. This spending limit is determined based on the user's credit history. Debit card is like credit card. But there is difference between debit card and credit card. With debit card, cardholders can withdraw their money, if there is money in their bank account. It can be used for buying and selling goods or services. But if there is no money in the bank account of the cardholder, debit card cannot be used unlike credit cards. A smart card has a chip that holds financial and personal information of its owner. The chip also stores cash.

Credit card usage has been increasing in recent years in Turkey. According to data released by BKM at the end of the 3rd Quarter 2014, the amount of credit card is 57,116,031 and the amount of debit card is 102,898,748. Figure 1.6 shows the development of number of credit card and debit card in Turkey between 2010 and 2014.

FIGURE 1.6 DEVELOPMENT OF THE NUMBER OF CREDIT CARD AND DEBIT CARD IN TURKEY BETWEEN 2010 AND 2014



Source: BKM

E-Money: e-Money is money that can be used for purchases made over the internet. Paypal is one of the most famous e-money systems.

Online payment: Online payment includes monthly payments such as monthly bill payments.

E-Wallet: e-Wallets are like physical wallets. E-Wallet holds its user's credit card informations, personal informations such as address of its owner, e-money etc. Thanks to e-wallet, users enter their information once.

Micro payment systems: Micropayment systems are used for small payments, such as cent.

Electronic gift: A person can take electronic gift from another person and can use this gift for online shopping.

1.4.8. Electronic mail and messages

Electronic mail or e-mail is also used in e-commerce. It is a text that is send and received over a computer network.

1.4.9. WWW technology

WWW (World Wide Web) is a service that provides access to web pages. World Wide Web or simply web, communicates the document on a computer to other computers. Web documents are called web pages, and a website can be prepared by bringing together these web pages. The address indicating the location of a website is called the URL.

1.4.10. Telecommunication

Telecommunication is providing news and information communication with tools such as telephone, telegraph, telex, facsimile, radio and television. Some telecommunication companies in Turkey are Turkcell, Vodafone, Avea, and Superonline.

Television: Television is a common e-commerce instrument. Although it provides one-way communication, shopping from home is increasing thanks to ads posted in television broadcasts.

Facsimile: Facsimile (fax) also provides fast communication in business transactions such as telephones. But, only document transfer is possible. Voice

communication is not possible via facsimile. Pictures can be sent by fax, but the quality is very low. Nevertheless, nowadays still fax is used in commercial transactions. According to availability of devices in households research of TUIK, fax availability rate is 0.8 per cent in Turkey in 2011.

Telephone: Telephone is one of the most important instruments of e-commerce. It provides good mutual communication. So, it is very common and widely used in the world. According to ITU data, number of fixed-telephone subscription is 16.2 per 100 inhabitant and the number of mobile-cellular subscription is 93.1 per 100 inhabitant in the world in 2013. In Turkey, according to TUIK data, there are 13,551,705 fixed-telephone subscribers and 69,661,108 mobile telephone subscribers and according to ITU data, number of fixed-telephone subscription is 18.09 per 100 inhabitant and the number of mobile-cellular subscription is 92.96 per 100 inhabitant in 2013.

GSM: GSM is a shortened form of “global system for mobile communications” expression. It is a mobile phone communications protocol. GSM provides users to make calls from different countries.

1.4.11. ATM

ATM is a shortened form of "automatic teller machine" expression. This machine helps users to perform banking transactions with a debit card or credit card, or without the card.

1.5. PARTIES IN E-COMMERCE

Indirect parties other than buyers and sellers are also available in e-commerce. Parties in e-commerce provide the functioning of e-commerce transactions, security and control. These parties can be listed as follows;

- Buyers
- Sellers
- Producers
- Banks

- Brokers
- Insurance companies
- Shipping companies
- NGOs
- Universities
- Approval agencies
- Electronic notaries
- Undersecretary of foreign trade
- Customs Undersecretary
- Organizations providing information technology services
- Other public institutions

1.6. TYPES OF E-COMMERCE

In time, e-commerce was divided into the types in itself. Sometimes consumers, sometimes businesses and sometimes the government has been involved into these types. It is possible to list these types as in the table 1.7. Also, there are other types of e-commerce such as P2P (Peer to Peer) or m-commerce. These types of e-commerce have been described briefly below.

TABLE 1.7. TYPES OF E-COMMERCE

	BUSINESS	CONSUMER	GOVERNMENT
BUSINESS	B2B	B2C	B2G
CONSUMER	C2B	C2C	C2G
GOVERNMENT	G2B	G2C	G2G

Table 1.8. shows the descriptions of types of e-commerce with the examples of these types.

TABLE 1.8. DESCRIPTIONS OF THE TYPES OF E-COMMERCE

TYPE OF E-COMMERCE	DESCRIPTION	EXAMPLE
B2B (Business to Business)	Buyer and seller are businesses. One business sells its product or service to other business.	Alibaba.com Kompass.com Tradeturkey.com
B2C (Business to Consumer)	Businesses sell their product or service to consumers.	Amazon.com Hepsiburada.com
B2G (Business to Government)	Businesses sell their product or services to governments.	Publication of public services on the internet and businesses to bid electronically.
C2B(Consumer to Business)	Consumers sell their product or services to businesses.	A web designer to design a website and sell it to a company over the internet.
C2C (Consumer to Consumer)	Consumers sell their product or services to other consumers.	Ebay.com Gittigidiyor.com
C2G (Consumer to Government)	Consumers sell their product or services to governments.	A person sells its car to government through a website.
G2B (Government to Business)	Governments sell their information or services to businesses.	Businesses can get information or advice from a government website.
G2C (Government to Consumer)	Governments sell their products or services to consumers.	Citizens to be able to query their tax debts electronically.
G2G (Government to Government)	Governments sell their products or services to other governments.	All the international trades between the governments through a website.

Other Types of E-commerce

Peer to Peer: Short form of peer-to-peer is P2P. Internet users implement P2P e-commerce form by transferring files such as music, video or photo to one another. Examples of some of the P2P application programs are Bittorrent and Shareaza.

M-commerce: Mobile commerce or m-commerce is buying and selling goods, services or information by mobile devices. These mobile devices use a wireless connection to communicate between the parties in m-commerce.⁸

Product ordering, mobile banking, information delivery are the examples of m-commerce transactions.

1.7. ADVANTAGES AND DISADVANTAGES OF E-COMMERCE

1.7.1. Advantages of E-commerce

The biggest advantage of e-commerce is that it offers instant shopping of the desired product to consumers and sellers from anywhere with internet access at any time.

Also, there are other advantages that e-commerce provides to consumers and sellers. These advantages can be summarized as follows;

- E-commerce provides faster buying and selling procedure.
- To find product in e-commerce is easier than traditional commerce.
- Consumers and sellers have the opportunity to do shopping during the whole day.
- With e-commerce, to reach to customers is easier.
- Operational costs are lower.
- Quality of services is better.
- In e-commerce, physical company set-up is not necessary.

⁸ Mobile commerce. (n.d). Retrieved May 06, 2015, from <http://www.investopedia.com/terms/m/mobile-commerce.asp>.

- Starting and managing a business is easier than in traditional commerce.
- Consumers can buy products or services from their home without going to stores or shopping places.
 - E-commerce offers customers to buy cheaper products by comparing products with other suppliers' products easily.
 - Transportation is easier and there is no geographic limitation. Customers can easily reach even the products sold in different countries thanks to e-commerce.
 - E-commerce also provides new business opportunities. Housewives to sell the products that they produce at home via the internet can be example of a new business opportunity.
 - National and international operations to be electronic provides time saving. Delivery lead time shortens (Ene, 2002, p. 52).
 - E-commerce also provides advantage in education. Users can easily access databases thanks to computers and the internet (Ene, 2002, p. 53).
 - Production, distribution and marketing costs that fall provide competitive advantage to companies and increase competition.
 - Probability of error is minimized in e-commerce, because documents are prepared electronically.
 - Since customer needs quickly detected, changes in market demand are quickly responded.
 - E-commerce increases firms' customer potential, because firms can reach anywhere in the world thanks to e-commerce.
 - E-commerce provides equal access right for everyone (Korkmaz, 2002 p. 21).
 - E-commerce provides price discounts and promotional offers opportunity to customers.

To increase the number of advantages of e-commerce is possible. With the widespread use of advanced technology and e-commerce the advantages of e-commerce is increasing.

1.7.2. Disadvantages of E-commerce

There are also disadvantages of e-commerce besides the advantages of it. Firstly, thanks to e-commerce, every person can start a business. Customers does not have guarantee of product quality. Secondly, security is another problem. Bad e-commerce websites can defraud customers. Moreover, personal details and credit card informations of customers can be captured by the e-commerce firm. Then, lack of personal touch can be a problem. Consumers may want to touch the product before they buy it. Also, they cannot do shopping without internet. Moreover, they cannot get products immediately. He has to wait for a while (Niranjanamurty M., Kavyashree N., Jagannath S., and Chahar D., 2013).

1.8. THE EFFECTS OF E-COMMERCE

E-commerce has an impact on economic relations, state administration, and the social structure. It has great importance towards globalization. Firms can reach to customers in the other end of the world without coming together physically and sell their products through e-commerce. Consumers are able to access the product manufactured in any country.

The effects of e-commerce will be examined in three parts in this section.

1.8.1. Social Impacts of E-commerce

E-commerce which is developing and being spread rapidly due to the advances in science and technology, makes many operations in the social life easier.

First of all, e-commerce is an important part of social transformation. Today, with the technological developments "e-society" concept has emerged (Cak, 2002, p. 27). The term e-society refers the society which started to use electronic means such as computer, internet, radio, telephone, television, and fax (Kesmez, Cagiltay & Mutlu, 2004). A concept such as e-commerce, e-mail has entered to our lives in a short time with the emergence of the Internet. People can reach information at zero cost thanks to the internet.

In the era we live in, the way of purchasing goods and services and knowledge acquisition has changed.

E-commerce has an impact on the society's education. Individuals can be trained over the internet.

At the same time, e-commerce has entered into our lives in the field of health (Cak, 2002, p. 28). Thanks to the telemedicine system, services are provided to patients via the internet. Through generated call centers, information about any health problems can be responded. People can also share health problems with the specialists over the internet.

1.8.2. Impact of E-commerce on the State Administration

With widespread use of internet, the impact on e-commerce in the state administration began to come into sight. E-government concept emerged, citizens' access to the services were given by the state easily via the internet. So that citizens' lives are made easier. Thanks to e-commerce, costs are also minimized, even zeroed in many services. Citizens can get many free services.

1.8.3. The Economic Impacts of E-commerce

The economic impact of e-commerce is inevitable. It has an effect on many fields such as growth, employment, market, producer, consumer etc. This section will focus on these effects.

Many new business opportunities have occurred thanks to e-commerce. Firms that will make e-commerce, will need people working in this field when creating the necessary infrastructure to do business electronically. Thus, new employment areas will be formed.

However, layoffs also occur in some sectors due to automation. Layoffs in the banking sector may be an example (Cak, 2002, p. 36).

Through e-commerce, companies get the opportunity to do business in international markets. Hence, even small firms increase customer potentials through e-commerce. Firms get the chance to reach more customers. Therefore, new markets

are created. Also, reduction in transaction costs and time occurs thanks to the internet and technology.

E-commerce also has an influence on growth. Duman (2004) noted that thanks to the internet, new products and services are produced, so that production increases and new business opportunities were born, and also e-commerce increases the efficiency.

With e-commerce, consumers are having the chance to make choice from a wider range of products, and to shop at lower prices. If a software is ordered over the internet, it would have purchased 4-10 per cent cheaper compared to order by phone, 2-3 per cent cheaper compared to buying from the retail store. Therefore, the increase in consumer surplus occurs through e-commerce. And when the size of the market expands, the increase in producer surplus occurs. So, total welfare increases. Moreover, Physical distribution costs approaches zero, when some products bought electronically (OECD, 1998, p. 30).

1.9. OBSTACLES TO E-COMMERCE

Although the use of e-commerce grows rapidly, there are still barriers to e-commerce. In this section, the barriers to e-commerce and the problems will be discussed.

Zaied (2012) determined the factors inhibiting the adoption of e-commerce in Egyptian SMEs. Technical barriers were found as the most important barrier to e-commerce. Also, legal and regulatory barriers, lack of internet security, limited use of internet banking and web portals were found as important barriers to e-commerce.

According to the international survey of e-commerce 2000 report which was published by WITSA, trust (26%), understanding (21%), skills (16%), existing business processes (10%), public policy (8%), costs (10%), insufficient corporate budget (7%) and technology limitations (1%) are the factors affecting the growth of electronic commerce (WITSA, 2000).

Kommerskollegium (2011) identified six types of e-commerce barriers in the report named “Survey of e-commerce barriers within the EU”. These barriers are;

- Bans on e-commerce as a sales form
- Pure establishment requirements
- Barriers linked to sales conditions
- Intellectual property barriers
- Legal barriers linked to payments
- Barriers linked to e-government.

In this study, barriers to e-commerce are listed and explained as follows;

- Security problem
- Perception problem
- Legal barriers
- Taxation
- Payment
- Infrastructure barriers
- Privacy

1.9.1. Security Problem

Security is one of the most important barriers to e-commerce.

The data stolen annually in The United States was estimated to be over \$ 10 million. Also, According to a survey conducted in 1996 which was made with 1320 companies, 78 per cent of the companies lost their money from security breaches (Singh and Frolick, 2000).

In the international survey of e-commerce 2000 report which published by WITSA, trust is identified as the most important barrier to electronic commerce (WITSA, 2000).

Entering the network resources without authorization, changing, damaging, thieving, and disposing of the data and network resources and transmitting

information to unauthorized persons are some of the security problems of e-commerce (Yesil, 2010, p. 113).

E-commerce security tools to solve the security problems are available. These are Firewalls – Software and Hardware, Public Key infrastructure, Encryption software, Digital certificates, Digital Signatures, Biometrics – retinal scan, fingerprints, voice etc, Passwords, Locks and bars – network operations centers.

1.9.2. Perception Problem

Perception problem involves consumers, companies, retailers, education world etc. In turkey, digital literacy is not sufficient and benefits of e-commerce are not known enough. This situation creates perception problem (Afra, 2014).

The report named “e-commerce which is the focus of digital market” which was published by TUSIAD in 2014, what to do to access the e-commerce potential is determined as follows;

- Consumers, corporate, and SMEs should be informed about the benefits of e-commerce,
- Students should be informed about the internet and e-commerce in formal education,
- Internet usage in state institutions should be increased.

1.9.3. Legal Barriers

Some problems arise in the implementation of the law in case of dispute in e-commerce transactions. Especially, complaints in cross-border shopping have increased. Despite the fact that forming a contract in e-commerce transactions, such contracts can be misleading or can have shortcoming (Yesil, 2010, p. 124). In such problems, in which court disputes will be discussed, which country's laws will be applied, how to be executed the court decisions constitute major problems. Therefore, international standards for e-commerce should be developed (Kircova & Ozturk, 2000, p. 85).

1.9.4. Taxation

The reasons that led to the taxation barrier to e-commerce can be listed as follows (Kircova & Ozturk, 2000, p. 81);

- The emergence of virtual companies and lack of knowledge about the locations of these companies.
- Facilitating of the shift of capital and labor from countries where high taxes are implemented to the countries where low taxes are implemented.
- Implementation of different tax regulations in case of companies and customers in different countries. Solution to this problem is implementation of taxation according to the law of the country where the seller company is located.

1.9.5. Payment

The key reason of customers not to want to make online payment and therefore not to make internet purchases is lack of trust (Rachna and Singh, 2013).

Customers who make online payment have to enter large amount of information. For example, when using credit card, system requires large amount of personal data and contact details. Because customers have to enter their credit card and payment account details, stealing money and personal information is very easy.

Lack of awareness is another problem in making online payment. Even educated people may not know how to make online payment or may have technical problems, so they fail to pay. Therefore, they avoid e-commerce (Rachna and Singh, 2013).

Also there are some costs of online payment. Set up cost, machine cost, and management cost are some of these costs (Rachna and Singh, 2013).

Electronic payment problem in e-commerce will be fixed with the development of systems such as digital cash, e-wallet, smart card, e-cash etc.

1.9.6. Infrastructure Barriers

Communication infrastructure (telephone lines, fiber optic cable, satellite, cable TV, etc.) and information technology (computer, software etc.) constitute the

infrastructure of e-commerce. The most important barrier that encountered in the solution of infrastructure problems in e-commerce is cost.

In many developing countries, communication costs are very high. Therefore, people living in these countries don't spend a lot of time on the web to buy a product. They use only specific sites. So, companies which want to sell their products online to people in developing countries should advertise in traditional media (radio, television, newspaper, etc.) (Schneider, 2007, p. 38).

1.9.7. Privacy

Another problem encountered in e-commerce is the privacy problem. Online privacy is important for consumers when shopping on the internet. The seizure of consumer information by others causes insecurity. Consumers refrain from making purchases in the absence of security. Therefore, some regulations relating to the information privacy should be made. Internet users when shopping on the internet should read privacy policy carefully before entering their own information required by the website to the system.

CHAPTER II

2.1. LITERATURE REVIEW

Factors affecting e-commerce has been investigated by many authors in Turkey and abroad. This part of the thesis is devoted to the results of these studies. Studies were listed according to the date of publication.

Gibbs, Kraemer and Dedrick (2002) found that factors affecting B2B and B2C e-commerce vary. Global competition, participation in global production networks and openness are important factors shaping B2B e-commerce, while B2C e-commerce are shaped by national and local environment such as consumer preferences, retail structure, local language and cultural factors.

Wong (2003) examined global and national factors affecting e-commerce diffusion in Singapore. He found that investment of information and communication technologies (ICT) infrastructure has facilitated the development of e-commerce in Singapore. Singapore's dependence on global MNCs is a positive factor for e-commerce diffusion. Also, active government policy has a positive influence on e-commerce and stronger government policies are needed, such as promotion of technological innovation and entrepreneurship. Direct subsidies, fiscal incentives and tax incentives are also important factors that affect e-commerce diffusion.

Molla and Licker (2005) studied e-commerce adoption in developing countries. They discussed e-readiness notion in their study. They analyzed perceived organizational e-readiness (POER) and perceived external e-readiness (PEER). POER includes awareness, commitment, human resources, technological resources, business resources and governance. PEER includes government e-readiness, market forces e-readiness and supporting industries e-readiness. As a result, they found that organizational factors are more important than external factors for e-commerce adoption in developing countries.

Aghaunor and Fotoh (2006) analyzed factors affecting e-commerce adoption in Nigerian banks. They used survey for this analysis. They identified 9 factors and determined 9 hypotheses with these variables. These factors are top management

support, organizational competency, IT capability, perceived benefits, perceived compatibility, perceived complexity, supporting industries, market e-readiness, and government e-readiness. As a result of the analyses, all factors except government e-readiness were found as significant for e-commerce adoption.

Weixin (2006) investigated factors affecting e-commerce diffusion in China. In his paper, factors are divided into two groups as national environment and national policy. He suggested that IT infrastructure, political and economic reforms are important factors for e-commerce development in China.

Eris (2008) analyzed factors affecting e-commerce performance. He used survey to collect data. 81 surveys were collected from different companies. Technology integration, human resources, business resources, customer pressure, and competition pressure were determined as e-commerce performance factors. To analyze these factors regression analysis was used. Positive relation was found between e-commerce performance and customer pressure, competition pressure, technology integration, and business resources.

Ardura, Artola and Requena (2008) analyzed factors influencing the evolution of e-commerce in the Spanish market. They used time series data for the period of 1996 and 2003. The variables which they used to analyze the evolution of e-commerce are the number of internet users, technological and legal changes, price of computers and the number of servers with the ".es" domain that use security protocols per 1000. As a result, all variables which they used in the analyses were found as significant variables for evolution of e-commerce in Spanish market.

Cosgun (2010) analyzed critical success factors affecting e-commerce activities of small and medium enterprises in turkey, in his master thesis. He generated a survey for this analysis. He applied regression analysis to analyze the factors affecting e-commerce activities of SMEs. As a result, financial resources and perceived benefit were found as critical success factors that affect e-commerce positively.

Baydar (2010) investigated e-commerce in his thesis and analyzed factors affecting e-commerce. He used panel data analysis with the help of STATA and EViews programs. 15 countries were included in the study and he used the data for

the period of 2003 and 2008. Variables which he used are employment, inflation, education, telecommunication investments, per capita GDP, and internet usage. Firstly, variables were tested with the random effects model, and then were tested with the fixed effects model. According to the results obtained with the random effects model, the effect of internet usage and inflation on e-commerce is significant at the 0.01 level of significance, and the effect of GDP per capita on e-commerce is significant at the 0.05 level of significance.

In a study worked by Turen, Gokmen and Tokmak (2011), factors affecting the volume of e-commerce transactions in Turkey were investigated. number of Internet users, per capita GDP, inflation, change of legal legislation that supports e-commerce, and economic crisis factors were determined as independent variables, a multiple linear regression model were created with these factors, the effect of these factors on e-commerce transaction volume has been tried to explain. In the study econometric analysis was conducted by using monthly data between 2004 and 2011. As a result of the analyses, they found that the number of Internet users, per capita GDP, and changes in legislation which are made in 2005 affect e-commerce transaction volume positively, while the economic crisis of 2009 and inflation affect e-commerce transaction volume negatively.

Chiliya, Chikandiwa and Afolabi (2011) studied factors that affect SMMEs ability to adopt e-commerce. They found that most significant e-business adoption variables are security, prestige, government support, vision, and the need to service niche markets.

Toyin and Damilola (2012) investigated abandonment factors affecting e-commerce transactions in Nigeria. They used survey to collect data. Surveys were administrated to the six geo-political zones of Nigeria. The responses of participants were analyzed by using correlation analysis and stepwise multiple regression analysis. They used abandonment as a dependent variable. Independent variables were risk, navigation, finance and purchase. They also used two dummy variables. These variables are age and level of education. Analyses' results show that risk, navigation, finance and purchase have significant impact on the abandonment of

online purchases. But, age and level of education don't have significant impact on the abandonment of online purchases.

Sayili and Buyukkoroglu (2013) analyzed the socio-economic factors affecting purchasing foods through e-commerce in Tokat. They used survey to collect data. Logit model and an estimator model was developed. The variables which were determined in their study are income, monthly total expenditure, food expenses, age, education level, internet network, trust, suggestion, shopping experience on the internet, ease of use, awareness and cost. They found that monthly food expenses, sense of trust and education level of consumers are significantly important factors.

Adawale, G.T, and S.A (2013) examined the factors affecting the adoption of e-commerce in Nigerian business organizations. They used survey to collect data. They applied multiple regression to analyze the collected data. They used e-commerce adoption as a dependent variable. Independent variables which were used in the analyses are innovation culture, infrastructure, finance, knowledge and skills, compatibility, and level of security. As a result of the analyses, they found that the most important factor which affects e-commerce adoption in Nigerian business organizations is infrastructure, followed by level of security, innovation culture, knowledge and skills, compatibility and finance.

Armagan and Turan (2014) have examined the effects of socioeconomic factors on shopping over the internet. They used survey for data collection. Collected data were analyzed with SPSS program and also probit analyses were implemented. As a result of these analyses, significant relationship was found between shopping over the internet and income level, education level, frequency of internet usage, internet usage time, and internet access at home. Reason of not to do shopping over the internet has been identified as security.

E-commerce is a new concept for Turkey. As it is seen in the literature, there is not much work about the factors affecting e-commerce in Turkey. Also, generally survey was used for collecting data in the studies which were made. In these studies which survey was used for collecting data, factors affecting e-commerce in Turkey were found as customer pressure, competition pressure, technology integration,

business resources, financial resources, perceived benefit, sense of trust, education level, income level, frequency of internet usage, internet usage time, internet access at home and security. In the limited number of studies which macro data was used, it was found that number of internet users, GDP per capita and inflation are important factors affecting e-commerce in Turkey.

In this dissertation, macro data has been used. Variables which have been used are consumer price index, number of internet users, credit card usage and import. There are two variables which have not been used for explaining e-commerce in Turkey before. So, this study will contribute greatly to the existing literature.

CHAPTER III

3.1. MODEL DETERMINATION

The aim of this study is to identify the factors affecting e-commerce in Turkey. For this purpose, monthly time series data has been used. This part of the thesis determines the models used and tests implemented to the variables.

3.1.1. Time Series Analysis

Time series data covers the observations of the variables over time. It can be daily, weekly, monthly or annually etc. For instance, annually unemployment rate of turkey between 2000 and 2008 is a time series data. Subscript t denotes time series data. For example, Y denotes Unemployment of Turkey between 2000 and 2008. Then

$$Y_t \text{ for } t = 1, 2, \dots, T$$

Where $t = 1$ for 2000 and $t = T = 9$ for 2008. One period lag is denoted as Y_{t-1} (Asteriou & Hall, 2007, p. 8).

Time series analysis provides to analyze the time series data statistically. It also provides to create a model which will explain the variables. Future values are predicted with the help of past values in time series analysis.

Time series components are trend, cyclical, seasonal and irregular. A time series can contain one or more component.

- If there is long term increase or long term decrease there is trend component.
- If a series is affected by seasonal factors, there is seasonal component.
- Cyclical component exists when there is increase or decrease which is not about seasonal changes. Short term expansion can be an example of cyclical process.
- Irregular component can not be predicted, it can be determined by error term.

3.1.2. Stationarity

Stationarity is a key concept of time series analysis. For a model to be able to give significant result, variables should be stationary.

A stochastic process is said to be stationary if its mean and variance are constant over time and the value of the covariance between the two time periods depends only on the distance or gap or lag between the two time periods and not the actual time at which the covariance is computed (Gujarati, 2005, p. 797).

A time series Y_t is stationary if

- $E(Y_t) = \text{constant}$ for all t
- $Var(Y_t) = \text{constant}$ for all t
- $Cov(Y_t, Y_{t+k}) = \text{constant}$ for all t and all $k \neq 0$

If a time series is not stationary, the result of the analysis will not be valid. So, before the analysis, the series should be tested whether there is non-stationary problem. If the series is not stationary, it should be made stationary.

Time series data may become stationary by being saved from unit root. We can use the following model to identify the unit root (Gujarati, 2005, p. 718).

$$Y_t = Y_{t-1} + u_t \quad (1)$$

If the coefficient of Y_{t-1} is equal to 1, there is a unit root problem which means non-stationarity problem. We can write equation (1) as follows;

$$Y_t = \rho Y_{t-1} + u_t \quad (2)$$

If ρ is found as 1, variable Y_t has a unit root (Gujarati, 2005, p. 718). A non-stationary time series can be made stationary by taking the difference. If a time series becomes stationary when the first difference is taken, we show this with $I(1)$. If a time series becomes stationary when the second difference is taken, we show this with $I(2)$.

For a time series to be saved from unit root, Dickey Fuller or Augmented Dickey Fuller test can be implemented.

Dickey Fuller test is implemented to the following regressions

$$\Delta Y_t = \delta Y_{t-1} + u_t \quad (3)$$

$$\Delta Y_t = \beta_1 + \delta Y_{t-1} + u_t \quad (4)$$

$$\Delta Y_t = \beta_1 + \beta_2 + \delta Y_{t-1} + u_t \quad (5)$$

The test hypothesis is

$$H_0 = \delta = 0 \quad \text{or} \quad H_0 = \text{There is unit root}$$

$$H_1 = |\delta| < 0 \quad \text{or} \quad H_1 = \text{There is no unit root}$$

If error term is autoregressive, the equation is adjusted as follows (Gujarati, 2005, p. 720);

$$\Delta Y_t = \beta_1 + \beta_2 + \delta Y_{t-1} + u_t + \alpha_i \sum_{i=1}^m \Delta Y_{t-i} + \varepsilon_t \quad (6)$$

If we implement Dickey Fuller test to equation (6), it is called Augmented Dickey Fuller test.

The test hypothesis is

$$\begin{aligned} H_0 = \delta = 0 & \quad \text{or} \quad H_0 = \text{There is unit root} \\ H_1 = |\delta| < 0 & \quad \text{or} \quad H_1 = \text{There is no unit root} \end{aligned}$$

Dickey Fuller threshold values were developed by Dickey & Fuller (1979). Mackinnon (1991) has extended these values in his study (Mackinnon, 2010).

3.1.3. Vector Autoregressive Models

VAR model was developed by Sims (1980). VAR model is used to analyze variables included in the model and the effects of random shocks to the variables.

In the economy, there are simultaneous equations which independent variables don't explain the dependent variable, but also they are explained by the dependent variable. In simultaneous equations, there are endogenous and exogenous variable discrimination.

Sims (1980) has brought criticism for this discrimination. According to Sims, there is no discrimination between endogenous and exogenous variables. All variables included in the model are endogenous. So, he developed the VAR model on this idea.

In VAR model, variables included in the model are subjected to analysis with their past values. An equation is formed for each variable and these equations are solved by the least squares method. Strong predictions for the future can be made with the use of lagged values.

A VAR model which is established by using two variables can be represented as follows;

$$Y_t = \alpha + \sum_{j=1}^p \beta_j Y_{t-j} + \sum_{j=1}^p \gamma_j X_{t-j} + u_{1t} \quad (7)$$

$$X_t = \alpha' + \sum_{j=1}^{\rho} \theta Y_{t-j} + \sum_{j=1}^{\rho} \lambda_j X_{t-j} + u_{2t} \quad (8)$$

In the model, α refers constant term, ρ refers lag length and u refers error term. Mean of error terms in the model and also covariance with their own lagged values are zero. Also they have a normal distribution and constant variance.

In the VAR models, to eliminate the autocorrelation problem, lag length of the variables can be increased. lagged values of endogenous variables are on the right side of the model and there is no simultaneity problem. Thus, the least squares method can be used to analyze the model (Ozturk, Aras & Kadi, 2012).

In the VAR analysis, the orders of variables are important. Because, the order of the variables is effective in determining the shocks (Lebe & Bayat, 2011). Granger causality test is usually applied for ordering of variables. Correct ordering should be made in order to determine the responses of the variables included in the model to the shocks correctly. If orders of the variables are changed, also impulse-response functions may change.

Ways used to get results from the VAR models are as follows (Ozgen, Guloglu, 2004);

- F-tests showing the Granger causality
- Impulse response functions
- Variance decomposition showing the interaction between the variables

3.1.4. Granger Causality Test

In a regression equation, if explanatory variable X affects the dependent variable Y , we can say that variable X causes variable Y . This is the concept of causality (Seddinghi, Lawler and Katos, 2000, p. 310).

Causality can be divided into two types as unidirectional and bidirectional causality.

If variable X causes variable Y , but variable Y does not cause variable X

Or

If Variable Y causes variable X , but variable X does not cause variable Y

This type of causality that is mentioned above is **unidirectional causality**.

If variable X and variable Y cause each other, it means that there is **bidirectional causality** between the variables.

To determine the direction of causality, Granger (1969) has been suggested a causality test.

Let's think about a two variable model. X_t and Y_t are two stationary time series. Then the simple causal model is

$$Y_t = \alpha_0 + \sum_{j=1}^m \beta_j X_{t-j} + \sum_{j=1}^m a_j Y_{t-j} + u_j \quad (9)$$

$$X_t = \beta_0 + \sum_{j=1}^m \alpha_j Y_{t-j} + \sum_{j=1}^m \beta_j X_{t-j} + u_j \quad (10)$$

In equation (9),

If $\{\beta_1, \beta_2, \dots, \beta_m\} \neq 0$ and $\{a_1, a_2, \dots, a_m\} = 0$, then there is a unidirectional causality from X to Y . ($X \rightarrow Y$)

In equation (10),

If $\{\alpha_1, \alpha_2, \dots, \alpha_m\} \neq 0$ and $\{\beta_1, \beta_2, \dots, \beta_m\} = 0$, then there is a unidirectional causality from Y to X . ($Y \rightarrow X$)

In both equation,

If $\{\alpha_1, \alpha_2, \dots, \alpha_m\} \neq 0$ and $\{\beta_1, \beta_2, \dots, \beta_m\} \neq 0$, then there is bidirectional causality between variable X and variable Y . ($X \Leftrightarrow Y$)

To test the causality between variable X and variable Y , the hypothesis are as follows (Seddinghi, Lawler and Katos, 2000, p. 311);

$H_0 = X$ does not granger cause Y

$H_1 = X$ does granger cause Y

To test the hypothesis referring the significances of coefficients of a VAR model, Wald F-statistic can be used (Seddinghi, Lawler and Katos, 2000, p. 310).

$$F_c = \frac{(SSR_r - SSR_u) / m}{SSR_u / (n - 2m - 1)} \sim F(m, n - 2m - 1)$$

where

SSR_u = Sum of squared residuals from the complete equation

SSR_r = Sum of squared residuals from the equation under the assumption that a set of variables is redundant

If $F_c < \text{critical value of } F$, then

$$\{\alpha_1, \alpha_2, \dots, \alpha_m\} = 0$$

So, we accept the null hypothesis, H_0 .

The order of VAR model is important when testing Granger Causality. Also, the variables that are used in the model should be stationary (Seddinghi, Lawler and Katos, 2000, p. 311).

There are also other studies that contributes causality notion. For example, Sims (1972), Geweke, Meese and Dent (1983) studied this issue in their studies. Granger (1988) discussed concept of causality again in his study.

3.1.5. Impulse Response Functions

Impulse response functions show the response of one variable to an impulse in another variable in the model. With impulse response functions, we can see the effect of a standard deviation shock in one of the random error terms of VAR model on the present and future value of endogenous variables.

3.1.6. Variance Decomposition

With variance decomposition, the change in one of the endogenous variables is divided into separate shocks affecting all endogenous variables. So, we can learn about the dynamic nature of the system.

Variance decomposition shows how much of the change that occurs periodically in a dependent variable arises from its own past values and how much of it arises from other variables.

In variance decomposition, values are expressed as a percentage.

3.2. ANALYSING THE FACTORS AFFECTING E-COMMERCE IN TURKEY WITH VAR MODEL

E-commerce transaction volume is increasing in Turkey constantly as in the world. In this part of the study, the factors affecting e-commerce in Turkey have been analyzed. VAR model which is popular recently has been used while analyzing. In the first step, variables and the data set have been explained. Second, stationarity of the chosen variables has been tested with the help of unit root test. Third, granger causality test has been implemented. Fourth, lag lengths of the variables have been determined. Fifth, variables have been ordered. Sixth, Impulse Response Functions have been created and discussed. Finally, variance decomposition results have been discussed.

EViews 7.0 package program has been used in the analyses.

3.2.1. Data Set

Monthly data between January 2010 and December 2014 has been used in the analyses. The total number of observations is sixty. Variables included in the analysis are as follows;

E-commerce (ECOM)	:Monthly e-commerce transaction volume
CPI (CPI)	:Monthly consumer price index (2003=100)
Internet Users (IU)	:Monthly total number of internet users
Import (IMP)	:Monthly import volume
Credit Card Usage (CCU)	:Monthly volume of credit card transactions

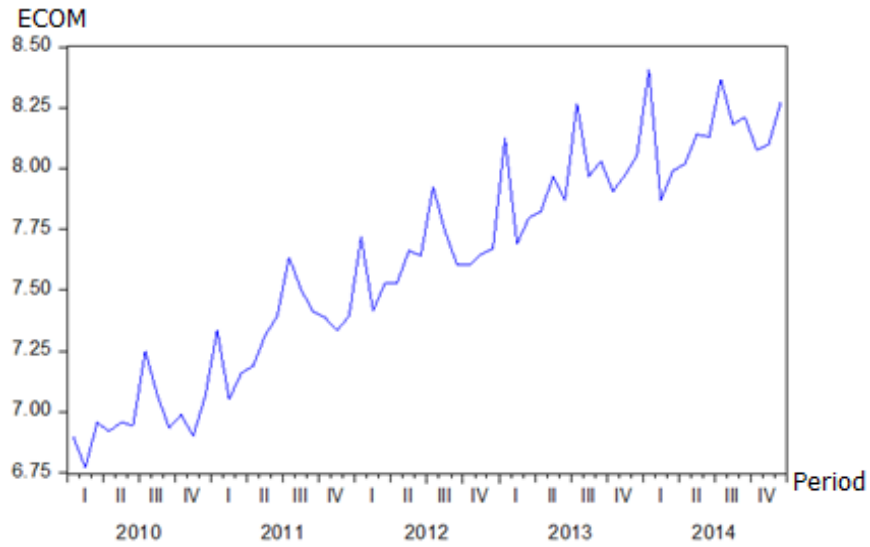
Also, as a result of Chow structural break test which is applied to the model, a structural break has been found in the eleventh month of 2012. Therefore, a dummy variable has been added to the model as an exogenous variable.

Firstly, the logarithm of all variables has been taken and then they have been subjected to the analyses.

Variable Characteristics

E-commerce: Variable of e-commerce has been used as dependent variable in the analyses. It identifies online domestic transactions with domestic and international cards in Turkey. Data for e-commerce variable has been taken from BKM website. Figure 3.1 shows the logarithm of e-commerce variable.

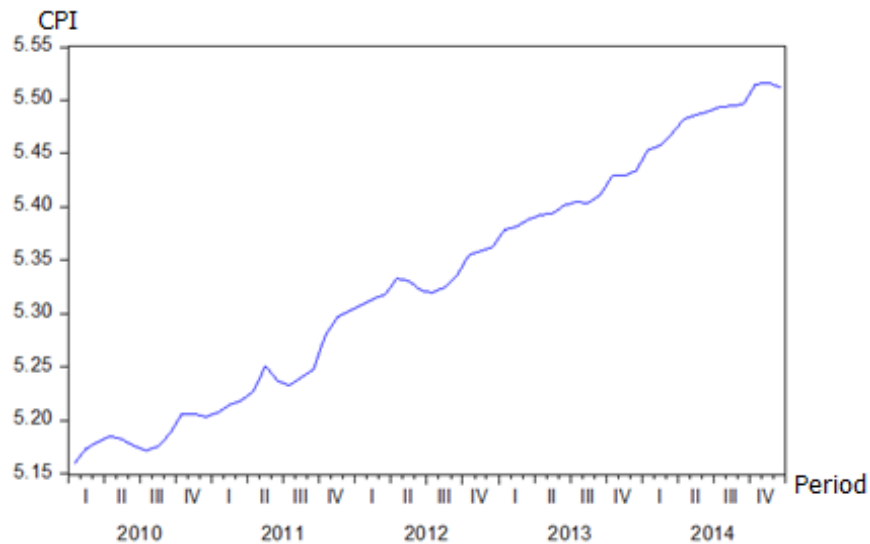
FIGURE 3.1 LOGARITHM OF E-COMMERCE



As it is seen in the figure 3.1, e-commerce transaction volume in Turkey is increasing rapidly.

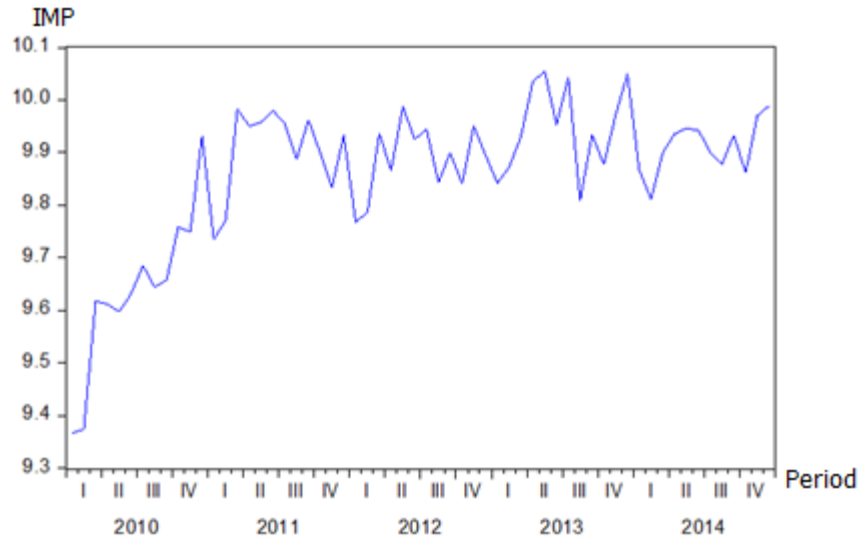
CPI : CPI identifies consumer price index (2003=100 based index). Data for CPI has been taken from Central Bank of Turkey database. Figure 3.2 shows the logarithm of CPI variable.

FIGURE 3.2 LOGARITHM OF CPI



Import: Import variable which has been used in the analyses identifies total import volume of Turkey (million TL). Data for import has been taken from Central Bank of Turkey database. Figure 3.3 shows the logarithm of import variable.

FIGURE 3.3 LOGARITHM OF IMPORT



Recently, since a large part of the products which are sold through e-commerce are imported products, import variable has been added to the analyses.

Credit Card Usage: Credit Card Usage variable which has been used in this study refers total domestic transaction volume (million TL) which was made with domestic and international cards.

According to Card Monitor 2014 published by BKM, the most preferred payment tool is credit card in online shopping in Turkey. Since payments in e-commerce transactions are generally made with credit card, credit card usage has been thought to affect e-commerce transaction volume. Therefore, it has been added to the analyses. Table 3.1 shows the share of payment types in online shopping in Turkey.

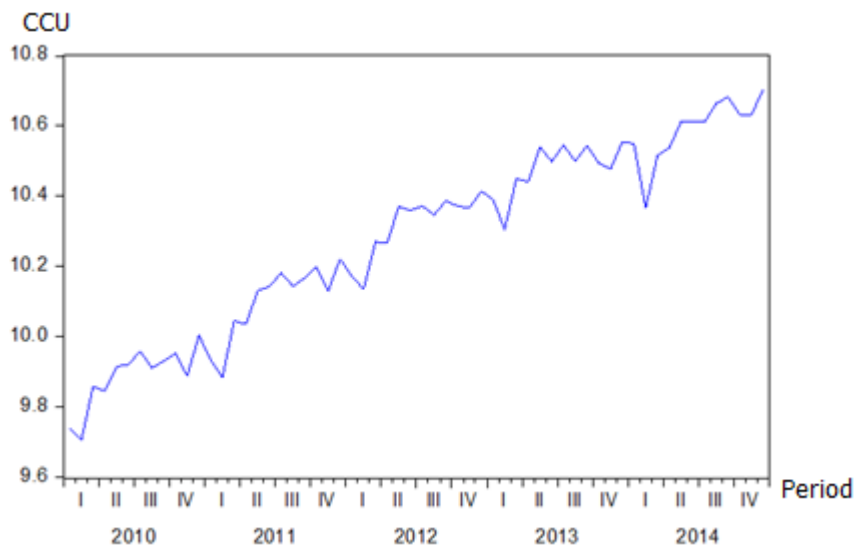
TABLE 3.1. SHARE OF PAYMENT TYPES IN ONLINE SHOPPING IN TURKEY

PAYMENT TYPE	SHARE (%)
Credit Card	84
Paying at the Door	6
Debit Card	3
Transfer – EFT	2
Other	5

Source: Card Monitor, 2014

Data for credit card usage has been taken from BKM website. Figure 3.4 shows the logarithm of credit card usage in Turkey.

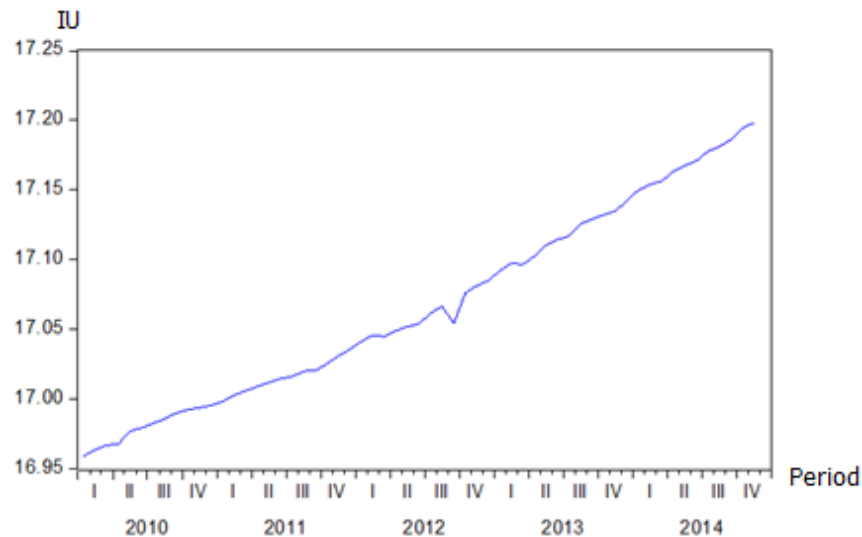
FIGURE 3.4 LOGARITHM OF CREDIT CARD USAGE



Internet Users: Variable of Internet users refers total number of internet users in Turkey. Data for internet users variable has been taken from IAB Turkey website. Since e-commerce transactions occur online via the internet, it has been thought to

affect e-commerce transaction volume. So, it has been added to analyses. Figure 3.5 shows the logarithm of the total number of internet users.

FIGURE 3.5 LOGARITHM OF INTERNET USERS



3.2.2. Stationarity Test of the Variables with Unit Root Test

In time series, to be able to apply VAR model, all variables included in the model should be stationary. In this study, stationarity of the time series which are included in the model has been tested with unit root test. Whether the variables contain unit root has been tested with the Augmented Dickey Fuller (ADF) test. The hypothesis of the test is as follows

$$H_0 = \text{There is unit root} \quad (\text{non-stationary})$$

$$H_1 = \text{There is no unit root} \quad (\text{stationary})$$

Except import variable, all variables have been found as non-stationary. Therefore, their first differences have been taken and they have been tested again. As a result of these adjustments, all series included in the model has become stationary. So, hypothesis H_0 has been rejected for all variables at the significance level of 0.01.

Table 3.2 shows the results of unit root test of the variables.

TABLE 3.2. RESULTS OF UNIT ROOT TEST

			T-STATISTICS	PROB*
ECOM	ADF test statistic		-7.361231	0.0000
	Test critical values	1%	-3.574446	
		5%	-2.923780	
		10%	-2.599925	
CPI	ADF test statistic		-6.456571	0.0000
	Test critical values	1%	-3.548208	
		5%	-2.912631	
		10%	-2.594027	
IU	ADF test statistic		-7.998689	0.0000
	Test critical values	1%	-3.552666	
		5%	-2.914517	
		10%	-2.595033	
IMP	ADF test statistic		-3.959617	0.0030
	Test critical values	1%	-3.546099	
		5%	-2.911730	
		10%	-2.593551	
CCU	ADF test statistic		-7.332211	0.0000
	Test critical values	1%	-3.574446	
		5%	-2.923780	
		10%	-2.599925	

Note: MacKinnon (1996) one-sided p-values.

3.2.3. Determination of Lag Length

After testing the stationarity of the variables, lag length selection has been made. The lag lengths are determined by LR, FPE, AIC, SC, HQ criterias⁹. The Optimum lag length is the minimum period which is determined by the maximum number of criteria. Table 3.3 shows the lag length of the series.

TABLE 3.3. LAG LENGTH SELECTION CRITERIA

Lag	LogL	LR	FPE	AIC	SC	HQ
0	557.9373	NA	1.06e-15	-20.29398	-19.92565	-20.15192
1	625.7796	118.0958	2.18e-16	-21.88073	-20.59157*	-21.38355
2	663.0234	57.93472	1.43e-16	-22.33420	-20.12422	-21.48190
3	697.9058	47.80182	1.06e-16	-22.70021	-19.56941	-21.49278
4	751.7828	63.85419*	4.20e-17*	-23.76973*	-19.71810	-22.20718*

Note: Indicates lag order selected by the criterion

As it is seen in the table 3.3, optimum lag period has been found as 4.

3.2.4. Results of Granger Causality Test

Granger causality test has been applied to determine the relations between the variables. Table 3.4 shows the results of granger causality test which has been applied to the variables in the model.

⁹ LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

TABLE 3.4. RESULTS OF GRANGER CAUSALITY TEST

Sample: 2010M01 2014M12			
Lags: 4			
Null Hypothesis:	Obs	F-Statistic	Prob.
CPI does not Granger Cause E-COMMERCE	55	9.25018	1.E-05
E-COMMERCE does not Granger Cause CPI		0.96807	0.4341
IU does not Granger Cause E-COMMERCE	54	3.40092	0.0163
E-COMMERCE does not Granger Cause IU		2.07418	0.1000
IMPORT does not Granger Cause E-COMMERCE	55	3.34417	0.0174
E-COMMERCE does not Granger Cause IMPORT		5.83542	0.0007
CCU does not Granger Cause E-COMMERCE	55	7.79837	7.E-05
E-COMMERCE does not Granger Cause CCU		6.53013	0.0003
IU does not Granger Cause CPI	54	0.67004	0.6162
CPI does not Granger Cause IU		1.13556	0.3519
IMPORT does not Granger Cause CPI	55	1.11767	0.3598
CPI does not Granger Cause IMPORT		1.82682	0.1399
CCU does not Granger Cause CPI	55	4.15348	0.0059
CPI does not Granger Cause CCU		2.83866	0.0347
IMPORT does not Granger Cause IU	54	0.92961	0.4553
IU does not Granger Cause IMPORT		0.38430	0.8187
CCU does not Granger Cause IU	54	0.69947	0.5964
IU does not Granger Cause CCU		0.47447	0.7542
CCU does not Granger Cause IMPORT	55	1.58590	0.1940
IMPORT does not Granger Cause CCU		2.09580	0.0967

According to Granger causality test results at 5% significance level;

There is unidirectional causality from CPI to ECOM ($CPI \rightarrow ECOM$)

There is unidirectional causality from IU to ECOM ($IU \rightarrow ECOM$)

There is bidirectional causality between IMP and ECOM ($IMP \leftrightarrow ECOM$)

There is bidirectional causality between CCU and ECOM ($CCU \leftrightarrow ECOM$)

There is bidirectional causality between CCU and CPI ($CCU \Leftrightarrow CPI$)

3.2.5. Ordering of the Variables

Ordering the variables is required in order to get the best results from the impulse response functions. In a VAR model variables should be ordered from exogenous to endogenous. Ordering of variables can be done with the help of Granger Causality test. If the orders of the variables are changed, impulse response functions can also change. Therefore, correct order is important. Variables used in this study have been ordered from the exogenous to endogenous with Granger causality test. Variables' Ordering is as follows;

1. Credit card usage
2. Consumer price index
3. Import
4. Internet users

3.2.6. Results of Impulse Response Functions

With Granger causality, whether there is relationship between e-commerce and the variables included in the model has been tested. Then, with impulse response functions, the response of e-commerce to a standard deviation shock that can occur in the variables has been observed. Figures below show the response of Ecommerce to the other variables. Dashed lines show confidence intervals. Horizontal axis shows the number of months which pass after shock. Vertical axis shows the scale of response of e-commerce variable.

FIGURE 3.6 RESPONSE OF E-COMMERCE TO CCU

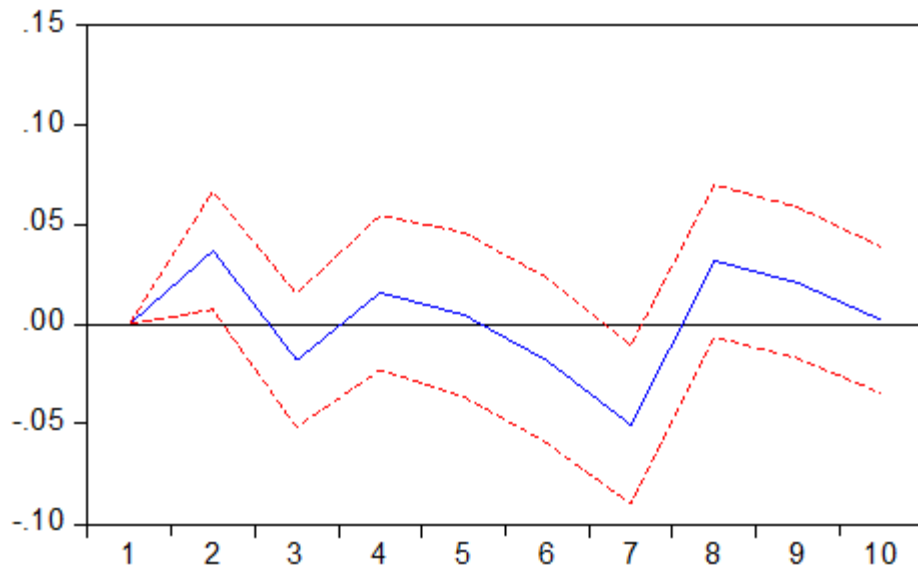


Figure 3.6 shows that the effect of credit card usage on e-commerce is positive beginning from the first period to the second period.

FIGURE 3.7 RESPONSE OF E-COMMERCE TO CPI

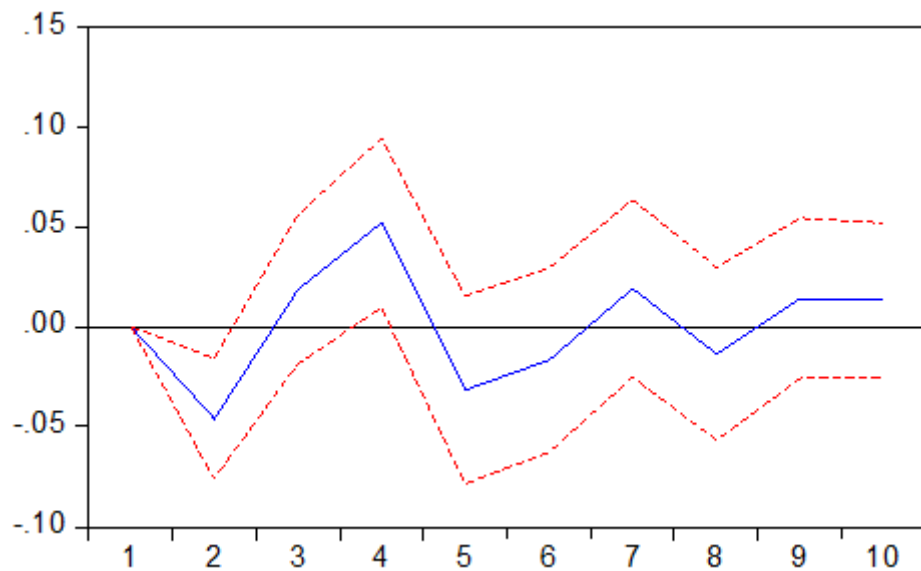


Figure 3.7 shows that the effect of Consumer Price Index (CPI) on e-commerce is negative beginning from the first period to the second period.

FIGURE 3.8 RESPONSE OF E-COMMERCE TO IMPORT

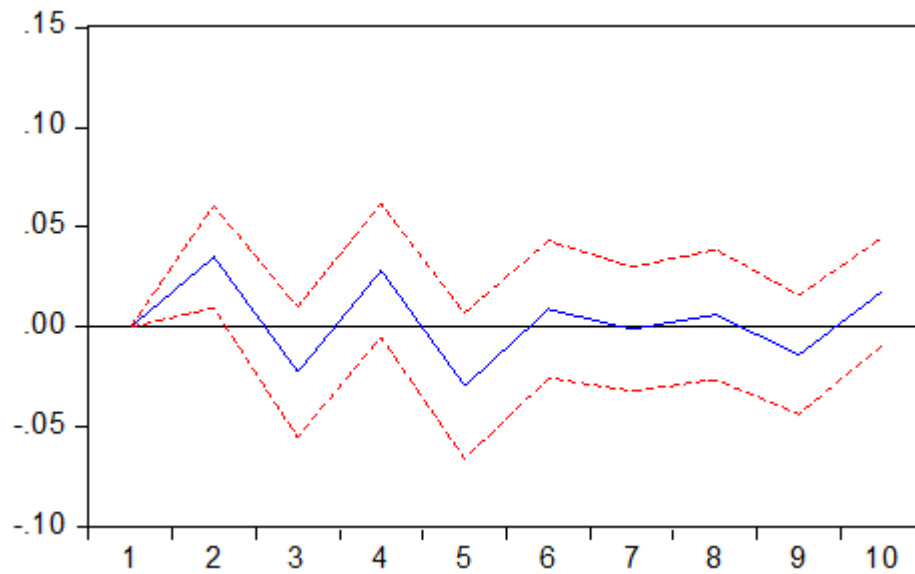
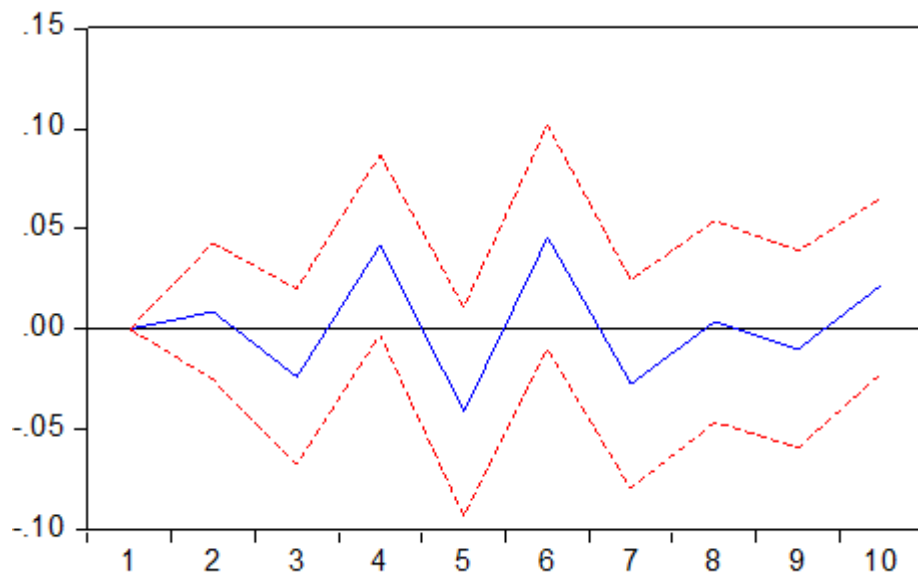


Figure 3.8 shows that the effect of import on e-commerce is positive beginning from the first period to the second period.

FIGURE 3.9 RESPONSE OF E-COMMERCE TO INTERNET USERS

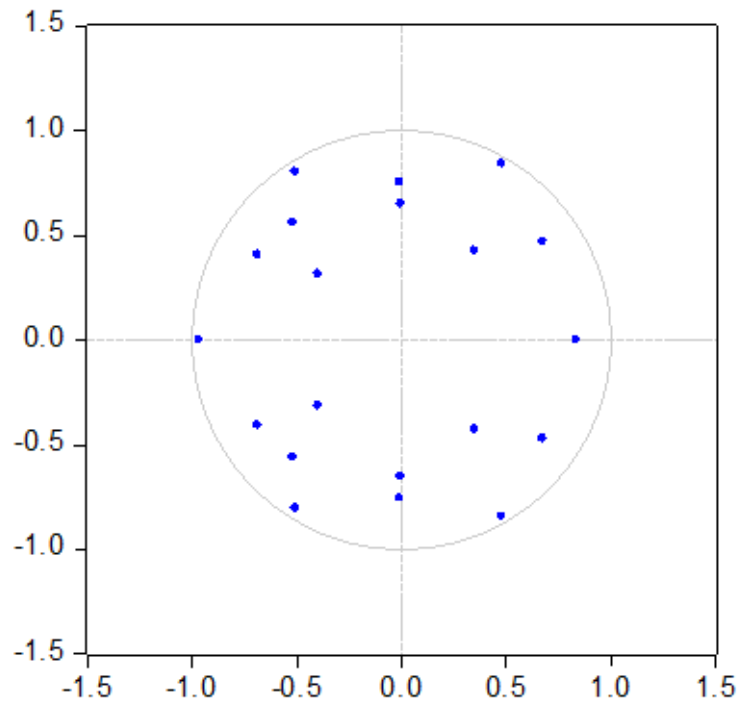


When we look at Figure 3.9, internet users variable has no significant effect on e-commerce.

3.2.7. Stability Test of VAR Model

After the model was set up, stationarity of the model has been tested. Figure 3.10 shows stationary test of VAR model. If there is one or more roots outside the unit circle, the model is called non-stationary.

FIGURE 3.10 STATIONARITY TEST OF VAR MODEL



In this model, since all the roots are in the circle, the model is stationary.

3.2.8. Autocorrelation Test of VAR Model

To determine whether the VAR model has a structural problem or not, serial Correlation LM Test has been used. Table 3.5 shows the autocorrelation¹⁰ test results.

¹⁰ Autocorrelation occurs when there is correlation of a time series with its own past or future values.

TABLE 3.5. RESULTS OF VAR RESIDUAL SERIAL CORRELATION LM TESTS

Lags	LM-Stat	Prob
1	34.48399	0.0980
2	34.40109	0.0996
3	27.86855	0.3139
4	24.48464	0.4915
5	15.83355	0.9197
6	28.13587	0.3016
7	29.56336	0.2411
8	36.12592	0.0697
9	24.41878	0.4953
10	25.24960	0.4485
11	19.42507	0.7763
12	19.95134	0.7494

The test results reveal that there is no autocorrelation between error terms for 12 lags.

3.2.9. Heteroskedasticity Test

To determine whether the model has heteroskedasticity¹¹ problem White test has been used.

¹¹ Heteroskedasticity occurs when the variances of the error terms are not constant.

TABLE 3.6. RESULT OF WHITE TEST

CHI-SQ	DF	PROB.
614.2448	615	0.5010

The test results show that variance of error term is the same for all observations and there is no heteroskedasticity in the model.

3.2.10. Results of Variance Decomposition

To understand how much of the change that occurs periodically in a dependent variable arises from its own past values and how much of it arises from other variables, variance decomposition has been used. Table 3.7 shows variance decomposition values.

TABLE 3.7. VARIANCE DECOMPOSITION

PERIOD	S.E.	ECOM	CCU	CPI	IMP	IU
1	0.088480	100.0000	0.000000	0.000000	0.000000	0.000000
2	0.120189	66.84679	9.367031	14.70729	8.549710	0.529184
3	0.129078	60.70373	10.09693	14.85371	10.45816	3.887472
4	0.148996	45.74680	8.708352	23.25981	11.43449	10.85055
5	0.160619	39.44582	7.575245	23.90566	13.20193	15.87135
6	0.169565	35.91654	7.988155	22.42428	12.11384	21.55719
7	0.180628	32.27511	14.87753	20.87670	10.67916	21.29151
8	0.186101	32.62523	16.90411	20.20319	10.16990	20.09757
9	0.189505	32.47308	17.47880	20.03545	10.34647	19.66620
10	0.193745	32.76965	16.73158	19.63658	10.75397	20.10822

In the second period, impulse or shock to e-commerce variable account for 66.85 per cent variation of the fluctuation in e-commerce (its own values), shock to credit card usage can cause 9.37 per cent fluctuation in e-commerce, shock to Consumer Price Index can cause 14.71 per cent fluctuation in e-commerce, shock to import can

cause 8.55 per cent fluctuation in e-commerce and shock to internet users can cause 0.53 per cent fluctuation in e-commerce.

In the fifth period, impulse or shock to e-commerce variable account for 39.45 per cent variation of the fluctuation in e-commerce (its own values), shock to credit card usage can cause 7.58 per cent fluctuation in e-commerce, shock to Consumer Price Index can cause 23.91 per cent fluctuation in e-commerce, shock to import can cause 13.20 per cent fluctuation in e-commerce and shock to internet users can cause 15.87 per cent fluctuation in e-commerce.

In the tenth period, impulse or shock to e-commerce variable account for 32.77 per cent variation of the fluctuation in e-commerce (its own values), shock to credit card usage can cause 16.73 per cent fluctuation in e-commerce, shock to Consumer Price Index can cause 19.64 per cent fluctuation in e-commerce, shock to import can cause 10.75 per cent fluctuation in e-commerce and shock to internet users can cause 20.11 per cent fluctuation in e-commerce.

CONCLUSION

This study has been conducted to explore the factors affecting e-commerce in Turkey. Firstly, general information about e-commerce has been given. Secondly, the studies about factors affecting e-commerce have been analyzed. Finally, the analysis of the factors affecting e-commerce in Turkey has been made.

For the analysis, macro data has been used. The data has been collected from Central Bank of Turkey, BKM, TUIK and IAB Turkey. VAR model has been applied in the analyses. E-commerce variable has been used as a dependent variable. The variables which have been used as an independent variable are CPI, import, credit card usage and the number of internet users.

Logarithm of variables has been taken before starting of the analyses. In the VAR model, the variables should be stationary. After determining the non-stationary variables with unit root test, these variables which were non-stationary have been made stationary. After the variables have been made stationary, lag length selection has been made. The optimum lag period has been found as 4. Then, to determine the relations between the variables, Granger causality test has been applied. As a result of Granger causality test, unidirectional causality from CPI to ECOM, unidirectional causality from IU to ECOM, bidirectional causality between IMP and ECOM, bidirectional causality between CCU and ECOM, bidirectional causality between CCU and CPI have been found. After Granger causality test, variables have been ordered. The order of the variable is as follows; credit card usage, consumer price index, import, internet users. After that, impulse response functions have been applied. Significant relationship has been found between e-commerce and the other variables except internet users. Then, stationarity of the model has been tested and model has been found as stationary. After that, autocorrelation and heteroskedasticity tests have been applied. Problem of autocorrelation or heteroskedasticity has not been found. Finally, variance decomposition has been applied to understand how much of the change that occurs periodically in e-commerce variable arises from its own past values and how much of it arises from other variables.

As a result of all analyses, the considerable effects of consumer price index, credit card usage and import on e-commerce have been observed. While the effects of import and credit card usage on e-commerce are positive, the effect of consumer price index on e-commerce is negative. According to the analysis, unlike literature, significant relationship couldn't be found between e-commerce and internet users variable statistically.

The positive impact of the import on e-commerce volume of Turkey is an expected result. Because, the goods which are the subject of e-commerce are generally imported goods. Therefore, when the import increases in Turkey, e-commerce volume also increases.

The positive impact of the credit card usage on e-commerce volume of Turkey is also an expected result. Because, the most preferred payment tool of e-commerce is credit card in Turkey. According to Card Monitor 2014 report published by BKM, share of credit card is 84 per cent between the other payment tools. So, when the credit card usage increases in Turkey, e-commerce volume also increases.

The other expected result was that consumer price index to have negative impact on e-commerce volume of Turkey. Because when the general level of price increases, the purchasing power of consumers reduces. So, it is normal the consumer price index to have negative impact on e-commerce volume.

Lastly, the internet variable to be insignificant was not an expected result. In the literature, internet was generally found as a significant variable for e-commerce volume. But, this dissertation's findings show that internet users variable does not have a significant effect on e-commerce volume of Turkey. It may be due to the fact that every internet user may not make purchases over the Internet. In Turkey, most of the internet population consists of young internet users. According to TUIK, the highest rate of computer and internet usage in Turkey is in the age group of 16-24 and purchasing power of this age group is low. People aged 16-20 are generally students in formal education and have a limited budget. And, unfortunately, the youth unemployment rate is 30 per cent for the 20-24 age group in Turkey. So they

may not make purchase over the internet. Therefore, the internet users variable may not have an effect on e-commerce transaction volume of Turkey.

Contributions, Limitations and Suggestions

This study consists of the variables of import and credit card usage which were not used in the previous studies. So, it will contribute the future works in this area. Besides, it has been considered that the level of education and per capita GDP are the factors which may affect e-commerce. But, the monthly data has been used in this study since e-commerce is a new concept for Turkey. So, it is hard to access the data for these variables. Analyses can be conducted by using these data in the future studies if they can be published.

E-commerce which began to be used for the first time in the early 1990s in the world met with Turkish market in 1998. Especially since 2008, Turkey has entered a rapid growth and development trend. Since then, e-commerce market in Turkey has shown an average growth rate of 35 per cent per year. According to the data published by BKM, e-commerce volume which was 25 billion TL in 2012, reached 41 billion in 2014. Although e-commerce is a new phenomenon in Turkey, it is developing day by day with the inclusion of new participants into the market. Moreover, e-commerce volume in Turkey is expected to exceed 60 billion in 2017.

Despite this rapid development, retail sales rate of e-commerce in Turkey appears to be quite low compared with other developing countries. While the share of the online retail in total retail is 1.3 per cent in Turkey in 2013, this value is an average of 5.5 per cent in developed countries and 3.5 per cent in developing countries. Moreover, when Turkey is compared with Poland which has 5.3 per cent rate in online retail, Turkey seems to follow e-commerce from the back. It can be said that the underlying causes of this condition are security, problems encountered in payment, perception problem, technological, legal and financial infrastructure problems.

The number of credit cards in use 56 million and the number of internet users is 36 million in Turkey. Turkey also has a young population and strong logistics

infrastructure. In the light of this information, Turkey's e-commerce potential appears to be quite high. Turkey performs behind the existing potential because of the reasons expressed above. It can be said that important tasks fall especially to the public for overcoming this situation, as e-commerce has entered into a wide area of responsibility such as transport, science, industry, finance, trade and education. Therefore, to contribute to the sector and to overcome the existing obstacles is possible with the coordinated work of the public and relevant ministries.

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