# Factors Affecting Electronic Commerce Acceptance and Usage in Libyan ICT Organizations

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**A thesis submitted in partial fulfilment of the requirements of Liverpool John Moores University for the degree of Doctor of Philosophy**

**April 2017**

## ABSTRACT

Studying how individuals accept new Informatics systems such as E-commerce is one of the main issues in information systems research. Libya needs to develop and implement E-commerce systems successfully; Libya has fallen far behind other similar states in the region with regard to internet and E-commerce uptake. Successful implementation of any system depends on its acceptance and use by potential users. This thesis investigates how managers make their decisions towards E-commerce systems. This investigation is conducted over two culturally similar countries, namely Libya and Tunisia to attempt to identify factors that differ between the two communities in terms of technology acceptance.

The study is undertaken using the well-accepted Technology Acceptance model (TAM), but extends this by incorporating new factors, which have both direct and indirect influences on a managers' decision to use E-commerce technology. The thesis seeks to answer the research question “What factors affect a managers' decisions to accept and use E-commerce systems in Libyan and Tunisian companies?” This research adds more constructs to the original technology acceptance model, which are adapted from the theory of reasoned action and the theory of planned behaviour.

This research adopts action research, case study and questionnaire survey methods to test the 18 hypotheses. The results confirm the value of the new extended technology acceptance model and hence represent a contribution to the literature of computer systems adoption. The contribution of this research is developing the Technology Acceptance Model and testing it on the Usage of E-commerce in Libyan and Tunisian companies, the Extended

Technology Acceptance Model appropriate to E-commerce (E-COMTAM) was based on the critical analysis of the TAM, with eight additional and new items.

The dissertation has seven chapters; Chapter One was the concepts of E-commerce, Chapter Two: Theoretical Literature Review of Technology Acceptance Model, the third chapter covers research aims and objectives, Chapter Four: covers the research methodology , Chapter Five research variables and hypotheses, Chapter Six: covers the data analysis and the research results. Finally, Chapter Seven is the conclusion and recommendations.

**Key words: E-commerce, accept, use, perceived, ICT, Libya, Tunisian, TAM adoption factors**

**DECLARATION**

**I, Abdunnaser Mrabet hereby declare that this thesis has been composed by myself, that it has not been accepted in any previous application for a higher degree, that the work of which it is a record has been performed by myself, and that all sources of information have been specifically acknowledge. Finally, I hereby give consent for my thesis, if accepted, to be available for photocopying and for inter-library loan, and for the title and abstract to be made available to outside.**

**……**

**Abdunnaser Mrabet**

**ACKNOWEDGEMENTS**

*In the Name of Allah, the Most Gracious, the Most Merciful*

First, I am forever thankful to my God (Allah) who has given me the inspiration, patience, time and strength to complete my study; without Allah, nothing would be possible. Furthermore, this study was the result of the collective efforts of a number of important and valued people who directly or indirectly assisted and supported me during my doctoral studies.

To these people I owe my gratitude and thanks. I sincerely wish to give my deepest thanks and appreciation to my supervisor, Mr: Andy Laws, for his very kind and constant support, wise guidance, encouragement and support throughout the thesis. Thanks Sir.

I am deeply grateful to all my brothers; Mohamed, Emhmed, Ebrihem, and Osama for their continued support and encouragement during the course of the research of my PhD. I would also like to thank all my sisters.

**DEDICATION**

This thesis is dedicated to:

**The soul of my father and my mother...** I have tried to achieve their dream to complete my study. They encouraged me to be the best I can be, to have high expectations and to fight hard for what I believe. They have also provided me with the best opportunities in life. I feel that they are always with me supporting and guiding. I always ask Allah to forgive all their sins and keep them for me.

**My wife...** The sun of my life was a great tower of strength during our time in the United Kingdom as she has always been. I pray that Allah will prolong her age. She has always been waiting patiently for the last couple of years for me to come to a successful ending in this PhD journey. Her practical and prayerful support, her confidence in me, taking care of the children, keeping the house together, comforting me and, most importantly, loving me enabled me to cope with the changes and stresses that accompany life and study in another country. I could not have done it without her.

She shares in my success and I will be forever grateful to her for her loving support.

This thesis is as much hers as mine.

**My kids...** The stars of my life, I do not forget them and thank my kids for their patience during my study and for their continued hard work (and success) in their own education at school. Thanks to my kids.

**ABBREVIATIONS**

ATM……Automated Teller Machines

ATI…… Agence Tunisienne d'Internet

ATT…….. Attitude

AW……Awareness

B2B…….. Business to Business

B2C…….. Business-to-Consumer

B2G…….. Business-to-Government

C2C…….. Consumer to Consumer

E…….. Experience

EDI…….. Electronic Data Interchange

E-com …….. E-commerce

G2G…… Government-to-Government

ICT ……Information and communication technology

IT……. Information technology

LL……. Laws and legislations

LTT…… Libyan Telecom and Technology

PBC……..Perceived behavioural control

PEOU……..Perceived ease of use

PU……..Perceived usefulness

T……Training

TAM ……Technology Acceptance Model

TAM2……Extended Technology Acceptance Model

TPB …… Theory of planned behaviour

TRA …….. Theory of Reasoned Action

PM…….Payment method

PIN…….. Personal Identification Number

UTAUT…….Unified Theory of Acceptance and Use of Technolo

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# Chapter 1. THE CONCEPTS OF E-COMMERCE

## 1.1. Introduction:

The future will be affected by using Electronic commerce; it will convert how people doing business forever, it has affected the international economy in many different ways. E-commerce, as it is commonly known, is the use of technology to conduct financial transactions online.

Here we will examine E-commerce in a general sense and also take a close look at how it is used in developing countries like Libya and Tunisia. As developing countries lag behind more developed ones in this area the researcher considers it important to look at the issues Libya faces in adopting E-commerce. We will also look at issues including the payment systems in developing countries as well as relevant legislation and rules. We will also look at both external and internal factors that may be relevant.

## 1.2. E-Banking and E-Money

Electronic banking, or electronic funds transfer (EFT), means the direct transfer of funds between bank accounts rather than payment by cheque or cash. This can be used to: Be paid directly into a bank or credit union account, withdraw cash from an ATM machine, Instruct a bank or credit union to pay monthly bills directly from an account, Transfer funds from a current account to a savings account, Have social security benefits or tax refunds deposited directly into a current account and buy groceries, gasoline and other purchases at the point-of sale using a debit card.

Use a prepaid card to make purchases, for example at a pay phone, on library photocopying machines or in stores and use a computer to manage personal finances.

### 1.2.1. VARIOUS FORMS OF E-BANKING

**INTERNET BANKING**

Internet Banking is a way to bank via your personal computer. You can see your account balance; arrange transfers between accounts and pay bills electronically without any help from banking staff.

The system can also tell the difference between requests which can be handled automatically and ones which need human intervention.

The system is linked to the bank's computer system and transactions have a number of stages, a customer makes a request from a pre-determined menu, which is sent to the bank's host computer over a network, the bank's system identifies the type of request received and automatically logs it.

It then compares it with a stored table of request types to check whether it can be fulfilled automatically or by a member of staff, it then directs the customer to a customer service representative or completes the request automatically.

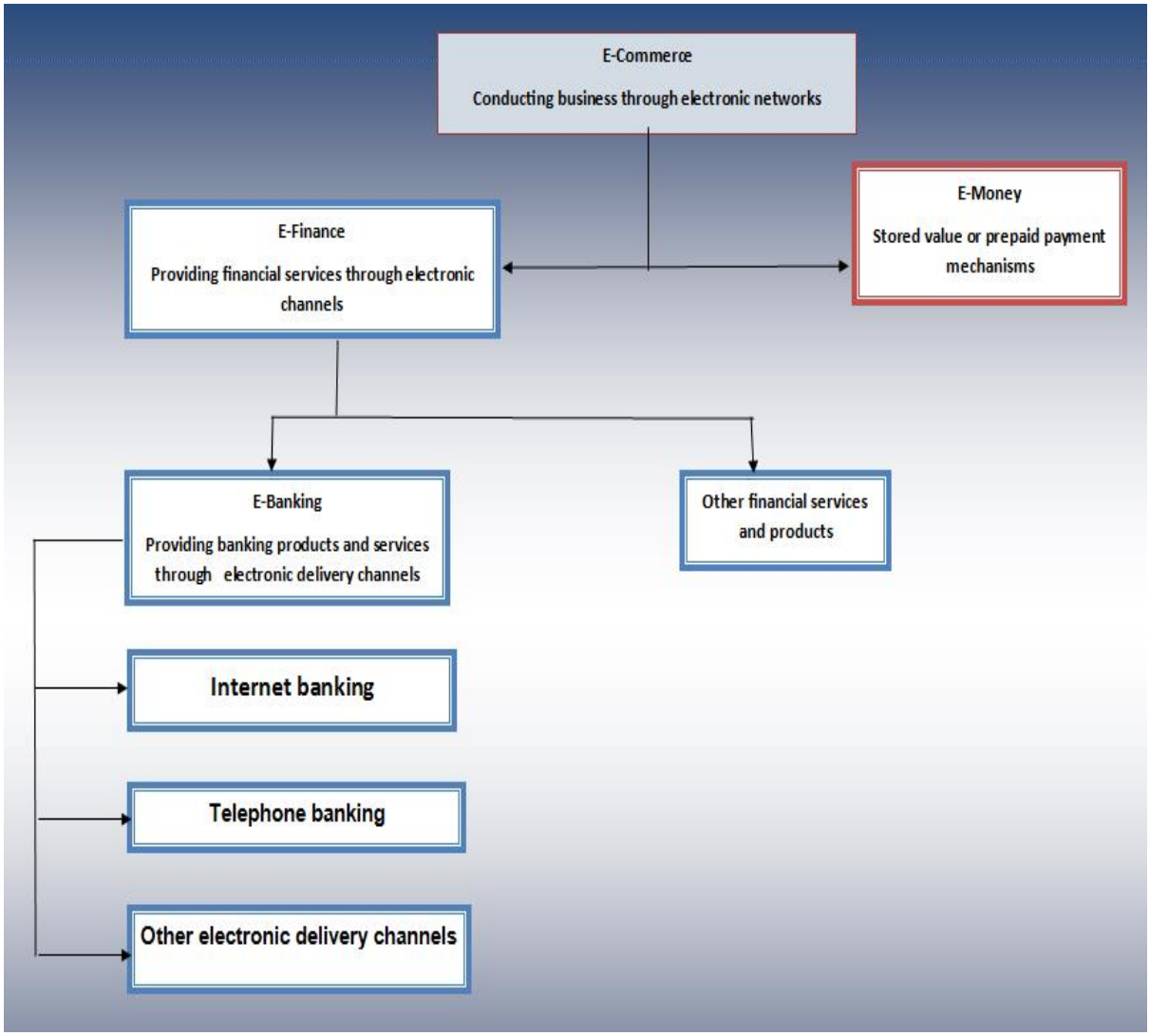


**Figure 1-1 the differences between E-money and E-banking**

### 1.2.2. AUTOMATED TELLER MACHINES (ATM):

An ATM is an electronic machine that is connected to a bank's data system and can be used by a bank customer to withdraw cash and use other banking services like checking their balance, depositing cash or cheques or topping up their pre-pay mobile phone.

The customer starts by inserting a plastic card with a magnetic stripe or a plastic smartcard with a chip that contains their account details.

The customer then verifies their identity using a PIN (Personal Identification Number) of four or more digits and then can carry out their desired transactions.

If the PIN is repeatedly entered incorrectly the machine will generally retain the card as a security precaution. Retained cards are often destroyed if the ATM is not at the card's issuing bank.

**Libyan ATM machines:**

The World Bank provides data for Libya from 2004 to 2012. During that period there were 3.63 ATMs per 100,000 adults with a minimum of 3.53 ATMs per 100,000 adults in 2007 and a maximum of 3.96 per 100,000 adults in 2012.

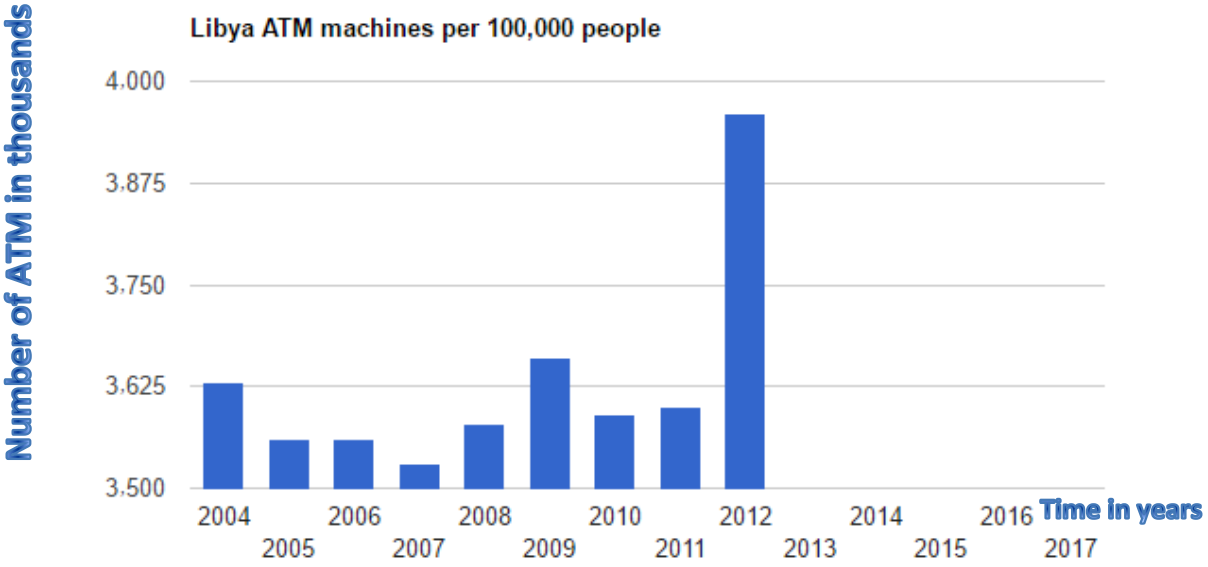


**Chart 1-1 Libya ATM machines per 100,000 adults (Global, 2017)**

The number of ATMs per 100,000 of population is a way of measuring levels of access to financial services in Libya and other countries. It also indicates the degree of innovation involved in E-commerce in Libya as ATMs are a relatively new arrival. (Global, 2017).

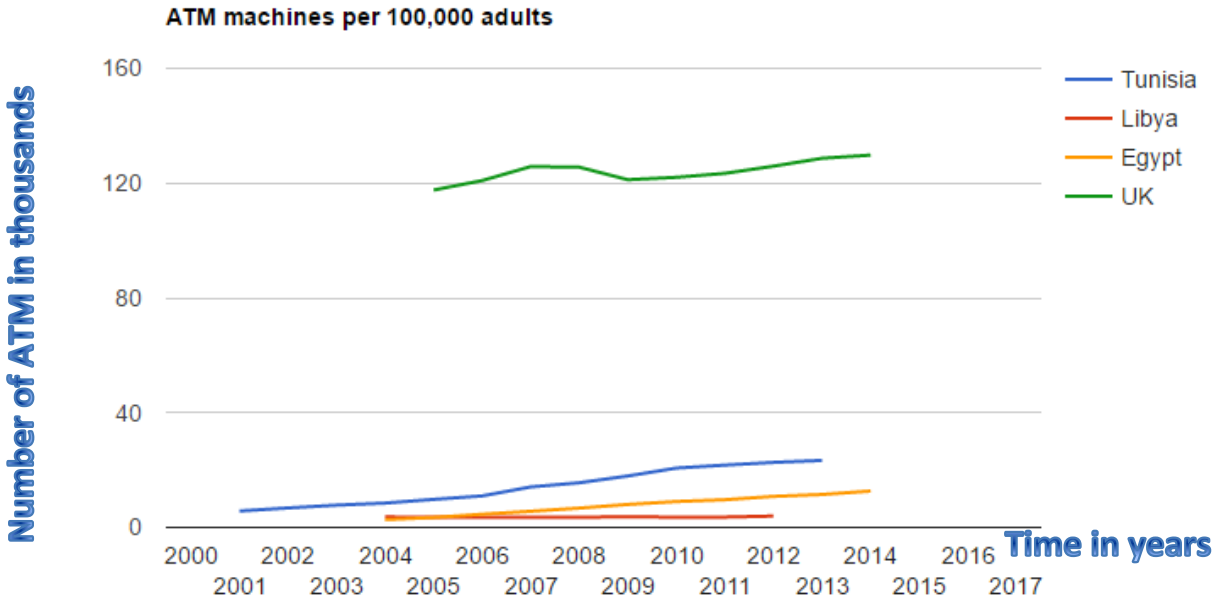


**Chart 1-2 Number of Libyan ATM machines compared with other countries (Global,2017)**

**TELE BANKING:**

By calling a telebanking number a customer can access their account and navigate via a user-friendly menu using an Interactive Voice Response (IVR) system. With enough lines made available, customers can always get through and the service is available in various languages. It offers the following services: Automatic balance announcement for the main account, balance and transaction inquiries for all accounts, and details of deposits made, ordering a statement of account by fax, e-mail or ordinary mail, Cheque book request, Instant payment stopping, Utility bill payments and Automatic renewal of regular deposits.

There is no tele banking in Libya.

**SMART CARD:**

A smart card usually contains an embedded 8-bit microprocessor under a contact pad on one side of the card.

The host computer and card reader actually "talk" to the microprocessor and it allows access to the data on the card.

The chips can regulate many kinds of transactions including making purchases using the current account, debit account or from a stored account value that can be loaded with fixed amounts of money. A smart card has a bigger storage capacity and processing power than a traditional magnetic-stripe card and can handle several different applications. It can also hold identification information, which means it is the only one needed. Smart cards can also be used with a smart card reader attachment connected to a personal computer for authentication purposes.

**DEBIT CARD:**

Also known as cheque cards, debit cards look like credit cards or ATM (automated teller machine) cards, but operate like cash or cheques. They are different from credit cards as the money is instantly withdrawn from a current or savings account.

Debit cards are used at many stores and outlets worldwide as an alternative to using cash or cheques**.**

**E-CHEQUE:**

An e-cheque is an electronic version or representation of a paper cheque and has the same legal standing. It is now used in place of paper cheques for remote transactions.

The person using the e-cheque to pay "writes" it using one of many types of electronic devices and sends it to the payee electronically. The payee "deposits" the e-cheque and receives credit for the specified amount when the payee's bank "clears" it to the paying bank. The paying bank then validates it and then "charges" the cheque writer's account for the specified amount; other forms of electronic banking are Direct Deposit, Electronic Bill Payment, Electronic Cheque Conversion and Cash Value Stored.

### 1.2.3. BENEFITS OF E-BANKING

For Banks:

Price- Banks can save money by not needing to have so many branches and by handling transactions over the internet.

Customer Base- the internet gives access to a wealthy new market as there are no geographic limits to constrain it.  It also enables smaller banks to compete for custom.

Efficiency- Banks can increase their efficiency for customers and have a nearly paperless system.

Customer Service and Satisfaction- It provide a number of customer services including many that are only available online. They can do a great deal without needing to go to a branch and the increase in the speed of service leads to increased customer satisfaction.

Image- A bank's image is enhanced by offering online services and, even if customers prefer not to use internet banking, it gives reassurance that the bank is keeping pace with technology.

For Customers:

Bill Payment: It allows customers to easily pay bills online, other Important Facilities: It gives real control and allows a customer to buy and sell securities, check stock market information, check currency rates, check balances, see if cheques have cleared, transfer money, view transaction history and avoid going to the branch. Best of all, it's free and at many banks the customer does not even have to have a minimum balance. The savings a bank makes also means it can offer better savings interest rates.

The banks are expected to be leaders in e-business. While the banks in developed countries mainly work online as non-branch banks, in developing countries like Libya they use the internet as a way to deliver information and provide better customer relations.

### 1.3. Use of the Internet

Everybody knows the internet has become too big a channel for communication to ignore and today about 40% of the world's population is online. In 1995 less than 1% of people could access the web and by 2013 there were ten times the number of users there had been in 1999. In 2005 the total number reached one billion, by 2010 this figure had doubled and by 2016 it had tripled. This chart shows the growth of use since 1993 (Foundation, 2017).

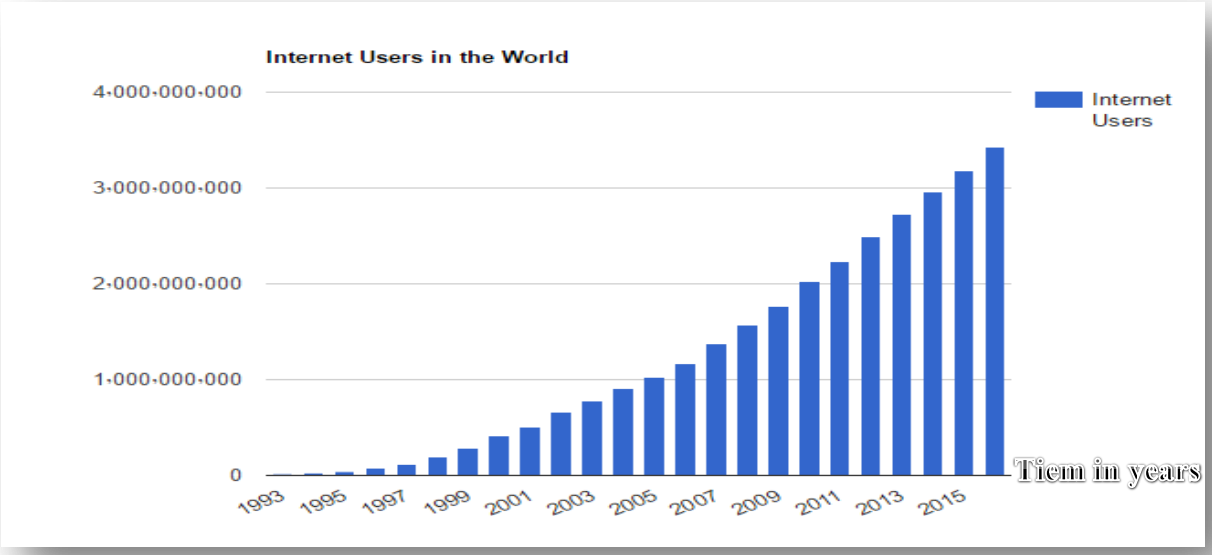


**Chart 1-3 the number of global internet users (foundation, 2017)**

| Year | Internet Users** | Penetration (% of Pop) | World Population | Non-Users (Internetless) | 1Y User Change | 1Y User Change | World Pop. Change |
|---|---|---|---|---|---|---|---|
| 2016* | **3,424,971,237** | 46.1 % | 7,432,663,275 | 4,007,692,038 | 7.5 % | 238,975,082 | 1.13 % |
| 2015* | **3,185,996,155** | 43.4 % | 7,349,472,099 | 4,163,475,944 | 7.8 % | 229,610,586 | 1.15 % |
| 2014 | **2,956,385,569** | 40.7 % | 7,265,785,946 | 4,309,400,377 | 8.4 % | 227,957,462 | 1.17 % |
| 2013 | **2,728,428,107** | 38 % | 7,181,715,139 | 4,453,287,032 | 9.4 % | 233,691,859 | 1.19 % |
| 2012 | **2,494,736,248** | 35.1 % | 7,097,500,453 | 4,602,764,205 | 11.8 % | 262,778,889 | 1.2 % |
| 2011 | **2,231,957,359** | 31.8 % | 7,013,427,052 | 4,781,469,693 | 10.3 % | 208,754,385 | 1.21 % |
| 2010 | **2,023,202,974** | 29.2 % | 6,929,725,043 | 4,906,522,069 | 14.5 % | 256,799,160 | 1.22 % |
| 2009 | **1,766,403,814** | 25.8 % | 6,846,479,521 | 5,080,075,707 | 12.1 % | 191,336,294 | 1.22 % |
| 2008 | **1,575,067,520** | 23.3 % | 6,763,732,879 | 5,188,665,359 | 14.7 % | 201,840,532 | 1.23 % |
| 2007 | **1,373,226,988** | 20.6 % | 6,681,607,320 | 5,308,380,332 | 18.1 % | 210,310,170 | 1.23 % |
| 2006 | **1,162,916,818** | 17.6 % | 6,600,220,247 | 5,437,303,429 | 12.9 % | 132,815,529 | 1.24 % |
| 2005 | **1,030,101,289** | 15.8 % | 6,519,635,850 | 5,489,534,561 | 12.8 % | 116,773,518 | 1.24 % |
| 2004 | **913,327,771** | 14.2 % | 6,439,842,408 | 5,526,514,637 | 16.9 % | 131,891,788 | 1.24 % |
| 2003 | **781,435,983** | 12.3 % | 6,360,764,684 | 5,579,328,701 | 17.5 % | 116,370,969 | 1.25 % |
| 2002 | **665,065,014** | 10.6 % | 6,282,301,767 | 5,617,236,753 | 32.4 % | 162,772,769 | 1.26 % |
| 2001 | **502,292,245** | 8.1 % | 6,204,310,739 | 5,702,018,494 | 21.1 % | 87,497,288 | 1.27 % |
| 2000 | **414,794,957** | 6.8 % | 6,126,622,121 | 5,711,827,164 | 47.3 % | 133,257,305 | 1.28 % |

*estimate for July1, 2016.

** Internet User = individual who can access the Internet at home, via any device type and connection.

**Table 1-1 the numbet of global user (Foundation, 2017)**

### 1.3.1. Internet in developing countries

The internet is not widely used in the developing world and reasons include the cost of getting online, limited access and a shortage of content relevant to the country. A Facebook report stated limited access and a shortage of content relevant to the country: “By early 2018, three billion people will be online. This is an incredible milestone, but it also means that only 49. 9 percent of the world’s population has ever connected to the Internet,” It reported that 76% of the developed world has internet access but this figure is just 29.8% for developing countries. It also noted that the increase in users was slowing down and in 2015-2016; the fourth year of deceleration, the rate of growth was 6.6%.

If the rate continues the 4 billion milestones will not be reached until 2019 and the report concluded that business, governments and non-government organizations would need to act to get more people online.

There is a case to be put that the lack of bandwidth in developing countries seriously affects the use of the internet. This is especially important because, owing to the lack of local content, it is estimated that between 70% and 80% of internet traffic in developing countries is international.

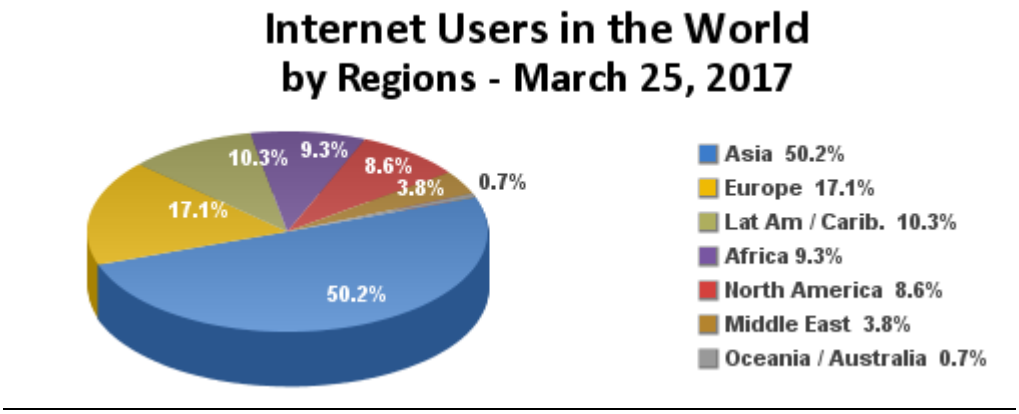


**Chart 1-4 Internet users in the world (Miniwatts, 2017)**

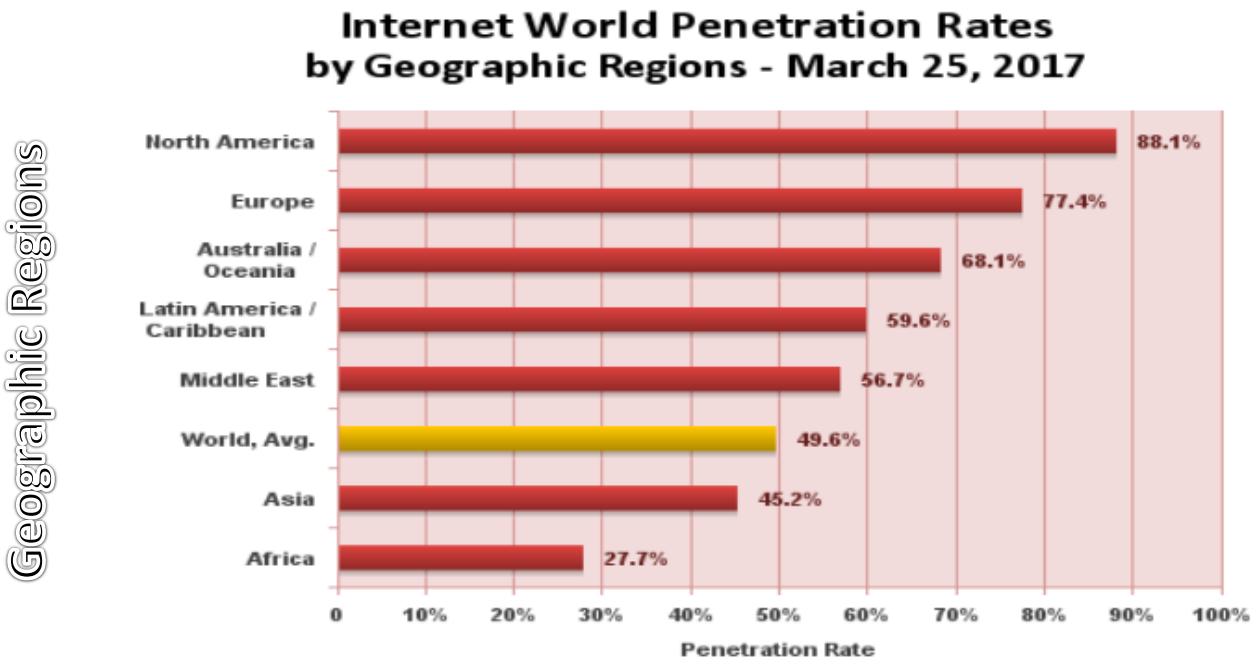


**Chart 1-5 world internet penetration rates by geographic regions (Miniwatts, 2017)**

It has been found that in the last three years a user in Africa has had one twentieth the capacity of a European user and 8.4 times less than people in North America" (UNCTAD, 2015).

### 1.4. The Libyan ICT sector:

Libya's government has recently moved towards making the country's ICT sector more liberal and turning it over to private hands. The current situation is that only the government can put money into it and this state monopoly has caused many problems including , Very low rates of usage, High prices compared with other countries ,Poor telecoms services ,No clear policies or plans and Lack of job opportunities or over supply of labour in the industry.

In Libya all telecoms and postal services are provided by one huge state owned organization called Libyan Post Telecommunications and Information Technology

This consists of four subsidiary companies: Al-Madar and Libyan provides mobile phone services, Libyan Telecom and Technology (LTT) provides internet services and GPTC controls fixed line and other telecommunications services.

Libya's two mobile phone operators are also government-owned which means there is no real competition between them.

A new regulatory body called the General Authority for Information and Communications (GAIT) has recently been created whose aim will be to regulate the ICT market when competition is introduced but it is thought that the way the relationships stand between GAIT and the government and the telecoms industry it is not likely to encourage private sector investment.

### 1.4.1. The internet in Libya :

There is increasing freedom to access the internet in Libya. Not only are internet cafés becoming more popular amongst young people, most businesses are now online and home access is increasing too. The expectation is that the growth will follow that of other North African countries (LITC, 2016).

The Libya Telecom and Technology Company (LTT) is the only authorised internet provider in the country. It has connections via satellite to Canada with a 5MB bandwidth and via fibre-optic cable with Italy with a 150MB and a 45MB capacity (Technology, 2016).

Using a dial-up connection is the cheapest and most popular method of internet connection and the number of people who currently use this method is around 200,000. Internet access is via servers located in Libya's main cities (Tripoli , Musratah, Zawia, Khoms, Zletin, Benghazi , Surt, Houn, Sabha, and Biniwaleed). Tripoli has a good dial-up connection speed

of about 33 kbps but users experience problems with the line largely caused by humidity and cable disconnections.

These good rates are typical of larger cities but in more remote areas the limited landlines and poor ICT infrastructure limits internet access for many (Doing business and Investment in Libya, 2011 (Alla & Foad, 2011). By 2015, 19% of Libyans were using the internet compared with 0% in 1990. The graph below shows the growth of users over this time.

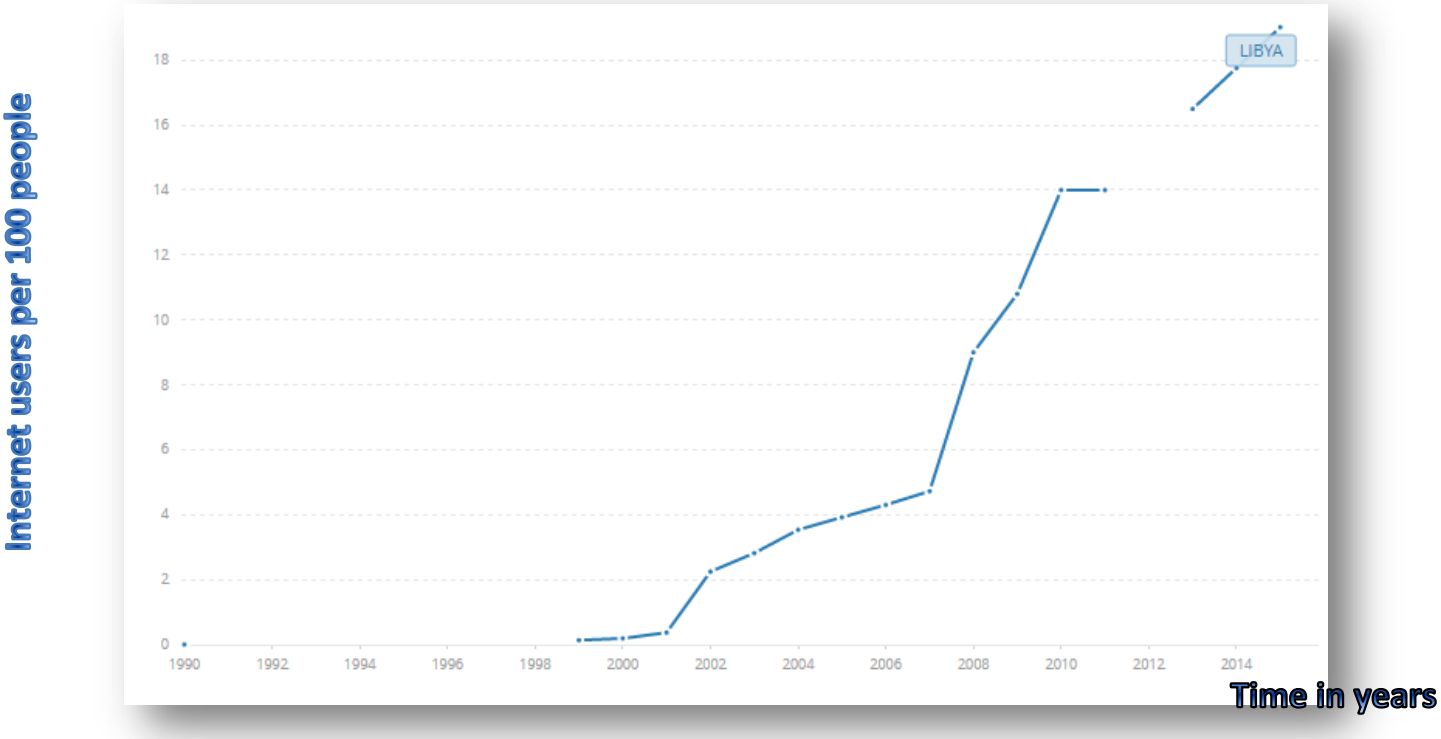


**Chart 1-6 Internet users in Libyan (per 100 people) (world, 2017)**

Asymmetric Digital Subscriber Line (ADSL) is also available in Libya. The costs for these services are relatively high. However, the cost is falling quickly and the quality of service and capacity are also on the rise.

| Duration | | 1 month | | | 6 months | | | 1 year | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Currency | | LD | US$ | Euro | LD | US$ | Euro | LD | US$ | Euro |
| Single Individual | | 75 | 60 | 45 | 375 | 300 | 225 | 660 | 530 | 400 |
| Multi-user/ Corporate(Maximum 5 users) | | 200 | 160 | 120 | 1,125 | 900 | 650 | 1,980 | 1,590 | 1,150 |

**Table 1-2 charge of internet in Libya**

A line is also available on a lease basis and this is provided by LTT. The company states that this can be an XDSL or an ATM service which can also let organizations hold voice and video conferences. The speeds range from 256 kbps up to 8Mbps.

LTT also provide wireless networking facilities and internal documents from the company state that they are secure and used by a wide number of organizations, the government, educational institutions and internet service providers. A broadband satellite service called DVB-RCS is also available and is provided by a number of companies offering both one and two-way communication. However only LTT is authorised to provide this service, the greatest demand is for a one-way receiving service and to receive and send needs a special permit which is only granted to a few companies, for example oil companies working in remote desert areas, (Telecom, 2016).

“According to a new report from Akamai, the average internet connection speed in Libya is the slowest in the world at 0.5 Mpbs. This puts Libya behind Bangladesh, which has an average connection speed of 1.0 Mbps, and Bolivia, Cameroon, Botswana, and Yemen with speeds of 0.9 Mbps” (Akamai, 2017).

## 1.5. E-commerce overview

E-commerce refers to the practice of retailing through a secure website and describes the exchange of products and services between businesses, groups and individuals (David, 2003). This gives access to opportunities and data all around the world without barriers and the massive networking and telecoms potential means E-commerce businesses can be very successful. Selling online is possible without incurring heavy overheads (Hunaiti, et al., 2009) and the huge explosion in technology means that E-commerce is an essential part of the future for many companies. It has three main issues namely instant access to data, the daily upgrading of business information using computer technology and the possibility for personal or business involvement via the internet (Deb, 2014).

### 1.5.1. E-commerce categories

Transactions can be classified in several ways: one is to look at the participants involved in a transaction, whether it's business-to-consumer (B2C), business to business (B2B), consumer to consumer (C2C) or Government to business/consumer (G2B/C).

Because E-commerce has the capacity to affect the economy and society it is not surprising that policy-makers and businesses have taken such an interest (Davis, 2005). (Wong & Seok Ling, 2010) , Identified the internet and E-commerce as the two key drivers of the new economy.

It's also part of more far reaching changes including market globalisation, the knowledge and information-based economy and technological dominance. To ensure that E-commerce is widely used there is a need to invest in the social infrastructure and to educate people in developing countries to use technology according to their conditions, cultures and abilities (Straub, 2003).

(Al-Khaffaf, 2013) Believe that trade and telecommunications freedom policies can affect E-commerce as they make internet access more affordable and encourage firms to adopt E-commerce. Therefore, it can improve a country's economy and promote production globalization and develop technology (Goldberg & Pavcnik, 2007). (Waghmare, 2012) Divided E-commerce into four categories:

B2B E-commerce: Companies that do business with each other. B2B represents the highest volume of business. B2C E-commerce: Businesses that sell to the public.

C2C E-commerce: This is when individuals sell to other individuals and a good example is ebay.com. Others: G2G (Government-to-Government), G2E (Government-to-Employee), G2B (Government-to-Business), B2G (Business-to-Government).

The great growth of the internet has encouraged a huge amount of investment in ICT leading to great leaps forward in the quality of equipment and software. In turn this has made it easier to conduct E-commerce – in some ways because it uses non-proprietary standards through communications infrastructure that already exists. A 2003 OECD report stated that previously E-commerce needed existing relationships, costly software, specific communication links and equipment that were compatible.

Talking about the agricultural sector, (Shapiro & Varian, 2013) believed it helped because information about market prices improved and it created commodity markets online. For the construction industry it means there is no need for blueprints and lets sub-contractors communicate with each other. Manufacturing industries can reduce costs of procurement and improve supply chain management. In the service sector it increases convenience and allows customisation cutting costs, reducing delays and increasing reliability.

### 1.5.2. E-commerce advantages and disadvantages

E-commerce has transformed the way people do business. (Grdina & Zipandshop, 2005) Define it as a system in which services and goods are sold over an electronic system like the internet.

There are also many other definitions but they all link consumerism and business to an electronic system (Fricke & Khan, 2015). However, it is much more than just buying and selling online. Because of internet technology it can bring buyers and sellers from all over the world together (Teo & Liu, 2007).

High speed internet has also meant that people can use social media sites like Facebook and Twitter as well as emails, blogs and forums to buy and sell without ever physically meeting. With more use of social media and online communities, people can access and share information (Ellison, 2010).

There are three main beneficiaries of the advantages of E-commerce: organizations, consumers and society, it opens up the world to an organization for relatively little investment and lets them find customers, suppliers and partners.

- It cuts costs associated with handling paper-based information
- It strengthens the brand identity
- It provides better customer service
- It makes business processes faster and more efficient
- It greatly reduces paperwork
- It increases productivity and encourages a “pull” type management which means responding to customer needs as they occur.

## Advantages to Customers:

- 24/7 support and the ability to buy at any time of day or night from anywhere in the world
- More options and quicker delivery
- Bigger choice and better value
- The chance to both review products and services and to see what others have said
- The chance to participate in virtual auctions
- Immediate access to product or order information
- Increased competition between suppliers means better value for consumers.

## Advantages to Society:

- Customers shop remotely which reduces traffic and air pollution
- Cheaper products are within the reach of more people
- Allows people in rural areas access to products
- Lets the government provide healthcare education and social services more cheaply and efficiently.

However, E-commerce does have two groups of disadvantages: technical and non-technical.

Technical disadvantages are Lack of security, reliability or standards,rapidly developing software,Insufficient bandwidth, Expensive hardware, software and web server requirements, Difficulty of integrating with existing applications , databases , hardware and software compatibility issues.

Non-Technical Disadvantages, High initial costs of creating E-commerce applications , Delays in launching due to lack of knowledge and experience ,Customers might not use the site because of lack of trust in online shopping ,poor security in online shopping ,customers want to see or feel a product before they buy ,Constantly evolving E-commerce applications and expense and inconvenience of internet use for people in remote areas.

### 1.5.3. E-commerce in developing countries

Because of its ability to increase efficiency and productivity there has been much interest in E-commerce worldwide though there are questions about its value in developing countries. As there are relatively few studies in this, the aim here is to examine and assess its adoption in Libya. It will examine the level of adoption and the benefits, disadvantages and problems that arise. Findings so far show E-commerce is growing. It has been agreed that E-commerce can improve trade and help to introduce developing countries into the global economy (UNCTAD, 1999). This has led to the growth of it in developed countries over the last two decades and, more recently, in developing countries too.

The western countries where E-commerce has largely been developed are very different to developing countries. How successfully technology is adopted depends on people using it and this relies on the fit between users and technology (Unhelker , 2003). It is perhaps not surprising, therefore, that technology is not always quickly adopted in developing countries and there are doubts about the relevance of E-commerce to them (Sannim, 2015)

So today, it is vital to look at the adoption of ICT and E-commerce by developing countries as it will enable them to trade more easily with developed countries. Currently there are few studies on the adoption of E-commerce by developing countries.

This study aims to help bridge the gap by carrying out multiple case studies in Libya and a survey of key organizations in Libya who are relevant to E-commerce especially information technology companies.

In common with other similar countries, Libya has not made much investment in ICT and scores poorly in the Network Readiness Index (NRI) and E-Readiness Index (ERI) (Indjikian & Siegel, 2013).

Libya is the subject of the study because it is a developing nation that has seen many changes in recent years. One of these was the lifting of the ban on foreign investment in wholesale and retail trading in March 2011. This has led to rapid ICT investment growth in various business sectors and it gives the opportunity to examine how this has affected various organizations' attitudes towards E-commerce adoption. This is because it is thought that competition plays a crucial role in ICT growth (Modimogale & Kroeze, 2009).

The insights gleaned from this study will help developing countries to devise their own strategies. They will also be developed over time to look at other countries and to build up more knowledge in the literature. What follows is an examination of the concept of E-commerce, examples of its technologies, its development and benefits.

It will then examine factors that affect its adoption which will be outlined, along with their relevance in a Libyan context. Then there will be a brief overview of the current state of E-commerce in Libya followed by a tentative conclusion and outlines for future studies.

E-commerce has many definitions but can be described as "a general concept covering any form of business transaction or information exchange executed using information and communication technologies" (Whitley & Darking, 2007). It can also mean transferring or

exchanging products, services or information via internet, extranet and intranet connections (Turban , et al., 2006). It also includes providing online customer service, collaborating with business partners and exchanging documents electronically. As it has so many facets E-commerce is often referred to as e-business (Barnes & Hunt, 2013).

Though it may seem like a relatively new term the first E-commerce application, Electronic Funds Transfer (EFT), was developed in the early 1970s to transfer funds electronically between financial institutions (Kurnia, 2006).

The Automatic Teller Machine (ATM) was introduced in the early 1980s and this allowed financial transactions to be carried out over a computer network (Barnes & Hunt, 2013).

Then the Electronic Data Interchange (EDI) was developed later in the same decade to broaden E-commerce to more industries. This enabled business documents to be sent between different computer systems automatically (Kurnia, 2006).

In the 1990s, the internet gained widespread use and the term E-commerce was coined. With the rapid growth of the internet E-commerce has grown significantly in the last few years (Turban, et al., 2006).

Today E-commerce is a vital element to many businesses and has three main issues: immediate access to unlimited information, improved business activities due to technology and the opportunities it provides for personal or business involvement through the internet (Moorthy, et al., 2012).

### 1.5.4. E-commerce in Middle East and Libya

Middle East countries like Egypt, Kuwait, Jordan and the United Arab Emirates have already begun increasing their web presence, while Iran and Saudi Arabia are extending full internet capabilities to government institutions and educational facilities (Bertot, et al., 2016). There are estimated to 141,931,765 million users of the internet in the Middle East (Miniwatts, 2017).

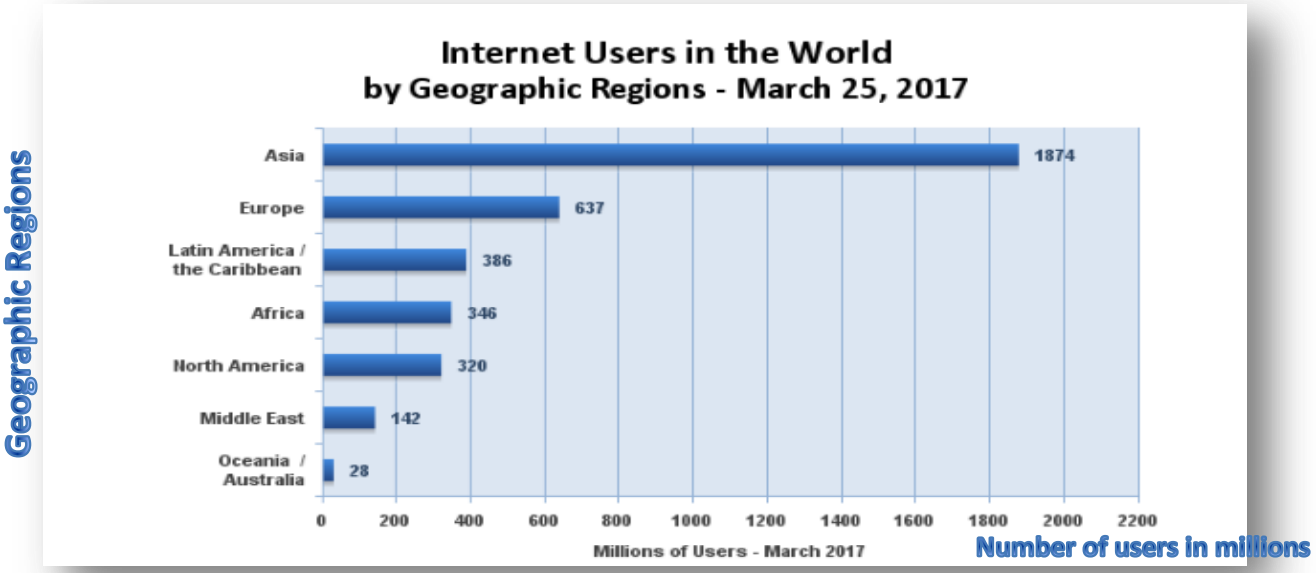


**Chart 1-7 Internet users in the world by Geographic (Miniwatts, 2017)**

E-commerce in Libya should boost the economy in the country, improve the quality of its goods and provide more efficient customer service. It may also build barriers that society will have to find ways to overcome through changed business practices, E-government initiatives should also make the government more effective and efficient and improve its relationship with both public and private sectors. E-commerce is also rapidly transforming government policies and improving online communication strategies to expand the economy.

However, according to “Committed to connecting the world” (2015) the increasing demand for communications in Libya means it lags behind poorer countries like Egypt and Tunisia.

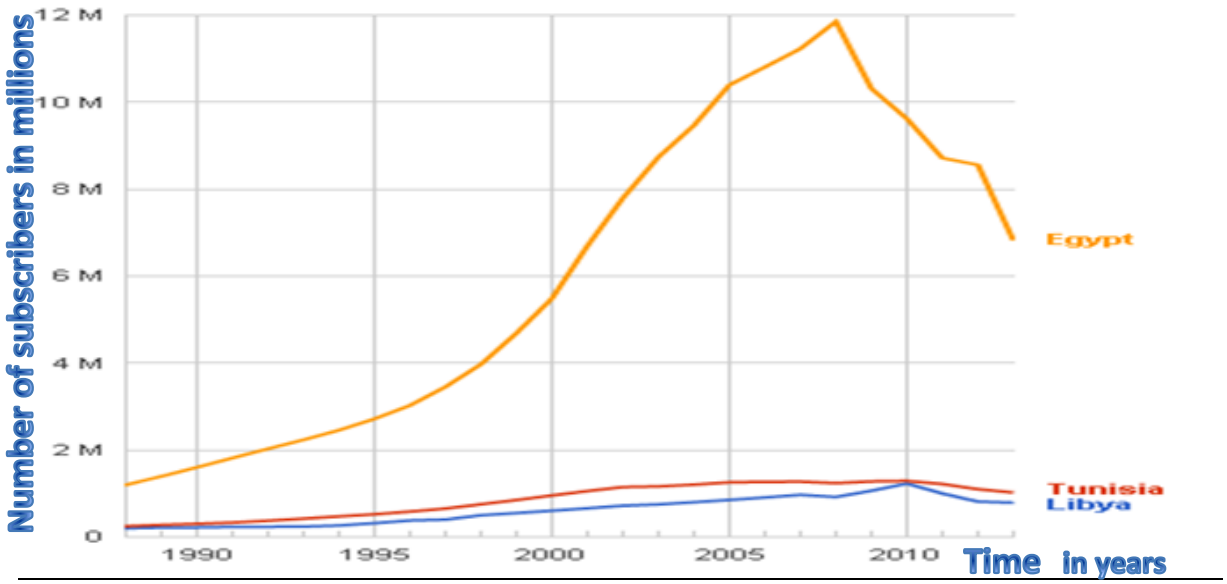


**Chart 1-8 Fixed telephone subscriptions in Libya, Egypt and Tunisia (Global, 2017)**

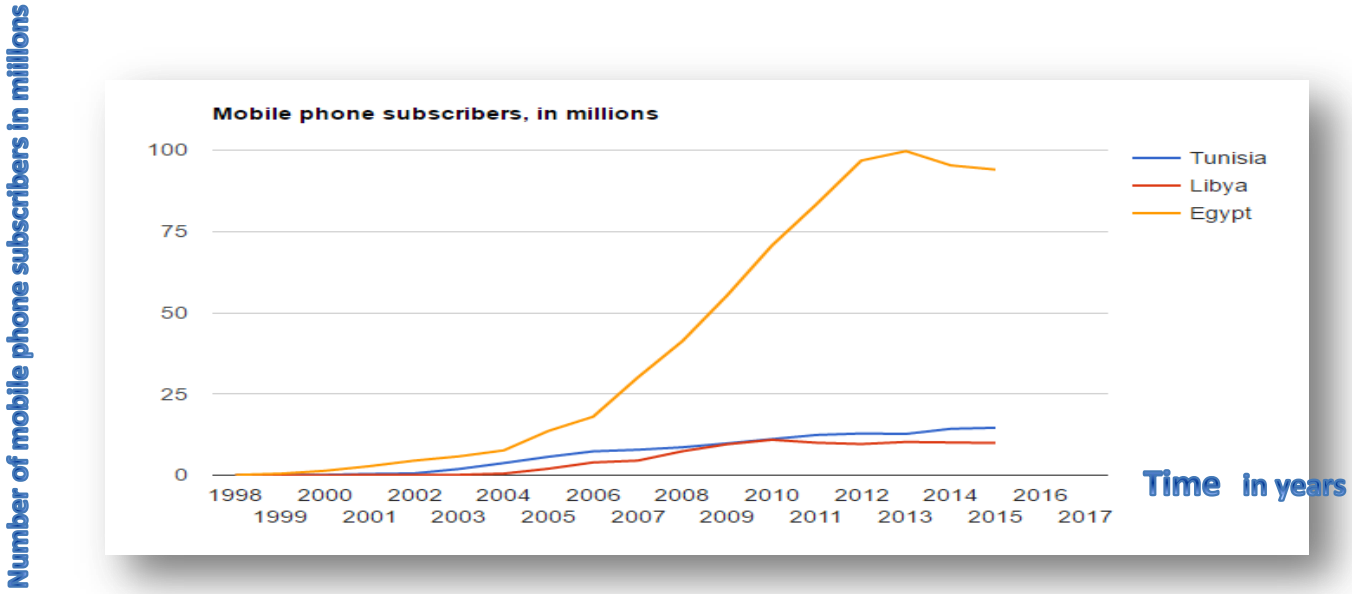


**Chart 1-9 Mobile cellular subscriptions in Libya, Egypt and Tunisia (Global, 2017)**

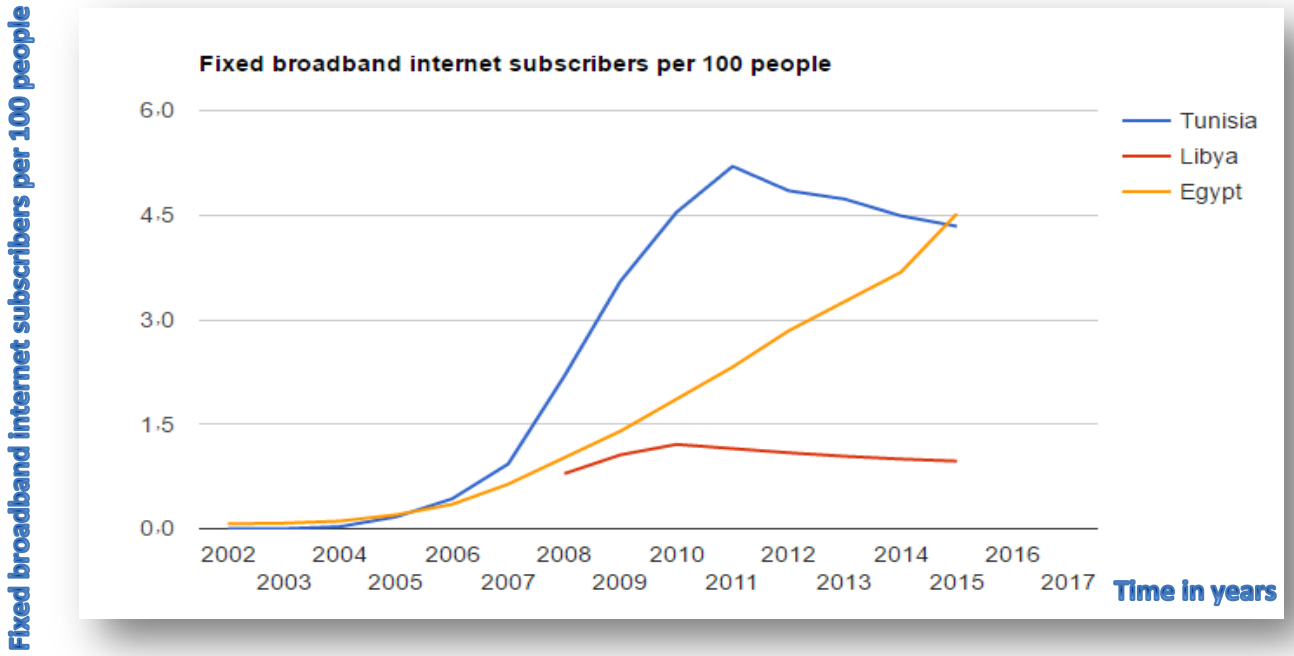


**Chart 1-10 Fixed (wired)- broadband subscriptions per 100 inhabitants in libya , Egypt and Tunisia (Global, 2017)**

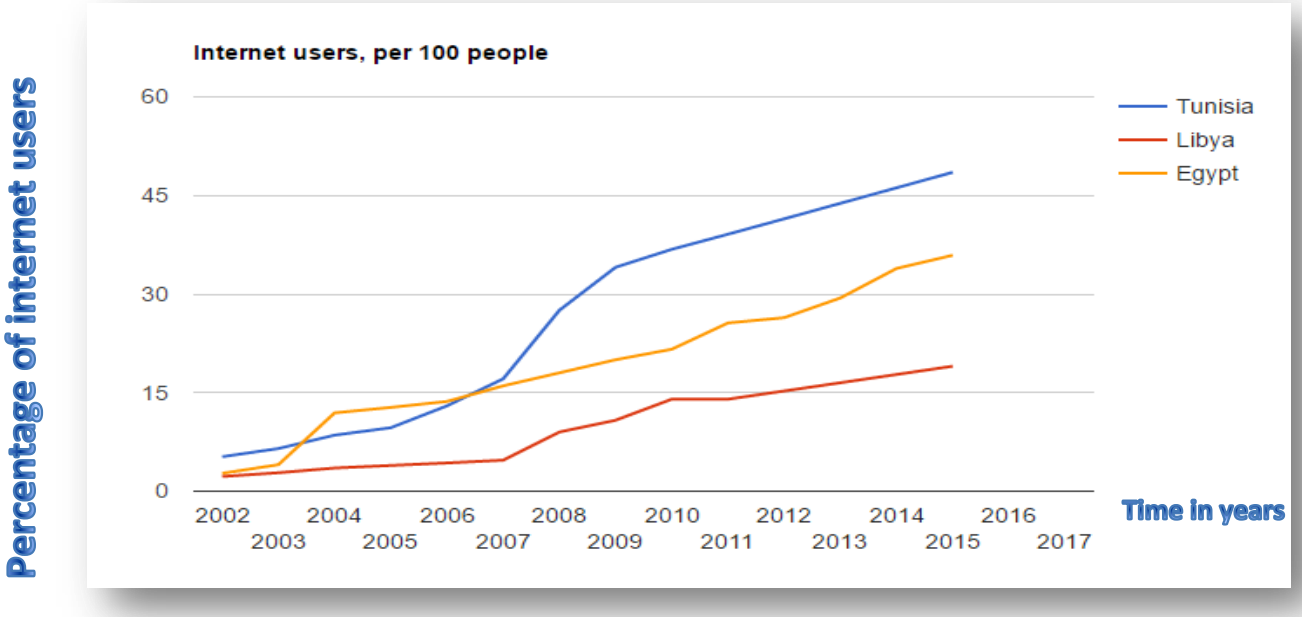


**Chart 1-11 percentages of individuals using the internet in Libya, Egypt and Tunisia (Global, 2017)**

In Libya, government ownership extends to both fixed line and mobile phone networks as well as the postal service. The latter, from the findings of The General People's Committee

for Tourism's report in 2010, is slow. Airmail letters take from 7 to 12 days to arrive and land-based mail is even slower. Often mail is not delivered at all so businesses are recommended to use independent delivery organizations (General, 2012).

In terms of fixed line telephones, the country has only 805,000 for a population of 6.3 million. There are 700,000 mobile phone users and around one million internet users.

However, numbers are on the rise. In 2004, 6.7% of people had landlines and by 2010 the figure was almost 10%. The same issue is true for mobile phones. The Libyana Mobile Technology Company claims over one million subscribers and according to their figures dial-up users reached 55,000 in 2013. Growth may be slow but demand is high as shown by the fact that there are now more than 150 internet cafés in Tripoli.

Internet users tend to be young people who surf the internet for entertainment rather than to shop or look for good deals.

Several conclusions can be drawn: People are not really using the internet for E-commerce, E-commerce is not yet developed in Libya, the traditional trading structure is better developed than E-commerce-commerce works alongside traditional trade and only traders who fail to offer a good service are under threat from E-commerce.

The exception was a call from the International Chamber of Commerce (ICC) to the Chamber of Commerce of Tripoli in 2001, which was very active at that time in the introduction of some electronic commerce applications. This did not receive the response in time due to a lack of internet access in Libya.

### 1.5.5. E-commerce in Libya

The fact that all those interested and Technicians in Libya know that there is no electronic commerce in its customary form in the world, and this may be due to several reasons,

- Lack of digital awareness in Libyan society

- Lack of postal services and accurate addresses of residents in Libya

- Lack of electronic knowledge of the reality of electronic leap

- Lack of workers and technicians specialized in the field of electronic commerce in Libya

- Do not use bank cards in public

- Poor infrastructure in banking services in the Libyan financial market

- The absence of a real financial market serving e-commerce

- Libyans' mistrust in this type of trade

Therefore, there is no declared E- commerce system in Libya

In general E-commerce in Libya is still in the process of experiment and study.

Although there are sites that use E-commerce, it is used mostly for publicity and advertising of goods as businesses have not yet been able to build effective E-commerce. This is for a number of reasons including legislation, level of awareness amongst consumers, loss of electronic payments and lack of experience in E-commerce. There have been some individual attempts in Libya to complete transactions over the internet, but these attempts have taken place in an atmosphere devoid of the necessary infrastructure for the development of electronic commerce. Therefore, the state and the private sector should

cooperate to create the right environment for E-commerce and, more importantly, the state must set the rules and regulations for the recognition of this fact while protecting the consumer and producers from manipulation, fraud and intellectual property theft. This needs investment and Libya government seek to provide it as they are serious about achieving realistic economic gains. It is intended to export through an electronic network and establish a virtual "shopping complex" online.

However , the types of E-commerce that would be most suitable for development in Libya such as Send and receive email ,the exchange of documents and contracts electronically, Access to the latest news and information, Searching on sufficient information on the prices, the announcement of the company's products, Find enough information about competitors, Provide enough information about the goods, Searches for different websites, Provide detailed information about the company and its products, Searching for new partners .

### 1.6. E-commerce in Tunisia, reality and prospects

In Tunisia the first moves towards E-commerce took place at the University at the Institut Supérieur de l'Enseignement Technologique en Télécommunications and the École Supérieure des Télécommunications which are controlled jointly by the Ministry of Communication and Technology and the Ministry of High Education. Students were invited to enrol at the university on line by using electronic cards for payment using the E-Dinar system created by the Tunisian Post in 2000. It was a success so the Ministry of High Education extended this new way of online enrolment to all universities.

### 1.6.1. The reality of E-commerce in Tunisie

ICT has caused profound changes in production methods and services and created new areas of competition which have accelerated the rate of development and progress in all parts of the world. It also represents a real opportunity for developing countries, including Tunisia.

To crystallize the concept of E-commerce on a global level and evolve it, the Tunisian government believes this should be given the importance it deserves. So in 1997 it created a national committee to make a study of the subject in all its aspects and to make suggestions. Proposals were submitted to the government and approved in May 1999 in the form of a work programme covering various aspects contributing to the development of electronic commerce.

These can be classified according to the following: Sensitization and training and education, ICT, Laws and legislation, Supporting the corporate sector and institutions, Sectoral policies, Communication management (E-government) and Banks and E-payment.

### 1.6.2. First: Sensitization and training and education

Since its foundation in late 1997 the National Committee for E-commerce focused on sensitization and training and held forums and awareness sessions. Since then, the following have been the most important stages of this trend.

Carrying out awareness campaigns to recruit an international information network (Internet) to optimize service in the national economy. They have been organizing internet convoys in all states to raise awareness about the benefits of the internet and areas of use

and to open it up in front of institutions that are prospects for export and promotion of national products abroad.

Organization of national Internet weeks - and most recently the International Summer Festival of the Internet under the slogan “Tunisia: Joy of Tourism” (Carpenter & Buchberger, 2010).

Organizing training sessions in the National Employment Fund range (21-21) for the benefit of a number of job seekers, graduates of higher education in a number of disciplines relevant to telecommunications and information technology, among them:

1) A rehabilitation programme in communication technology for the benefit of the public and private sector.

2) An assistance programmer to organize institutions especially in the field of website design.

Organizing several forums, school days and training including the export of textile products , garments using modern technologies and e-tourism, in collaboration with third parties, in particular the European Commission, within the scope of joint ventures.

In the area of training, Tunisia has succeeded in meeting the needs of the telecommunications sector of engineers, supervisors and technicians.

Moreover, in the field of continuous periodic training and this is because of the contribution of national competencies and an extensive network of high-level help.  Such as the national university institutions (Graduate School of Transportation , the National School of Engineers the Higher Institute of Technological Studies in Communications and  the National Institute

of Applied Science and Technology). The Tunisian government has established the City of Technological Telecom located near the Tunisian capital. The arena of education, research and training, production and technological city includes several institutions in one place as follows: Complex of Technological and Communications, Tunisia High School for Communications, Higher Institute of Technological Studies in Communications, Training Centre of the National Bureau of Communications, Research Centre in Software and Communications Sciences, Development Centre of the National Bureau of Communications and Information and Training Centre, Documentation and Studies in Communication Technology.

### 1.6.3. Information and communication Technology in Tunisia

The Tunisian state focused on information and communication technology (important exemptions from customs duties) and work on the development of applications. A presidential project was introduced that enabled families and citizens with limited incomes to get a computer at a reasonable price and the intervention of the Tunisian Bank for Tidman meant more than 270,000 computers were acquired for this project. On the other hand, the number of holders of bank credit cards amounted to 966,120.

Infrastructure: The continuous development of infrastructure for communication is the basis of the development strategy in this sector.

1. The telephone network continues to grow:

In 1999, the telecommunications network converted to a digital network ,There were a million subscribers in 2004, 12 lines per 100 inhabitants, There was a phone line for every four citizens in 2008 and now, there is a phone line for every house.

2. Mobile network: Sources in Tunisia Telecom confirmed that the number of subscribers to the mobile phone network exceeded eleven million in March 1998 with a capacity of previews in that time did not exceed 30 000 lines. The demand for mobile phones has seen a quantum leap since September 2002, where the number of those involved did not exceed 500 000. By September 2003, there were 1.4 million users and by the end of 2013 Tunisia Telecom had ten million users.

This steady appetite for Tunisia Telecom Services has meant a reduction in the telephone call prices for mobile phone calls. They fell from 225 pence to 180 pence in daytime periods and from 175 pence to 150 pence during the night period. The cost for pre-paid calls fell to 225 pence and was accompanied by a reduction in the cost of maintenance from 1,600 pence to 1000 pence.

3- Basic National network: The National Network includes 6,500 kilometres of fiber optic cable and about seven multi-service switches. These basic networks ensure communication between the different regions of the country and have high-speed equipment. This represents a double benefit to the internet to facilitate communication processes and reduce costs. It is worth mentioning that there are other foreign companies offering mobile services including Egypt's Orascom Telecom and the National Mobile Telecommunications Company of Kuwait.

4- International Telecommunication Network

Tunisia has developed its international telecom network to keep pace with the growth of trade with the world and includes: Two international outlets, Marine Cable links with

Europe, Links to digital satellites Intelsat and Arabsat ,Tunisia has also acceded to the major telecommunications and International information network (Internet ).

In 1991, Tunisia was the first Arab African country linked to the international information network (Internet) by connecting the Regional Institute of Computer and Communication Technology in Tunis with the French Institute for Applied Media Research using the IP protocol. Internet connectivity speed increased by about 50 times in three years.

As a result of increased demand for the services of this network it has since been expanded to 19.2 Kbit / s in 1991 to 51kbit / s in 1996 and then to 105 megabits / second in 2003, and 380 megabits / second in 2009. It is expected to reach the highest international levels in this area.

With regard to the provision of services, twelve players have been allowed (five from the private sector and seven from the public sector) to supply online services in Tunisia or for Tunisian websites until the end of 2013. These amounted to 19,801 locations (of which 87% are private sites).

Due to the allocation of public places and the evolution of technical means, adoption rates are increased day by day. The number of subscribers in Tunisia with access to the internet has increased from 110 subscribers in 1997 to 350,000 subscribers in 2002. There are currently more than three million subscribers.

Application Development:

The Tunisian strategy succeeded in introducing and disseminating digital culture in the various sectors of activity mainly through the implementation of the set of applications in the field of e-government before 2000. These included the following:

1- Mainstreaming access to the internet
2- In the area of education, it was decided to connect the internet to all academic institutions, research centres, high schools and universities in the first phase and to schools (nine years of primary education) at a later stage, now three quarters of primary schools have access to the internet.

They allowed the organization to provide the internet to the most remote areas in the country and through a presidential project (The Seventh of November Internet Bus), which was run by a qualified Tunisian and created a mobile classroom containing thirteen computers in addition to a mobile distributor, printer and server. It travelled around for the year to remote areas to provide young people with the opportunity to learn how to use the internet through a wireless network connected to a portable station to pick up the satellite broadcast.

### 1.6.4. Laws and legislation:

Since its inception the National Committee for E-commerce has given top priority to this issue and has led the introduction of several amendments to the laws of trade and trade-offs as well as other laws and issuing orders. These have been the most important:

- Law No. 40 of 1998 dated June 2, 1998 on ways and selling commercial advertising, which includes special remote provisions.

- Law No. 89 of 1999, dated August 2, 1999 on the revision and completion of certain provisions of the Criminal Code, which provides for the adoption of the documents to make it without -material and to be digital document information.
- Law No. 57 of 2000 dated June 13, 2000 on the revision and completion of some chapters of the obligation of contracts, which approved:

1) Electronic documents: Information recorded in a manner that requires a computer or other electronic device to display, interpret, and process it. This includes documents (whether text, graphics, or spreadsheets) generated by a software and stored on magnetic media (disks) or optical media (CDs, DVDs), as well as electronic mail and documents transmitted in electronic form. In contrast to a paper (hard copy) document, an electronic document can contain non-sequential (non-linear) information as hypertext connected by hyperlinks, and it has been adopted in Tunisia since the date of issuance of the law.

2) Electronic Signature: An electronic signature is the electronic equivalent of a written signature. Electronic signatures come in many forms, including: Typewritten, Scanned, an electronic representation of a handwritten signature, a unique representation of characters, a digital representation of characteristics, for example, fingerprint, retina, a signature created by cryptographic means and it has been adopted in Tunisia since the date of issuance of the law.

3) Probative force of electronic records and adding the recognition of copies that are accomplished in accordance with the availability of all guarantees for compliance with

assets. Law No. 83 of 2000 dated August 9, 2000 on exchanges and electronic commerce, which provides most of the following provisions:

1) E-commerce Definition: Business operations are conducted through the electronic exchange of any trade-offs using electronic documents.

2) Terms preservation of electronic document: That other special conditions of the document written oblige the sender to save the document as it was sent, and oblige the consignee to save as received, and must save the document in a letter holder that can be associated with them for the duration of legal validity, while ensuring the integrity of their content.

3) The necessary mechanisms for the credibility of all interventions in trade operations and E-commerce: the foundation the National Agency for electronic authentication of law which is a public institution that does not gain an administrative nature and has a legal personality and financial autonomy and has the following tasks: Granting licenses to use electronic authentication service providers in the entire territory of the Republic of Tunisia, Specification of the signature events and audit system,Concluding mutual recognition agreements with foreign parties,Issuance and delivery and keeping qualified staff for electronic authentication certificates for the electronic exchanges and Contributing to the research activities, training, studying the relevant exchanges and E-commerce.

4) General rules for the protection of consumers in electronic transactions, through the composition of the principle of free will and by requiring the seller to inform the

consumer about the product with features and methods of sale and payment, and enabling them to review the choices and the rescinding of the purchase.

Resolution No. 244 of 2000 dated January 31, fixing the routes to carry out foreign trade and the withdrawal of the special regime in the areas of foreign trade procedures on enterprises that export products through electronic means. This represents a special exemption system in some export operations and the ones that are made by electronic means of carrying out any action.

Resolution No. 2807 of 1999 and dated December 21, 1999 providing for the establishment of electronic commerce Ministerial Committee and the National Technical Committee on Electronic Commerce and its goal: Follow-up E-commerce file, Coordination between the various parties involved in the E-commerce process, Keep pace with national and international developments in E-commerce, Take interest in all new fields of E-commerce for the periodic evaluation of E-commerce activities and Completion of all other functions entrusted to it.

Resolution No 2331 of 2000 and dated October 10, 2000, fixing the administrative and financial management of the organization and methods of the National Agency for electronic authentication.

Decision No 2331/2000 of 17 July 2001 on the ratification of the specifications for the activity of electronic certification services provider.

Resolution No. 1668 of 2001 dated July 17, 2001, fixing the procedures for obtaining a license to practice as a provider of electronic authentication.

Resolution No 2727/2001 of 20 November 2001 relating to adjusting the conditions and procedures for the use of methods or encryption services over networks and dealing with related activities and the decision of the Minister of Communication Technology in July 19, 2001 fixing the technical specifications for the system of Electronic Signature.

### 1.6.5. Support the corporate sector and institutions:

Numerous measures have been taken to assist companies and institutions to improve their performance and involvement in information and communication technology, especially the internet and the use of media to publicize their production and services and to increase competition capacity. It is a direct assistance as a contribution to corporate and institutional sectors and actions at the level of tourism and handicrafts. ICT and the location on the level of some of the funds as an export promotion fund, which provides grants to accomplish and develop websites and CD rates between 35% and 50%. Loans for the same purpose and can cover about 80% of the cost of the project.

All of the private sector, and within the framework of promoting the establishment of their specific information technology projects, are encouraged to innovate in information technology. There was also a reduction of 50% of the fee for companies.

The indirect support represented in the projects and actions taken to mitigate the institution mobilized and complexity procedure managerial.

Private export such as criminal permits remote and the only dossier which are made through electronic data interchange, with the task of facilitating exchanges with the outside world and simplify Tunisia Network Trading Group procedures and exchange of information in this exchange and the payment of accounts between banks from a distance. Accordance

with international standards at all levels (Customs, ports, and transportation - various managerial interests).

### 1.6.6. Sectoral policies

Attention focused at first on exporting enterprise, several measures were taken to encourage them to engage in the internet. There are now 2,000 websites belonging to the private sector in Tunisia and a large number of companies and business owners who have chosen to host their sites abroad. With the launch of the work of the National Committee for Electronic Commerce and the start of projects on the part of tourism and traditional industries and export-oriented products, the first was the commercial corridor developed by the Centre for export promotion, WWW.ECOM.TN contains 51 Foundation exporters followed by several initiatives undertaken by other public or private organizations. The decision of the Minister of Communication Technology in July 19, 2001 fixing the technical specifications for the system of Electronic Signature.

### 1.6.7. Communication management (E-government in Tunisia)

Proceeding from the future programme of the Tunisian government on management and its role in the overall development work began on the development of the management concept to bring it closer to its clientele.

www.sicad.gov.tn shows the services provided by the Department and how to get them and also includes administrative publications outlining the following projects:

Online registration: An online registration project was completed in training institutions, the Higher School of Communication of Tunis and the Higher Institute of Technological Studies

in Communications in the Tunis Academic year 2004- 2005. The fees paid by virtual currency (e-dinar).

Virtual Agency for Tunisia Telecom: The Agency provides services for public communications networks including : Access to detailed telecom billing,Telephone bill payment via electronic dinar, Guide definitions to current communication services,access to utilizing the additional services for communications

Subscription to the mobile phone network to adopt prepays information consumption.

Virtual Agency Mail: The basic services provided by Virtual Agency Mail via "Internet" using the default national currency are: Postcards, Stamps and supplies along with the acquisition of Tunisian philatelic products from the first issue dated July 1988 to the latest version of 2014, see all the details related to postal service and Tracking post by using a code.

E-Learning: Based on draft (section without paper) a sophisticated system enables the student in the field of communications technology or working in the private sector to follow the lessons in one of the relevant terms through the communications network without having to attend the Higher School of Communications or the Higher Institute of Technological Studies in Communication. This advanced system allows for those interested in the possibility of using configuration services and studying without the paper, whether they are within the educational institutions with feedback given to the Ministry of Communications Technology or working in a foreign institution.

Pay bills: This is used by: Tunisia Telecom, National Transport Company ,Tunisian Company of Electricity and Gas, Some public hospitals to book appointments and take payment, The National Social Security Fund to pay salaries.

### 1.6.8. Banks and payment via the internet in Tunisia:

The banking sector under the framework of the technical committees at the level of the Tunisian Exchange Company and under the supervision of the Tunisian Professional Association of Banks and Financial institutions established a system to pay via the internet:

Installation of a secure payment system: This system enables institutions and merchants entrusted with services to carry out secure payment transactions over the internet by Visa and MasterCard cards and with the electronic dinar. The system links the commercial sites across the Tunisian Internet Agency with special hubs either by post or bank institutions to accomplish direct exchanges in a timely way. It enables a payment processing system between the commercial and website payment methods secured by the global system for electronic exchange security (layer standards safe).

E-Money: since August 2005 the Tunisian post service has provided the public with an electronic means of payment via the internet. This is a virtual process dubbed the e-dinar and allows reimbursement for purchases through certain sites on the internet. This virtual currency is easy to use, safe and was used for the first time to allow students to pay tuition fees via the internet.

### 1.6.9. The prospects of E-commerce in Tunisie

The National Technical Committee for E-commerce has held four meetings and formed two working groups. The first is interested in the development of electronic trade, and the second in e-payment. The first team proposed a plan of action and a focus on exchanges between institutions and gives exports priority as institutions rely on a good relationship between themselves and the consumer.

The ministerial meeting was approved on June 9, 2010 and the work programme centred on: The completion of a virtual market between institutions, a typical programmer (on the line) to rehabilitate 100 institutions in the Informatics field paid for by the Rehabilitation Fund and the Ministry of Communications, Technology and Transport and the Ministry of Industry and Energy, Development of electronic commerce between the institution and the consumer by creating centers to sell tickets on-line and to carry out a study to develop the services provided to students, The consolidation and completion of portals to give more support in the fields of tourism, health, ICT and traditional and food industries and Carrying out an awareness campaign for further definition of the E-commerce programmer.

### 1.7. Payment Methods:

The basic structure of a country's economy and financial markets consists of the payment systems in use (Demirgüç-Kunt & Maksimovic, 2002). Banking and financial services are being rapidly changed by E-commerce with new systems that should make banking more efficient (Carnell, et al., 2009).

Technology leads to better delivery channels and this is part of a financial world which has changed greatly over the last two decades with the introduction of wholesale banking, multinational banking, Euro-banking, international banking facilities, multiple currency loans, collateralised mortgages, interest rate and currency options and swaps, and financial futures. Credit cards, debit cards, automated teller machines, cash management accounts, electronic fund transfers, point of sale terminals are also part of developments that are transforming banking and finance (Panopoulou, 2011).

Declining computing costs and more powerful computing and telecommunications technologies are changing payment systems. Simultaneously, the lowering cost of communications has opened markets world-wide. These also offer the potential to improve efficiency and to create new payment mechanisms (Chaffy, 2009).

In the past the banks controlled payment systems but consumer demand is leading to alternatives and today numerous other services exist – so much so that the competition has made money transfer into a commodity. The banking industry has followed others in developing new payment systems for small value purchases (Mallat, 2007) and other organizations have also become involved including MasterCard, Visa, Microsoft as well as start-ups like Digi-Cash, Cyber-Cash and First Virtual (Swire, 2003).

These payment systems are becoming more common everywhere in the industrialised world because they are quicker and more efficient. They also offer economies of scale and the chance to rationalize. This is accompanied by advances in payment technology help to increase the liquidity of the banks. Because they are expensive to implement they also need cooperation and the help of the relevant central bank (Yu, et al., 2006). So far, the banking sector has performed well in this area.

Increasing globalisation and faster communications have necessitated changes and some of the banking solutions have included credit cards and travellers' cheques, as well as internet payments and these have helped to secure financial markets in the last few years (Saarinen, 2012), (Panopoulou, 2011).

In developing countries it is more likely that the relatively affluent use credit and debit cards to shop (UNCTAD, 2015) whereas in other parts of the world, especially in Asia and Latin

America, credit cards are not common (Kaynak & Harcar, 2010). So a Western company could not do great business over the internet in a country that does not use this payment method (Jennex, et al., 2004).

(Jennex, et al., 2004), believe that under-developed electronic payments systems will limit E-commerce. In these countries companies are prevented from taking payments in this way for legal and business reasons including transaction security.

The absence of laws governing the operation of E-payments is also a concern and this is why E-banking operations employ service agreements between themselves and their clients (James, et al., 2006). Innovations that have affected consumers include credit and debit cards, automated teller machines (ATMs), stored value cards, and e-banking. Innovations that have helped to develop E-commerce are e-cash, e-checks, smart cards, and encrypted credit cards but these are not common in developing countries. A few large companies use them on a transaction basis and innovations that affect companies are related to the payment mechanisms that banks provide for their clients, including inter-bank transfers through automated clearing houses which allow payment by direct deposit (Andam, 2014). The main payment method for online transactions in developing countries is cash-on-delivery or bank transfer payments in which cash is paid directly into the bank account of the company from which the goods were ordered (Andam, 2014).

### 1.8. Regulation and legislation

A problem with E-commerce is a lack of regulation that allows pornography, counterfeiting products, and other illegal actions to create security and legal issues that cannot be solved

(Ciocchett, 2007). There is also a threat to privacy and intellectual property rights as well as the danger of universal defamation and problems of tax collection.

System security is also a worry as is the availability of indecent, obscene and racist content. There are also issues like fraud and concern about publishing hate speech (Beynon-Davies, 2002). Governments looked into introducing regulations to deal with security issues and recently many US congressmen and other political officials expressed concerns about unsolicited offers that are being made online (Evans & Yen, 2006)

Although copyright laws apply online many people ignore this and sell without permission from the copyright owners. As they are not allowed to do this in a shop they should not be allowed to online in selling items like DVD, CDs or books (Belk, 2014). It is hard for governments to control this and it might be necessary for world governments to introduce legislation to prevent this (Janssen, et al., 2012). The combination of encryption techniques and laws may be able to eliminate these practices (Stamp, 2003).

There has already been a great deal done in the “offline” world to limit the amount of information an organization can hold about an individual, most notable the 1998 Data Protection Act (Turban, et al., 2002). In addition, a number of organizations including AltaVista, Microsoft and AOL use the TRUSTe seal that they call a “trustmark” and which appears on e-tailers’ websites. The aim is to give customers confidence about privacy, credit card security and the general integrity of the site and organization (Trust, 2017).

### 1.9. E-commerce challenges

The internet is not only concerned with money. There are also extensive databases containing confidential information about businesses, organizations and governments. The

internet can also be considered to be a Foreign Direct Investment (FDI) tool. Companies go about breaking into foreign markets in different ways to grow and become multi-national concerns and also to gain competitive advantage over rivals. Often they are helped by features like cheap labour and materials costs as well as an advantageous infrastructure, communications and laws.

Challenges come with E-commerce both for companies and governments and these can affect the economy on every level. It is also important for any business entering into E-commerce or E-business to consider re-structuring or even to create a whole new business. This can include new processes of management, a different culture and altered management of employees. It could also be necessary to change information systems and networked processing. Most notably, though, their business strategy must change (Chaffy, 2009).

Every E-business needs a robust IT structure if it is to co-ordinate online transactions and business activities and to communicate with other organizations. A strong IT infrastructure can help to break down barriers and create a 'business global village' (Chaffy, 2009). So businesses have to choose the most appropriate technology for their needs including their business processes and data needs from the wide number of options available (Laudon & Laudon, 2009). What's more, technology advances quickly and business needs to keep up with new systems, applications and hardware if it is to function well for its customers and suppliers. This means that there is a need to redesign information architecture and IT infrastructure. However, (Nolan & McFarlan, 2005) identified five key issues that can make this difficult.

1. Loss of management control: this happens as end-users gain independence and can collect, store and handle software. This occurs because there is no central point where management can be enforced.

   2. Connectivity and application integration: to control problems of connectivity and to create compatible networks it's vital for a company to upgrade its IT infrastructure.

   3. Organizational change requirements: to be compatible with any new IT infrastructure the old organizational structure has to be changed.

   4. Hidden costs of enterprise computing: unexpected costs can arise and anticipated savings may not materialise. These relate to hardware and software installation, maintenance costs, labour costs etc.

   5- Scalability, reliability, and security: as the volume of data transactions and the need for storage increase, along with the need for applications like audio, streaming video and graphics, managers need to develop strategies to manage those issues.

As the key aim is to cut labour and materials costs, governments need to eliminate barriers like taxation, regulation, censorship, and let the market dictate the growth of a business. They also need to create a legal framework for commerce in the internet (Drezner, 2004). The move to E-commerce will also increase the need for skilled workers and therefore change the labour market. If the skilled workers are in countries that cannot pay the salary they want or do not have the technology they need then they will probably move to countries that can offer both these things (Hamel & Prahalad, 2013).

## 1.10. Summary

E-commerce is part of a broader process of social change characterised by globalisation, the growth of knowledge and information-based economy and the advance of technology. If E-commerce is to succeed in developing countries then investments must be made in social infrastructure and skills to create a technological environment that fits in with local circumstances, cultures and abilities of users. It gives producers in developing countries the chance to reach new international markets for a low capital investment. It also has the potential to improve competitiveness and customer service and to cut transaction costs and overheads.

Other benefits include overcoming the limitations associated with restricted access to information, the elimination of high market-entry costs and opening up potential markets.

Successful international E-commerce requires knowledge of many areas that are beyond many businesses at the current time including online promotion, international payments and shipping.

More and more developing countries have followed the example of developed countries and launched their own national ICT programmes and strategies. These help with awareness raising, infrastructure building, telecommunications deregulation, education and labour force training, changes in legislation and E-government. There has not been universal success and developing countries need to appreciate that building an efficient telecommunications infrastructure is expensive.

In Libya, E-commerce is causing a rapid transformation of government policies and improving their online communication strategies in order to expand the economy although it still has much ground to catch up with poorer neighbours like Egypt and Tunisia. Both the

fixed line and mobile network systems are government-owned and the postal system is nationalised. International postal services to Libya are slow and not guaranteed.

A population of 6.3 million has only around 800,000 fixed lines and in 2015 there are four million mobile phone users. Most of the country's internet services are provided by the only authorised supplier, the Libya Telecom and Technology Company (LTT).

Their costs are high compared to other service providers but the cost of internet use is falling fast. Users are mainly young people and teenagers who generally use it for leisure and entertainment.

E-commerce payment systems and regulations are important issues in developing countries as credit and debit cards are often only used by economically advantaged people. This means that payment for online transactions in developing countries is usually cash-on-delivery and many E-commerce transactions only involve submitting purchase orders online. Another common form of payment is by bank transfer. At the time of writing this thesis cards and electronic payments are not very common in Libya. This lack of card payments means that a Western company expecting to make many sales could face disappointment. There is no transitional regulation of goods, allowing the transmission of pornography, product piracy and other illegal actions to create security and legal issues that may never be totally solved.

# Chapter 2. THEORETICAL LITERATURE REVIEW OF TECHNOLOGY ACCEPTANCE MODEL

## 2.1. Introduction:

There are differences in the way that users make decisions about new technology and they are often based on whether they plan to accept it (Straub, et al., 1995), (Taylor & Todd, 1995). Many employees feel that using ICT applications such as E-commerce will improve their personal performance and that of the whole organization. To really benefit any organization technology must be adopted by employees and to what extent this happens can be considered as a measure of success for the information system (Delone & McLean, 2003).

In many studies, the Technology Acceptance Model (TAM) (Davis, 1989, p.321) (Venkatesh & Davis, 1996) and (Venkatesh & Johnson, 2002) has been shown to be successful in predicting users' attitudes towards new technology and therefore it is a very important tool. It has emerged from the Theory of Reasoned Action (TRA) of (Ajzen & Fishbein, 1975) and a wide number of researchers have used it in their studies.

In this chapter, we will review the literature about TAM starting with a review of Resource Based Theory, Theory of Reasoned Action (TRA), and the Theory of Planned Behaviour (TBP) and of TAM. This will be followed by a comparison between TAM and other theories.

## 2.2. Matching Person & Technology:

The Matching Individual & Technology (MPT) assessment operation is a lot of mortals - centered measures, all of which examine the self-reported view of adult consumers regarding strong suit/capableness, needs/goals, taste and psychosocial characteristics, and expected engineering science welfare. There are separate measures for general, assistive,

pedagogy al, workplace, and healthcare applied science use; in Ireland, the measures were used to assess outcomes of assistive engineering (AT) provision for (a) multitude throughout the res public participating in a new localized AT service delivery cognitive operation and (b) student transitioning from secondary coil education. There are comrade provider forms so that consumer-provider shared perspectives can be assessed and to ensure that the matching process is a collaborative one; the Irish Gaelic version assumes collaboration from the start. Each measure can be used when evaluating a person for technology use and as person-centered, ideographic, outcomes measure. The measures have been determined to have good dependableness and validity.

### 2.3. The Theory of Reasoned Action:

Martin Fishbein and Ajzen introduced the Theory of Reasoned Action (TRA) in 1975 to study behaviour as social psychology (Figure 2.1). They stated that the postulation of TRA is that intentions stimulate behaviour and they are driven by two determinants which are attitudes toward behavioural and subjective norms.

TRA has been widely used to study behaviour in social psychology (Donald & Cooper, 2001) and in many instances it has proven to be very successful in achieving this. Examples of this have been studies into health belief (Pool, 2001), mobile chat (Nysveen, et al., 2005), condom use (Sneed & Morisky, 1998) as well as numerous others.

Figure 2.1 shows the elements of the theory of reasoned action are attitudes towards behaviour, subjective norms and behavioural intention.

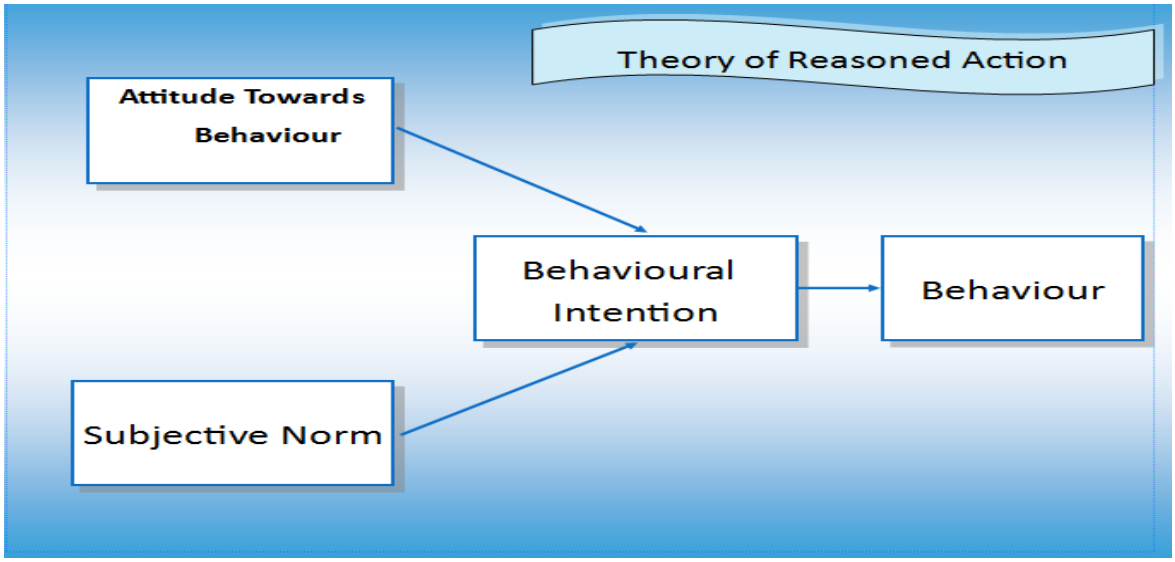


**Figure 2-1 The Theory of Reasoned Action**

### 2.3.1. Attitude Toward Behaviour:

In the chapter "The Behaviour of Attitudes" (Fishbein, 1967) Doob defined an attitude as `an implicit drive-producing response considered socially significant in the individual's society'. Fishbein felt attitudes are "learned predispositions to an object or class of objects in a favorable or unfavorable way' (Fishbein, 1967b). Other studies have found that an attitude will integrate social perceptions and experiences (Fishbein, 1967a). Fishbein and Ajzen pointed out that a person's attitude toward behaviour is determined by the set of salient beliefs he or she holds about performing the behaviour (Fishbein & Ajzen, 1975). According to Ajzen and Fishbein salient beliefs are a small number of beliefs, perhaps five to nine that a person can attend to at any given moment. A major determinant of the behavioural intention is the attitude toward the behaviour (Slocombe, 1999).

### 2.3.2. Determinants of Subjective Norms:

This the definition of Subjective Norm as (Ajzen & Fishbein, 1980) Say “a person's belief that most of his important others think he should or should not perform the behaviour in question". They indicated out that in developing subjective nom, standard, an individual

requires into account the normative objectives of other resources that are essential to him or her. Salient beliefs need to be identified in order to determine the subjective norms. Bright and his colleagues suggested that in order to change the subjective norms of an individual there should be change in the individual's perception of what a specific group would want (normative beliefs) and his willingness to comply with the opinions of that group (Bright & Morris, 1994). Sable and his fellow worker argued that subjective norms did not predict physicians' intentions to prescribe emergency contraception (Sable, et al., 2006). (Taylor, 2001) Represented the theory of reasoned action symbolically and gave an example:

B ~ I = (Aact) w1+ (SN) w2

Where B= Behaviour

I = Intention

Aact = the person's attitude toward the behaviour

SN = the influence of the person's subjective norms

The w1 and w2 components represent empirically determined regression coefficients.

An example:

Attitude: "I think drinking is bad for my health"

Subjective Norm: "I bet my girlfriend wants me to stop drinking"

Intention: "I want to stop drinking"

Behaviour: "I'm going to AA and I haven't had a drink in 6 weeks"

Taylor's example of TRA is interpreted as a drinking person might have two driving determinants which affect his behaviour towards something. If the drinking person has an attitude against drinking e. g. he thinks drinking is bad for his health and he thinks that his girlfriend wants him to quit drinking, these two beliefs will direct him to have behavioural intention to stop drinking, which will lead him to the behaviour of stopping drinking.

### 2.3.3. The TRA's Limitation:

Although many research studies support the Theory of Reasoned Action, it has a number of limitations (Fishbein & Ajzen, 2011). For example, it has been criticised because it focuses on intentions not behaviour (Poss, 2001). Poss also noted that TRA takes a long time to examine complex behaviours because every part of the behaviour needs to be checked. Taylor also outlined some limitations including that it is only applied using self-reported information which may not be accurate. In addition, TRA cannot predict behaviour without agreement of attitude and intention on action, context and time (Taylor, 2009). (Ajzen & Fishbein, 2004) examined Ogden's (2003) opinion and found that it was hard to know why she only reviewed 5 years when many meta-analyses are available.

Ogden found three major conceptual flaws in the theory. Firstly, it cannot be disconfirmed. She argued that the theory is too general to include precise tests so it cannot be disproved. She also found that one or another of the theory's antecedent variables cannot predict the outcome and that the theory's predictors cannot explain variance in intention or behavior, the definition of behavior  is the action or reaction of something, such as a machine or substance, under specified circumstances (dictionary, 2016). However, this does not mean that the theory is false.

Replying to this, (Ajzen & Fishbein, 2004) pointed out that the influence of attitude, subjective norms, and perceptions of behavioural control for the prediction of intentions should be different from behaviour to behaviour and in different populations. They claimed that they had found that the constructs of TRA predict behaviour (Ajzan, 1988), (Ajzan, 1991), (Ajzen & Fishbein, 1980), (Fisnbein, 2000).

So Ajzen and Fishbein strongly defended TRA citing that three theoretical antecedents should be enough to predict intentions, and that only a couple should be needed for any application.

Ogden also felt that there was too great a variance of intention in Theory of Reasoned Action (TRA) Ajzen and Fishbein said that it was uncertain just what level of variance a model needed to explain for it to be considered workable. They cited that it was validated in some studies in which TRA was tested for convergent and discriminant validity such as (Bamberg, et al., 2003). So they argued that it covered variance in intentions well.

Ogden's second comment was that TRA leaves too much of variance in intentions.

Ajzen and Fishbein stated that it was not made clear how much variance a model had to explain for it to be judged acceptable. They pointed out that TRA was validated in some studies, which tested TRA for convergent and discriminant validity such as (Bamberg, et al., 2003). Therefore, they defended the theory in that it fared quite well in explaining variance in intentions.

Ogden (2003) also suggested that data gathered from questionnaires, instead of examining existing cognitions, might create new cognitions or change existing ones and these changes in cognitions could alter behaviour. Replying to this Ajzen and Fishbein argued that this is

the case for all questionnaire studies and surveys. They also raised the possibility that the instrument affects any studied phenomenon under study.

Therefore, (Ajzen & Fishbein, 2004) refuted all Ogden's comments (Ajzen & Fishbein, 2004). Since being developed TRA has been useful in many studies, for example in examining the propensity to bid in online auctions (Bosnjak, et al., 2006). explaining intention to use mobile chat (Nysveen, et al., 2005), studying health behaviour (Poss, 2001), carrier attributes (Voss, et al., 2006), condom use . (Slocombe, 1999), explaining physicians' intention to prescribe emergency contraception (Sable, et al., 2006) , and HIV prevention (Fishbein, 2000).

In the study from intentions to actions' (1985) Ajzen looked at the limitations of TRA. This led to the theory of planned behaviour being posited as a new way to study intention and behaviour. Many studies have found the theory of reasoned action to be valid and successful. While it is a psychological theory it has been successfully transferred to many other disciplines.

Mostly, (Fishbein & Ajzen, 2004) rejected all Ogden's comments (Fishbein & Ajzen, 2004). Since its development TRA has been used successfully in many studies. for example, social network technology and socioeconomic behaviour in malaysia (JY, et al., 2014). Applying the Technology Acceptance Model to Understand Aviation Students' Perceptions toward Augmented Reality Maintenance Training Instruction ( Wang & Tim, 2016). Using technology acceptance model to study adoption of online shopping in an emerging economy (Tabssam , 2016). Consumer Acceptance of Electronic Commerce: Integrating Trust and Risk with the Technology Acceptance Model (Paul, 2014). An empirical study of determinants of E-

commerce adoption amongst micro, small and medium enterprises (msmes) in kenya ( Ochola, 2015).

The theory of reasoned action was validated and is successful in many studies. While it is a theory from psychology it has been used successfully in many different topics. The current study adopts attitude and subjective norm, which are the two main pillars of TRA: the importance of applying these to the research model is based on the similarity between TAM and TRA and both affect the behavioural intention.

### 2.4. Theory of Planned Behaviour:

Ajzen first introduced the Theory of Planned Behaviour (TPB) in 1985 with the aim of extending the Theory of Reasoned Action (Figure 2.2). The postulation of TPB is that that attitude, subjective norms and behavioural control impact on the behavioural intention towards the target behaviour. There may also be beliefs that are antecedent to attitude, subjective norms and perceived behavioural control. These may include behavioural beliefs and outcome evaluations that act on attitude, normative beliefs and intention to comply with the subjective norm. They may also control beliefs and have an effect on influencing perceived behavioural control. The latter was defined by (Darker, et al., 2009) as "the extent to which a person feels that the behaviour is easy to perform and under his or her control' (Darker, et al., 2009).

Researchers used TPB in literature concerning information systems (Mathieson, 1991), (Taylor & Todd, 1995b), (Taylor & Todd, 1995b), (Shih, 2004), (Karjaluoto, et al., 2002). According to TPB, behaviour is shaped by a person’s intention to perform and this is informed by attitudes towards the behaviour, subjective norms and perceptions of whether

the individual will achieve the target behaviour. (Ajzen, 1985) noted that an attitude toward behaviour is a positive or negative assessment of performing it. Attitude dictated by beliefs, subjective norms are informed by normative beliefs and motivation to comply, and perceived behavioural control is informed by beliefs (Ajzen, 1991).

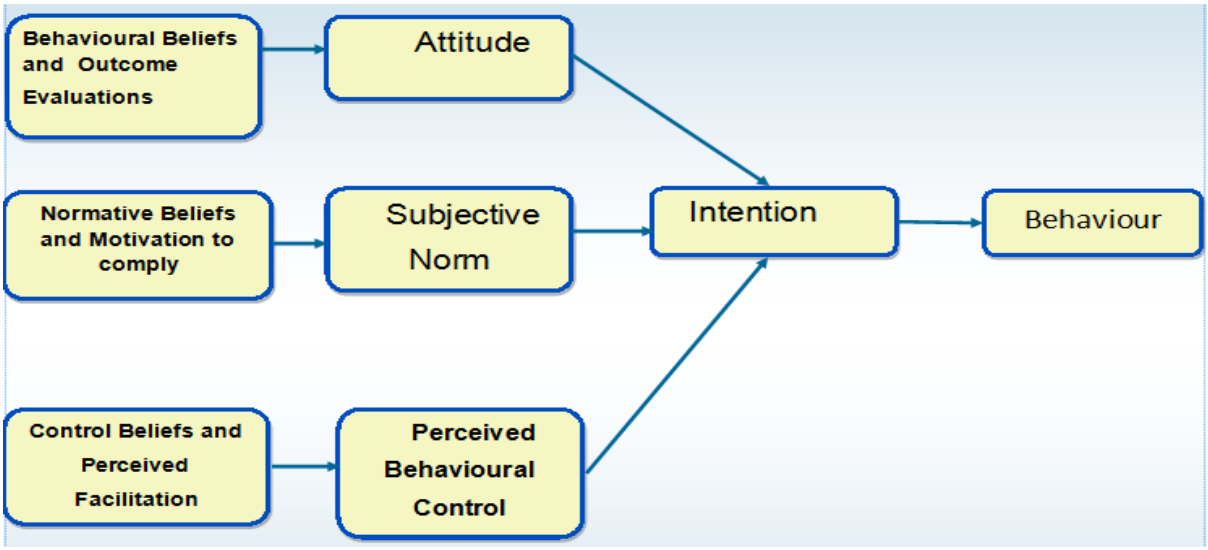


**Figure 2-2 The Theory of Planned Behavior**

The Theory of Planned Behaviour (TPB) does not determine beliefs linked with any behaviour and it is the researcher's role to determine them. TPB does include a direct link between perceived behavioural control and behavioural performance. Ajzen stated that the theory aimed to identify causal antecedents of behaviour by positing an individual's intention to perform as a direct determinant of the action. This indicates how determined individual is to achieve behaviour.

Subjective norm and intention are strongly linked (Bhattacherjee, 2000). TPB helps to understand how people's behaviour can change (Ajzen, 1988).

According to the theory, human action is led by three main motivators:

1) Behavioural Beliefs,

2) Normative Beliefs

3) Control Beliefs (Ajzen, 1991)

Behavioural beliefs concern the consequences of behaviour. Normative beliefs concern the normative expectations of others. Control beliefs concern factors that may encourage or limit behaviour. According to the theory, subjective norm and perceived behavioural control can have independent influences that affect behaviour (Ajzen, 1991). People will behave in a certain way when they believe that it is important to others that they do so (Courneya & McAuley, 1995). Ajzen emphasizes that attitudes come from beliefs in the benefits of behaving in a certain way. The subjective norm is one's belief that it is important that others support or reject the required behaviour and provides motivation to comply with this. Perceived behavioural control concerns resources, opportunities and threats to the behaviour (Ajzen, 1988), (Hanson, 1997) and features two elements:

1) Perceived self-efficacy or the ease or difficulty of behaving in a certain way and

2) Perceived controllability which defines the extent to which the actor controls the performance (Ajzen, 2002), (Tarkiainen & SundQvist, 2005).

Beliefs, attitudes, and behaviour are examined by the theory. A determinant of the behavioural intention is the attitude towards that behaviour. Another is the subjective norm, which is determined by

1) The individual's beliefs that certain other significant people support their actions, and

2) The individual's motivation to comply with their needs (Ajzen, 1991).

This describes subjective norms as the influence of referent others , in another meaning Normative beliefs are the beliefs about the normative expectations of others. TPB is similar to TAM in that it considers that previously held beliefs can be used to predict behaviour such as the antecedents to attitude, subjective norm and perceived behavioural control. The current research model shares similarities with TPB because it studies users' beliefs and the effect they have on the main determinants of TAM. This research combines the theory of reasoned action's two main constructs:  attitude and subjective norm. The combination with the constructs of TAM will result in a strong model which better predicts behaviour.

### 2.5. Technology Acceptance Model:

The Technology Acceptance Model (TAM) (figure 2.3). Emerged from the Theory of Reasoned Action (TRA). Its aim is to predict computer users' behaviour and was introduced by Fred Davis in his unpublished PhD thesis and introduced by Davis and his colleagues in 1989. TAM aims "to provide an explanation of the determinants of computer acceptance, which is capable of explaining user behaviour across a broad range of end-user computing technologies and user populations, while at the same time being both parsimonious and theoretically justified' (Davis, et al., 1989).

TAM is based on TRA as a way to identify the relationship between the two main determinants (beliefs) - perceived usefulness (PU) and the perceived ease of use (PEOU), and user's attitude (ATT), behavior intentions (BI) and actual computer acceptance and usage behaviour TAM (figure 2.3) investigates whether there is a relationship between these constructs.

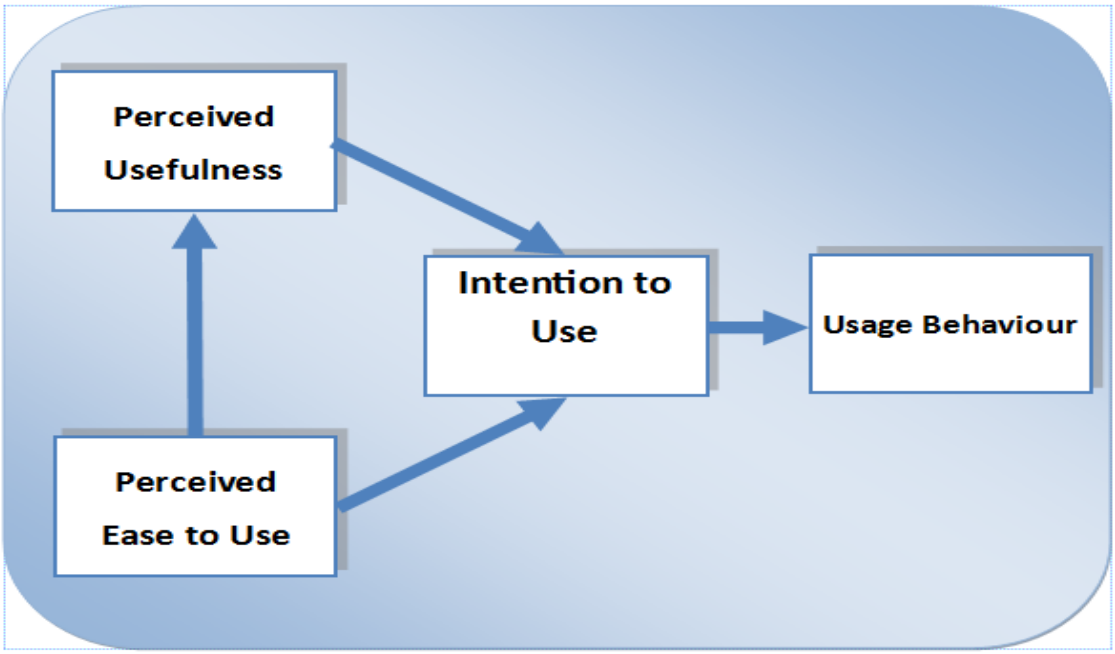


**Figure 2-3 The Original Technology Acceptance Model**

In TAM, the main determinant of usage is behaviour intention (BI) to adopt new technology which can be determined by the person's attitude towards using new technology. Both its perceived usefulness and perceived ease of use have an influence (ATT) and, while the former has a stronger impact than the latter, there is a correlation between the two and they are also dependant on each other. When a user believes new technology is useful it will be accepted and adopted. While TAM has come from the theory of reasoned action there is no subjective norm (SN) as a determinant of behavioural intention. One argument is that subjective norm scales were weak and cannot influence behavioural intention - especially if the technology or system use is optional ( (Davis, 1989), (Davis, et al., 1989). To better understand how TAM predicts usage behaviour we should further examine perceived usefulness and perceived ease of use.

### 2.6. The rationale for choosing TAM as research model:

TAM looks into technology acceptance and use at a personal and individual level. In the past this has been examined using different theories and disciplines including user participation and psychological theories like the theory of planned behaviour, TAM, user satisfaction and human-computer interaction.

Because this particular study concerns user behaviour, the model we use should be capable of predicting user intention and it should also be possible to expand it to include constructs from alternative theories too.

TAM has been chosen because it is capable of understanding the precise relationship between the beliefs of users and the benefits that they enjoy from using E-commerce technology.

This helps to comprehend the external constructs whose causal links influence users' attitudes towards technology (Wang, et al., 2003). TAM is also simple and parsimonious to apply compared with other models (Davis, et al., 1989).

Furthermore, the effectiveness of TAM has been proven in many other studies and in a wide range of technology settings. In the past it has been used to analyse usage intentions for word processing packages like WordPerfect and Lotus 1-2-3 (Adams, et al., 1992), internet applications like telemedicine technology (Chau & Hu, 2002) and Consumer e-shopping (Ha & Stoel, 2009)

It has also been used in many different sectors including manufacturing, financial, healthcare and education.

### 2.7. Perceived Usefulness:

This is defined as "the degree to which a person believes that using a particular system would enhance his or her job performance" (Davis, 1989). Many studies have shown this to be a strong indicator of user acceptance. It has been used to study word processing and spreadsheet systems acceptance (Davis, et al., 1989), predicting user intentions (Mathieson, 1991), telecommuting technology (Venkatesh & Johnson, 2002) and measuring web and wireless site usability (Venkatesh & Ramesh, 2006) . Other researchers have found that it is a determinant of continual system use (Kim & Malhotra, 2005). Bhattacherjee found that post-use PU is influenced by pre-use PU and that this predicts actual system use (Bhattacherjee, 2001).

When users believe that a new technology is useful, they will accept it. PU is the main influence which positively affects users' beliefs and intention to use new technology. TAM also addresses how some external variables affect perceived usefulness. These can include computer training (Nelson & Cheney, 2009), organizational characteristics (Raymond, 2008), attitudes towards the system (Ives, et al., 1983), user participation (Baroudi, et al., 1986) and computer experience (Fuerst & Cheney, 1982) . Computer skills and how complex the technology is considered to be can also affect PU (Compeau & Higgins, 1995b). In a development of TAM Venkatesh and Davis in 2000 added other constructs like social influences (subjective norm, voluntariness and image) and cognitive instruments (job relevance, output quality, result demonstrability and PEOU). Their study found the importance of social influence and for almost 60% of the variance in perceived usefulness. Results showed that variables affect PU directly or indirectly through PEOU as do user training, end-user policy and PEOU. These explained the 48% of variance of PU (Chau & Hu,

2001). Just how involved users are in software development can also affect the perceived usefulness of the system (Delone & Mclean, 1992).

Most studies used Davis's (Davis, 1989) original five-point Likert scales, which ask users to rate their answers from strongly disagree to strongly agree. Davis's included these items to measure the perceived usefulness:

1) "Would improve individual's job performance,

2) Would increase the individual's productivity,

3) Would enhance individual effectiveness on the job,

4) Would enhance the individual to accomplish tasks more quickly,

5) Would make it easier to do the job, and

6) The individual would find the particular system useful on the job (Davis, 1989)."

This scale was adopted by many researchers and was used to explore many areas, for example, students' internet use (Fusilier & Durlabhji, 2005), a communication project (Kelleher & O'Malley, 2006), wireless internet (Lu , et al., 2003), studying social influences (Malhotra & Galletta, 1999) and internet banking (Wang, et al., 2010).

The scale was found to be valid and reliable in that "the degree to which the score or scale being used represents the concept about which generalizations are to be made" ( (Davis, 1989). Many other studies used the scale for such things as studying electronic commerce (Keat & Mohan, 2004) implementing digital libraries (Hong, et al., 2002), examining a data warehouse system (Hong, et al., 2006), internet banking (Wang, et al., 2003)and in determining the intention to use biometric devices (James, et al., 2006).

### 2.8. Perceived Ease of Use:

In many studies, perceived ease of use (PEOU) has been found to have two effects: a direct effect on intention and an indirect one on perceived usefulness. It is defined as "the degree to which the user expects the target system to be free of effort" (Davis, et al., 1989). Many previous studies had also looked into the different results that the perceived ease of use has. (Davis, et al., 1989), (Davis, 1989) , (Adams, et al., 1992) , and ( Szajna , 1996) found no significant influence on behavioural intention to use. This was because PU mediated its influence.

However (Igbaria, et al., 1997), found PEOU was a major determinant of use and other studies found a significant influence in areas such as predicting the usage of information technology (Adams, et al., 1992), mobile internet acceptance (Cheong & Park, 2009), online shopping usage g (Gefen, et al., 2003), electronic commerce (Keat & Mohan, 2004), wireless internet (Lu, et al., 2003), and online banking (Pikkarainen , et al., 2004) . While PEOU has a significant impact on behavioural intention it is less than the impact of PU. While PEOU does not impact directly on intentions, it has an effect on them through PU. Therefore, if someone has no perception of the usefulness of new technology PEOU will not have any effect on their intentions (Szajna, 1996). PEOU is the TAM's second determinant and one that can be an antecedent variable for PU.

This means that if users believe that a new system will be easy to use it will positively influence them to adopt it.

Perceived ease of use was found to relate to external variables. It has been claimed that PEOU affects the user's perception of usefulness in the short term (Compeau, et al., 1999) and external variables like user training, end user computing support, management

support, organizational support, system quality and computer experience have been found to have a direct effect (Chau & Hu, 2002). The link between direct experience with technology and its characteristics has also been found (Davis, 1989), (Lucas & Spitler, 2000) . A further link exists between individual computer self-efficacy (Davis, 1989), (Igbaria & Livari, 1995), (Lucas & Spitler, 2000) and motivation (May, 2001). So while PEOU has an effect on behavioural intention it is weaker than the influence of perceived usefulness as PEOU does not impact directly on users' behavioural intention although it does have an effect on intention through PU (McKechnie, et al., 2006). So where there are perceptions of the usefulness of new technology, PEOU will not have any effect.

Davis's original Likert five-point scale in 1989 has been widely used and was found to be useful and valid. The scale has six statements:

1) I would find it easy to get the system to do what I want it to do;

2) My interaction with the system would be clear and understandable;

3) I would find the system to be flexible to interact with;

4) It would be easy for me to become skilful at using the systems;

5) I would find the system easy to use;

6) Learning how to use the system will be easy for me" ( (Davis, 1989 , p324)“.

Lucas and Spitler in 2000 used only a two-item scale for measuring PU and PEOU. The statements were 1) My interaction with the system would be clear and understandable; 2) I would find the system easy to use.

## 2.9. TAM Validation:

Many researchers have successfully used TAM to investigate and predict users' adoption of new technology and applications and this has been supported by the literature review.

As such, TAM was found to be a useful predictor of usage of many computer applications like word processing systems such as WordPerfect and Lotus 1-2-3 (Adams, et al., 1992), telemedicine technology (Chau & Hu, 2002), e-mail communication application (Davis, 1989) and, recently, internet applications like E-commerce systems (Liu, et al., 2013).

Davis and his colleagues in 1989 used TAM to study user behaviour in universities and found the model predictive. It has also been used in various sectors including manufacturing, financial, hospitals and education.

As an established model to explain information technology acceptance behaviour it provides a framework to investigate the impact of external variables on individuals' intentions to accept IT (Darsono & Mada, 2007) . However, some researchers have not applied the original TAM as introduced by Davis but have added other important variables. This has been to overcome some of TAM's limitations which will be discussed later in this chapter.

## 2.10. Model Extensions:

Davis in 1993 stated that non-acceptance of new technology is a barrier to achieving successful information systems. This has put more importance on the technology acceptance that is vital for organizations to achieve competitive advantage. Since 1989, TAM has been tested in various research studies to extend it and to integrate various constructs from other information systems' development theories. TAM has been extended successfully to give more understanding of how users come to accept new systems and to

implement it in measuring usage. A discussion of these extensions to the original TAM follows.

### 2.10.1. Extended Technology Acceptance Model (TAM2):

To address the limitations of TAM Venkatesh and Davis in 2000 extended the explanation for perceived usefulness and usage intentions through social influence and cognitive processes. They named the extended model TAM2 (figure 2.4). It was tested under voluntary and mandatory conditions and was found to be very successful.

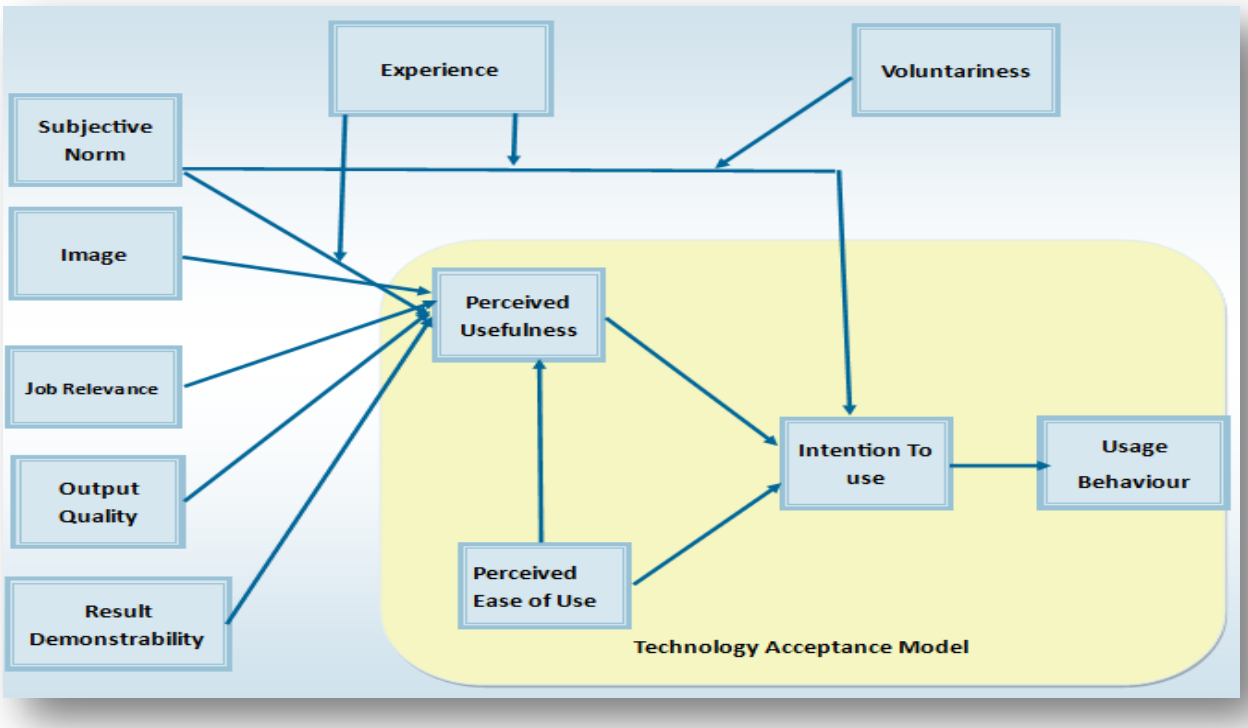


**Figure 2-4 Extended Technology Acceptance Model (TAM2)**

TAM2's hypothesis is that four cognitive factors influence perceived usefulness. The first is job relevance which how applicable the technology is to a user's job tasks.

The second is output quality, which is when a user believes that it will increase work output. Venkatesh and Davis explained this as the consideration of the tasks a system can perform and how much this matches users' jobs.

Thirdly, there are demonstrable results, which mean that a system's results should show users the usefulness of the system.

If the system produces effective and useful results, but not in an obvious way, then the new system's users will not see its usefulness.

The fourth factor is perceived ease of use (Venkatesh & davis, 2000). As observed in figure 2.4, TAM2 postulates that perceived usefulness is influenced by experience, subjective norm, image, job relevance, output quality, results demonstrability and perceived ease of use. This means that perceived usefulness has an impact on intention to use. Perceived ease of use influences intention to use directly and indirectly through perceived usefulness. Voluntariness impacts on intention directly while experience also influences intention directly. The subjective norm influences image.

There is also an influence on intention to use even without perceived usefulness but Venkatesh and Davis stated that this is limited to situations of mandatory technology use. They state in (Moore & Benbast, 1991) that the image is defined as "the degree to which use of an innovation is perceived to enhance one's status in one's social systems". Job relevance is defined as "an individual's perception regarding the degree to which the target system is applicable to his or her job" (Venkatesh & Davis, 2000,p.191).

TAM2 accounts for the effect of three interrelated social forces acting on an individual who has the opportunity to adopt or reject a new system and these are subjective norm, voluntariness, and image.

According to TAM 2, the subjective norm on intention above perceived usefulness and ease of use will occur in mandatory, but not voluntary, system usage settings (Venkatesh & Davis,

2000). TAM2 adds another pair of theoretical instruments by which subjective norm can indirectly impact on intention through perceived usefulness and these are internalisation and identification. TAM2 includes internalisation and identification in the subjective norm. These are not separate beliefs as internalisation (Kelman, 1985), (Warshaw, 1980) means that an individual perceives that an important referent thinks they should use a system and then adopts it as their own belief too. These are what Deutsch and Gerard (1995) called informational (in contrast to normative) social influences, defined as “influence to accept other's opinion as evidence about reality” (Venkatesh & Davis, 2000).

### 2.10.2. Extended TAM to Account for Social Influences:

The extension to TAM includes any psychological attachment to the new technology usage (Malhotra & Galletta, 1999), (figure 2.5). This aspect of the extended model postulates that the psychological element includes social influence processes on the behavioural intentions and attitudes on technology acceptance and users accept behaviour through the social influence processes of compliance, identification and internalisation. This extension of TAM includes Kelman's social influence processes (Malhotra & Galletta, 1999)

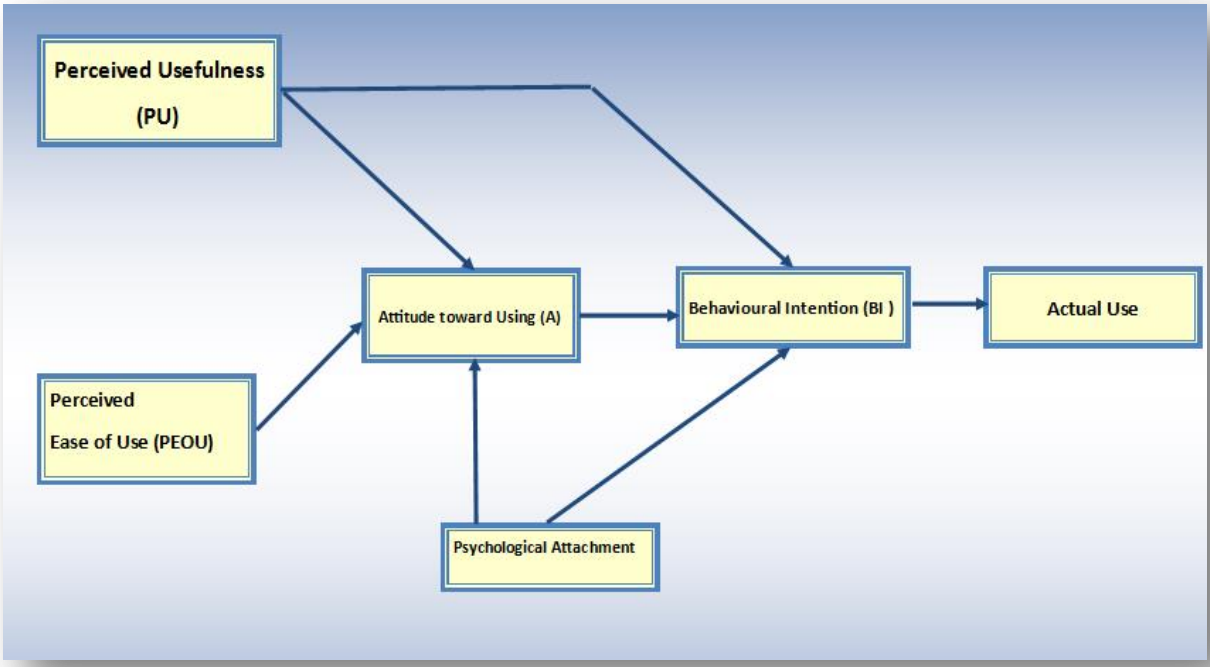


**Figure 2-5 Extended TAM to Account for Social Influences**

Malhotra and Galletta believe social influence processes determine the user's psychological attachment to new technology use. These processes impact on the user's internalisation, identification and compliance. This psychological element, based on social influence processes, impacts both directly on behavioural intention for actual use and indirectly through attitudes towards it.

The subjective norm construct is used in this research, which includes both internalisation and identification so using the psychological attachment as an additional construct would conflict with the role of the subjective norm.

### 2.10.3. The Unified Theory of Acceptance and Use of Technology (UTAUT):

(Venkatesh, et al., 2003) introduced the unified theory of acceptance and use of technology (UTAUT) (figure 2.6). This includes dependent and independent constructs with two dependent components: behavioural intention and usage behaviour. There are also eight independent constructs: performance expectancy, effort expectancy, social influence, facilitating conditions, gender, age, experience and voluntariness of use.

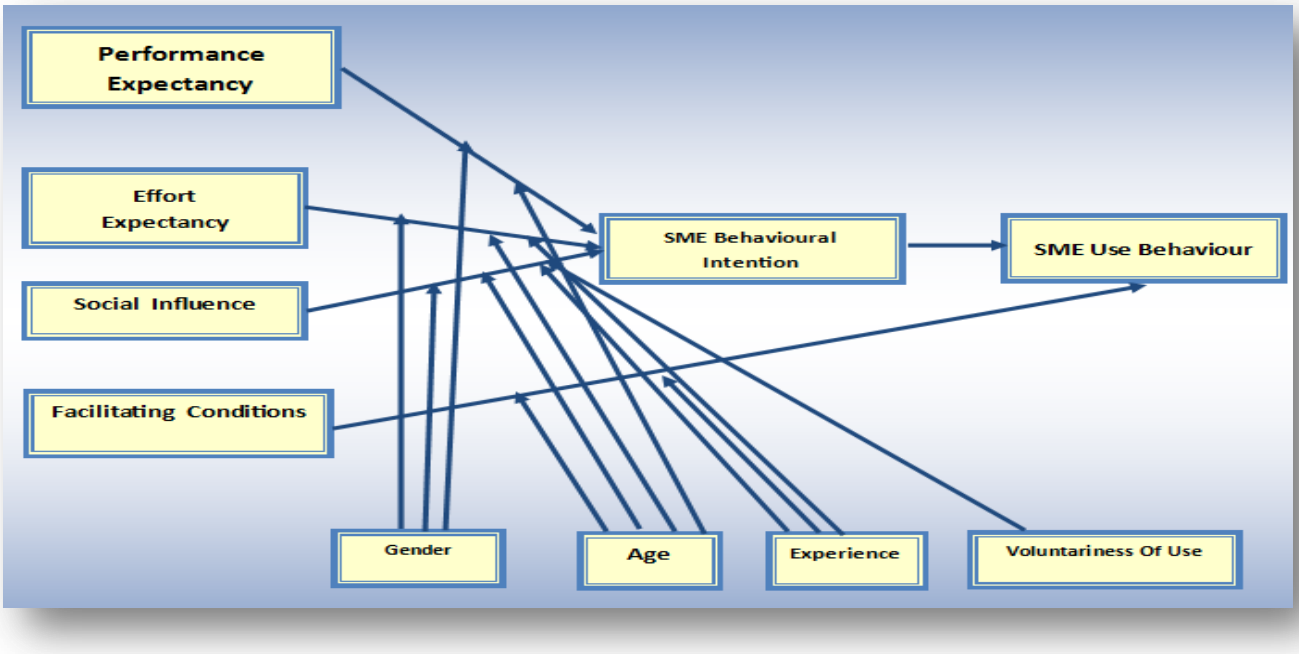


**Figure 2-6 Unified Theory of Acceptance and Use of Technology (UTAUT)**

UTAUT aims to explain user intentions towards the acceptance and use of new systems and postulates that there are three key constructs directly determining intention and behaviour usage:

1) Performance expectancy,

2) Effort expectancy, and

3) Social influence.

Four other elements influence behavioural intention indirectly:  performance expectancy, effort expectancy, social influence and facilitating conditions. Other indirect factors are gender, age, experience and voluntariness which operate as mediators of the impact of the key constructs on intention and behaviour usage (Venkatesh, et al., 2003). According to Venkatesh and his colleagues this model was developed through the consolidation of eight others applied to information systems' usage behaviour. These are: technology acceptance, theory of reasoned action, the motivational model, theory of planned behaviour, a combination of TAM and theory of planned behaviour, the PC utilisation model, innovation diffusion theory and social cognitive theory.

To review the new constructs, first there is performance expectancy or "the degree to which an individual believes that using the system will help him or her to attain gains in job performance" (Venkatesh, et al., 2003,p.447). According to Venkatesh et al. this was the strongest predictor of the eight. Second came effort expectancy which is defined as "the degree of ease associated with the use of the system" (Venkatesh, et al., 2003,p.450). Third was social influence, or the level of importance a person places on the belief of other people regarding his or her use of the system.

In TRA and TAM2 this is represented as subjective norm and, according to UTAUT, social influence is only significant in situations where its use is mandatory. Even here it seems more important during the early stages of technology experience and diminishes over time. (Venkatesh & Davis, 2000). In UTAUT it was found that women and older employees are more sensitive to the opinion of others so social influences are more important (Venkatesh & Morris, 2000), (Venkatesh, et al., 2003).

`Facilitating conditions' are the fourth factor and these are the level at which an individual believes there is the organizational and technical infrastructure support for the new systems. Supporting infrastructure, which is a basic concept, is covered by the effort expectancy construct and particularly when it comes to the ease of tool application. (Venkatesh, et al., 2003) pointed out that it is older employees who give greater importance to the assistance available from an organization. This is due to the physical and cognitive limitations that come with age.

### 2.11. Technology Acceptance Model Limitations:

TAM has succeeded in predicting users' attitudes towards new technology but some feel that that TAM has limitations. One is that the model is simple so is limited in measuring intentions. Only two determinants measure behavioural intention. However the simplicity of TAM is considered by most researchers to be strength. (Davis, et al., 1989) also considered it a limitation that current usage cannot predict future or continual use. May (2001) argued that usage in the short-term can predict continued usage (May, 2001).

(Straub , et al., 1997) tested TAM in three airlines in three different countries - Japan, Switzerland and the USA. Their study showed different results with success in the USA and Switzerland, but not for Japan. This can be taken as evidence that TAM may not be effective in all cultures. However, (Khalifa & Cheng , 2002) did not find this from their experience of TAM in different cultures. The following is a comparison between the Technology Acceptance Model, the Theory of Reasoned Action and the Theory of Planned Behaviour.

## 2.12. Comparison with Other Models:

TAM and the Theory of Planned Behaviour emerged from the Theory of Reasoned Action (TRA) so there are similarities between them. So it is worth examining the similarities and differences to compare them.

According to (Ajzen & Fishbein, 1980,p.4) TRA is successful at predicting behaviour across many fields in "virtually any human behaviour". It hypothesises that beliefs influence attitude and social norms and these influence behavioural intention.

In trying to address some of the limitations of TRA (Ajzen, 1988), introduced another independent determinant of intention, namely perceived behaviour control which deals with behaviours over which people feel they have limited control. This relates to the perceived ease of behaving in the required way and reflects internal and external constraints on behaviour.

In a study of the use of the word processing programme `WriteOne', Davis and his colleagues in 1989 compared the TAM with TRA. The results supported both models. They found that social norms had a weak influence on behavioural intention.

The difference between TAM and TRA is that TAM does not have subjective norms and it is claimed that they do not explain behavioural intentions (Anandarajan, et al., 2000). In a comparison between TAM and TPB carried out by (Mathieson, 1991), it was found that both TAM and TPB both predict behaviour from intention.

Mathieson used three main criteria for comparing TAM and TPB. The first was their ability to predict intention and it was found that this explained this properly. TAM accounted for more variance than TPB but the margin was not large enough to conclude that one model is

better than the other. TAM was also found to be better at explaining attitudes towards using an information system. In the second criterion used to compare the information provided, TAM was found to give general information about perceived ease of use and usefulness while TPB was more specific and, therefore, more useful. The third criterion was the time needed to use the two models and TAM was easier. TAM is also fast and effective at finding users' perceptions of a system.

(Taylor & Todd, 1995) compared the TPB with TAM and TPB and found all three models useful for understanding behavioural intention as the main determinant of behaviour. Additional insight into behavioural intention was provided by the decomposed theory of planned behaviour as the theory includes subjective norms, perceived behavioural control and the decomposition of beliefs as determinants of behaviour.

When Chau and Hu in 2001 compared TAM, TPB and Decomposed TPB to analyse physicians' acceptance of telemedicine technology, TAM explained 40% of the variances, TPB explained 32% and Decomposed TPB explained 42%.

This showed that perceived usefulness was a strong determinant of attitude and behavioural intention in both TAM and Decomposed TPB. No effects of PEOU on PU or attitude were found in any of the models.

When (Plouffe, et al., 2001) conducted a study into merchant adoption of a smart card-based payment system they compared TAM with the Perception of the Characteristics of Innovation (PCI) which is a model proposed by (Moore & Benbast, 1991) that draws on earlier conceptual work by Rogers in 1991.

They discovered that PCI belief constructs explained intention to use better than the TAM (Plouffe, et al., 2001). The TAM figure was 32.7% while PCI model showed 45%. Plouffe et al. explained the comparison between TAM and PCI was assessed empirically in only one adoption context. This meant that the generalizability of the results could not be known beyond their sample and smart card technology adoption context. This was unlike TAM which effectively predicted intention in many studies and in different technology settings.

Comparison to Plouffe and his colleagues is also made more difficult because they only measured behavioural intention and not the actual adoption of the payment system.

Perception of Characteristic of Innovation measures users' perceptions of adopting innovations in information technology innovation. (Moore & Benbast, 1999, p. 195) listed the five characteristics of innovation which influence diffusion as:

- Relative Advantage: which is the perception that an innovation is better than its originator

- Compatibility: the perception that an innovation is consistent with the existing values, needs and past experiences of potential adopters;

- Complexity: the perception that an innovation is difficult to use;

- Observability: the perception that the results of an innovation are observable to others

- Trialability: the perception that an innovation may be experimented with before real adoption.

It is obvious that Relative Advantage is similar to TAM's first construct, Perceived Usefulness. The complexity is the same as TAM's second construct, namely Perceived Ease

of Use. Compatibility in its definition is consistent with the system that provides the needs of users.

This is just part of what perceived usefulness provides while observability is similar to TAM2's construct of result demonstrability. Finally, trialability is usage stage that comes before implementation.

This comparison between TAM and PCI shows the former is a more suitable model for technology due to its simplicity.

TAM can be applied in more instances than TPB and TRA. (Davis, et al., 1989) Found it could predict software usage intention better than the Theory of Reasoned Action. (Mathieson, 1991) Found that TAM predicted intention to use a spreadsheet package better than TRA. (Venkatesh & Davis, 2000) Pointed out that TAM is a robust and economical model for predicting user acceptance of new technology.

## 2.13. Applicability of the Technology Acceptance Modal in Developing Countries:

Using empirical methods TAM has been successfully tested in North America but only a few studies have been carried out beyond this region. Some of the countries where it has been tested include Japan, Switzerland, New Zealand, Hong Kong, Singapore, the United Kingdom, the Arab world and Malaysia. What follows are reports from some developing countries: Saudi Arabia, Egypt, Oman and Malaysia.

### 2.13.1. TAM Research in Saudi Arabia:

(Straub & Keil, 1997) Noted that system usage is useful for managers interested in evaluating the impact of IT. While TAM has been widely applied and tested in North America, few attempts have been made to examine other regions of the world. It has been

argued that TAM might not translate into other cultures and Straub et al. believed that the rapid globalisation of businesses and systems meant it would be vital to find out if this is true. Al-Gahtani worked to discover whether TAM would be relevant in developing countries. As he lacked strong a priori evidence for its applicability in the Arab world (specifically in Saudi Arabia), he asked 'why TAM would not apply to Saudi Arabia as a developing country of different culture?'

At the end of this survey, Al-Gahtani reports that 'findings confirm that TAM constructs are both 'valid and reliable', 'was successful as TAM effectively predicts computer technology adoption and use in the Saudi culture' and 'supports the applicability of TAM to the Arab culture.

### 2.13.2. TAM Research in Egypt

Taher Farahat has done his work in Egyptian Universities; the title of his research applying the Technology Acceptance Model to Online Learning in the Egyptian Universities, The purpose of the research is to identify the determinants of students' acceptance of online learning and to investigate how these determinants can shape students' intention to use online learning. A conceptual framework based on the Technology Acceptance Model (TAM) was modified. A questionnaire was developed and used to solicit information from the 153 undergraduate students who used online learning in DBMU. The results reveal that students' perception of ease of use, usefulness, attitudes towards online learning, and the social influence of students' referent group were identified as significant determinants of students' intention to practice online learning. The possibility of using the social influence of students' referent group, students' perceived ease of use, students' perceived usefulness

and their attitudes towards online learning to predict their behavioral intention to use online learning was also confirmed.

### 2.13.3. TAM Research in Kuwait:

The aim of the study is to investigate the extent to which learners have accepted the Blackboard Learning Management System in their learning decision and to identify the factors that can contribute to the achievement of learners' motivation towards the Blackboard system to be used when designing any curriculum that integrates the harmonious learning method into their curriculum.

In order to achieve the objectives of the study, the descriptive method was used. The study sample consisted of (168) students of university-level enrolled in elective courses in the Faculty of Education at Kuwait University. The study tool was applied at the end of the course and at the end of each semester in the academic years 2008 to 2011.

The study tool used a survey tool based mainly on the Technology Acceptance Model as a theoretical tool to track the degree of acceptance of technology among university students and their view of its effectiveness. This tool included 19 items divided into four axes: Ease Perceived use, perceived benefit, trends, and technology effectiveness.

The results of the study showed that the ease of use of technology and perceived benefit have a positive impact on trends and that the attitudes of learners have a clear effect on the effectiveness of technology, which in turn influenced the level of use. The results also suggest that the technology acceptance model can be critical to investigating the effectiveness of technology application.

In the light of the research results, many recommendations were made, including:

Emphasize the importance of the availability of ease of use factor when working on the design, implementation, and operation of any learning management systems.

Develop a time plan by decision-makers to work on legislation by deploying the Blackboard application in coursework as a way to support the philosophy of self-learning.

Encourage Blackboard users to transfer the skill to their colleagues.

### 2.13.4. TAM Research in Malaysia

In its aim to become a developed nation Malaysia has The National IT Agenda (NITA) which provides the foundation and framework developing these technologies. The research by Suradi is similar in concept to Al-Gahtani's as it aimed to test TAM in a non-Western environment. It also came from an acceptance that culture has a role to play in the acceptance of certain models (eg. USA), TAM was found to be a workable model in the Malaysian environment and results were similar to the findings of Davis etc. Consequently, it was confirmed by Igbaria Suradi that TAM could be applied in the Malaysia for organizations introducing new IT initiatives.

## 2.14. The rationale for inclusion of the additional factors in The Research Proposed Technology Acceptance Model for E-commerce

In this research the researcher developed the theory of acceptance of technology to be applicable to the technology of E-commerce. A new number of elements have been added that have a direct impact on the acceptance and use of E-commerce. All these elements have been added after extensive discussion with the interested and researcher Where there was a match in the views on these additions, and therefore because of these factors of the impact and a real relationship to the extent of the use of this technique,

For example, the real understanding of the need for this technology drives people to try to accept and use it, as well as the existence of laws and regulations governing this type of trade, people feel a lot of security and the existence of the necessary and integrated infrastructure that drives people to experience this technology. The network protection and the confidentiality of information encourage the user to trust in the use of this technology. There has been almost agreement among all that the existence of experience in this technique is a factor and a basis on the position of the user to use this technical.

In addition, these factors have been used in some research and they were successful.

## 2.15. Summary

The reviewed literature has given an account of the widespread use of TAM which is used to investigate technology acceptance behaviour.

TAM has been empirically found to be robust across different computing technology settings and user groups and to be cost-effective and justified.

By comparing TAM with other models its strength becomes obvious although certain researchers criticize its simplicity and the fact that it has only two determinants to predict behavioural intention. To avoid this, it is desirable to import constructs from other theories. Generally, the limitation of TAM is a minor consideration in the context of its overall success. The comparison between TAM, TPB and TRA has shown that TAM is the best choice.

TAM was first introduced in 1989 when technology was far less advanced than today when it includes communication and daily use of PDA applications. This is why it is vital to extend TAM to encompass more factors which influence the acceptance of new technology.

The same thing happened to the ICT computer-based systems developed in the last ten years. Today there are decision support systems, executive information systems, intelligence systems, and financial and budgeting systems which are all used by different levels of manager.

Failure to implement these systems will result in organizations losing money and market position and this is why being able to predict acceptance and use of technology by managers is important. The proposed model of this research (figure 2.7) is an integration of original TAM, extended TAM2, and unified theory of acceptance and use of technology (UTAUT),

theory of planned behaviour (TPB), and constructs from other information systems and technology development theories including user experience and training.

The choice and testing of constructs is dictated by their relevance to managers' use of E-commerce. In this study the aim is to extend TAM to include social and technical factors which will affect the uptake of new technology by managers and employees alike.

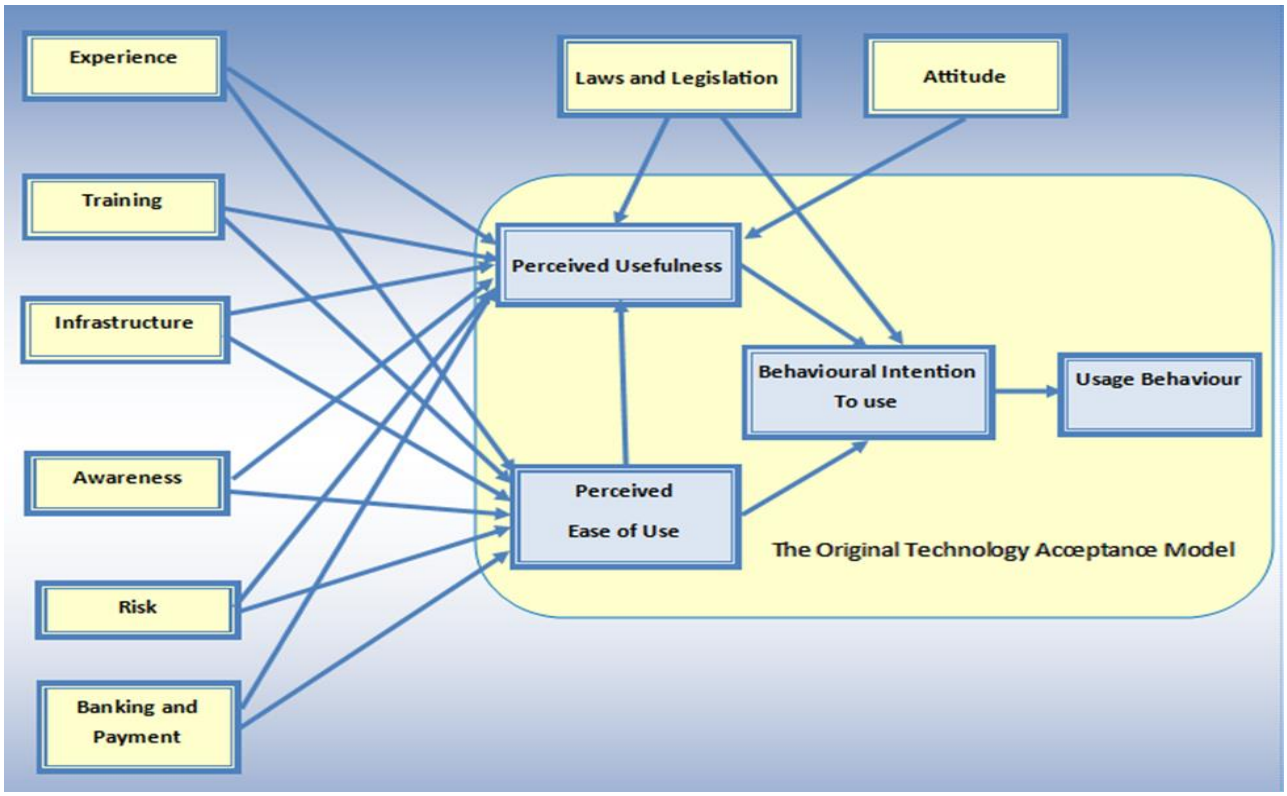


**Figure 2-7 The Research proposed Technology Acceptance Model for E-commerce**

# Chapter 3. CHAPTER THREE: RESEARCH AIMS AND OBJECTIVES

## 3.1. Introduction and research background:

Libya has fallen behind in its uptake of the internet and web/E-commerce when compared with other African and particularly north African countries, which can be considered to be very similar to Libya (e.g. Tunisia). While this is complicated by the political upheaval that Libya has seen in the last few years, it is vitally important that Libya embraces these new technologies because if it does not, it is in danger of falling even further behind than it is now. This study intends to study the uptake of the internet in Libya in comparison to the uptake in a close neighbor (Tunisia) with the intention of attempting to identify the similarities and differences between the two countries and hence identify addressable factors that could improve the situation in Libya.

When studying information systems it can be difficult to establish why users accept or reject certain types of technology, as outlined by (Swanson, 1987). A number of studies, such as those by Ives et a l. (Ives, 1983), (Robey, 1979) looked at how internal beliefs and prevalent attitudes to the use of technology can have an effect. Other external factors like the technical design characteristics or systems were also examined. (Hong, et al., 2002) asserted that developers can adjust external variables such as perceived usefulness and Perceived Ease of use in order to influence users' beliefs about new systems.

The Technology Acceptance Model (TAM) is capable of explaining user behavior across a broad range of end-user computing technologies and user populations, while at the same time being both parsimonious and theoretically justified (Lee, et al., 2005). Under this model it is suggested that when new systems, for example E-commerce, are introduced a number

of factors influence whether they are accepted and adopted and these include subjective norm and personal experience which play a big role in influencing the peoples' decisions to accept and utilise the system (Davis, 1989).

TAM evolved from the Theory of Reasoned Action (TRA), which had been devised and introduced by Fishbein and Ajzen in the mid-seventies (Fishbein & Ajzen, 1977).

TAM goes further and aims to cite the causal relationships between technology's perceived usefulness and ease of use, the intentions of the users and the actual usage.

How useful, and how easy to use, new technology is perceived to be both influences whether people intend to use it and its actual use.

When (Davis, 1989) and (Davis, et al., 1989) conducted some initial investigations on the take-up of information systems, findings indicated that TAM offered important insights into the study of how new technology is accepted and used.

A number of studies have since validated the use of TAM in investigating the acceptance of technology and use and these included (LU, et al., 2005), (Sánchez-Franco & Roldán, 2005), (Szajna, 1994), (Taylor & Todd, 1995), (Venkatesh & Davis, 2000) and (Wang, et al., 2003).

The latter also used measures that had been used as validation in previous studies to confirm their usefulness in assessing TAM.

(Davis, 1989) Proposed developing TAM and worked with Venkatesh to introduce TAM2 in 2000, which they tested under both voluntary and mandatory use and it was shown to be highly applicable. (Venkatesh, et al., 2003) went on to introduce the Unified Theory of

Acceptance and Use of Technology (UTAUT) including new constructs affecting behavioural intention.

### 3.2. The proposed research model:

It has been a long time since TAM was first used and over this time its success has been proven. As technology has progressed, so has TAM. For example, (Venkatesh & Davis, 2000) introduced TAM 2. As technology advances continuing research is necessary to examine its effectiveness and limitations.

Therefore, this study aims to do just that using constructs based on four different theories. The model to be used will be an integrated version of TAM and TAM2 along with the unified theory of acceptance and use of technology (UTAUT), theory of planned behaviour (TPB), and constructs from other information systems and technology development theories like user participation and training.

These will be selected based on their relevance to applicable technologies .

#### 3.2.1. E-commerce acceptance and use:

The research aims to use the Technology Acceptance Model (TAM) and TAM2, the Unified Theory of Acceptance, the Use of Technology (TUAUT) and the Theory of Planned Behaviour (TPB) in the context of managerial acceptance and use of E-commerce (E-com) systems. (Laudon & Traver, 2007) Identified different kinds of E-commerce in the IS literature and it is also possible to define different categories according to the websites. (Young & Benamati, 2010) felt that E-commerce systems could be split into informational, transactional or those concerned with customer service. The first of these categories, informational, can also be sub-divided into general routine information and to answer specific questions or customer

requests. Some are also interactive in which customers can perform actions like changing personal details or ordering while others are not. However, care must be taken when analysing and measuring E-commerce use.

### 3.2.2. Technology Acceptance Model and E-commerce system

The use of TAM can help to give a clearer picture of consumer intentions and behavior and many studies have attempted to use it for this purpose. (Han & Jin, 2009), (Park, et al., 2004), (Khan, et al., 2010) in the first of these, by (Lu & Yongsheng, 2009) it was found necessary to choose examples closely related to the research to get a clear picture. It was also found that examples from different countries and cultures should be scrutinized to make findings universally applicable. (Lee & Chu, 2000) felt that the power of explanation was low and this means our model might not give the clearest picture of consumer behaviour in an E-commerce environment.

Their study has looked at using E-commerce to predict how it is adopted by businesses and their customers. Most research has found that consumer behaviour strongly affects technology adoption and business success.

A vast number of individual differences can influence consumer behavior. Some of the most important include personality, lifestyles and psychographics, and motivation. Personality reflects a person's consistent response to his or her environment (Sarkane , 2009).

## 3.3. The problem statement and research question:

Certain managers and staff reject new information and communications system technology such as E-commerce out of hand. This can be because of lack of experience in using computers for E-commerce, lack of postal services, a need for training in E-commerce, a

poor E-commerce infrastructure or a difficult interface. These can all be considered E-commerce failures.

This research proposes TAM as an enabling model for a system of E-commerce which can be used in development and implementation. It can examine and predict behaviour and, as this study aims to scrutinize managerial acceptance and use, the research question should be:

**((What factors affect managers' decisions to accept and use E-commerce systems in Libyan and Tunisian companies?))**

### 3.4. Research objectives:

This research aims to look at levels of acceptance and use of E-commerce using TAM. This involves extending the model, particularly in the constructs of TAM2, Theory of Planned Behaviour TPB, Unified Theory of Acceptance and Use of Technology (UTAUT)."In the past, certain researchers examined implementation of systems, user behaviour and interface design (Liu, et al., 2010). Others looked at training (Venkatesh & Speier, 1999) and user participation (Barki & Hartwick, 1989). Other studies looked at how managers related to technology (Saadé & Bahli, 2005).

Therefore it is vital to study what affects managers as their acceptance is key if technology is to be used for its intended purpose (Darsono & Mada, 2005).

Therefore the objectives of this research are to:

1. Critique the Technology Acceptance Model by applying it to a real case study of Libyan and Tunisian companies to examine how managers make decisions about E-commerce technology.

2. Show how users develop their orientations towards technology systems over the round (belief - attitude - behaviour). There should be assessments of users' beliefs before and after implementing the new technology with measurement of users' beliefs and attitudes.

3. Find the key factors that encourage or restrict technology use by managers and staff. This can be done by assessing TAM and other psychological theories like planned behaviour (TPB) and theory of reasoned action (TRA).

4. Find what supporting factors make users consider technology as useful.

### 3.5. The Importance of the research:

This research is useful because it will extend the study of TAM to include the acceptance of E-commerce technology in Libya and Tunisia. It will use similar methods to those employed in previous TAM studies. TAM is a widely used method by researchers to understand how users accept new technology. To maintain its relevance, it needs to be applied to emerging technology as and when it is introduced.

### 3.6. Aim of the investigation:

1. Other North African countries are far more advanced in the uptake of E-commerce than Libya. For example, neighbouring Tunisia is in the top 10 of E-commerce users in Africa but Libya is at the bottom of the list despite being similar in population and culture. This may be due to political reasons but these cannot be the only cause. This research aims to discover

the reason and to draw up a plan for the future to improve this important commercial channel. So the specific objective is to study current E-commerce practices in Libya compared with those in Tunisia.

2. To understand the growth of Libyan E-commerce compared with Tunisia.

3. To see if the infrastructure needed for E-commerce is in place and, if not, to examine what that infrastructure might include.

4. To spot the challenges facing Libya in taking E-commerce online and building an Electronic Data Interchange (EDI), it is the structured transmission of data between organizations by electronic means and it is the computer-to-computer exchange of business documents in a standard electronic format between business partners. (Text, 2016).

### 3.7. Summary

The Technology Acceptance Model (TAM) is an E-commerce that TAM is a model that can be used to evaluate technology acceptance. It can therefore be used to understand the uptake of E-commerce.This chapter opened by reviewing previous studies of the use of TAM to highlight the importance of continuing research. It also identified the proposed model of the current research.The chapter also examined the problem statement and question and looked into the importance of, and rationale for, this research. This comes from the fact that new systems are often abandoned and rejected at all levels in an organization. TAM is the most popular method of information systems research to examine users' acceptance and which can predict their intentions , behavior towards new technology.

# Chapter 4. CHAPTER FOUR: RESEARCH METHODOLOGY

## 4.1. Introduction:

This chapter shows how applicable the hypotheses were when the case studies were carried out during field work and also reviews the research methodology used. It begins by outlining the hypotheses grouped into three according to the impact of variables: E-commerce use, perceived usefulness and perceived ease of use. An element of the literature review is also included as it had a role of research methodology in the study.

Then the main research case study of companies in Libya and Tunisia will be given and, finally, there will be a review of the definitions and measurements of research variables.

## 4.2. Research Hypotheses:

The research hypotheses grew from the literature and the TAM constructs that have been previously outlined. To understand the connections between constructs that are proposed, the hypotheses should be grouped according to the impact the constructs may have on each other.

Classified according to influenced constructs these groups are:

1) E-commerce usage

2) Perceived usefulness

3) Perceived ease of use.

The behavioural intention is directly affected by perceived usefulness, perceived ease of use and laws or legislation and indirectly by attitude, experience, training, infrastructure, awareness, risk and available banking and payment methods.

Below are the three groups of proposed variables in the technology acceptance model according to their effect:

Research Hypotheses Related to E-com Usage:

- Perceived usefulness has a positive impact on behavioural intention to use E-commerce.
- Perceived ease of use has a positive impact on behavioural intention to use E-commerce.

Research Hypotheses Related to Perceived Usefulness:

- Perceived ease of use has a positive impact on perceived usefulness.
- Positive attitude has a positive impact on perceived usefulness.
- Training has a positive impact on perceived usefulness.
- Strong laws and legislation have a positive impact on perceived usefulness.
- User experience has a positive impact on perceived usefulness.
- Training has a positive impact on perceived usefulness.
- Infrastructure has a positive impact on perceived usefulness.
- Awareness has a positive impact on perceived usefulness.
- No Risk has a positive impact on perceived usefulness.
- Banking and payment method have a positive impact on perceived usefulness.
- Research Hypotheses Related to Perceived Ease of Use:
- User experience has a positive impact on perceived ease of use.
- Training has a positive impact on perceived ease of use.
- Infrastructure has a positive impact on perceived ease of use.

- Awareness has a positive impact on perceived ease of use.
- No Risk has a positive impact on perceived ease of use.
- Banking and payment method have a positive impact on perceived ease of use.

### 4.3. Research Paradigms:

Because we are using various research methods including action research, case studies and interviews it will help to compare the methodology of this study with work that has gone before.

In addition, as we will discuss philosophical concepts, a definition is needed for certain terms like ontology, epistemology and methodology.

Ontology is a philosophical term that refers to the theory of being and relates to the real world being researched. Epistemology is the way in which knowledge is gained by the researcher while methodology refers to the way in which logical and empirical work is carried out (LEE, 2004).

The two main approaches to carrying out research are positivism and interpretivism. The former was developed by Auguste Comte in the 19th century and in this a theory is tested in a deductive way. In other words, a theory is created and then is tested to prove it (Weber, 2004). Objective and factual knowledge can arise from direct experience or observation and is the only knowledge that it is possible to use. All theoretical and abstract elements are rejected (Robson, 2002), Robson added that the continuation of a relationship between events is what positivists look for. In their opinion, there is just one reality and their task is to discover it. Theories are inductively tested within this paradigm and the researcher develops a theory from the information gathered.

Positivism deals with a kind of reality that is separate from the individual observing it. On the other hand, interpretivism regards reality and the researcher as one and the same. Positivism uses epistemology to build a knowledge of reality outside the human mind and assumes human experience reflects on reality under study.

Interpretivists believe knowledge of objective reality is gained through multiple social constructions of meaning and knowledge. Their research methods include interviews and observation to gain multiple perspectives (Robson, 2002). In this way they learn through social construction of the world (Weber, 2004).

There are advantages and disadvantages to both approaches (Easterby , et al., 1991)

| Advantages of the Positivist | Disadvantages of the Positivist |
|---|---|
| 1) Can be fast and economical | 1) Methods tend to be inflexible and artificial. |
| 2) Can provide wide coverage of a range of situations | 2) Not very effective in understanding processes or the significance people attach to actions. |
| 3) May be of considerable relevance to policy decisions especially when statistics are aggregated from large samples | 3) Because they focus on what is, this makes it difficult for policy makers to infer what future changes and actions should take place. |
| | 4) Not very helpful in generating theories. |

**Table 4-1 Advantages and Disadvantages of Positivism**

| Advantages of Interpretivism | Disadvantages of Interpretivism |
|---|---|
| 1) Ability to look at change process over time. | 1) Data collection is time-consuming and needs many resources. |
| 2) Ability to understand meanings | 2) Analysis and interpretation of data may be difficult. |
| 3) Ability to adjust to new issues and ideas as they emerge and to contribute to the evolution of new theories | 3) Difficult to control pace, progress, and end-points of study, hence often criticized as 'untidy '. |
| 4) Provides ways of gathering data that are seen as natural rather than artificial | 4) Often assigned low credibility by policy makers. |

**Table 4-2 Advantages and disadvantages of interpretivist**

This research has been carried out in a positivist fashion. Hypotheses were developed and tested. Interpretivism was only used in face-to-face interviews in the two case studies. This was because direct questions were needed to explore attitudes towards E-commerce.

### 4.3.1. Research Methods:

A combination of qualitative and quantitative methods has been used. The former was used for the action research and case study and the latter for the survey. The interpretative nature of qualitative research aims for deep understanding so it is based on words, perceptions and feelings rather than facts. Methods can include experiments, interviews, focus groups and open-ended questionnaires.

According to (William , 2005) qualitative research became more prevalent after it emerged that traditional quantitative data collection methods could not capture human feelings and emotions.

Vaus (Vaus, 2013) noted that, “qualitative methods are often regarded as providing rich data about real life people and situations and being more able to make sense of behaviour and to understand behaviour within its wider context”. However, qualitative research is often criticised for lacking generalizability, being too reliant on the subjective interpretations of researchers and being incapable of replication by subsequent researchers”.

While qualitative research includes interviews, questionnaires, documents and observation, quantitative methods include experiments, mathematical modelling and numerical analysis. This research used qualitative and quantitative methods. (Robson, 2002) Stated that there is no reason to limit oneself to a single method and that using more than one has benefits. He also added this allows triangulation thus enabling the researcher to check and compare the results of the two methods. Therefore, this helps to enhance interpretability (Robson, 2002).

### 4.3.2. Research in Information Systems:

Two main approaches apply to the research of information systems, scientific/positivist and interpretivist (Galliers, 1992)

In the former the researcher assumes that objective and rigorous observations can be made. These approaches are defined by repeatability, reductionism, and refutability.

Interpretivist researchers believe a reality exists but that it can only be known imperfectly and uncertainly because of the researcher's limitations (Robson, 2002). Galliers, in `Information systems research: issues, methods and practical guidelines' outlined information system research approaches in a table (table4.3)

| Positivist | Interpretivist |
|---|---|
| Laboratory and experiments | Subjective/argumentative |
| Field experiments | Reviews |
| Surveys | Action research |
| Case studies | Descriptive/interpretive |
| Theorem proof | |
| Forecasting | Future research |
| Simulation | Role/game playing |

**Table 4-3 information systems research approaches**

Galliers argued that in the information systems research method taxonomy helps researchers to identify the best research method for the task in hand, depending on the topic area under scrutiny (Galliers, 1992). Table 4.4 shows the strengths and weaknesses of the most common research approaches used to study information systems.

| Approach | Key features | Weakness | Strengths |
|---|---|---|---|
| Laboratory Experiments | Identification of precise relationships between chosen variables via a designed laboratory situation, using quantitative analytical techniques, with a view to making generalizable statements applicable to real-life situations. | The limited extent to which identified relationships exist in the real world due to over simplification of the experimental situation and isolation from most of the variables found in the realworld | The solution and control of a small number of variables which may then be studied intensively. |
| Field experiments | Extension of laboratory experiments into the real-life situations of organizations and/or society | Finding organizations prepared to be experimented on. | Greater realism; less artificial/sanitized than the laboratory situation. |
| Surveys | Obtaining snap shots of practices, situations or views at a particular point in time (via questionnaires or interviews) from which inferences are made (using quantitative analytical techniques) regarding the | Likely that little insight obtained regarding the causes/processes behind the phenomena being studied. Possible bias in respondents the researcher, and the moment in time at which the research is undertaken | Greater number of variables may be studied than in the case of experimental approaches. Description of real world situations. More easy/appropriate generalizations. ate |

| | | | |
|---|---|---|---|
| | relationships that exist in the past present and future. | | |
| Case studies | An attempt at describing the relationships, which exist in reality, within a single organization or organizational grouping. | Restriction to a single/organization. Difficulty in generalising, given problems of acquiring similar data from a statistically meaningful number of cases. Lack of control of variables Different interpretations of events by individual researchers. | Capturing 'reality' in greater detail and analysing more variable possible using any of the above approaches. |
| Action research | Applied research where there is an attempt to obtain results of practical value to groups with whom the researcher is allied while at the same time adding to theoretical knowledge. | Similar to case study research, but additionally places a considerable responsibility on the researcher when objectives are at odds with other groupings. The ethics of the particular research are a key issue. | Practical as well as theoretical outcomes most often aimed at emancipatory outcomes. Biases of researcher made known. |

**Table 4-4 summary of key features weaknesses and strengths of information systems research approaches**

A case study was defined by Yin as "a way of investigating an empirical topic by following a set of pre-specified procedures" (Yin , 1994). He stated that, "while the `who', `what' and `where' questions are likely to favour survey strategies, the `how' and `why' questions are more explanatory and likely to lead to the use of case studies as the preferred research strategies" (Table4.5).

Organizational behaviour, innovation and change have been widely used in studies using case studies ( (WALTERS, et al., 1994) . It enables a varied range of data collection techniques. This agrees with Yin's opinion that "the case study's unique strength is its ability to deal with a full varied data collection techniques" (Yin , 1994). They have often been viewed as a useful in the early stages of a research project and as a launch-pad for the development of the more structured tools that are necessary in surveys and experiments (Rowley, 2002).

| Strategy | Form of research question |
|---|---|
| Experiment | How, why |
| Survey | Who, what, where, how many, how much |
| Archival analysis | Who, what, where, how many, how much |
| History | How, why |
| Case study | How, why |

**Table 4-5 case study questions**

(Yin , 1994) Identified some advantages of using case studies, For example, they allow the researcher to create a database, have a chain of evidence and use multiple data sources.

Triangulation adds to the reliability of data. However, limitations include the fact that case studies need information to be provided by several sources.

Another possible limitation is the lack of rigour. (Yin , 1994) Stated that a case study researcher may show bias in order to influence findings and conclusions (Yin , 1994). He suggested that every investigator must report all evidence fairly. He added that bias can also arise in experiments and questionnaire design.

"Case study research is also good for contemporary events when the relevant behaviour cannot be manipulated. Typically, case study research uses a variety of evidence from different sources, such as documents, artefacts, interviews and observation, and this goes beyond the edge of sources of evidence that might be available in historical study" (Rowley, 2002).

### 4.4. Research Methodology:

There are two different parts to the research methodology used to test the empirical validity of the proposed model. The first examines the proposed model in a case study with three companies in Tripoli the capital city of Libya which aims to validate it. The second phase involves a shorter case study of three companies in Tunis.

Action research is the first methodology to be used because the study needs to include a thorough application of the proposed technology acceptance model in the authentic implementation of an E-commerce application.

It was also to study the potential users' beliefs in both the implementation and post-implementation stages as it is the researcher's ambition to be an agent of change within the

Libyan government. A literature review of action research follows. (Mckay & Marshal, 2001) stated that it offers many benefits in information systems and is a good way to examine the relationship between humans, technology, and information in a socio-cultural context. Action research leads to progress in organizations and helps researcher and contributors to share in the process of research.

## 4.5. Action Research:

It is worth looking at some literature relating to action research in order to examine how applicable the methodology will be for the first case study. Then there will be a summary of action research definitions and an analysis of how useful it will be as a methodology to study information systems as well as a description of its characteristics and a comparison with the case study.

Most researchers see the origins of action research in the work of Kurt Lewin in the 1940s. He carried out socio-technical experiments at the Tavistock Institute and examined their relevance to practices of social democracy and organizational change (Coghlan & Brannck, 2001).

Lewin, as one of its early proponents, felt that action research should express a theory and any new results should feedback in to the theory (Reason & Bradbury, 2001).

### 4.5.1. Definition of Action Research:

One definition is, “an approach in which the action researcher and a client collaborate in the diagnosis of the problem and in the development of a solution based on the diagnosis” (Bryman & Bell, 2015) . So a feature of action research is that researcher and subject work together to solve organizational problems.

(Coghlan & Brannck, 2001) Said, "It is an approach to research that is based on a collaborative problem-solving relationship between researcher and client which aims at both solving a problem and generating new knowledge".

In the opinion of (Collis & Hussey, 2003) the assumption of an action study is that the world is always changing and both the researcher and research are part of that change.

Generally, action research can be divided into three kinds: positivist, interpretive and critical.

The first, also known as ‘classical action research’, sees research as a social experiment, and accordingly is thus a good method to test hypotheses in a real world environment.

Interpretive action research, or ‘contemporary action research’, sees business as a social construct and concentrates on local and organizational factors.

Critical action research is one that adopts a critical approach to business processes and its object is improvement. These features of action research need to be considered when judging its suitability for a project:

- ✓ Action research relies on action, evaluation and critical analysis of practices using collected data in order to introduce improvements.
- ✓ It involves the participation and collaboration of a number of individuals with a common purpose.
- ✓ It concentrates on specific situations and the context in which they occur.

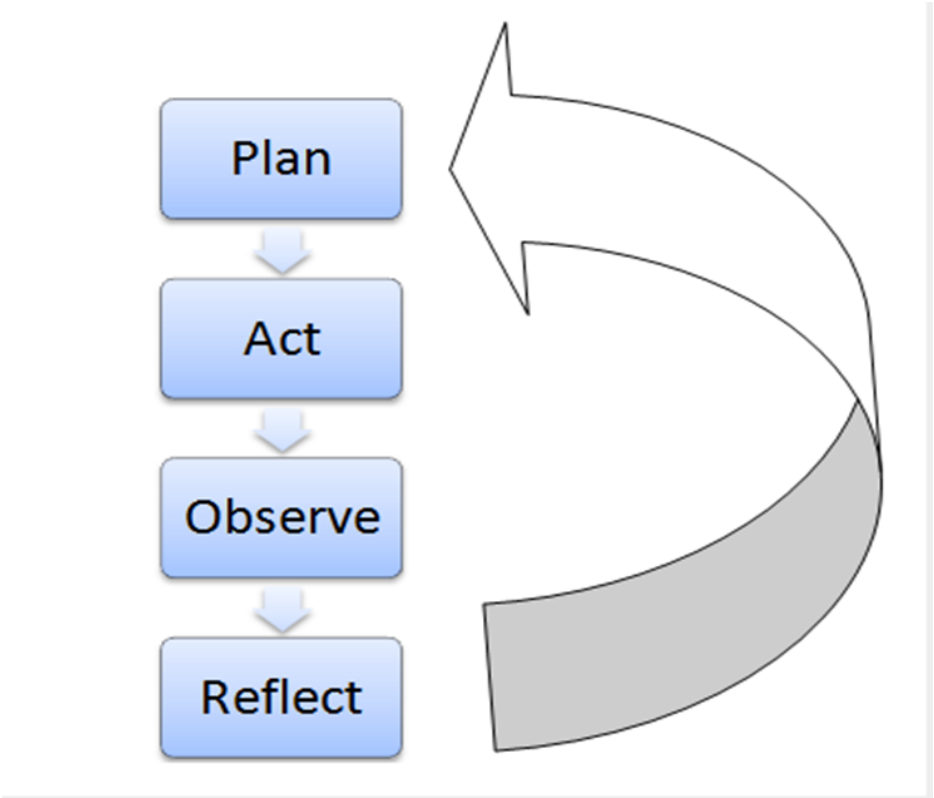


**Figure 4-1 Basic Model of Action Research**

Action research has the following advantages:

- Very relevant to business research
- Quantitative and qualitative data can be used
- Allows in-depth knowledge to be gained

Disadvantages may include:

- Action and research can become confused
- Often there are delays in the completion of action research for various reasons
- There may be problems with repeatability and rigour

There must be a clear distinction between action research and consultation. Action research is more than consultation as it combines action and research, but consultation can lead to action without any research.

### 4.5.2. Action Research as a Research Methodology:

Research is a quest for knowledge and includes ontology - the way we see ourselves and a theory of being, epistemology – or how we understand knowledge and the way in which it is gained and methodology – how we do things.

McNiff (McNiff, 2002) argued that in action research the ontological issues that action researchers face are that people can shape their own identities and allow others to create theirs.

The epistemological issue problem is that researchers see knowledge as something they can acquire. People can gain knowledge from life, learning or work.

Action researchers believe that reality is a surprising and random evolution, "Some theorists believe that learning happens only in critical episodes. Certainly it does, but learning also happens all the time, in our moment-to-moment living. We learn how to walk, to catch a ball, to avoid trouble, to respond to our feelings" (McNiff, 2002)

Methodological problems revolve around how researchers do their research. These kinds of researchers feel that the process of learning helps individuals to choose who they are and how they work together.

People pose questions like `How do I do this better? How do we understand? '. This leads to change because they reflect on what they learn in practice (McNiff, 2002).

According to (McNiff, 2002), there is now wide acceptance of the three-paradigm approach. (Figure 4.2). The empirical, interpretive and the critical are the three key ones. The first sees the natural world as a set of interrelated parts. The second emerged from sociological enquiry and case-study research has become a major approach in the field.

It involves data collection and analysis for interpretation (McNiff, 2002). This is the case for the Libyan case study.

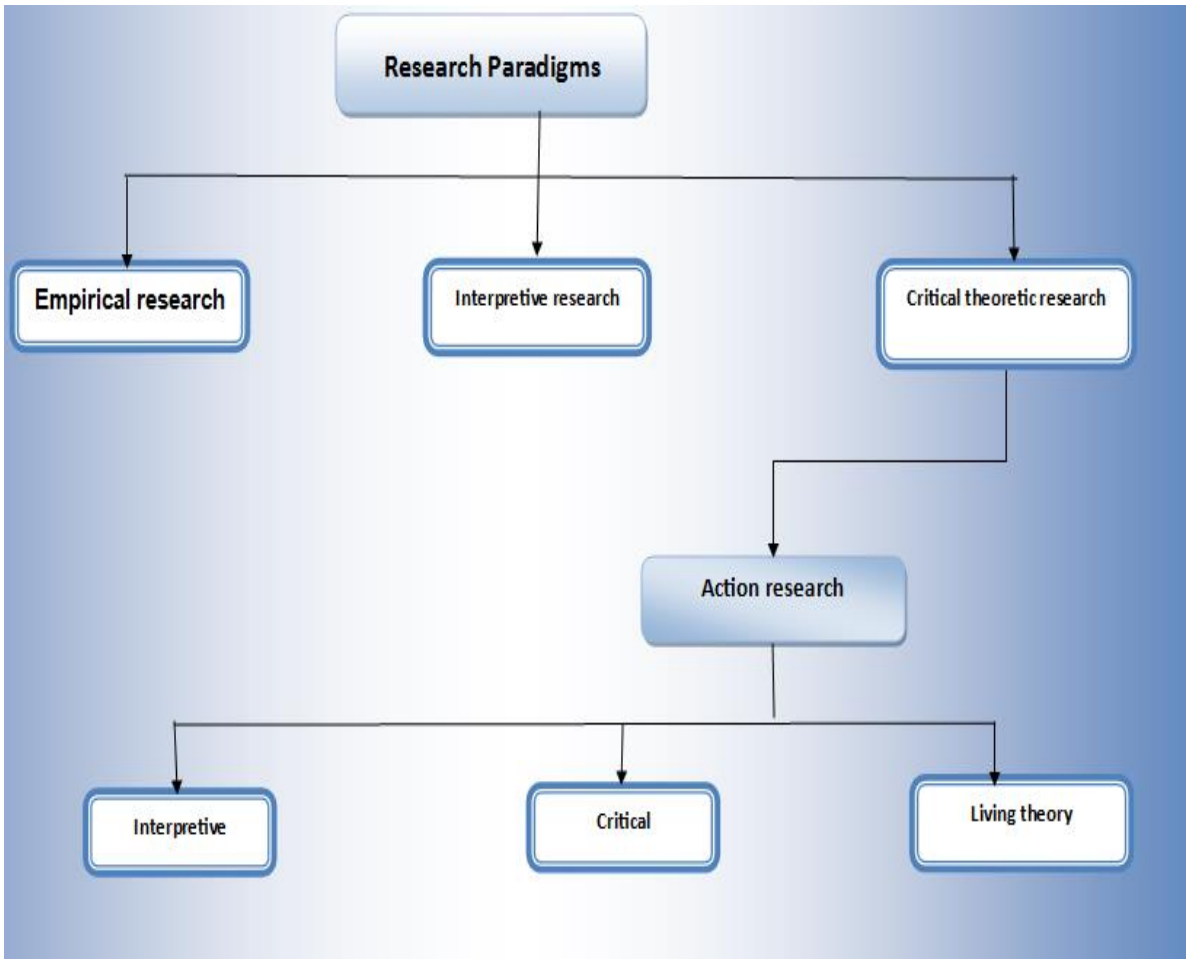


**Figure 4-2 The Three Paradigms Approach**

### 4.5.3. Action Research as Information Systems Methodology:

Wood-Harper was the first to introduce action research as a research methodology. He also introduced the concepts into an action-based systems development methodology called Multiview. Action research was ideal as he was interested in studying the interplay between humans, technology information and their socio-cultural context (Mckay & Marshal, 2001).

Multiview is a flexible framework which creates a structure for tasks for analysts and users during activities. It allows the choice of different methodologies according to the particular

circumstances (Avison & Wood-Harpep, 1986) and incorporates human, social and technical aspects.

Action research has been proven to be a good qualitative research method for information systems (Avison & Wood-Harpep, 1986).

There are different kinds of action research in information systems and each one has its own characteristics (Baskerville, 1999) (table4.6)

| Forms of IS Action Research | Characteristics of IS Action Research |
|---|---|
| • Canonical<br>• IS Prototyping<br>• Soft Systems Methodology<br>• ETHICS<br>• Multiview<br>• Action Science<br>• Participant Observation<br>• Action Learning | • Process Model<br>Iterative<br>Reflective<br>Linear<br>• Structure<br>Rigorous<br>Fluid<br>• Typical Participation<br>Collaborative<br>Facilitative<br>Expert<br>• Primary Goals<br>Organizational Development<br>System Design<br>Scientific Knowledge |

**Table 4-6 information systems action research forms and characteristic**

McKay and Marshall felt that the strengths of action research outweighed its weaknesses. So it is thought that that it is a potential way to increase the practical relevance of IS research. According to (Baskerville, 1999) other disciplines including organization development and education accept it as a valid technique and it has also succeeded in information systems research projects. This is because it helps researchers wanting to work alongside organizations.

### 4.5.4. Action Research and Case Studies:

Action research and case studies could be seen as being the same because they take the same format but are different. This is because action research is involved in organizational change but a case study only involves an observer searching for organizational phenomena. The action researcher is also keen to study the process (Babüroglu & Ravn, 1992). So a case study is action research but without the element of change. (Gummesson, 2003) added that action research is the most demanding way to carry out case study research.

Vreede, In his PhD thesis has explained some differences between case study and action research (Vreede , 1995):

| Case Study | Action Research |
|---|---|
| Researcher is observer | Researcher is active participant |
| Exploratory, explanatory or descriptive | Prescriptive, intervening |
| Focus "How? " and "Why? " | Additional focus on "How to?" |
| May be positivist or interpretivist | Usually interpretivist |

**Table 4-7 differences between case study and action research**

### 4.6. The Research Sample

As this research aims to employ TAM to include acceptance and use of E–commerce by managers these should make up the research sample. They should also come from different levels of management including operational and middle management as well as others like supervisors and executives. The Libyan and Tunisian companies taking part were informed that these would be the required participants.

The Libyan study sample consisted of three companies: Libyan Post Telecommunications & Information Technology Company, Libyana Mobile Phone and Libya Telecom & Technology. In Tunisia there were also three companies: The Tunisian Post, Tunisie Telecom and Tunisian Internet Agency as it showing in table 4.8.

| Libyan companies | Tunisian companies |
|---|---|
| 1- Libyan Post Telecommunications & Information Technology Company<br>2- Libyana Mobile Phone<br>3- Libya Telecom & Technology | 1-The Tunisian Post<br>2- Tunisie Telecom<br>3-Tunisian Internet Agency |

**Table 4-8 Libya and Tunisian companies**

### 4.6.1. The rationale for the choice of companies

Companies in the Libyan and Tunisian side are the largest companies operating in the field of information technology and the Internet; they have a direct relationship with the field of research. as they are government companies can make a difference in the field of electronic commerce to adoption it, there are a number of specialists whose interested in scientific research, the existence of documentation and information centres which makes it easier for the researcher to access the information easily, these companies control the labour market in both sides possess a large capital to be able to adopt E-commerce in the future, and the existence of some attempts especially the Tunisian companies in the use and adoption of electronic commerce .

In addition to these companies have managers who influence decision - making at the state level.

Libyan companies:

| Libyan Post Telecommunications & Information Technology Company | | Lilyana Mobile Phone | | Libya Telecom & Technology | |
|---|---|---|---|---|---|
| **Administrations** | **Number** | **Administrations** | **Number** | **Administrations** | **Number** |
| Computer Management and Informatics | **8** | Accounts and Budget Section | **16** | Financial management | **20** |
| Commission to assess the company's activity | **4** | Procurement Section | **8** | Commercial Management | **3** |
| General Administration of purchases & business services | **6** | Department of subscriber accounts | **20** | Technical management | **28** |
| General Department of Administrative & Financial Affairs | **8** | | | | |
| **Sum** | **26** | | **44** | | **51** |
| **The total number =121** | | | | | |

**Table 4-9 shows the number of employees and departments in libya companies**

Tunisian companies:

| The Tunisian Post | | Tunisie Telecom | | Tunisian Internet Agency | |
|---|---|---|---|---|---|
| **Administrations** | **Number** | **Administrations** | **Number** | **Administrations** | **Number** |
| Media Centre | 7 | Billing Management | 100 | Technical management | 30 |
| Quality Centre | 3 | Follow-up Department | 80 | Financial Management | 6 |
| Financial Services Management | 6 | Central Administration | 80 | Marketing Management | 3 |
| Communication and Public Relations Department | 2 | Administration Organization and management information systems | 35 | | |
| Transaction technology development center | 3 | | | | |
| Quality Strategy and Development Department | 4 | | | | |
| The commercial department | 2 | | | | |
| Sum | 27 | | 295 | | 39 |
| The total number =361 | | | | | |

**Table 4-10 shows the number of employees and departments in Tunisian companies**

### 4.7. Libyan companies case study:

**The Libyan Post Telecommunications & Information Technology** offers fixed and mobile data and telephony, international telecommunications, internet and data, MMS, voicemail, and television broadcasting services. It also handles postal services and the marketing of products and services for public and private organizations and provides investment, building and construction, maintenance, and operation of infrastructure facilities for telecoms services. Founded in 2009, the company is based in Tripoli, Libya.

**Libyana** first offered GSM mobile services in September 2004 and quickly achieved market success by providing network coverage throughout Libya. It went on to be the first company in North Africa to introduce 3G services in September 2006 and became the market leader in Libya. The company aims to serve every home and city and has been has approved for 15 Business Centres in different regions. The company has 6,200,000 subscribers or around 116% of the population.

**Libya Telecom & Technology (LTT),** was established by Muhammad Gaddafi in 1997. It is still a state owned monopoly which continues to dominate the sector. LTT is Libya's most-used internet service provider, having 5.6% penetration with 380,000 users due to its DSL and WiMAX services.

This is why these companies were chosen for case studies in this research which took more than three months and involved face-to-face semi-structured interviews with workers and managers. The action research needed some participation from the researcher.

The managers who took part were involved in normal managerial tasks like planning, directing, organising and controlling. They were also responsible for human resources functions like staff training and recruitment.

### 4.7.1. Getting in to Libyan companies:

Penzhorn (Penzhorn, 2002) suggested five phases for an action research project:

Phase one: planning

Phase two: entering the community

Phase three: applying the research plan:

- Deciding on the time, place and frequency of meetings;
- Making decisions about methods of data collection and recording;
- Categorising the information needs
- Exploring explanations for these needs
- Deciding how to use the information.

Phase four: reflection and analysis of the research process.

Phase five: leaving the community.

Penzhorn's five-phase framework of action research was found to be a good course of action for this case study as its various stages granted the researcher great flexibility.

The planning phase involved background research hypotheses and the way in which it needed to be done.

Phase two - entering the community – involved contacting the companies and requesting their participation. The research plan was discussed with the internal programme manager. This covered the time, place and frequency of meetings, an agreement of the research topic

(TAM), the presentation of the interviews and questionnaires to be used and the reflective report.

Two cycles of the project were agreed - action and research. The action cycle would be completed by the internal programme manager, while the researcher would be responsible for the research cycle including hypothesis testing with some research with participants. There is a mix of action and research as parts of different cycles. According to (Mckay & Marshal, 2001) the duality of action research can be regarded as a juxtaposition of action and research and theory and practice. So the researcher should drive improvements by instigating changes, and introducing knowledge to the organization (Mckay & Marshal, 2001). Action and research is integrated (Walton & Gaffney, 1991) (figure 4.14).

During the first meeting all ethical issues were discussed with the internal programme managers and the researcher signed a non-disclosure agreement. The researcher received permission to give the names of Libyan companies for academic purposes in conferences and in the thesis.

| Action Cycle | Research Cycle |
|---|---|
| Identify problems to solve and other opportunities, causal factors, environmental constraints and relevant practice | Identify topic to study and review relevant knowledge. |
| Formulate proposed changes and the, Implementation plan. | Operationalise hypotheses. |
| Initiate changes in targeted areas. | Select sample to observe. |
| Assess changes and implementation | Select other research methods, gather data, and generate findings. |
| Deepen, institutionalize and diffuse change. | Derive and disseminate implications for theory and practice. |

**Table 4-11 Action research and their potential integration**

The researcher was introduced to some managers and staff and arranged mutually convenient times for meetings.

The action research methodology meant the researcher had to participate and this included holding semi-structured face-to-face interviews and phone interviews in order to examine the beliefs and of the managers.

The semi-structured interviews allowed the researcher to be flexible and responsive according to the interviewees' answers. It also gave the participants a chance to share their knowledge and experience. Each semi-structured interview had two parts - one led by the interviewer consisting of 33 questions using a Likert scale for answers and one open question which allowed participants to answer freely.

Three senior managers in decision-making positions were interviewed with each interview lasting around 30 minutes.

At the beginning of the interview the interviewees were given copies of the questionnaire to ensure they wanted to contribute. The researcher was able to interview both of these managers: the Director of the Technical Department in Libya Telecom & Technology and technical adviser to Libyan Post Telecommunications & Information Technology and the General Manager of Lilyana Mobile Phone.

These interviews were conducted with a list of (5) five questions to serve the objectives of the study.

The following answers were obtained by the researcher during the interview.

- The interview with the Director of the Technical Department in Libya Telecom & Technology:

Q1- How much change can E-commerce make to the relative position of your organization

A- There is no doubt that the benefits of E-commerce to reduce costs and save time will lead to improved performance of the company and thus bring about a change in the relative position of the company in the market.

Q2- How comfortable do staff feel in dealing with the internet?

A- Libya Telecom and Technology encourages people to use the internet to get a benefit from it.

Q3- Is there a relationship between the Internet and competitive advantage?

A- Of course there are some problems. The Internet will lead to a reduction in the size of the labour and the huge corporations are not measured by the size of their building. As you know, with a computer linked to the Internet you can enter the world of E-commerce. Although these are simple possibilities they provide a great competitive advantage.

Q4- Is it possible to achieve competitive advantage away from the Internet?

A- No way.

Q5- Does the company's business needs to find a competitive advantage in the market?

A- Sure, competition is required.

- The interview with the General Manager of Libyana Mobile Phone:

Q1- How much change can E-commerce make to the relative position of your organization?

A- Change will be complete and comprehensive because the system was originally linked to development in the electronic field.

Q2- How comfortable do staff feel in dealing with the internet?

A- Internet use is essential to the movement of the future work of the company and there is still a large field for the development of the Internet and its use in Libya.

Q3- Is there a relationship between the Internet and competitive advantage?

A- The Internet can be a direct cause in the field of competitive events.

Q4- Is it possible to achieve competitive advantage away from the Internet?

A- You can, but part of the development must be online.

Q5- Does the company's business need to find a competitive advantage in the market?

A- Competition is based on creativity and whenever there is room for competition, the better the quality of the service.

### 4.8. Tunisian companies Case Study:

As well as the Libyan case study there was also a shorter term Tunisian case study which took almost 45 days.

Tunisian companies were contacted to gain permission and this was granted by each of the following:

The Tunisian Post is the company responsible for the postal service in Tunisia. It also operates banking services and was founded in 1999.

Tunisie Telecom is the incumbent telecom operator in Tunisia. Founded in 1995 it has more than 6 million subscribers in Tunisia and abroad. It also has also worked hard to increase Internet penetration in Tunisia and had achieved 15 million subscribers by the end of September 2016.

The Tunisian Internet Agency,(or ATI which is short for Agence Tunisienne d'Internet) was created on 12 March 1996.

This is Tunisia’s principal ISP and is run by the Ministry of Communications. As well as having the role of promoting Internet usage it also installs networks in various fields (health, education and agriculture) and manages the national network and domain name (.tn) to launch websites and train users.

For all these reasons, the researcher has chosen these companies to be part of the case study in Tunisia.

Case studies were carried out in both Libya and Tunisia to be able to apply TAM in different cultural contexts to see if the research hypothesis brought forward different results and to measure the effectiveness of the extended TAM.

At the beginning of the interviews the interviewees were given copies of the questionnaire just to make sure they wanted to contribute. The researcher was able to interview all three of these managers: the Director of the Media Center in The Tunisian Post, the Director of the Organization and Management of information systems of Tunisie Telecom and the Director of Technical Management of Tunisian Internet Agency.

• The interview with the Director of Media Center in The Tunisian Post:-

Q1- How much change did E-commerce make to the relative position of your organization?

A- As it was an active partner, E-commerce was adopted for the marketing of some of the Tunisian Post's products or partnerships with institutions and individuals, and the use of E-commerce meant a clear change both for the structure and means of distribution.

Q2- How comfortable do staff feel in dealing with the internet?

A- The Internet is considered to be the most important means of action and production and has been adopted since its inception as the technology to use in the field of marketing and promoting products as well as for dealing with institutions and customers.

Q3- Is there a relationship between the Internet and competitive advantage?

A- Using the Internet and building websites for private institutions and their products is an urgent need. There is no choice about promotion and marketing of the products for display of the organization internally and internationally and it is vital for the increase in competitiveness and confidence of customers.

Q4- Is it possible to achieve competitive advantage without the internet?

A- As already mentioned this is the era of the Internet and modern technology and an organization which has still not adopted the internet cannot be competitive and provide new services. Because of the wide use of this network Tunisian Post has become more competitive.

Q5- Does the company's business needs to find a competitive advantage in the market?

A- It is obvious and necessary for every company or organization to develop new techniques and methods of work, and to create quality new products and offer them to customers everywhere.

• The interview with the Director of the organization and management of information systems in Tunisie Telecom:

Q1- How much change can E-commerce make to the relative position of your organization?

A- Engaging in E-commerce is a matter of principle and the results show that the use of electronic commerce is the result of changing mindsets and not vice versa. The first officer of the institution wants to change mentalities to achieve this goal.

Q2- How comfortable do staff feel in dealing with the internet?

A- The daily use of the Internet and application software for the dissemination of the use of e-mail for more speed and reduces the use of paper and printers.

Q3- Is there a relationship between the Internet and competitive advantage?

A- At present increased use of the Internet improves the image of Tunisia Telecom although most customers do not deal with Tunisia Telecom online.

Q4- Is it possible to achieve competitive advantage without the internet?

A- Yes, but in the near future it will be essential to use the Internet.

Q5- Does the company's business needs to find a competitive advantage in the market?

A- When signing a contract with private telecommunications companies, we are convinced of the importance of competitive advantage and this is the preoccupation of Tunisia Telecom.

• The interview with the Director of Technical Management in the Tunisian Internet Agency:-

Q1- How much can E-commerce change in the relative position of your organization?

A- E-commerce can be added to give quality institutions better goods and services to offer. With respect to the Tunisian Internet Agency we can now use electronic payment in renewal of contracts and electronic final bills.

Q2- How comfortable do staff feel in dealing with the internet?

A- The Tunisian Internet Agency is the Internet service provider so we take it for granted that staff are comfortable using the Internet.

Q3- Is there a relationship between the Internet and competitive advantage?

A- Organizations that are present online have a better chance of success. This was observed with hotels online.

Q4- Is it possible to achieve competitive advantage without the internet?

A- Competitive advantage can be achieved without the Internet, but the Internet Is a shortcut to get you there.

Q5- Does the company's business need to find a competitive advantage in the market?

A- Of course, the company's business requires a competitive advantage in the market as several other companies and consumers are looking for quality and price.

### 4.9. The Questionnaire Survey:

A survey is a data gathering exercise to collect, analyse and interpret the views of a group of people. Surveys feature in many fields of research, such as sociology, marketing research, politics and psychology.

In a survey a questionnaire is used and this consists of a set of questions to be asked to the participants. Originally introduced by Sir Francis Galton, questionnaires usually ask questions that try to unearth ideas, behaviours, preferences, traits, attitudes and facts.

This research study will use quantitative and qualitative research. The former will use survey questionnaires in Arabic and English languages to gain the maximum number of responses. The latter will aim to get answers to qualitative questions such as “how many?”, “how often?”, and “how much?”

The survey technique will help to collect responses within a short period and will clarify any uncertainty in the answers (Cavana, et al., 2001). Other advantages of surveys are their easy management, easy checking of values, the examination of relationships between variables, help with objective comparison of different responses and the ability to explore a wide range of opinions (Stroh, 2000).

Data collection in qualitative research will come from semi-structured face-to-face interviews with a number of decision-makers in Libyan and Tunisian E-commerce projects. It will aim to answer qualitative questions to provide rich information from just a few people (Creswell, 2013).

The questionnaire survey was only addressed to the companies featured in the two case studies. In view of the heterogeneity of the number of workers in each of the Libyan and Tunisian companies a sample directly related to the subject of the study was chosen to be of equal size. The sample consisting of 70 people was selected from single workers in departments that had been covered by the questionnaire. Questionnaire sheets were distributed in departments surveyed in the Tunisian companies. Of the 361 people around 17% were questioned including managers and department heads and ordinary staff.

Questionnaire sheet respondents were as follows:-

In Libyan companies, Libyan Post Telecommunications & Information Technology Company (26) Libyana Mobile Phone (25) Libya Telecom & Technology (19) as shown in table 4.12.

| Libyan Post Telecommunications & Information Technology Company | Libyana Mobile Phone | Libya Telecom & Technology |
|---|---|---|
| 26 | 25 | 19 |
| 70 | | |

**Table 4-12 shows the number of employees and managers that have received the questionnaire in Libya companies**

Table 4.13: shows the number of employees and managers that have received the questionnaire in Tunisian companies. The distribution of the questionnaire was as follows: The Tunisian Post (26), Tunisie Telecom (25), and Tunisian Internet Agency (19). Each company was commissioned to distribute a questionnaire to respondents and 63 responses were gathered from Libyan companies (giving a response rate of 90%) and 68 were gathered from Tunisian companies (a 97%.response rate).

| The Tunisian Post | Tunisie Telecom | Tunisian Internet Agency |
|---|---|---|
| 26 | 25 | 19 |
| 70 | | |

**Table 4-13 shows the number of employees and managers that have received the questionnaire in Tunisian companies**

Interviewees were given copies of the questions and they were asked by the researcher to choose one answer on a scale of 1 to 5 to correspond with how they felt about a series of statements: 1= fully disagree, 2= disagree, 3= neutral, 4= agree and 5= fully agree. During the meeting the researcher discussed the hypotheses with the participants.

The questionnaire had three parts. The first part consisted of 27 questions about TAM to be answered using the Likert scale mentioned and a closed question about the number of years computing experience each manager had. The second part also included a five-point Likert scale to measure how often E-commerce is used. The third part was an open question to allow the questionnaire participant to help find the factors behind acceptance of E-commerce. The same Likert scale used for the Libyan case study was used in Tunisia too.

### 4.10. Variables Definitions and Measures:

Previous methodological studies have validated the measures used in this study and have been used in more than one previous empirical study into TAM, the Theory of Reasoned Action, the Theory of Planned Behaviour and numerous other theories relating to information systems implementation. Almost all use Likert scales consisting of statements followed by rating answers. The Likert five-point scale is reliable as it offers respondents a broad range of options.

Because questions concerned attitudes and behavioural intentions, the best route was to borrow questions that had been used successfully before. This helps to avoid problems of formulating questions and uncertainty about a scale's reliability. It also means that the researcher does not need to pilot questions to avoid errors ( (Bradburn, et al., 2004). The questionnaire was in three separate sections: 1) variables of TAM, TRA, TPB and, 2) actual use, and 3) An open question left for the participant to give their opinions about the critical success factors for E-commerce to be accepted by managers and employees.

### 4.11. Reliability and Validity of the Scale:

The reliability of the data was measured by Cronbach's Alpha. For Libyan companies the reliability was measured as .849 and for Tunisian companies it was .841. The same scales were used more than once and the same results were given each time.

Cronbach's alpha measures the efficiency of variables in measuring a single unidimensional latent construct. Cronbach's alpha is a coefficient of reliability. Its formula is as follows:

$$\alpha = \frac{N \cdot \bar{r}}{1 + (N - 1) \cdot \bar{r}}$$

Where: N is equal to the number of items;

r-bar is the average inter-item correlation among the items.

The reliability coefficient of 0.7 or higher is considered acceptable in most social science research situations (Cortina, 1993). (Shevlin, et al., 2000) illuminated that alpha is strongly

related to the reliability of the items that constitute a scale. Shevlin added that the scale can measure properly only if it has a score of reliability of 0.8.

Therefore 0.8 is a conservative estimate of reliability.

### 4.11.1. Perceived Usefulness:

The study used the perceived usefulness instrument developed and tested by (Davis, 1989). This had been evaluated in numerous studies e. g. (Chin & Todd, 1995), (AL-Gahtani & King, 1999), (Davis, 1989), (Dias , 1998), (Taylor & Todd, 1995b), (Venkatesh & Davis, 2000), (Dorian , 2016).

Participants were asked to indicate their perceptions of the usefulness of E-commerce using a Likert five-point scale with options of strongly disagree, disagree, uncertain, agree, and strongly agree, Table 4.14 reviews and shows the questions.

| | | |
|---|---|---|
| 1- | I think I should use e- commerce as much as I need. | (1-2-3-4-5) |
| 1- | I find E-commerce useful for my life and work. | (1-2-3-4-5) |
| 3- | Using e- commerce improves my job productivity. | (1-2-3-4-5) |
| 4- | Using E-commerce enables me to accomplish my tasks more quickly | (1-2-3-4-5) |

**Table 4-14 item used to measures E-commerce perceived Usefulness Perceived Ease of Use**

The study used the perceived ease of use instrument developed and tested by (Davis, 1989). This had been evaluated in numerous studies e. g. (Chin & Todd, 1995), (Chau & Hu, 2002), (Davis, 1989), (Venkatesh & Davis, 2000), (Alebachew, 2015). Participants were asked to indicate their perceptions of the ease of use of E-commerce using a Likert five-point scale with options of strongly disagree, disagree, uncertain, agree, and strongly agree, Table 4.15 reviews and shows the questions.

| |
|---|
| 1-I find it easy to use the system. (1-2-3-4-5) |
| 2-I think it is easy to use the system. (1-2-3-4-5) |

**Table 4-15 items used to measure E-commerce perceived ease of use**

### 4.11.2. The Banking services and payment Method:

The banking and payment methods used are very important elements of E-commerce because they are closely linked to consumer trust. Few credit cards are used in Libya mainly due to culture and awareness. Two measurements were used to measure perceptions of banking services and payment methods. Participants were asked to give their opinions of two statements using the same five-point Likert scale; Table 4.16 reviews and shows these two instruments.

| |
|---|
| 1-The banking Services (report, accuracy etc.) I get from E-commerce is high quality. (1-2-3-4-5) |
| 2-I have no problem with the payment method. (1-2-3-4-5) |

**Table 4-16 items used to measure the banking services and payment method**

### 4.11.3. Computer Training:

Training was measured in both Libyan and Tunisian case studies using an instrument adapted from (Linu & Wu , 2004). Participants were asked to agree or disagree with three statements using the same five-point Likert scale. Table 4.17 reviews the instrument used in measuring training.

| | |
|---|---|
| 1- | I have had enough training to use E-commerce. (1-2-3-4-5) |
| 2- | I think I will have the training to use E-commerce if I request it (1-2-3-4-5) |
| 3- | Training is very important to get the skills to use E-commerce (1-2-3-4-5) |

**Table 4-17 items used to measure training**

### 4.11.4. Awareness of E-commerce :

The term "poor awareness" deals with rational customer concerns and may relate to E-commerce paybacks, poor ICT knowledge, poor language skills, poor domestic language convenience and poor managerial observations. Rational modules related to topics are vital in the initial acceptance of E-commerce in developing countries (Kshetri, 2008). Poor awareness is one of the strongest causes of rational blocks (Molla & Heeks, 2007) which, in turn, refer to poor domestic language availability, poor knowledge of international language and poor ICT knowledge (Kshetri, 2008). Participants were asked how much they agreed or disagreed with two statements using the same five-point Likert scale. Table 4.18 reviews the instrument used in measuring awareness.

| | |
|---|---|
| 1- | Senior managers are aware of the benefits that can be achieved with the use of E-commerce. (1-2-3-4-5) |
| 2- | I aware the importance of E-commerce in this time. (1-2-3-4-5) |

**Table 4-18 items used to measure awareness**

### 4.11.5. Law and legislation in E- commerce :

Regulations and rules are very important to protect all parties involved in commercial transactions. When there are no rules people will be reluctant to use a service. As Mr. Salem commented: "there is no system... It has to be done from an early stage. Customers

have to be sure that there are rules and legislation to protect their rights. This is very important to build trust with customers." Participants were asked to indicate their opinions in how much they agreed or disagreed with two statements using the same five-point Likert scale. Table 4.19 reviews the instrument used in measuring law and legislation in E-commerce.

| |
|---|
| 1- Laws and legislation on E-commerce current valid to protect rights. (1-2-3-4-5) |
| 2- Laws and regulations concerning E-commerce provide adequate protection. (1-2-3-4-5) |

**Table 4-19 items used to measure laws and legislation in E-commerce**

### 4.11.6. Perceived Risk:

Messages on the Internet travel through a shared domain so consumers are not yet comfortable with sending personal information across it (Kaplan & Haenlein, 2010). Most online vendors allow consumers to pay with a credit card and this instantly limits the number of consumers. Security concerns about using credit cards online are still a major anxiety for consumers (Park, et al., 2004). Participants were asked to indicate their opinions of how much they agree or disagree with two statements using the same five-point Likert scale. Table 4.20 reviews the instrument used in measuring perceived risk in E-commerce.

| |
|---|
| 1- The E-commerce system has low risk to use. (1-2-3-4-5) |
| 2- The E-commerce system has been designed to be safe to use (1-2-3-4-5) |

**Table 4-20 items used to measure perceived risk E-commerce**

### 4.11.7. Infrastructure:

Infrastructure for E-commerce is not developed in Libya so it is still to get a foothold in the country. My confidence is high that the buoyant market means people will become involved

in E-commerce, but the infrastructure is essential. In order to achieve this, we must make sure that reliable Wi-Fi is more widespread. Participants were asked to indicate how much they agree or disagree with two statements given to them using the same five-point Likert scale. Table 4.21 reviews the instrument used in measuring Infrastructure in E-commerce.

| | |
|---|---|
| 1- The E-commerce infrastructure has been designed to be user–friendly. | (1-2-3-4-5) |
| 2- The E-commerce infrastructure is easy to use. | (1-2-3-4-5) |

**Table 4-21 items used to measure infrastructure in E-commerce**

### 4.11.8. User Experience

(Thompson, et al., 1994) argued that the user experience can be measured in two dimensions: the length of information system use and level of computer use expertise. Computer expertise was measured by asking participants to identify the extent of their agreement with two main statements using the five-point Likert scale and to answer a closed question of how many years' experience they have had working with computers. The previously used five-point scale was and validated by (AL-Gahtani & King, 1999). Table 4.22 reviews the items used in measuring users' experience.

| | |
|---|---|
| 1-I think my experience with using the computer will enable me to use E-commerce. | (1-2-3-4-5) |
| 2-I think I have enough experience in working with computers. | (1-2-3-4-5) |
| 3-How many years' experience do you have in total with computers? | |

**Table 4-22 items used to measure users experience**

### 4.11.9. Attitude towards E-commerce Acceptance and Usage:

Some studies by researchers like (Davis, et al., 1989), (ThompsonR, et al., 1991) and (Taylor & Todd, 1995) have examined attitude using (Fishbein & Ajzen, 1977) suggestions. This takes

an individual's position on bipolar good or bad scales. But some researchers, including (Taylor & Todd, 1995b) and (Thompson, et al., 1991) felt Fishbein and Ajzen's suggested measurement of attitude was weak. So they recommended measuring user satisfaction as it gives a better understanding of attitude. The first was the technique used by (Mathieson, 1991), (Taylor & Todd, 1995) and (Chau & Hu, 2002). So participants were asked to rate the level of their agreement with three statements using the same five-point scale. The other instrument used here was end-user E-commerce satisfaction. The instrument developed by (Doll & Torkzadeh, 1988) and validated by (Doll, et al., 1995), and (Gelderman, 1998) was adapted here, in which the participants were asked to rate their agreement with statements relating to the timeliness and accuracy of E-commerce. Table 4.23 reviews the items used in measuring managers' attitudes towards E-commerce.

| | |
|---|---|
| 1- Using E-commerce is pleasant. | (1-2-3-4-5) |
| 2- Using E-commerce is beneficial to me. | (1-2-3-4-5) |
| 3- I think it would be good to use E-commerce. | (1-2-3-4-5) |
| **Measuring End-User E-commerce Satisfaction (EUES):** | |
| 4- Does E-commerce provide the information you need in time? | (1-2-3-4-5) |
| 5- Are you satisfied with the accuracy of E-commerce? | (1-2-3-4-5) |
| 6- Can you access the E-commerce anytime you need? | (1-2-3-4-5) |

**Table 4-23 items used in measuring managers Attitude about E-commerce**

### 4.11.10. Other Variables Measured in the Study:

Two more variables were measured in the case study; intention to use and actual use of the system. Participants were asked what they thought would be successful factors to encourage users to accept E-commerce.

Intention to use or reject the new system was measured using an instrument validated by (Mathieson, 1991), (Chau & Hu, 2002), (Wyme & Regan, 2005) and (Jayasingh & Eze, 2015). The intention was measured by asking the participants to rate their level of agreement with three statements, utilising the five-point scale. Table 4.24 shows the items used in measuring users' intentions.

| | | |
|---|---|---|
| 1- | I intend to use E-commerce in my daily activities. | (1-2-3-4-5) |
| 2- | Whenever possible I intend not to use E-commerce | (1-2-3-4-5) |
| 3- | To the extent possible, I would use E-commerce. | (1-2-3-4-5) |

**Table 4-24 the items used to measure the users` intentions to use**

Actual use was measured using the instrument developed by (AL-Gahtani & King, 1999), in which the participants were asked to rate their average weekly use of the E-commerce by choosing one of five options (almost never, less than once a week, 1-2 times a week, 2-3 times week, more than 3 times a week).

## 4.12. Summary

This chapter has outlined the methodology used in this research. The hypotheses were reclassified and presented in three groups and the research paradigms were discussed. In addition, action research was introduced and its usefulness as a methodology was examined.

The Libyan case study was described followed by the Tunisian one and the variables and how they were measured have been defined.

This meets the first objective of this study which is `to provide an application and critique of TAM'. In the following chapters we will analyse the data gathered in observational interviews and the questionnaire. The results of applying the model at the managerial level using new constructs will also be discussed.

# Chapter 5. RESEARCH VARIABLES AND HYPOTHESES

## 5.1. The Research Model:

The current research model combines TAM with elements from the Theory of Planned Behaviour (TPB) alongside a number of information system theories including user experience, training and support. Under the TAM hypothesis perceived usefulness (PU) and perceived ease of use (PEOU) are the main ways to determine whether new technology will be adopted. Furthermore, the only determinant of PU is PEOU. (Davis, et al., 1989) thought that the suggestion of TAM is that other factors like user beliefs indirectly influence the adoption of new technology. It was therefore thought that these external variables should also be examined. This research model also supports the view that other influences affect information and technology use by managers and these include attitude, laws and legislation, experience, training, infrastructure, awareness, risk and payment method.

TAM has been used successfully by many researchers to investigate and predict the attitudes of users towards adopting new technology. These have included word processing programmes and other IS applications (Adams, et al., 1992), e-mail (Gefen & Straub, 1997), spreadsheets (Adams, et al., 1992), internet m-banking (Lule, et al., 2012) and on-line banking (Lee, 2013). It was also used by (Davis, 1989), to investigate computer applications in Canadian universities. Other sectors covered include manufacturing, finance and healthcare.

## 5.2. The Research Hypotheses:

Because this research will use TAM to examine the acceptance and use of new technology it will include constructs from TAM2, Theory of Planned Behaviour, Unified Theory of Acceptance and Use of Technology (UTAUT) as well as some constructs from E-commerce

development. The acceptance and use of E-commerce can be determined by perceived usefulness (PU), perceived ease of use (PEOU), attitude (A), laws and legislations (LL), experience (E), training (T), infrastructures (I), awareness (Aw), risk (R) and payment method (PM). A number of hypotheses arise from previous studies while others emerge from information systems development theories and are applied to TAM. A discussion of these will follow.

There is one element of TAM2 that is not included because of its similarity to perceived usefulness. This is job relevance which is defined as "the individual's perception regarding the degree to which the target system is applicable to his or her job" (Venkatesh & Davis, 2000).

Similarly, elements of the unified theory of acceptance and use of technology (UTAUT) have not been included as they are similar to elements of TAM. UTAUT's performance expectancy is defined as "the degree to which an individual believes that using the system will help him or her to attain gains in job performance" (Venkatesh, et al., 2003) while its effort expectancy is defined as "the degree of ease associated with the use of the system" (Venkatesh, et al., 2003). This is very similar to perceived ease of use. UTAUT's social influence relates to how other people regard an individual’s use of a system and is the same as the subjective norm. Gender, which also features in UTAUT, has not been taken into account as it is irrelevant in this study.

### 5.2.1. Perceived Usefulness (PU):

There are a number of factors that determine whether technology is accepted or rejected but research has found two are particularly important. The first is whether people think it will help them do their job better. This is referred to as perceived usefulness. The second is

whether people think the difficulty of using the system outweighs the benefits that using it will bring. This is a separate consideration called perceived ease of use.

Perceived usefulness has been defined as "the degree to which a person believes that using a particular system would enhance his or her job performance." In an organization the measurement of good performance can be judged by the granting of pay increases, promotions, bonuses, and other rewards (Ong, et al., 2008), (Van der Heijden, 2004). Therefore, a system that is perceived to be useful is one which involves a positive user-performance relationship.

Many empirical studies have supported the link between perceived usefulness and use e. g. Money & Turner, 2010), (Liébana-Cabanilla, et al., 2014), (Khan, et al., 2015) and (Triandini, et al., 2013).

Bhattacherjee found that post-use of PU is determined by its pre-use which predicts actual system use (Bhattacherjee, 2001). TAM includes the theory that perceived usefulness is an important indicator of use.

This study expects to find that subjects will use E-commerce if they believe it will help them improve performance and accept it.

As PU is the main determinant of potential adoption the following hypothesis is proposed:

H1: Perceived usefulness has a positive impact on behavioural intention to use.

### 5.2.2. Perceived Ease of Use (PEOU)

On the other hand, perceived ease of use is "the degree to which a person believes that using a particular system would be free of effort: Effort is a finite resource that a person

may allocate to the various activities for which he or she is responsible" (Radne & Rothschild, 1975). So acceptance is more likely for any technology perceived to be easier to use (Davis, 1989).

Perceived ease of use is similar to self-efficacy or, "judgement of how well one can execute courses of action required dealing with prospective situations" (Davis, 1989,p.321). The views of the effect of PEOU on use are not definitive. (Davis, et al., 1989) , (Szajna, 1999) found it had no real influence on use because PU had an effect but it was found to be an important factor in the use of e-government (Carter & Belanger, 2005) .

The following studies found it did influence use positively (Adams, et al., 1992), (AL-Gahtani & King, 1999), (Gefen & Straub, 1997), (AL-Shammari, et al., 2015) and (Yousafzai, et al., 2014).

Compeau and Higgins pointed out that computer self-efficacy, which is compatible with PEOU positively impacts computer usage (Compeau & Higgins, 1995b). While PEOU affects behavioural intention it is less important than PU. Because PEOU does not directly change behavioural intention it does affect behavioural intention through PU. So where there are no perceptions of how useful technology can be, PEOU will not affect them (Szajna, 1996). PEOU is TAM's secondary determinant and can be an antecedent variable for PU. If it is felt that a new system will be easy to use it will positively influence their use of the system.

So the research model hypothesises that:

H 2.1: Perceived ease of use has a positive impact on behavioural intention to use.

H 2.2: Perceived ease of use has a positive impact on perceived usefulness.

### 5.2.3. Attitude:

On page 43 of his chapter `The behaviour of attitudes' from the book `Reading in attitudes theory and measurement' Doob calls attitude "an implicit drive-producing response considered socially significant in the individual's society" (Doob, 1967). Chein, on the other hand, calls it a "disposition to evaluate certain objects, actions and situations in certain ways" edited by (Fishbein, 1967a).

Doob stated that an attitude is:

1. An implicit response

2. Anticipatory and mediating

3. Induced by some stimulus and previous learning

4. Drive-producing.

The concept of attitude was first used to explain social behaviour by Thomas and Znaniecki (1918). They felt attitudes were mental processes determining a person's actual and potential responses cited by (Ajzen & Fishbein, 1980). Attitude is key in determining how keen people are towards using the system and is influenced by beliefs about system use.

Therefore, it has an influence on PU and PEOU – positively if the user's attitude is also positive. PU is the belief that underlies users' attitudes to acceptance and determines whether they will continue to use it (Karahanna, et al., 1999). The attitudes of managers towards a new system can be positive or negative. The former will lead to its acceptance, the latter to its rejection.

Attitude has been measured by researchers like (Davis, et al., 1989), (AL-Gahtani & King, 1999), (Parthasarathy & Bhattacherjee, 1998) and (Taylor & Todd, 1995) using (Fishbein & Ajzen, 1975) method which uses a bi-polar good or bad dimension. Attitude is an important antecedent of behaviour which impacts on it directly or indirectly (Bagozzi & warshaw, 1990) and (Kim, et al., 2015).

Other researchers have found that that attitude has a weak effect on usage and have suggested measuring it through a broader criterion like user satisfaction (Taylor & Todd, 1995). (ThompsonR, et al., 1991) Attitude has also been found to have a strong influence on behaviour.

This is why it is important to include it as an additional construct in the research model and to measure its effects.

The research hypothesis about attitude is:

H3: Positive attitude has a positive impact on perceived usefulness.

### 5.2.4. Laws and Legislation:

In any form of commercial transaction it is vital to have a formal legal framework to protect all parties involved. Where it does not exist it can be hard to progress. In Libya there are no laws governing E-commerce but, in order to be sure that their rights are protected, customers need these laws if an atmosphere of trust is to be developed. Otherwise a situation could arise in which ordered goods are not delivered and sellers can be branded as dishonest.

This forms part of an issue called “repudiation of participation in a transaction”. In a situation where goods are paid for and not delivered it raises questions about whether the

seller or the delivery methods are reliable. Or, if the delivery is made but the customer denies it and does not pay, then the customer or delivery system may be questionable from the seller's perspective. This means that payment systems need to identify all parties so funds cannot be withheld and to ensure orders are delivered.

Laws and Legislation are an important antecedent of behaviour which impacts on it directly or indirectly, (Shu-Chiang, et al., 2014), (Krishnasamy & Nayan, 2015).

The research hypotheses concerning laws and legislation are:

H4.1: Strong laws and legislation have a positive impact on perceived usefulness.

H4.2: Strong laws and legislation have a positive an impact on behavioural intention to use.

### 5.2.5. User Experience:

The Merriam-Webster Dictionary defines `experience' as "practical knowledge, skill, or practice derived from direct observation of or participation in events or in a particular activity'. (Thompson, et al., 1994) felt that both skill level and length of use should be considered in defining user experience. This could be the case in which an individual is used to using a computer for comparatively simple tasks but still has limited computer skills. Therefore, experience should be included as a factor in TAM (Szajna, 1994), ( Szajna , 1996).

Researchers have found that user experience has a strong influence on a user's readiness to use the system including (Bachmann, 2005), (Gallivan, et al., 2005), (Karat, et al., 2003), (Palanisamy, 2005) and (Rusell , et al., 2003).

It was also found to have a positive influence on the perceived quality of information by (Lillrank, 2013), and (Irani, et al., 2009).

(Chris, 2015) found that there was a direct and positive influence on ease of use and attitudes towards it by end-user experience. Both (Kim & Malhotra, 2005) , (Pavlou & Fygenson, 2006) found experience of IT applications to affect the relationship between beliefs, intention, and behaviour. (Cheong & Park, 2009) Found that once people's experience of a system grows they develop opinions about its ease of use. Experience also develops users' ability with technology. Because of this, user experience has been added and we will study how it impacts on beliefs about the new system.

The following hypotheses are also added to this study:

H5.1 User experience has a positive impact on perceived ease of use.

H5.2 User experience has a positive impact on perceived usefulness.

### 5.2.6. Training

Libya's Ministry of Education (Education, 2009) defined training as a planned individual and group activity to develop ability in terms of information, experience, skills, rates of performance, methods of work, behaviour and trends in order to increase efficiency.

(Armstrong, et al., 2010) said that training is the formal and systematic modification of behaviour through education, instruction, development and planned experience. According to (Goldstein, 1993) it is the process of developing the knowledge and skills of an employee to complete tasks. (Saleemi & Bogonko, 1997) Regarded it to be organized activity designed to alter the thinking and behaviour of people and to enable them to carry out their jobs in a more efficient manner. (Laird, 1988) Defined it as the gaining of the technology to let employees perform as required. So it can be defined as an experience, discipline or regimen which lets people develop new behaviours.

A great benefit of collecting satisfaction data is that it allows analysis down to the technician level and this enables targeted training to be given to employees according to need, for example in cases of poor ICT literacy.

Indeed, it is vital for ICT development (DeLone & McLean, 1999). In some studies, it has also been found to be important in affecting user perceptions about technology (Wart , et al., 2016), (Ibrahim & Zakaria, 2016) and (Wichadee, 2015), found that training affects many parts of user acceptance and by investigating the effect of training on user participation, satisfaction and perceived ease of use it may help to explain the conflicting research findings. (Cheong & Park, 2009) Identified training as a very important variable which can impact on acceptance and use of the internet in the university. Training has also been found to encourage leaders to accept technology (Schepers, et al., 2015). (Venkatesh & Davis, 2000) found that training improved perceived ease of use and (Igbaria, et al., 1997) agreed with this. As training is expected to influence usage the following hypotheses are proposed:

H6.1 Training has a positive impact on perceived usefulness.

H6.2 Training has a positive impact on perceived ease of use.

### 5.2.7. Infrastructure:

The networks, hardware, software, skills, processes and resources that must be in place for an organization to build an E-commerce application combine to create what is called the infrastructure. It may be held within or outside the organization.

The technical infrastructure exists for customers and suppliers and to cover the geographical area between them. In studies, only worker technical skills were considered critical. Other

attributes were only very important. This may indicate that organizations recognise that more than technical ability and solutions are needed for E-commerce.

The client interface is also vital in developing the relationship between buyer and seller. It has three critical attributes and these are that it provides trust in the relationship, holds knowledge of the customer and is in their language. It must also have a facility to resolve issues too.

(Iddris, 2012) Found obstacles to the use of E-commerce in developing countries included poor ICT infrastructure and a weak financial sector affecting e-payments. Countries like Libya also have limited internet accessibility and slow network speeds which have a negative effect on E-commerce.

Infrastructure has also been found to encourage leaders to accept technology, (Dahi & Ezziane, 2015), ( Govender & Chitanana , 2016).

Because infrastructure is expected to affect perceived usefulness and perceived ease of use the following hypotheses are proposed:

H7.1 Infrastructure has a positive impact on perceived usefulness.

H7.2 Infrastructure has a positive impact on perceived ease of use.

### 5.2.8. Awareness

A key reason that inhibits people from shopping online is the fact that they cannot inspect the goods before purchase so awareness of the other benefits of E-commerce for consumers is crucial.

These include easy payment methods, clearly understood rules, home delivery and business participation. Government can also play a significant role. Therefore, these hypotheses are included:

H8.1 Awareness has a positive impact on perceived usefulness.

H8.2 Awareness has a positive impact on perceived ease of use.

### 5.2.9. Perceived Risk

Ever since Bauer (1960) equated the behaviour of consumers with risk taking much empirical research has tried to identify types of risk this involves.

Cox and Rich (Cox & Rich, 1964) refer to it as the overall amount of uncertainty a consumer experiences when buying.

Jacoby and Kaplan (Jacoby & Kaplan, 1972) identified five types of risk: physical, psychological, social, financial, and performance (functional).

Chaudhuri (Chaudhuri, 1998) stated that the lower the perceived risk the more positive the feelings experienced during consumption.

Sweeney (Sweeney, et al., 1999) defined perceived risk as the subjective expectation of a loss, both in performance and money, which can be perceived as a future cost.

In E-commerce risk involves buying the product “unseen” so it may not live up to expectations. There can also be additional costs when returning unwanted goods.

Research into online transactions by (Hoffman , et al., 1999), (Pavlou & Gefen, 2004) and (Swaminathan, et al., 1999). (Triandini, et al., 2013), (Oduor, et al., 2016) found consumer

trust is improved by making the transaction process transparent, minimising the personal data required and making the legal status clear.

(Bhimani, 1996) Suggested seven essential elements for security in E-commerce: authentication, authorization, availability, confidentiality, data integrity, non-repudiation, and selective application services. (Swaminathan, et al., 1999) asserted that consumers evaluate sellers before buying so their characteristics can facilitate any sale. (Rose, et al., 1999) stated that if people deal with dishonest sellers or if sensitive information is stored on unsecured databases there are definite security threats. Therefore, the following hypotheses are proposed:

H9.1 A lack of risk has a positive impact on perceived usefulness.

H9.2 A lack of risk has a positive impact on perceived ease of use.

### 5.2.10. Banking and payment method:

The banks are expected to be leaders in e-business. While the banks in developed countries mainly work online as non-branch banks, in developing countries like Libya they use the internet as a way to deliver information and provide better customer relations.

To get people working in traditional businesses getting help to build e-enterprise is not easy. To make it happen will need a major revision of incentive schemes, planning and budgeting processes and management roles.

The role of electronic banking in the adoption of E-commerce is crucial in Libya, Therefore the following hypotheses are proposed.

**H10.1 Banking and payment methods have a positive impact on perceived usefulness.**

**H10.2 Banking and payment methods have a positive impact on perceived ease of use.**

## 5.3. Summary

| No. | Hypotheses |
|---|---|
| 1- | Perceived usefulness has a positive impact on behavioural intention to use |
| 2- | Perceived ease of use has a positive impact on behavioural intention to use. |
| 3- | Perceived ease of use has a positive impact on perceived usefulness. |
| 4- | Positive attitude has a positive impact on perceived usefulness. |
| 5- | Strong laws and legislation have a positive impact on perceived usefulness. |
| 6- | Strong laws and legislation have a positive impact on behavioural intention to use. |
| 7- | User experience has a positive impact on perceived ease of use. |
| 8- | User experience has a positive impact on perceived usefulness. |
| 9- | Training has a positive impact on perceived usefulness. |
| 10- | Training has a positive impact on perceived ease of use. |
| 11- | Infrastructure has a positive impact on perceived usefulness. |
| 12- | Infrastructure has a positive impact on perceived ease of use. |
| 13- | Awareness has a positive impact on perceived usefulness. |
| 14- | Awareness has a positive impact on perceived ease of use. |

| | |
|---|---|
| **15-** | **No Risk has a positive impact on perceived usefulness.** |
| **16-** | **No Risk has a positive impact on perceived ease of use.** |
| **17-** | **Banking and payment method have a positive impact on perceived usefulness.** |
| **18-** | **Banking and payment method have a positive impact on perceived ease of use.** |

**Table 5-1 the proposed research Hypotheses**

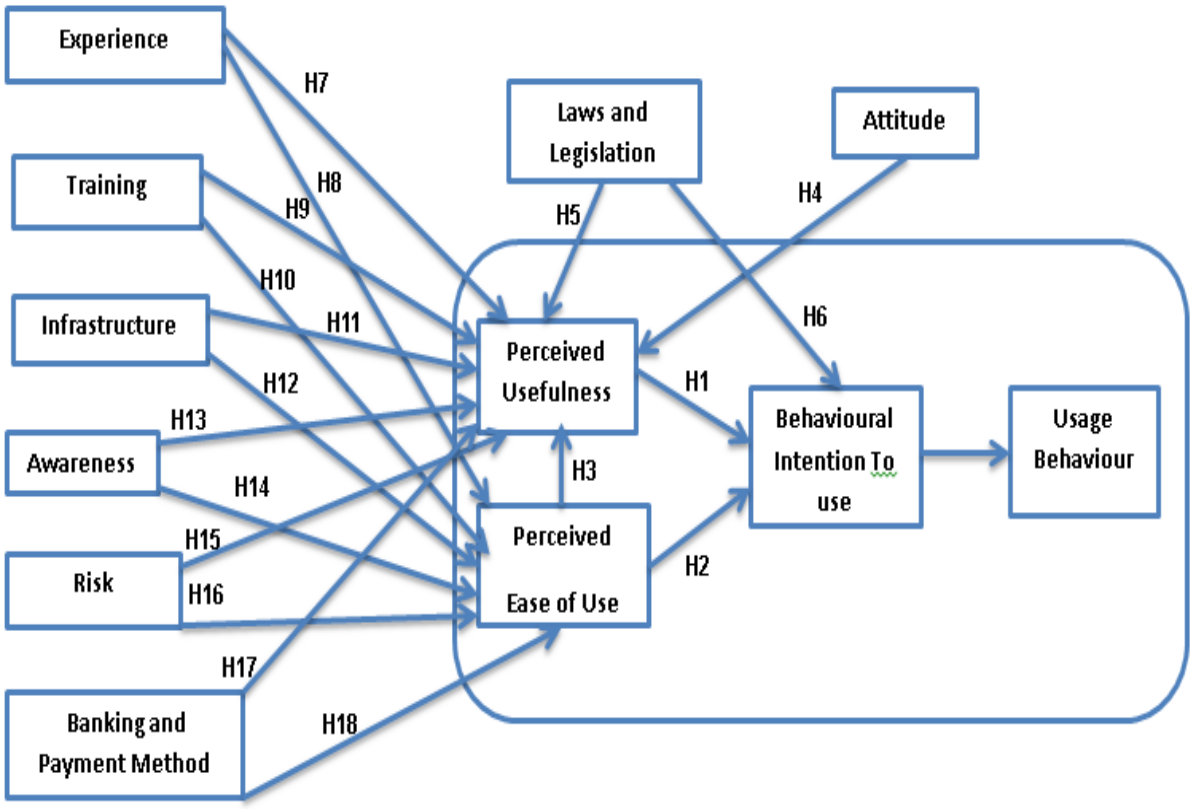


**Figure 5-1The Proposed Research Model with Hypotheses order in table 4.1**

This chapter has explained the proposed model for E-commerce use in this study. It tries to combine the technology acceptance model with the theory of planned behaviour and the

theory of reason action. There are also some constructs taken from information systems development including training, banking and payment methods, risk and experience.

These new constructs are treated as external variables that also have a direct or indirect effect on the main determinants of TAM including perceived usefulness and perceived ease of use. It is a valuable exercise to list all the proposed hypotheses in the table and diagram to show how the new model differs from existing ones.

It is proposed from this model of research that there are links between the outlined constructs and the intention to make use of E-commerce. It also puts forward the proposition that there is a correlation between perceived usefulness and users' behavioural intentions. This means that people who have found this technology is useful to them will intend to use it. The same is also true of people who feel there is no risk attached to using it. There is also a correlation between awareness and perceived usefulness and between laws and legislation and behavioural intention and perceived usefulness. Correlations are also proposed between infrastructure and banking and perceived usefulness and ease of use.

The test results for all the hypotheses are examined in Chapter Six. In Chapter Five we will review the research methodology used to test them and discuss how the variables relate to each other.

# Chapter 6. DATA ANALYSIS AND RESULTS

## 6.1. Introduction:

In chapter four looked at the methodology and data collection techniques and in this one we will describe their analysis. We will begin by presenting the Cronbach's Alpha reliability, and then we will present the results of the study of Libyan companies followed by the questionnaire given to Tunisian companies. The SPSS application was used to analyse data as was used in other TAM studies, starting with that carried out by Davis. In the past some researchers also used LISREL for data analysis and this is similar to SPSS. In this chapter we look at how answers compare and their frequency and, from testing the research hypothesis, how it supports the use of extended TAM including E-commerce at the managerial level. The relationships between the different constructs of TAM are also discussed along with other extensions of TAM.

## 6.2. Data Analysis Results:

Here is the Cronbach's Alpha reliability table for the questionnaire measures used in the Libyan companies case study and Tunisian companies case study.

| Measures | Cronbach Alpha | Cronbach Alpha |
|---|---|---|
| | Libyan companies' | Tunisian companies' |
| I think I should use E-commerce as much as I need | .821 | .834 |
| I find E-commerce useful for my life | .851 | .812 |
| Using E-commerce improves my job productivity | .823 | .824 |

| | | |
|---|---|---|
| Using E-commerce enables me to accomplish my tasks more quickly | .865 | .841 |
| I find it easy to use E-commerce | .857 | .858 |
| I think it is easy to use E-commerce | .832 | .829 |
| The banking services (report, accuracy etc.) I get from e- commerce are high quality. | .823 | .823 |
| I have no problem with the payment method. | .876 | .833 |
| I have had enough training to use E-commerce. | .845 | .844 |
| I think I will have the training to use E-commerce if I request it. | .836 | .854 |
| Training is very important to get the skills to use E-commerce. | .872 | .864 |
| Senior managers are aware of the benefits that can be achieved with the use of E-commerce | .843 | .823 |
| I am aware of the importance of E-commerce at this time | .826 | .845 |
| Using E-commerce is pleasant | .862 | .825 |
| Using E-commerce is beneficial to me | .865 | .846 |
| I think it would be good to use E-commerce | .817 | .854 |
| I intend to use E-commerce in my daily activities. | .857 | .856 |
| Whenever possible I intend not to use E-commerce. | .826 | .843 |
| To the extent possible, I would use E-commerce. | .867 | .817 |
| The E-commerce infrastructure has been designed to be user –friendly. | .835 | .854 |
| The E-commerce infrastructure is easy to use. | .871 | .852 |
| The E-commerce system is low risk to use. | .856 | .812 |
| The E-commerce system has been designed to be safe to use. | .842 | .852 |
| Laws and legislation on electronic commerce are good enough to ensure rights | .858 | .876 |

| | | |
|---|---|---|
| Laws and regulations concerning electronic commerce provide adequate protection | .873 | .861 |
| I think my experience with using the computer will enable me to use E-commerce. | .862 | .832 |
| I think I have enough experience in working with computers. | .873 | .865 |

**Table 6-1 Questionnaire measures reliability used the libyan companies` case study and Tunisian ` case study**

Pearson's one-tailed method of correlation was used to examine how the variables relate to each other. This method was chosen because the direction of the relationship is stated by the hypotheses of the research. For example, perceived usefulness can positively affect the behavioural intention to use. As shown in Appendix A, the Likert's five-point scale offered these options. 1= strongly disagree, 2= disagree, 3= neutral, 4= agree and 5= strongly agree. The data was analysed using SPSS version 22.

The correlations range between -1.00 and +1.00, depending on the strength of association between the variables under examination. A positive value from 0 to +1.00, shows that if one variable increases in value, the other will too. For negative values of between 0 and -1.00 if one variable increases, the other decreases. The significance probability used here is ($p<.05$). So the correlation could occur by a 5% chance (George, 2011). Some variables are correlated using a range of less than (0.01) and this might mean the chance would be 1%.

The Libyan and Tunisian companies' case studies had 33 items to measure the variables and the items statements have been discussed in the previous chapter.

The average of each variable's measures has been calculated to enable the researcher to get meaningful results from the adapted measures. The average for all the measures for each variable were used and this avoided bias in favour of one measure. Instead of selecting the results which most strongly supported the research hypotheses, the correlation between

the averages of all measures was chosen to take all the collected data into account. For example, perceived usefulness has four measures in the questionnaire. The average of these four measures is calculated and the correlation's average is used to test the hypotheses. Table 6.2 shows the average correlations.

| Variables | Correlations | |
|---|---|---|
| | Libyan company | Tunisian company |
| Perceived usefulness and behavioural intention | .986** | .864** |
| Perceived ease of use and behavioural intention | .864* | .762** |
| Perceived ease of use and perceived usefulness | .971** | .678* |
| Positive attitude and perceived usefulness | .567* | .745** |
| Strong laws and legislation and perceived usefulness | .760** | .698* |
| Strong laws and legislation and behavioural intention | .912* | .658** |
| User experience and perceived ease of use | .785* | .832** |
| User experience and perceived usefulness | .897** | .967** |
| Training and perceived usefulness | .845* | .785** |
| Training and perceived ease of use | .786* | .896* |
| Infrastructure and perceived usefulness | .783* | .731** |
| Infrastructure and perceived ease of use | .873* | .732** |
| Awareness and perceived usefulness | .854* | .785** |
| Awareness and perceived ease of use | .857* | .987** |
| Risk and perceived usefulness | .913** | .834** |
| Risk and perceived ease of use | .876* | .872** |
| Banking and payment and perceived usefulness | .956** | .982** |
| Banking and payment and perceived ease of use | .982** | .956** |

**Table 6-2 the variables average correlation: correlation is significant at the 0.05 level (1-tailed.** Correlation is significant at the 0.01 level (1-tailed)**

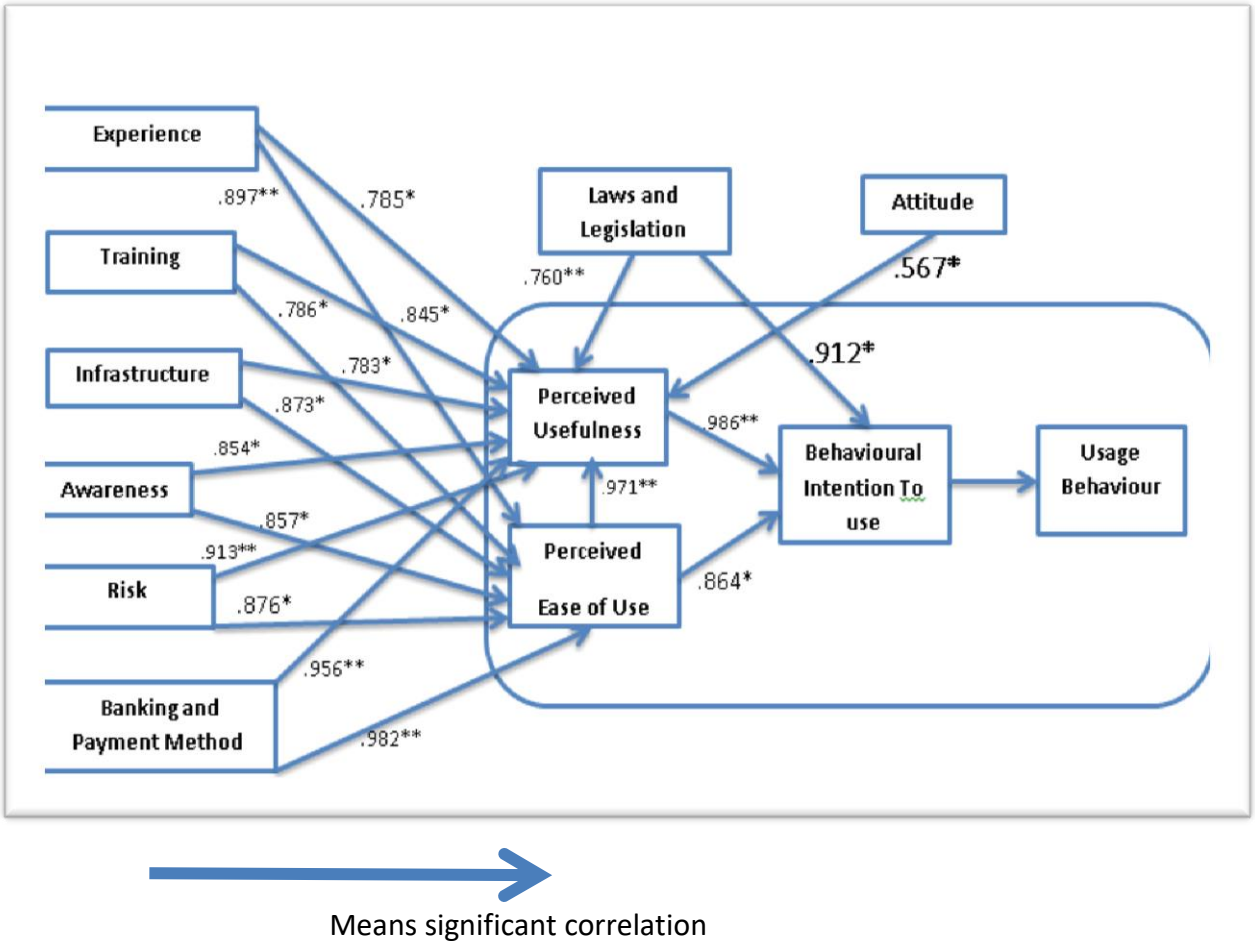


**Figure 6-1 the significant correlating variables at Libyan company case study**

There is significant correlation between perceived usefulness and behavioural intention at .986 which means that perceived usefulness impacts on behavioural intention. Perceived ease of use correlates significantly with behavioural intention at .846. Perceived ease of use and perceived usefulness correlate significantly at .971. Attitude and perceived usefulness correlate significantly at .567. There is significant correlation between strong laws and legislation and perceived usefulness at .760. Strong laws and legislation correlate significantly with behavioural intention at .912. User experience correlates with perceived ease of use at .897, with perceived ease of use at .785. Training correlates significantly with perceived usefulness at .845, and with perceived ease of use at .786.

Infrastructure correlates significantly with perceived ease of use at .873 and with perceived usefulness at .783. Awareness correlates significantly with perceived usefulness at .854, with perceived ease of use at .857. Risk correlates significantly with perceived usefulness at .913 and with perceived ease of use at .876. Banking, payment experience correlates significantly with perceived usefulness at .956 and with perceived ease of use at .982.

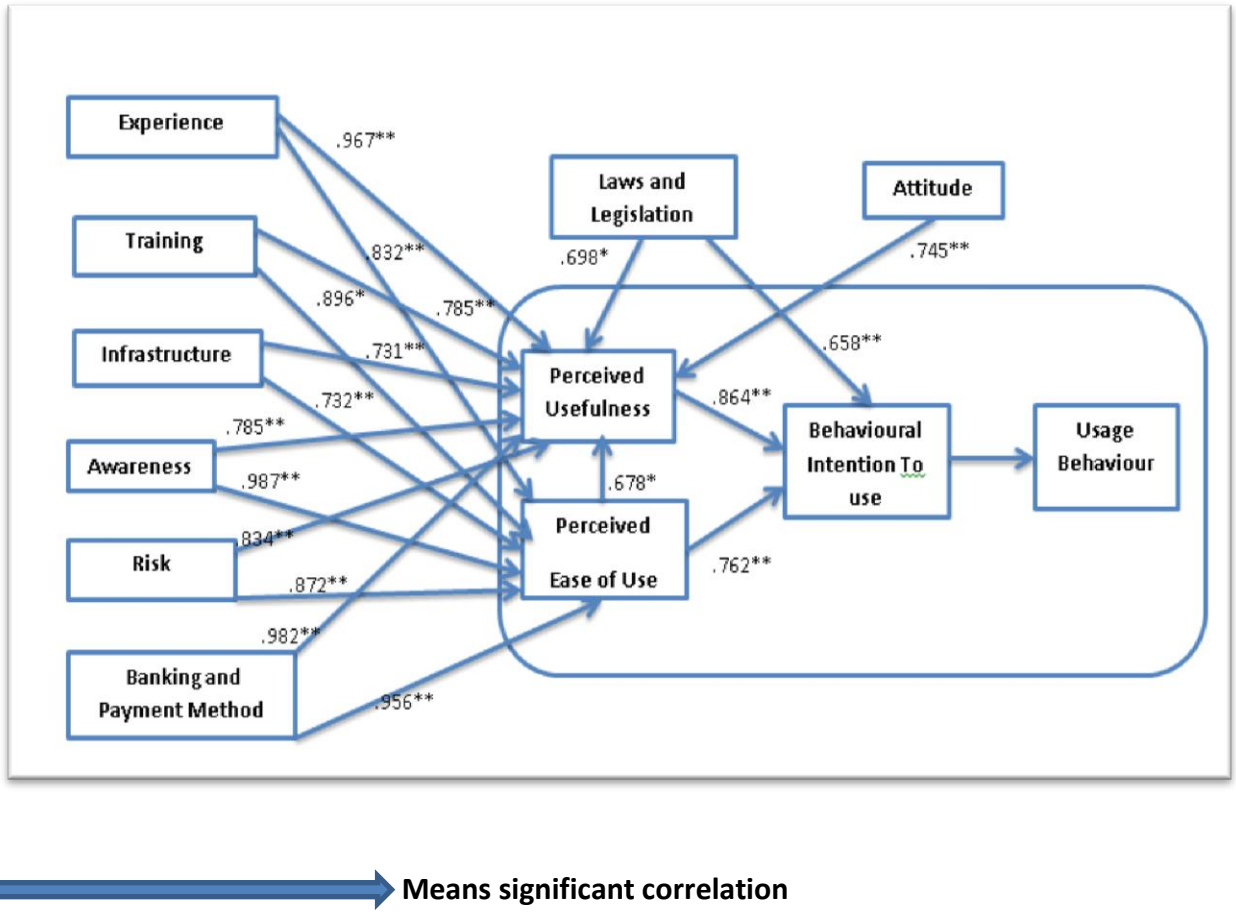


**Figure 6-2 The significant correlation variables at Tunisian company`s case study**

Perceived Usefulness and behavioural intention correlate significantly at .864.

Perceived ease of use correlates significantly with both behavioural intention at .762 and with perceived usefulness at .678. Attitude correlates significantly with perceived usefulness at .745. Strong laws and legislation and perceived usefulness correlate significantly at .698.

Strong laws and legislation correlate significantly with behavioural intention at .658. User experience correlates with perceived ease of use at .832 and with perceived usefulness at .967.

Training correlates significantly with perceived usefulness at .785 and with perceived ease of use at .896. Infrastructure correlates significantly with perceived usefulness at .731 and with perceived ease of use at .732. Awareness correlates significantly with perceived usefulness at .785 and with perceived ease of use at .987. Risk correlates significantly with perceived usefulness at .834 and with perceived ease of use at .872. Banking and payment method correlates significantly with perceived usefulness at .982 and with perceived ease of use at .956.

### 6.3. The Hypotheses Testing:

For the testing of the research hypotheses a number of null hypotheses should be generated to express the opposite statements.

This is thought to represent falsification of the hypotheses and the test has two possible results: either the rejection of the null hypothesis or its acceptance. If the null hypothesis is rejected, the alternative hypothesis is accepted. If the p-value of the correlations between the two variables are less than or equal to .05 then the result would be to `reject the null hypothesis' and accept the alternative. For correlations of more than .05, the result would be 'do not reject the null hypothesis' and do not accept the alternative. Testing the hypotheses uses the correlations of the average scores recorded in the case studies.

| NH 5. Strong laws and legislation have no impact on perceived usefulness. |
| --- |
| AH5. Strong laws and legislation have a positive impact on perceived usefulness. |

| NH6. Strong laws and legislation have no impact on behavioural intention to use. |
| --- |
| AH6. Strong laws and legislation have a positive impact on behavioural intention to use. |

| NH7. User experience has no positive impact on perceived ease of use. |
| --- |
| AH7. User experience has a positive impact on perceived ease of use. |

| NH8. User experience has no positive impact on perceived usefulness. |
| --- |
| AH8. User experience has a positive impact on perceived usefulness. |

| NH9. Training has no positive impact on perceived usefulness. |
| --- |
| AH9. Training has a positive impact on perceived usefulness. |

| |
|---|
| NH10. Training has no positive impact on perceived ease of use. |
| AH10. Training has a positive impact on perceived ease of use. |

| |
|---|
| NH11. Infrastructure has no positive impact on perceived usefulness. |
| AH11. Infrastructure has a positive impact on perceived usefulness. |

| |
|---|
| NH12. Infrastructure has no positive impact on perceived ease of use. |
| AH12. Infrastructure has a positive impact on perceived ease of use. |

| |
|---|
| NH13. Awareness has no impact on perceived usefulness. |
| AH13. Awareness has a positive impact on perceived usefulness. |

| |
|---|
| NH14. Awareness has no impact on perceived ease of use. |
| AH14. Awareness has a positive impact on perceived ease of use. |

| |
|---|
| NH15. No Risk has no impact on perceived usefulness. |
| AH15. No Risk has a positive impact on perceived usefulness. |

| |
|---|
| NH16. No Risk has no impact on perceived ease of use. |
| AH16. No Risk has a positive impact on perceived ease of use. |

| |
|---|
| NH17. AH17. Banking and payment method have no impact on perceived usefulness. |
| AH17. Banking and payment method have a positive impact on perceived usefulness. |

| |
|---|
| NH18. Banking and payment method have no impact on perceived ease of use. |
| AH18. Banking and payment method have a positive impact on perceived ease of use. |

**Table 6-3 the results of Testing the Hypotheses**

Table 6.3 reviews the results of the hypotheses taking into account the correlations' average from table 6.2.

| No. | Hypotheses | Test Results |
|---|---|---|
| **1-** | **Perceived usefulness has a positive impact on behavioural intention to use** | **confirmed** |
| **2-** | **Perceived ease of use has a positive impact on behavioural intention to use.** | **confirmed** |
| **3-** | **Perceived ease of use has a positive impact on perceived usefulness.** | **confirmed** |
| **4-** | **Positive attitude has a positive impact on perceived usefulness.** | **confirmed** |
| **5-** | **Strong laws and legislation have a positive impact on perceived usefulness.** | **confirmed** |
| **6-** | **Strong laws and legislation have a positive impact on behavioural intention** | **confirmed** |

| | | |
|---|---|---|
| | **to use.** | |
| **7-** | **User experience has a positive impact on perceived ease of use.** | **confirmed** |
| **8-** | **User experience has a positive impact on perceived usefulness.** | **confirmed** |
| **9-** | **Training has a positive impact on perceived usefulness.** | **confirmed** |
| **10-** | **Training has a positive impact on perceived ease of use.** | **confirmed** |
| **11-** | **Infrastructure has a positive impact on perceived usefulness.** | **confirmed** |
| **12-** | **Infrastructure has a positive impact on perceived ease of use.** | **confirmed** |
| **13-** | **Awareness has a positive impact on perceived usefulness.** | **confirmed** |
| **14-** | **Awareness has a positive impact on perceived ease of use.** | **confirmed** |
| **15-** | **No Risk has a positive impact on perceived usefulness.** | **confirmed** |
| **16-** | **No Risk has a positive impact on perceived ease of use.** | **confirmed** |
| **17-** | **Banking and payment method have a positive impact on perceived usefulness.** | **confirmed** |
| **18-** | **Banking and payment method have a positive impact on perceived ease of use.** | **confirmed** |

**Table 6-4 the Hypotheses testing results**

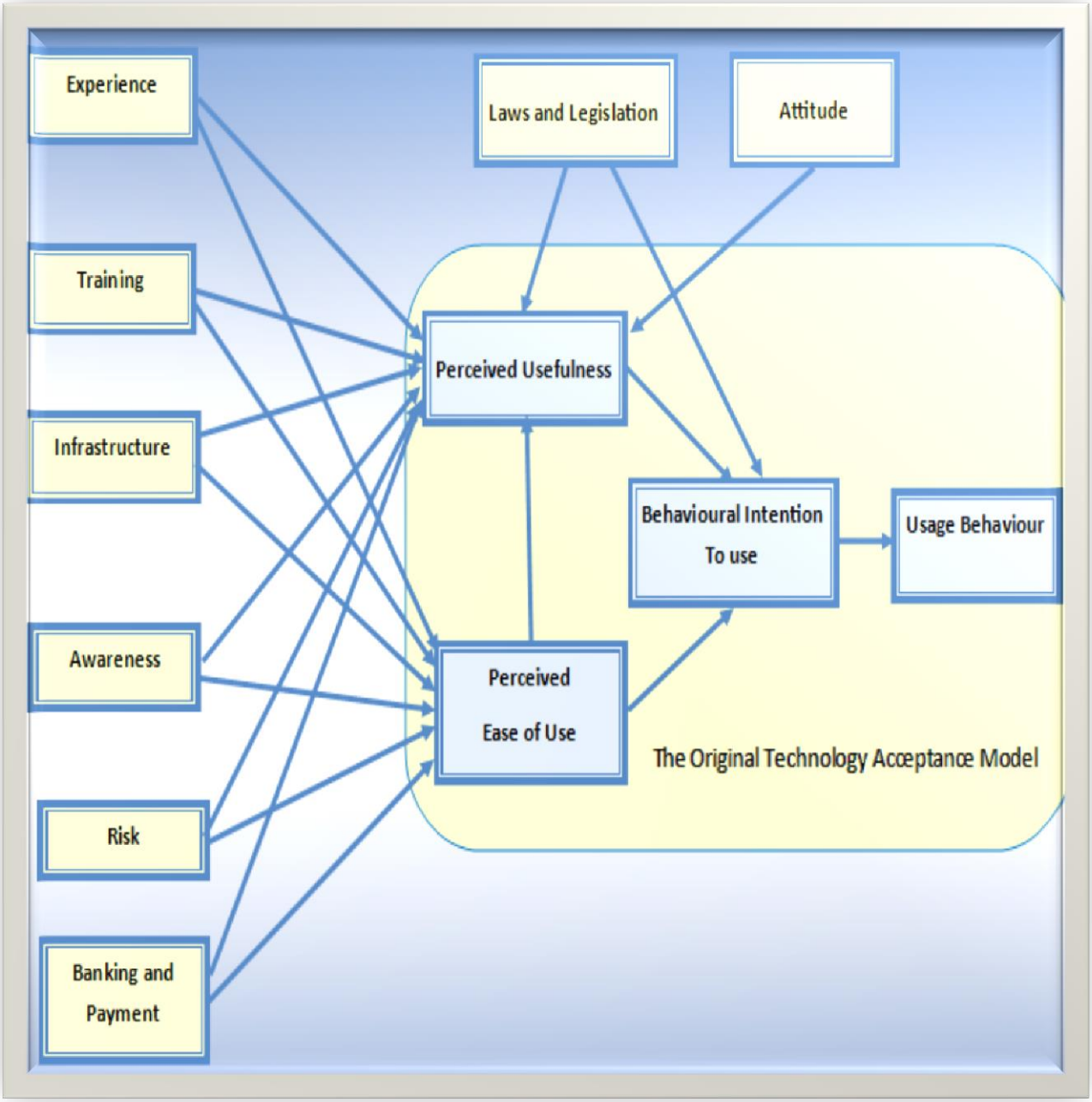


**Figure 6-3 Extended Technology Acceptance Model with E-commerce**

### 6.4. Other Questionnaire Questions:

The questionnaire that was used featured 27 Likert five-point statements plus other additional questions. Two of these were open questions and there were four Likert five-point questions with different answer statements.

Question 28 was “How many years’ total experience do you have with computers?” This discovers any direct use of computers in the past. Answers varied from three to 20 years and demonstrated how important previous experience of computers was.

The other part of the questionnaire examined “End-user E-commerce satisfaction” using a five point Likert five-point scale: 1= almost never, 2= some of the time, 3= about half of the time, 4= most of the time, and 5= almost always.

It included four questions:

| Qu No. | Question | Study | Response Frequencies | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | About half of the time | | Most of the time | | Almost always | |
| | | | Number | % | Number | % | Number | % |
| 29- | Does the E-commerce provide the information you need in time? | Libyan | 0 | %0 | 62 | 98% | 1 | 2% |
| | | Tunisian | 0 | %0 | 15 | 22% | 53 | 77% |
| 30- | Are you satisfied with the accuracy of E-commerce? | Libyan | 0 | 0% | 61 | 96% | 2 | 4% |
| | | Tunisian | 0 | 0% | 20 | 29% | 48 | 71% |
| 31- | Can you access E-commerce anytime you need? | Libyan | 0 | 0% | 43 | 68% | 20 | 32% |
| | | Tunisian | 0 | 0% | 18 | 26% | 50 | 78% |
| | | | 1-2 times week | | 2-3 time week | | More than 3 time week | |
| 32- | On average, how much time do you spend using E-commerce? | Libyan | 30 | 47% | 20 | 32% | 13 | 21% |
| | | Tunisian | 15 | 22% | 17 | 25% | 36 | 53% |

**Table 6-5 the results of questions 29, 30, 31,32**

Question33: What are the factors that you think would help users to accept E-commerce and start using it?

This open-ended question allows participants to give their own opinions about the best way to ensure acceptance of E-commerce.

This question was included to discover new constructs of technology acceptance using the participants' experience. Answers varied, but most of the respondents answered using the earlier statements from the Likert five-point scale.

Participants believed certain factors influence the adoption of E-commerce including receiving training and support, staff communication and motivation. Having the right infrastructure, awareness, advertising, laws and regulations, compatibility with other systems and financial support were also very important for the acceptance of E-commerce.

These answers were gained from the open question asking about their experience of E-commerce implementation and they show that they all should be taken into consideration when E-commerce is being developed. For example, good communication allows users to share their experience and discuss how E-commerce can be implemented. It was also pointed out that communication between IT specialists and users is very important to resolve technical issues. This has the added advantage that users who believe E-commerce is useful can spread their enthusiasm to other colleagues and peers.

Most respondents agreed that training is the most important factor in introducing E-commerce systems. This both demonstrates the usefulness of the system and helps users to overcome any difficulties in using them. This lends credence to these two hypotheses of

training: 1) Training impacts positively on perceived usefulness and, 2) training impacts positively on perceived ease of use.

### 6.5. Interviews analysis

In this research, because the number of people interviewed was not very large, the number of questions was also simple and direct, because the directors` responses in Libyan and Tunisian companies were close to each other. So after consultation with some specialists in practical research, it has become clear that there is no need to use any computer software to analyze interview because the vision is clear and they all agree in their views and so it was easy to get the expected result of the interviews. The researcher did not focus on the interviews in drawing the results, but his focus was on the questionnaire because it is larger and comprehensive.

More accurate One of the main reasons for not using any computer software in the analysis of interviews was that all those who participated in the interviews were among those who participated in the questionnaire, so their opinions were within the precise answer in the questionnaire.

Through interviews with senior leaders in the Libyan and Tunisian companies, we can say that the managers (who are decision-makers) have a good understanding and realize the important role that communication technology and information has to play in everyday life. They also show a great willingness to adopt E -commerce for their companies. It was also noted that they would need support from their respective governments because, as everyone pointed out, the Internet and E-commerce are the future and they will have to catch up with the developed world if they are to compete effectively.

The researcher also noted that managers have a vision of how successful they could prove to be if the right infrastructure can be developed. In this way customers and companies alike will be prepared for the online world, just as they are in developed countries.

# Chapter 7. CONCLUSIONS AND RECOMMENDATIONS

## 7.1. Introduction

The previous chapter looked at data analysis and the testing of hypotheses and the results have shown that the Technology Acceptance Model is applicable at managerial level for Libyan and Tunisian companies whose sphere of operation is in information technology. Here we will examine TAM extensions and compare them with the current research extension. We will also look at relationships between the newly extended TAM's constructs.

Consequently, it will demonstrate how this study meets the research objectives, look at limitations and recommend further areas of research.

## 7.2. Discussion-Extended Technology Acceptance Models:

Understanding why people to accept or reject a particular technology are a challenging issue in the field of information systems research (Legris, et al., 2003).

This suggests that there is a need to examine the influences that affect whether managers and staff accept and use technology in the workplace and, in particular, how it relates to the introduction and use of E-commerce in these companies.

This is vital as the co-operation of managers and technology staff is essential if technology is going to be used for the purpose intended.

According to (Davis, 1989), where there is minimal user acceptance it is a real hindrance to the successful use of information systems which are intended to improve performance.

Since TAM was introduced in 1989, it has been tested in various research studies and settings to prove its applicability, validity and reliability. This resulted in the integration of

various behavioural models covering particular situations involving the acceptance of technology.

(Venkatesh & Ramesh, 2006) criticised TAM for being unable to offer designers guidance on how to ensure more effective implementation.

The TAM model is also limited by the way in which it does not include social influences although numerous researchers have tried to incorporate these as well as many other processes.

However, TAM does allow the researcher to examine external factors that affect internal processes such as beliefs, behavioural intentions and attitudes. It also investigates theoretical relationships between variables. The affective and cognitive factors of user acceptance can also be incorporated.

(Ajzen, 2005), highlighted the importance of external variables in studies of technology acceptance and stated that they form a link between internal factors like attitudes, beliefs and intentions and those that ultimately affect behaviour.

According to (Hong, et al., 2002) users' beliefs can be directed towards a new system through external variables. So researchers have incorporated external factors such as subjective norm, job relevance and image to make TAM more applicable.

### 7.3. The Contribution to The Knowledge: The Extended TAM Incorporating E-commerce (E-COM):

The Extended Technology Acceptance Model (Figure 6.4) appropriate to E-commerce (E-COMTAM) was based on the critical analysis of the TAM. Numerous extensions were made

when other researches were conducted since the development of TAM tested the model in a number of settings involving new technology.

### 7.3.1. Hypothesised Relationships of Constructs for the Extended TAM :

The model which is applicable for E-COM includes eight constructs.

1) Previous experience of, and practical exposure to, E-commerce.

2) Training to improve the skills of people using E-commerce.

3) The attitude, beliefs and feelings leading a person to act in a particular way, for example to accept or reject E-commerce and the level at which they do this.

4 Legislation as strong laws have an impact on the acceptance and use of E-commerce.

5) The need for suitable infrastructure as this is one of the most important factors behind the acceptance or rejection of E-commerce.

6) Awareness of the advantages of E-commerce is key to acceptance.

7) If there is a low perceived risk it has a very positive impact.

8) Having adequate banking and payment methods are strong reasons to accept and use E-commerce.

These constructs have an influence on either or both perceived usefulness and perceived ease of use. Perceived usefulness and ease of use interact with each other and have an effect on behavioural intention. This ultimately is manifested in actual usage behaviour.

The derivation of experience comes from a construct of the extended TAM2 that affects both perceived ease of use and intention to use. The level of an individual's exposure to E-commerce determines their perception of whether to accept and use it. This can depend on previous experience of using technology so it cannot apply to people using E-commerce for first time. It is counted as an external factor because it is an independent variable. Experience is also counted as a moderating factor in the Unified Theory of Acceptance and Use of Technology (UTAUT). This is because it is an independent construct that influences several others in a way that can change research results. In the extended model (figure 6.4) experience is shown to have a direct effect on both perceived ease of use and perceived usefulness.

Training relates to the construct facilitating conditions in the Unified Theory of Acceptance and Use of Technology (UTAUT). These refer to the organizational and technical support for the use of the technology. When TAM is extended to include E-commerce training it is given the status of a construct because it is so important for E-commerce adoption and use. It impacts on perceived usefulness and ease of use because someone with previous knowledge of computer systems is more likely to find using E-commerce easy.

Infrastructure relates to the technical aspects of the model and is important as it directly affects people's perceived ease of use. An E-commerce system that is hard to use because it is supported by an inadequate infrastructure would result in users having negative perceptions and could result in non-usage.

Where there are no laws and legislation in place, or they are not sufficient, the extended TAM model considers this to be a construct that directly influences both perceived usefulness and perceived ease.

Lack of risk is another construct that determines eventual technology acceptance and use. This construct is included in the model developed for E-commerce because it has a clear influence on perceived usefulness. This means that a higher value can be imposed upon the organization. Sharing information through the system leads to a perception of the usefulness of E-commerce.

Attitude features as another construct in the Unified Theory of Acceptance and Use of Technology (UTAUT) which can facilitate acceptance and is included because it directly influences perceived usefulness.

Similarly, awareness is another variable from the facilitating conditions. These are activities implemented by management to encourage acceptance and adoption of E-commerce. But, in the extended TAM (Figure 6.4) developed for this research, awareness was classified as an independent construct because it affects both perceived usefulness and perceived ease of use.

Finally, banking facilities and payment methods are other important constructs that apply to E-commerce acceptance and use and have a direct influence on perceived usefulness and perceived ease.

Testing the hypotheses has substantiated the usefulness of the new extension of TAM which has been developed to take managerial acceptance and use of new technology into account. Managers differ from other staff as their work includes more control and supervisory tasks. So E-commerce should always meet their needs. The extended TAM (E-COMTAM) helps E-commerce designers and should be applied early in E-commerce development projects. All

the previously outlined constructs should also be included if the best outcome is to be achieved.

The results also meet the study's second objective which is to use the case studies `to demonstrate how users develop their orientations towards technology systems through the cycle (belief-attitude behaviour)'. This leads on to the third objective `to identify key factors and relationships likely to prevent or enhance effective technology use by managers'.

In confirming the hypotheses, it brought to light other constructs which can enhance technology acceptance and use. These constructs support the fourth objective of this study which is to examine potential users' perceptions of perceived usefulness and perceived ease of use.

| No. | Hypotheses |
|---|---|
| 1- | **Perceived usefulness has a positive impact on behavioural intention to use** |
| 2- | **Perceived ease of use has a positive impact on behavioural intention to use.** |
| 3- | **Perceived ease of use has a positive impact on perceived usefulness.** |
| 4- | **Positive Attitude has a positive impact on perceived usefulness.** |
| 5- | **Strong laws and legislation have a positive impact on perceived usefulness.** |
| 6- | **Strong laws and legislation have a positive impact on behavioural intention to use.** |
| 7- | **User experience has a positive impact on perceived ease of use.** |
| 8- | **User experience has a positive impact on perceived usefulness.** |

| | |
|---|---|
| **9-** | **Training has a positive impact on perceived usefulness.** |
| **10-** | **Training has a positive impact on perceived ease of use.** |
| **11-** | **Infrastructure has a positive impact on perceived usefulness.** |
| **12-** | **Infrastructure has a positive impact on perceived ease of use.** |
| **13-** | **Awareness has a positive impact on perceived usefulness.** |
| **14-** | **Awareness has a positive impact on perceived ease of use.** |
| **15-** | **No Risk has a positive impact on perceived usefulness.** |
| **16-** | **No Risk has a positive impact on perceived ease of use.** |
| **17-** | **Banking and payment method have a positive impact on perceived usefulness.** |
| **18-** | **Banking and payment method have a positive impact on perceived ease of use.** |

**Table 7-1 the validated research Hypotheses**

### 7.4. LIMITATIONS OF THE STUDY:

In common with all research projects, this has had several limitations that must be brought to the attention of those using this study's findings or evaluating its results. This is in line with Yin (2003) who asserted that every research study is limited by its constraints.

The researcher has made every effort to overcome these limitations to ensure that this study could be conducted smoothly, but it was not possible to control all the factors that were likely to affect its quality. The limitations are:

• Events in Libya in 2011 that disrupted the research but perhaps also made the research more valid within the public discourse in the region.

- Travel to Tunisia and some problems in the border

• With limited resources and time, it was not possible to do any more research other than the interviews held.

• A study of this kind may not get the whole picture and this is why any findings should be considered to merely be exploratory and preliminary.

### 7.5. Future Research:

The key objective was to expand the Technology Acceptance Model (TAM) to incorporate E-commerce use by managers. To achieve this, the case study method was used alongside action research carried out at management level in numerous Tunisian and Libyan companies working in the field of informatics and communication technology.

As the extended model required additional case studies to be undertaken in order to determine its validity, another case study was carried out to reconfirm the research hypotheses around the acceptance and use of E-commerce.

A questionnaire was also issued to scrutinize the reliability of the extended model. However, the extended model will need more research, this time at the employee level, to determine how relevant it is for non-managerial staff and others using E-commerce.

As the extended model was tested to be relevant to a wider scope of technology then greater reliability could be attributed to the results if the model were to be extended.

### 7.6. Recommendations:

The research has a number of hypotheses have been confirmed and the following recommendations are made to the Libyan government generally and in particular for Libyan companies specialized in communications and information:-

- ✓ As long as strong laws and legislation have a positive impact on perceived usefulness and on behavioural intention to use, so work should be done on E-commerce law and to deter computer crimes in line with the recent developments in this area.
- ✓ Very clear that the user experience has a positive impact on perceived ease of use and in on perceived usefulness, for this reason competent authorities in Libya need to develop an action programme covering various aspects of the development of E-commerce and take advantage of the Tunisian experience in this area.
- ✓ As it is clear that the banking and payment method have a positive impact on perceived usefulness and on perceived ease of use, wherefore work should be done by banks in the field of electronic commerce through the issuance of e-payment and bank credits and to develop their role in guarantor systems.
- ✓ As is evident from search results that the Infrastructure has a positive impact on perceived usefulness and on perceived ease of use, for this the basic and technological infrastructure efficiency should be enhanced through communication projects and the provision of software. Subscription to the internet should be made cheaper.
- ✓ Awareness has a positive impact on perceived usefulness and on perceived ease of use; curricula should be developed for all stages to keep pace with the information age and the introduction of the internet in the field of education. There should be the establishment of virtual universities as well as study and research centres for the

information industry and the researcher recommends the specific introduction of E-commerce within the curriculum of all relevant subjects.

- ✓ In addition to training has a positive impact on perceived usefulness and on perceived ease of use , consequently there should be human resource development in the field of technology, through the dissemination of education and training related to computerised automation and the use of information networks. There should also be a dissemination of cultural creativity and a deepening of participation in the exchange of information within the community groups and organizations. This would enhance the skills of the workforce, as well as raise awareness of the importance of E-commerce for individuals and companies.
- ✓ Finally, no Risk has a positive impact on perceived usefulness and on perceived ease of use, Information security and networks and electronic transactions should be made more secure and there should be encouragement to find and follow methods to secure business transactions conducted through open networks at the local and global levels.

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APPENDIX A

## APPENDIX 1 BASIC DATA FOR LIBYA POST TELECOMMUNICATIONS & INFORMATION TECHNOLOGY COMPANY AND THE TUNISIAN POST

| | Libyan Post Telecommunications & Information Technology | The Tunisian Post |
|---|---|---|
| Sign | | |
| The nature of the company's activity | A service | Service institution with a commercial division |
| The company's headquarters | Zawai street - Tripoli | 1030 Hadi Nowra street, Tunisia |
| Number of Workers | 16200 | 10000 |
| The number of computers | 10500 | 6000 |
| Bodies that the company belong | Member of the World Postal Union.<br>Member of the African Postal.Union<br>Thuraya Satellite Telecommunications Company.<br>Member of the Organization of Arab Satellite Communications. | Member of the World Postal Union.<br>Member of the Organization of Arab Satellite Communications.<br>Member of the International Organization for the Development of express postal.<br>Member of the International |

| | | |
|---|---|---|
| | | Organization for IT activities. |
| company website | www.lptic.ly | www.poste.tn<br>www.E-Dinsr.post.tn<br>www.postlearning.post,tn<br>www.Fatoura.post.tn<br>www.E-stamps.poste.tn<br>www.Rapidposte.post.tn<br>www.e-fleurs.post.tn |
| E-mail | not found in time of study | onp@post.tn |
| Ownership | Public sector | Public sector |
| Date of incorporation | 2000 | 1999 |
| The affiliate | Council of ministers | The Ministry of Communications Technology |
| The number of fixed telephone lines | Almost two million | It is not in the business of providing fixed-line services |

APPENDIX B

## APPENDIX 2 BASIC DATA FOR LIBYANA MOBILE PHONE AND TUNISIE TELECOM

| | Libyana Mobile Phone | Tunisie Telecom |
|---|---|---|
| Sign |  |  |
| The nature of the company's activity | A service | Industrial and commercial nature |
| The company's headquarters | Abou setta beside Al-Foroseya club/ Libya – Tripoli | 1002 Saddr Bgal road - Tunisia |
| Form of ownership | Public sector | Public sector |
| Date of incorporation | 2004 | 1995 |
| Number of Workers | 1100 | 8500 |
| The affiliate | Libyan Post Telecommunications & Information Technology | The Ministry of Communications and Informatics |

| | | |
|---|---|---|
| The number of computers | About 700 | About 2500 |
| Bodies that the company belong | member of the Organization of Arab Satellite Communications | Member of the Organization of Arab Satellite Communications.<br><br>Member of the International Telecommunication Union.<br><br>Thuraya Satellite Telecommunications Company |
| The number of mobile phone lines | The current system capacity of more than six million line almost | Almost 10 and a half million |
| The number of fixed telephone lines | Not one of their roles | Five million lines |
| The company website | www.libyana.ly | www.Tunisietlecom.tn |
| E-mail | No email found | Actel@uiruelleqttnet.tn |
| Facebook page | https://www.facebook.com/Libyana.Mobile.Phone?ref=br_rs | https://www.facebook.com/TunisieTelecom.PageOfficielle?ref=ts&fref= |
| Tasks and services | Providing mobile services in all regions of Libya | The functions and services essential to provide networking for the benefit of public an |

## APPENDIX 3 BASIC DATA FOR LIBYA TELECOM & TUNISIAN INTERNET AGENCY

| | Libya Telecom & Technology | Tunisian Internet Agency |
|---|---|---|
| Sign |  |  |
| The nature of the company's activity | Service | Service |
| Date of incorporation | 1997 | 1996 |
| The company's headquarters | Omar moktar street -Tripoli | 13 Jugurtha Street - extends Alfel- Tunisia |
| Number of Workers | About 2000 | About 1500 |
| The number of computers | 800 | 900 |
| The number of Internet users | About Two million | About Four million |
| The affiliate | Libyan Post Telecommunications & | The Ministry of Communications and Informatics |

| | | |
|---|---|---|
| | Information Technology | |
| Bodies that the company belong | Arab coalition of the Internet | Arab coalition of the Internet.<br><br>Global coalition for internet protocol.<br><br>Global Organization of the Internet |
| The company website | www.lttnet.com | www.Ati.tn |
| E-mail | support@lttnet.com | wehadmain@Ati.tn |
| Facebook page | https://www.facebook.com /LibyaTT?ref=ts&fref=ts | https://www.facebook.com/pages/Tunisian-Internet-Agency/107964202557613?ref=br_rs&rf=508092172597968 |
| Tasks and services | Internet service via the telephone line.<br><br>Domain registration web design pages.Hosting-provide the database for each of the required information for any company working in Libya. | Development of strategy use in Tunisia and finding new applications in t<br><br>Contributing to the concentration of national networks ((educati agriculture)).<br><br>Manage national Internet network connectivity.<br><br>Registration of the subsidiary titles |

## APPENDIX 4 THE QUESTIONNAIRES LIKERT FIVE POINT SCALE RANGING FROM:

1= fully disagree, 2= disagree, 3= neutral, 4= agree and 5= fully agree.

| No | Statement | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| 1- | I think I should use e- commerce as much as I need<br>أعتقد أنه يجب أن استخدام التجارة الالكترونية بقدر ما أحتاج | | | | | |
| 2- | I find e- commerce useful for my life.<br>أجد التجارة الالكترونية مفيدة لحياتي | | | | | |
| 3- | Using e- commerce improves my job productivity<br>استخدام التجارة الإلكترونية يحسن إنتاجية الوظائف | | | | | |
| 4- | Using e- commerce enables me to accomplish my tasks more quickly<br>استخدام التجارة الإلكترونية تمكنني من إنجاز المهام الخاصة بي بشكل أسرع | | | | | |
| | | | | | | |
| 5- | I find it easy to use e- commerce<br>أجد أنه من السهل أن استخدام التجارة الإلكترونية | | | | | |
| 6- | I think it is easy to use e- commerce<br>أعتقد أنه من السهل أن استخدام التجارة الإلكترونية | | | | | |
| | | | | | | |
| 7- | The banking services (report, accuracy etc.) I get from e-commerce are high quality.<br>الخدمات المصرفية )تقرير والدقة الخ( ل يحصل من التجارة الإلكترونية هي ذات جودة عالية . | | | | | |
| 8- | I have no problem with the payment method. | | | | | |

| | |
|---|---|
| | ليس لدي أي مشكلة مع طريقة الدفع |
| | |
| 9- | I have had enough training to use E-commerce.<br>لقد حصلت على التدريب الكافي لاستخدام التجارة الالكترونية |
| 10- | I think I will have the training to use e- commerce if I request it.<br>أعتقد أنه يمكنني الحصول على التدريب استخدام التجارة الالكترونية اذا طلبت ذلك |
| 11- | Training is very important to get the skills to use e- commerce.<br>التدريب مهم جدا للحصول على المهارات اللازمة لاستخدام التجارة الإلكترونية |
| | |
| 12- | Senior managers are aware of the benefits that can be achieved with the use of E-commerce<br>كبار المديرين يدركون الفوائد التي يمكن تحقيقها مع استخدام التجارة الإلكترونية |
| 13- | I aware of the importance of ecommerce in this time<br>أنا على علم بأهمية التجارة الإلكترونية في هذا الوقت |
| | |
| 14- | Using E-commerce is pleasant<br>استخدام التجارة الإلكترونية هو لطيف |
| 15- | Using E-commerce is beneficial to me<br>استخدام التجارة الإلكترونية هو مفيد لي |
| 16- | I think it would be good to use E-commerce<br>أعتقد أنه سيكون من الجيد أن استخدام التجارة الإلكترونية |
| | |
| 17- | I intend to use E-commerce in my daily activities.<br>أنوي استخدام التجارة الإلكترونية في نشاطاتي اليومية |

| | |
|---|---|
| 18- | Whenever possible I intend not to use E-commerce.<br>كلما أمكن ذلك أنوي عدم استخدام التجارة الإلكترونية |
| 19- | To the extent possible, I would use E-commerce.<br>إلى أقصى حد ممكن، وأود أن استخدام التجارة الإلكترونية |
| | |
| 20- | The E-commerce infrastructure has been designed to be user – friendly.<br>تم تصميم البنية التحتية للتجارة الإلكترونية لتكون صديقة للمستخدم |
| 21- | The E-commerce infrastructure is easy to use.<br>البنية التحتية للتجارة الإلكترونية سهلة الاستخدام |
| | |
| 22- | The E-commerce system has a low risk to use.<br>نظام للتجارة الإلكترونية لديها مخاطر منخفضة لاستخدام |
| 23- | The E-commerce system has been designed to be safe to use.<br>وقد تم تصميم نظام للتجارة الإلكترونية لتكون آمنة للاستخدام |
| | |
| 24- | Laws and legislation on electronic commerce are currently valid to ensure rights<br>القوانين والتشريعات المتعلقة بالتجارة الالكترونية سارية المفعول لضمان حقوق |
| 25- | Laws and regulations concerning electronic commerce provide adequate protection<br>القوانين والتشريعات المتعلقة بالتجارة الالكترونية توفير الحماية الكافية |
| | |
| 26- | I think my experience with using the computer will enable me to use E-commerce. |

| | |
|---|---|
| | أعتقد تجربتي مع استخدام الكمبيوتر سوف تمكنني من استخدام التجارة الإلكترونية . |
| 27- | I think I have enough experience in working with computers.<br>عتقد أن لدينا ما يكفي من الخبرة في التعامل مع أجهزة الكمبيوتر . |

28- How many years do you have in total experience with computers?

……

End-User E-commerce Satisfaction (EUES):

Please circle the number that corresponds to the participant's best description of E-commerce:

1= Almost never time 2= some of the time 3= about half of the time

4= Most of the time 5= Almost always.

| NO. | Statement | | | | | |
|---|---|---|---|---|---|---|
| 29 - | Does E-commerce provide the information you need in time?<br>هل توفر التجارة الإلكترونية ما تحتاجه من معلومات في الوقت المناسب؟ | 1 | 2 | 3 | 4 | 5 |
| 30- | Are you satisfied with the accuracy of E-commerce? | 1 | 2 | 3 | 4 | 5 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | هل أنت راض عن دقة التجارة الإلكترونية؟ | | | | | |
| 31- | Can you access E-commerce anytime you need<br>يمكنك الوصول إلى التجارة الإلكترونية في أي وقت تحتاجه | 1 | 2 | 3 | 4 | 5 |
| | | | | | | |

32- On average, how often do you use the E-commerce?

32 - في المتوسط، كم من الوقت هل استخدام التجارة الإلكترونية؟

Almost never ☐ Less than 1 time week ☐ 1-2 times week ☐

2-3 time week ☐ More than 3 time week ☐

33- What are the factors that you think would help users to accept E-commerce and start using it?

33 - ما هي العوامل التي تعتقد أنها تساعد المستخدمين على قبول التجارة الإلكترونية والبدء في استخدامه؟

## APPENDIX 5 SPSS FREQUENCY TABLES

**Libyan companies Frequency Tables: PU1**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | neutral | 5 | 7.9 | 7.9 | 7.9 |
| | agree | 25 | 39.7 | 39.7 | 47.6 |
| | fully agree | 33 | 52.4 | 52.4 | 100.0 |
| | Total | 63 | 100.0 | 100.0 | |

PU2

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | agree | 32 | 50.8 | 50.8 | 50.8 |
| | fully agree | 31 | 49.2 | 49.2 | 100.0 |
| | Total | 63 | 100.0 | 100.0 | |

PU3

**PU3**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | neutral | 2 | 3.2 | 3.2 | 3.2 |
| | agree | 26 | 41.3 | 41.3 | 44.4 |
| | fully agree | 35 | 55.6 | 55.6 | 100.0 |
| | Total | 63 | 100.0 | 100.0 | |

PU4

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | neutral | 1 | 1.6 | 1.6 | 1.6 |
| | agree | 27 | 42.9 | 42.9 | 44.4 |
| | fully agree | 35 | 55.6 | 55.6 | 100.0 |
| | Total | 63 | 100.0 | 100.0 | |

PEOU1

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | agree | 22 | 34.9 | 34.9 | 34.9 |
| | fully agree | 41 | 65.1 | 65.1 | 100.0 |
| | Total | 63 | 100.0 | 100.0 | |

PEOU2

| Percent | Valid Percent | Cumulative Percent |
|---|---|---|
| 15.9 | 15.9 | 15.9 |
| 84.1 | 84.1 | 100.0 |
| 100.0 | 100.0 | |

Banking1

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | agree | 34 | 54.0 | 54.0 | 54.0 |
| | fully agree | 29 | 46.0 | 46.0 | 100.0 |
| | Total | 63 | 100.0 | 100.0 | |

Banking2

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | agree | 3 | 4.8 | 4.8 | 4.8 |
| | fully agree | 60 | 95.2 | 95.2 | 100.0 |
| | Total | 63 | 100.0 | 100.0 | |

Training1

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | agree | 3 | 4.8 | 4.8 | 4.8 |
| | fully agree | 60 | 95.2 | 95.2 | 100.0 |
| | Total | 63 | 100.0 | 100.0 | |

Training2

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | agree | 21 | 33.3 | 33.3 | 33.3 |
| | fully agree | 42 | 66.7 | 66.7 | 100.0 |
| | Total | 63 | 100.0 | 100.0 | |

Training3

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | agree | 10 | 15.9 | 15.9 | 15.9 |
| | fully agree | 53 | 84.1 | 84.1 | 100.0 |
| | Total | 63 | 100.0 | 100.0 | |

Awareness1

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | agree | 14 | 22.2 | 22.2 | 22.2 |
| | fully agree | 49 | 77.8 | 77.8 | 100.0 |
| | Total | 63 | 100.0 | 100.0 | |

Awareness2

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | agree | 8 | 12.7 | 12.7 | 12.7 |
| | fully agree | 55 | 87.3 | 87.3 | 100.0 |
| | Total | 63 | 100.0 | 100.0 | |

ATT1

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | agree | 31 | 49.2 | 49.2 | 49.2 |
| | fully agree | 32 | 50.8 | 50.8 | 100.0 |
| | Total | 63 | 100.0 | 100.0 | |

ATT2

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | agree | 10 | 15.9 | 15.9 | 15.9 |
| | fully agree | 53 | 84.1 | 84.1 | 100.0 |
| | Total | 63 | 100.0 | 100.0 | |

Att3

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Agree | 32 | 47.1 | 47.1 | 47.1 |
| | fully agree | 36 | 52.9 | 52.9 | 100.0 |
| | Total | 68 | 100.0 | 100.0 | |

Intentionl1

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Agree | 3 | 4.4 | 4.4 | 4.4 |
| | fully agree | 65 | 95.6 | 95.6 | 100.0 |
| | Total | 68 | 100.0 | 100.0 | |

Intentionl2

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Agree | 39 | 57.4 | 57.4 | 57.4 |
| | fully agree | 29 | 42.6 | 42.6 | 100.0 |
| | Total | 68 | 100.0 | 100.0 | |

Intentionl3

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | agree | 9 | 13.2 | 13.2 | 13.2 |
| | fully agree | 59 | 86.8 | 86.8 | 100.0 |
| | Total | 68 | 100.0 | 100.0 | |

infrastructure1

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Agree | 4 | 5.9 | 5.9 | 5.9 |
| | fully agree | 64 | 94.1 | 94.1 | 100.0 |
| | Total | 68 | 100.0 | 100.0 | |

infrastructure2

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | agree | 17 | 25.0 | 25.0 | 25.0 |
| | fully agree | 51 | 75.0 | 75.0 | 100.0 |
| | Total | 68 | 100.0 | 100.0 | |

Risk1

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Agree | 14 | 20.6 | 20.6 | 20.6 |
| | fully agree | 54 | 79.4 | 79.4 | 100.0 |
| | Total | 68 | 100.0 | 100.0 | |

Risk2

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | agree | 17 | 25.0 | 25.0 | 25.0 |
| | fully agree | 51 | 75.0 | 75.0 | 100.0 |
| | Total | 68 | 100.0 | 100.0 | |

LandL1

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | agree | 25 | 36.8 | 36.8 | 36.8 |
| | fully agree | 43 | 63.2 | 63.2 | 100.0 |
| | Total | 68 | 100.0 | 100.0 | |

LandL2

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | agree | 18 | 26.5 | 26.5 | 26.5 |
| | fully agree | 50 | 73.5 | 73.5 | 100.0 |
| | Total | 68 | 100.0 | 100.0 | |

Experience1

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | agree | 32 | 47.1 | 47.1 | 47.1 |
| | fully agree | 36 | 52.9 | 52.9 | 100.0 |
| | Total | 68 | 100.0 | 100.0 | |

Experience2

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | agree | 32 | 47.1 | 47.1 | 47.1 |
| | fully agree | 36 | 52.9 | 52.9 | 100.0 |
| | Total | 68 | 100.0 | 100.0 | |

## APPENDIX 6 SUPERVISOR'S LETTER FOR DATA COLLECTION

liverpool JMU

Faculty of Technology & Environment

15th June 2015

Ref: Abdunasser Mrabet – Person No: 499044

**To whom it may concern:**

This is to certify that Mr Abdunnaser A Mrabet is a registered full-time student studying for the degree of PhD (Research) at School of Computing & Mathematical Sciences, Liverpool John Moores University, Liverpool in the United Kingdom.

Mr Mrabet is carrying out research on the (Factors Affecting Electronic Commerce Acceptance and Usage in Libyan Organization). The aim of the research is to explore and understand the current e-commerce practices in Libya as compared to Tunisia.

I would appreciate any assistance you are able to give Mr Mrabet during his visit to Libya and Tunis regarding to his studies.

If you require any further information regarding this work, please don't hesitate to contact me using the details given at the foot of this letter.

Yours faithfully

A.G. Laws
Senior Lecturer in Information Systems
School of Computing & Mathematical Sciences
Liverpool John Moores University

School of Computing & Mathematical Sciences

## APPENDIX 7 SAMPLE LETTER REQUESTING INTERVIEW

Mr……

I am writing to you to invite you to participate in a research study. I am a graduate student in School of computing & Mathematical Sciences in Liverpool John Moores University in the United Kingdom under the guidance of Mr A.G. Laws . Presently I am writing my doctoral dissertation on the topic of (Factors Affecting Electronic Commerce Acceptance and Usage in Libyan Organization). I am collecting information about the process of reform, but I am particularly interested in the current e-commerce practices in Libya as compared to Tunisia I would like to ask if you would be willing to be interviewed. You are an important contributor to my research study. I cannot complete this research without your help. Because you are a specialist in the field of Information and communications technology (ICT) I would like to find out your views on some general questions.

If you would consent to participate in and assist with my study, I will be traveling to Libya this coming days to conduct the interviews , Could you please be so kind and send me an email my address is a.mrabet@2011.ljmu.ac.uk , abdumrabet@gmail.com or call me at 0926307401 or 0918503344 letting me know if we can arrange a time for an interview , I sincerely hope that you will accept my invitation . I certainly appreciate your valuable time and kind consideration in helping me with this study.

Respectfully yours ,

Abdunnaser A Mrabet

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