U-Commerce, the Technology with Broad Imagination: Exploring the Emerging Field of Wireless Communication

M. Adeel Mannan[*]

[*] Khadim Ali Shah Bukhari Institute of Technology, Karachi, Pakistan

Abstract- As the technology shifts from traditional to electronic, electronic to mobile the way of commerce is also changed. But apart from all of these technologies and advancement we look another emerging field of wireless communication during this research, called U-Commerce.

U-commerce transforms the traditional commerce either geographic or electronic or mobile to a world of unique networks having universal devices. Through this users can do "business anywhere, anytime"; using a wide range of devices to invoke personalized services.

During this research, we look into the basic construct or building blocks of U-commerce and what are the obstacles faced in its implementations. Also perform a detailed analysis of the research questions and identified the top factors under consideration by several stakeholders while adopting this newly invented technology within its business.

Index Terms- U-commerce, m-commerce, e-commerce, Ubiquity, Universality

I. INTRODUCTION

Commerce means buying and selling or the exchange on a large scale and includes transportation from one place to another. Until now we know some of the following types of commerce.

- ✓ E - Commerce: - Most popular, doing transaction on Internet
- ✓ M - Commerce: - Business transactions through mobile
- ✓ V - Commerce: - Using voice commands to do transactions
- ✓ P - Commerce: - Proximity commerce using Bluetooth or infrared technology

A. Need of New Technologies

Newer technologies, empowered customers, and highly competitive marketplace make it imperative for businesses to invest in ways of improving the overall business performance. [1]

"The Internet has introduced a significant wave of change. Our communication patterns have changed. We have become dependent on email. We interact with firms via Web sites.

The next wave-introduced through wireless technology-is about to change our lives even more. The increase in transmission capacity of wireless devices lays the foundation for communication unrestricted by physical locations. [1] We can surf the Internet decoupled from landline computers.

In addition, we can do it any time, blurring the borderlines of business and private space. In the future, we will experience another wave of change-a world that provides the ultimate form of ubiquitous networks and universal devices, a world that presents an alternative view of space and time."

We are now shifted to do business in virtual space rather only proving ourselves in geographical space.

B. Purpose of Study

Research has been conducted in order to critically evaluate and examine that how many individuals or businesses are in favor of adopting this new technology for doing their business.

The purpose of this study is also to observe and analyze the factors identified by several stakeholders to better understand the value of U-commerce in the near future.

Specifically, this study highlights the important factors that ensure to be implemented or fulfill while adopting U-Commerce business to increase customer satisfaction, secure and trusted mode of transactions and to develop loyalty for the company even as well.

C. Subject of Study

A total of 50 senior level managers and technical leads in the field of marketing, HR, MIS served as subjects for this research. These are selected randomly not only from Pakistan but also from Dubai, Qatar, Sweden, and Australia even as well.

D. Organization of Paper

The structure of this research has been designed in such a way that in next section we are going to understand the background of study followed by U-Commerce constructs and principle in section 3. In section 4 we compare the U-Commerce with other commerce technologies. Later on we can see some possible applications of it in section 5. In section 6, we perform a detail analysis of our research based on factors. The study based conclusion is described in following section and finally a brief recommendation about future work.

II. BACKGROUND OF STUDY

The advancement of new technologies such as radio frequency identification (RFID) and sensor networks has initiated a trend towards ubiquitous computing, which is also called "anytime, anywhere" computing. [3][4]

In a ubiquitous computing environment, computing devices, applications, networks, and data will be fully integrated and merged. Almost any physical item can be embedded with computing power to establish a unique and verifiable identity, store a wealth of information, collect observations from the physical world, and sense changes in the environment. [3][4][5]

Ubiquitous computing has enabled a new paradigm of commerce which goes above and beyond any traditional commerce. This type of commerce is called "Ubiquitous/Universal Commerce", or simply "U-commerce", and is considered to be the ultimate form of commerce. U-commerce refers to the ability to interact and transact with anything and anyone, anytime and anywhere. [5][6]

Therefore, u-commerce is pervasive – as it will become a part of everyday life and will be so prevalent that most people would not even notice its presence. [11] U-commerce is going to be the next wave in commerce – i.e., after e- and m-commerce.

Personalization is the key in u-commerce. Technologies used in u-commerce, such as RFID and sensor networks, have the ability to identify, track, and trace objects automatically. The use of such technologies has made it technically possible for service providers and merchants to deliver personalized products to their customers based on customers' preferences, and geographical locations. [11][12]

U-commerce can provide a higher degree of personalization, which can provide additional benefits and value to customers. Despite the promising future of u-commerce and the tremendous benefits it can bring to customers, customers' privacy concerns appear to be the biggest obstacle and social issue. In order to enjoy the benefits of personalization in u-commerce, customers usually need to give up some of their personal information to the service providers or merchants. [12][13] The advancement of technologies embedded and used in the u-commerce environment raises concerns of customers because their personal information not only can be constantly accessed and continuously tracked, but also can be easily disseminated and possibly used in ways unknown to them. [13]

Electronic commerce has hit the business world like a tsunami over the past several years, first with a wave of excitement around business-to-consumer (B2C), and then business-to-business (B2B) and person-to-person (P2P). [14] All of these channels, in fact, already exist. But an explosion of new commerce channels and devices is creating something totally new – an environment where buyers and sellers will literally be able to conduct commerce anytime, anywhere and any way they like. And for both buyers and sellers, this new environment provides more choice, more convenience, and more control over how they do business with one another. We call this integrating phenomenon "u-commerce" or universal, ubiquitous commerce. [14][15] It is about the integration of more value-added information into each transaction, in ways that benefit both consumers and businesses.

The idea has been prevalent since the first time people started thinking about conducting innovative forms of commerce other than g-commerce. As such, u-commerce can be viewed as the conceptual extension of g-, e- and m-commerce. [16] However, its purpose is not to serve as a substitute for any one of them; rather different forms of commerce will coexist. U-commerce simply represents the final (and still emerging)

destination of commerce—initiated by e- and propagated by m-commerce. Its purpose is to lay the groundwork for structuring future information systems and providing a discussion forum for trends in the field of IS. [14][16]

Figure 1: U-Commerce Path

III.   WHAT IS U-COMMERCE?

U-commerce transforms the traditional commerce either geographic or electronic or mobile to a world of unique networks having a wide range of devices to invoke personalized services. An experimental set-up is chosen that examines how U-commerce fit into our traditional understanding of IS and under what conditions does u-commerce technology impact perceptions of usefulness, and performance?

A.   The U-construct
When we compared U-Commerce to e-commerce and m-commerce, it reveals five characteristics that make it distinct:
✓   *Portability*
It comprises the physical aspects of mobile devices—one is able to readily carry them. Among the five characteristics, portability has a unique standing.
✓   *Reach ability*
It covers the idea that a person can be in touch and reached by other people 24 hours a day, 7 days a week— In an e-commerce, reach ability is limited to the computer level, or rather the plug-in level. [13]
✓   *Accessibility*
A user can access the mobile network at any time from any location—assuming adequate mobile network coverage. Future mobile technologies will allow users to stay connected permanently. [13][16]
✓   *Localization*
It is the ability to locate the position of a mobile user. As such, localization is the key to providing geographically specific value-added services (so-called location-based services) [13] [16]

B.   Vision and Managing Principle
U-commerce is a managing principle. As technology rapidly drives the convergence of many different spaces – information, financial services, communications – U-commerce can help us think more expansively. It's a vision that compels us to transcend borders – and build links. And it reminds us that technology is

valuable and it makes sense to the user – interesting and productive – and presents a clear business case.

C. U-Commerce Barriers
✓ *Standards*

It means that the application or technology must follow the proper standards. Such as the Open System Interconnection (OSI) model describes how applications and components would communicate with others, or how Transmission Control Protocol/Internet Protocol (TCP/IP), a subset of OSI model, describes the modern Internet standards.

✓ *Security*

As money and information are transmitted across more devices, channels, the security of the transaction becomes more critical. [14] We must extend the same kind of security that exists in the physical world to virtual transactions and to ensure the privacy of users.

✓ *Systems*

Systems used to calculate and distribute value across the chain of users involved in transactions, so are the systems to seamlessly integrate the information across the various transaction components.

✓ *Simplicity*

The most difficult challenge is to integrate technology with simplicity. Without it failure in the consumer environment is almost guaranteed.
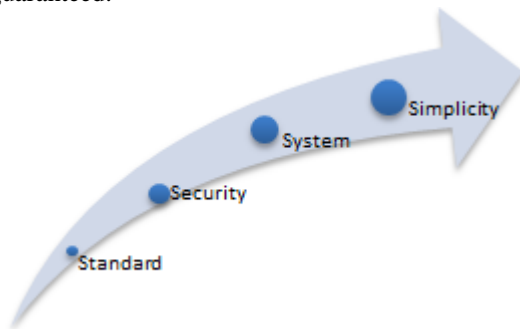
Figure 2: U-commerce Barriers

D. The four building blocks of u-commerce
✓ *Ubiquity*

It allows users to access networks from everywhere at any time, and in turn to be reachable at any place and any time.

✓ *Uniqueness*

It allows users to be uniquely identified, not only in terms of their personal identity and associated preferences, but also in terms of their geographical location.

✓ *Universality*

Means mobile devices are universally usable and are multifunctional and used for managing the communication from everywhere.

✓ *Unison*

It means the idea of integrated data across multiple applications, so users have a consistent view on their information irrespective of the device and network used.
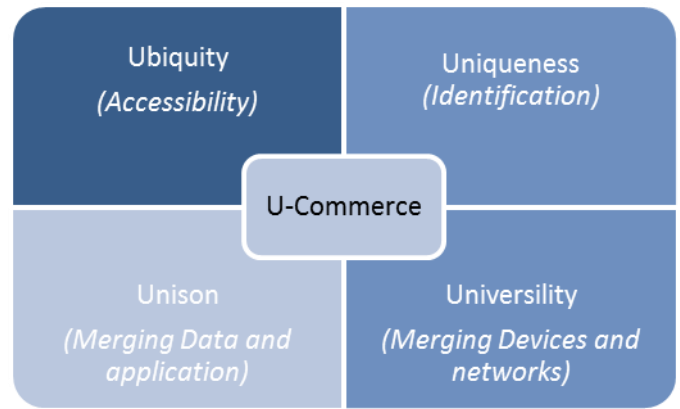
Figure 3: U-Commerce Building blocks

IV. TECHNOLOGY SHIFT FROM E-COMMERCE TO U-COMMERCE?

A. E-commerce to M-commerce
✓ Portability:
Customer's device can be taken almost anywhere.
✓ Reach ability:
M-commerce service can contact the customer at any time and any place.
✓ Accessibility:
Customer can contact m-commerce service at anytime from anywhere.
✓ Localization:
M-commerce service can locate person and provide value-added services to customer based on geographic location.
✓ Identification:
M-commerce service can identify who customer is.

B. M-commerce to U-commerce
✓ Ubiquity = reach ability + accessibility + portability
The customer can be reached by and can reach the m-commerce service anywhere, anytime
✓ Uniqueness = localization + identification + portability
The customer's location and identity can be uniquely identified by the m-commerce service
✓ Universality = device + network
Universal usability of mobile technology for customer with multiple functions
✓ Unison = application + data
Data is kept in unison (synchronized) and is usable with multiple applications on multiple devices by customer

V. DATA ANALYSIS AND FINDINGS

A. 6.1 Do consumers want u-commerce?
When analyzing the data it comes to know that almost 55% of the sample population is in favor of adopting this newly emerging technology. It means that the people live in the world is always willing to adopt and learn the new technologies, because of its ubiquitous nature and universality. The pie chart shows [figure 4] the overall people interests in it.
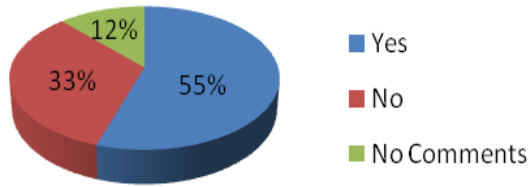
Figure 4: Market Analysis

B. Factors Based Analysis

All the factors that were found to be important for U-Commerce were not given equal importance by the stakeholders. Some of the factors were given a lot of importance while others were given less importance.

We can see that the most important factors of U-Commerce Implementation are different for stakeholders from difference streams. The following tables show the most important factors/outcomes for stakeholders including business managers, technical persons, marketing, HR and operations.

Table 1: Top factors identified by business manager based on ratings

Top factors identified as Business Managers	Ratings
Ease of availability of Network	
Convenience (time and place)	
Reliability	
IT and data security	
Increase in efficiency	

Table 2: Top factors identified by technical persons based on ratings

Top factors identified as Technical Persons	Ratings
Make the work more interesting	
Increase in quality of projects	
Improving communication between Consumers	
Infrastructural readiness	
Increase in productivity	

Table 3: Top factors identified by marketing stakeholders based on ratings

Top factors identified as Marketing Stakeholders	Ratings
Increase in efficiency	
Improving the project presentation	
Increase in quality of projects	
IT and data security	
Increase in productivity	

Table 4: Top factors identified by HR stakeholders based on ratings

Top factors identified as HR Stakeholders	Ratings
Convenience (time and place)	
Upgrading communication technology skills	
Improving the project presentation	
Financial readiness	
Increase in efficiency	

Table 5: Top factors identified by operations stakeholders based on ratings

Top factors identified as Operations stakeholders	Ratings
Ease of learning technology	
More focus on real-world tasks and examples	
Keeping up with current developments technology	
Availability of supportive softwares	
Improving communication between Consumers	

C. Demographic Analysis of Factors
✓ Analysis by Gender

When analyzing the data by gender, it is found that males are more in favour of adopting this technology than the females. The factors creating the lowest percentage of female are because of trust towards the technology and unawareness about it. This is obvious because of the environment created by technology is virtual and no one can adopt it until it will ensure them the proper security and transfer mechanism of data and information.
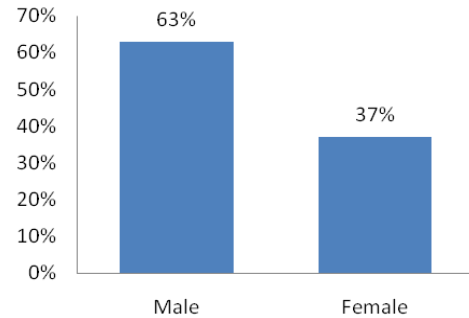

Figure 6: Gender wise Analysis

✓ Analysis by Marital Status

A higher degree of negation is found in married people as compared to un-married people on the average. Also threat of data and information theft and family problems are two strong reasons among married people. One of the reasons of this phenomenon may possible; most of the married people belong to higher age group and have issues on both official and personal, while unmarried people are working for stretched hours and willing to take chances in adopting the newest technology.
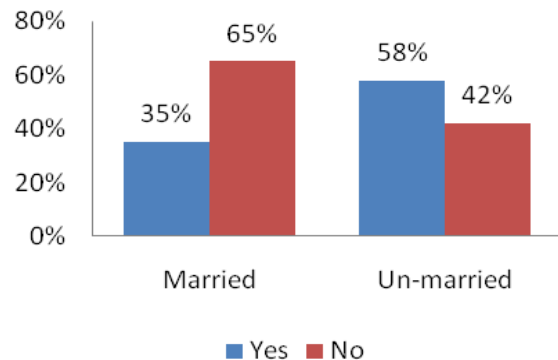

Figure 5: Marital Status based Analysis

✓ Analysis by Age

The data is collected from age groups ranging from below 20 years to above 30 years; however, no respondent reported the age above 40, while less percentage of respondents agreed for it. The respondents between 28–30 years are showing very high interest; while the age groups from 21 to 23 years and 24–26 years are reporting the moderate interest, and the obvious reason of this could be role overload and changing technology.
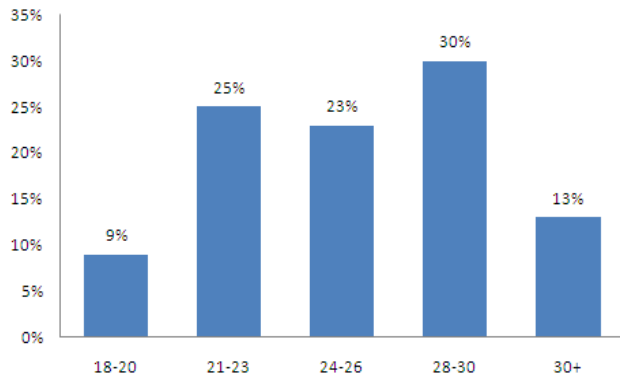

Figure 7: Age Group Analysis

VI. CONCLUSION

Through this research it has been concluded that U-Commerce is a continuously emerging field of wireless communication in the present age and one of the non-negligible technology in the market place. We have been seen in the whole research, U-Commerce enable users to connect the whole world anytime and from anywhere. There has been mix opinion of stakeholders about this technology but most of them are in favor of it. The major findings are:

✓ U-Commerce technology was perceived to be very useful for location-independent tasks.
✓ None of the technology either wireless or wired, turned out to be superior in terms of perceptions of ease of use. Through U-Commerce we can achieve high performance of non-location-dependent tasks.

In short, we say that U-Commerce is the creation of a marketplace and a landmark of wireless technology, which reaches individuals where they are at using the devices that they want to use, with the networks doing the work.

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AUTHORS

First Author – Muhammad Adeel Mannan, MS, Department of Information Technology, Khadim Ali Shah Bukhari Institute of Technology, Karachi, Pakistan. Email: madeelonline@gmail.com