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**APPLYING ECOLOGICAL CONCEPTS  
FOR MOBILE COMMERCE:  
A CASE STUDY FOR CELCOM (MALAYSIA) SDN BHD**



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**CS224**

**THIS IS SUBMITTED IN PARTIAL FULL FILLMENT FOR  
THE DEGREE OF BACHELOR OF SCIENCE (Hons) IN  
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**FACULTY INFORMATION TECHNOLOGY  
AND QUANTITATIVE SCIENCES  
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**SHAH ALAM**

**OCTOBER 2004**

## **APPROVAL**

### **APPLYING ECOLOGICAL CONCEPTS FOR MOBILE COMMERCE: A CASE STUDY FOR CELCOM (MALAYSIA) BERHAD**

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This thesis was prepared under the direction of thesis supervisor, Pn Mardziah Hj Hashim. It was submitted to the Faculty of Information Technology and Quantitative Science and was accepted in partial fulfillment of the requirements for the degree of Bachelor of Science.

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Date: 11 October 2004

## DECLARATION

I certify that this thesis, and the research to which it refers, are the product of my own work, and that ideas or quotations from the work of other people, published or otherwise, are fully acknowledged in accordance with the standard referencing practices of the disciplines. I acknowledge the helpful guidance and support of my supervisor, Puan Mardziah Hj Hashim.

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IN the name of ALLAH, the most gracious and the most merciful with the Selawat and Salam to Prophet Muhammad S.A.W. Alhamdulillah to ALLAH SWT, with the help and permission of ALLAH eventually this report is completed.

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## ABSTRACT

The rapid growth in mobile data communications and the needs of business people exploring new channels and methods of supporting their customer bases and increase competitive market and add value to their customers has led to the emergence of Mobile Commerce (m-commerce). A study in Celcom (M) Berhad is perform, looking at the information environment factors put up by Celom to propel the success in m-commerce initiatives.

The studies on ecosystem in mobile commerce using the idea specified by Davenport are appropriate to observe the factors prosper in wireless commerce today. The component inside the model will be discussed to see for interrelated aspect and issues in the area studies. Each viewpoint that comes from different background and is intended for different audience with various significance, but the basic concept of information ecology is a vision of recognizing the extricable relationships between people and technology.

Adopting Davenport's Ecological model, this report shall discuss the finding of the study according to the 6 components of the information Ecology namely, Information Strategy, Information Architecture, Information Process, Information Staff, Information Politics, Information Culture and Behavioral

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# **CHAPTER 1**

## **INTRODUCTION**

### **1.0 INTRODUCTION**

The fascinating technology rising in mobile data communications, the needs of business people exploring new channels and methods of supporting their customer bases and the increasing of competitive market and adding value to their customers have led to the emergence of Mobile Commerce (m-commerce).

For that reason, the concept of information ecology is used to focus on relationship involving tools and people and their practices. The information ecology is derived from the biological metaphor and is defined as a system of people, practice, values and technologies in a particular local environment (Nardi, 1999). This notion puts how people create, distribute, understand and use information as its center. It calls for a new management framework, incentives and attitudes toward organizational hierarchy, complexity and division of resources for a start. Information ecologist will critically examine the relationships between accelerating technology and human activities in contextually sensitive, humanist approach so as to inspire responsible use of technology to create experiences. Consequently, information ecology will help to direct designing the mobile systems completely.

### **1.1 BACKGROUND OF THE RESEARCH**

The progressive emergence of m-commerce activities are caused by numerous integrated factors that arise from various channels either the technology infrastructure such as services, devices, products or probably the curiosity from the society in this environment of mobile world. Therefore, this research is looking at the possible

aspects that foster m-commerce activity. To look into this problem area, results are derived from a case study in Celcom (M) Berhad that focus on specific m-commerce initiatives.

Celcom is one of the leading and vibrant mobile communication providers in Malaysia. To maintain as a leading provider, Celcom must come with an outstanding mobile plan and strategy to catch the attention of customers also to meet and exceed their expectations.

Information ecology is a system of people, practices, values and technologies in a particular environment with the core focus is on human activities that are served by technology. Hence, the concept of information ecology will be possibly applicable to facilitating m-commerce initiative and plans.

## **1.2 PROBLEM STATEMENT**

Even though m-commerce progress is moving rapidly, there are many major problems in ensuring the society to engage with the services given by the content providers. Technologies that enable m-commerce should be considered as a primary factor in the direction of this initiative in providing the needs of better services, capacity, mobility and coverage to the user. However, the technology itself is not enough, Celcom has to look at the other issues that will lead the success in m-commerce arrangement. This study will identify exertion that has been taken by Celcom to prosper the m-commerce by adopting Davenport (1999) model in information environment, which consists of strategy, staff, architecture, behavioral and cultural, process and politics. These components overlap and will be affected one another; even of they seem very different.

The theory of this study showed that the firm's information ecology might shape the degree to which Celcom is able to adjust and adapt the successful to its m-commerce solutions, which transform the work processes and create the new ways of doing things.

### **1.3 OBJECTIVE OF THE RESEARCH**

- To determine m-commerce initiatives in Celcom.
- To apply ecological concepts for m-Commerce in Celcom (M) Berhad.

### **1.4 PROJECT IMPORTANCE AND BENEFITS**

The benefit of the project are mainly to Celcom, which the finding of this research will highlight qualities that prosper m-commerce initiatives in Celcom. Thus, to other telcos, can consider factors identified and adopted to support in their m-commerce arrangement respectively.

### **1.5 THE RESEARCH APPROACH AND METHODOLOGY**

#### **1.5.1 Methodology**

Information will be gathered from several sources, which will include primary data and secondary data.

### 1.5.2 Primary Resources

The primary data is gathered from an interview conducted with Celcom officer pertaining to their experience and knowledge regarding the studied topics

### 1.5.3 Secondary Resources

Secondary data is gathered from several printed resources such as newspapers, magazines, journals and Internet.

### 1.5.4 Ecological Model for Information Management

To understand the overall landscape in which ecology is used, a model referred as Ecological Model is employed. This model will aggregate individuals in a particular organization affected by broader market trends, to works with, to thinking about, to focuses on and generally managers' information. Once the Ecological Model analysis is complete, the potential strategies or combination of tactics will suggest themselves. The possible areas to look into in this model are:

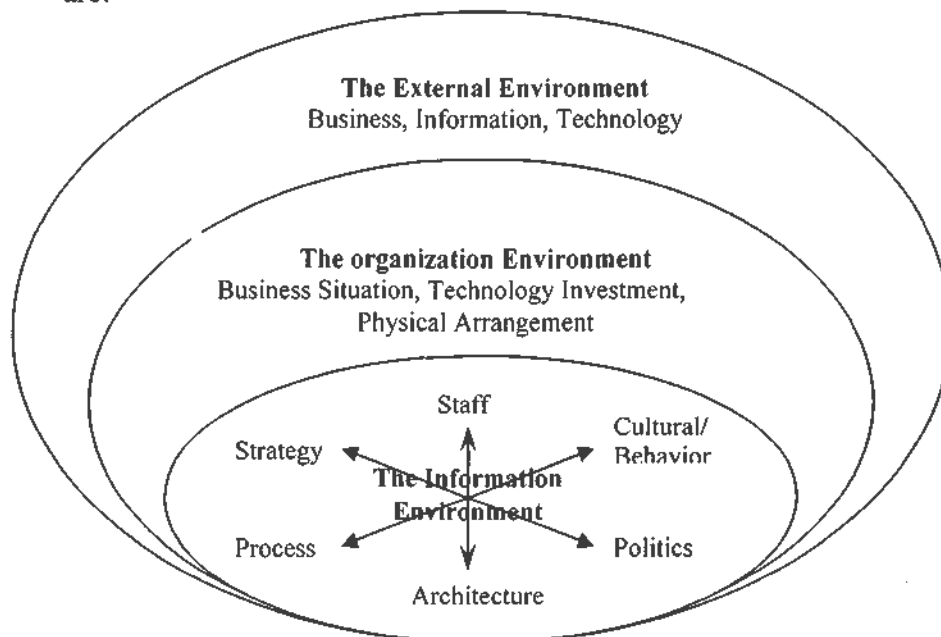


Figure 1 : An Ecological Model for Information Management



## **1.6 RESEARCH QUESTION**

Research question will be used as a guide to look for relevant information to proceed in this research study. Each of the research questions has its own significant and can give explanation, clarify and to conclude the finding that has been made. Refer to Appendix A for research question.

## **1.7 LIMITATION OF THE RESEARCH**

In conducting the research, there are few limitations in the data collection as listed below:

- It is difficult to get cooperation from the telcos company due to the privacy and confidentiality of the company information's.
- There are a few mobile provider practices in m-commerce.

## **1.8 PROJECT SCOPE**

This research will emphasize on m-commerce, which will determine the issues that can influence the growth from this technology. Consequently, the issues will focus on the external and internal factors that play a great role in the improvement of this event. In determining these factors, Celcom (M) Bhd was selected as a case study as it is among the most outstanding organization that has best infrastructure in m-commerce. This study will look into the relationship between human activities, accelerating technology and mobile systems that foster the growth of this event.

## **1.9 OVERVIEW OF THE FOLLOWING PROCESS**

### **1.9.1 Chapter 2 – Literature Review**

This chapter will detail about the similar approaches and concepts that related are to the study. A comprehensive study and explanation are provided to give an overview regarding the environmental causes that arouse m-commerce activities. Furthermore, any terms related to this research will be defined in order to provide a better understanding of the mobile world.

### **1.9.2 Chapter 3 – Research Approach and Methodology**

The discussion will pertain methodology chosen for this project. Such as are the types of data used and their characteristics, theory and approach employed. Several procedures are applied to get the essential information. This research is divided into several phases. Data is gathered from primary and secondary data.

### **1.9.3 Chapter 4 - Results and Findings**

This chapter includes detailed explanations on factors influencing m-commerce activities by Celcom. All the findings were gathered from the previous methodology in Chapter 3. This section will also determine whether or not the objectives are achieved.

#### **1.9.4 Chapter 5 – Conclusion and Recommendation**

The last section will conclude the analysis and findings made on this study. In addition, suggestion and recommendations will be given to improve the m-commerce activities that can be adopted by Celcom to meet up the customer requirements.

## **CHAPTER 2**

### **LITERATURE REVIEW**

#### **2.0 INTRODUCTION**

Recent advances in the areas of wireless computer technology, wireless telecommunications technology, software and information technology have resulted in changing the standard of living of people in an unimaginable way. These new technologies are making mobile computing possible, fully portable, real-time access to information, applications and tools that recently, were accessible only from a desktop computer (Turban et al,2003). Thus mobility significantly changes the manner in which people and customers interact, communicate and collaborate, mobile applications are expected to change the way society live, play and do business. As a result, this is where the flexibility in terms of place, time, space, distance, payment that mobile commerce offers the business environment plays a vital role. It is a modern business methodology that addresses the needs of organizations, merchants and consumers to cut costs while improving the quality of goods and services and increase the speed of service delivery using computer network to search and retrieve information.

#### **2.1 MOBILE COMMERCE (M-COMMERCE)**

M-commerce is the term for the extension of electronic commerce (e-commerce) from wired to wireless computers and telecommunications and from fixed locations to anytime, anywhere and anyone (Keen and Mackintosh, 2001). Han (2001) define m-commerce as all activities related to a potential commercial transaction conducted through communication networks that interface with wireless devices. This trend

marks the start of a new era in business. It opens up new business opportunities and turns wireless technology into the value for both customer and company that ensure profitable innovation. Elliot (2004) states that, the use of wireless technologies extends the nature and scope of traditional electric commerce (e-commerce) by providing the additional aspects of mobility on the participation and portability with the technology. Therefore m-commerce is sometimes to refer as mobile e-commerce.

At times, Mobile Commerce is referred to as M-commerce, Mobile Electric Commerce or Wireless Commerce, using these terms interchangeably. According to this definition, M-commerce represents a subset of all e-commerce transactions, both in the business-to-business (B2C) and business-to-business (B2B).

Rulke (2003) defines, M-commerce is a layer of an application atop the “Mobile Internet”, that is the recent technology between the Internet and wireless telephone and other handheld communication devices.

M-commerce is now the buzzword of the marketing industry (King, 2000). It allows user to purchase over the Internet without the use of a Personal Computer. Commerce will transpire as organizations induce new methods to employ the mobiles technology to communicate, inform, transact and entertain using data via connection to public and private networks. It is predicted that this emergence of m-commerce will happen even faster than the development of Electric Commerce (e-commerce) (Clarke, 2003). In addition, m-commerce is going to bring about an enormous change in the way users consume products and services.

Finally, Encik Kamarul Hisham from Celcom, defines m-commerce as buying tangible and non-tangible goods using mobile devices.

## **2.2 FACILITATING TECHNOLOGIES FOR M-COMMERCE**

The market for mobile wireless is increasing by leaps and bounds. The success of mobile communications lies in the ability to provide instant connectivity anytime and anywhere and the ability to provide high-speed data services to the mobile users. A number of different technologies exist, each with its own advantages and disadvantages. The technologies facilitate the provision of contextual information, which is of paramount importance for innovative m-commerce activities. These facilitating technologies are briefly discussed in this section.

### **2.2.1 Frequency Division multiple access (FDMA)**

FDMA stands for frequency division multiple access and exclusively used on all analog cellular systems. FDMA systems are the least efficient cellular system since one user can only use each analog channel at a time. Analog signals are also especially susceptible to noise – and there is no way to filter it out. Given the nature of the signal, analog cell phones must use higher power (to get acceptable call quality. Given these shortcomings, it is easy to see why FDMA is being replaced by newer digital techniques.

### **2.2.2 Time-Division Multiple Access (TDMA)**

TDMA is a digital transmission technology that allows a number of users to access a single radio frequency channel without interference; by allocating unique time slots to each user within each channel (Helal et al 1999). TDMA has its limitation where it has no flexibility for varying digital rates and has no accommodations for silence in a telephone conversation

### **2.2.3 Code Division Multiple Access (CDMA)**

Code Division Multiple Access (CDMA) is a digital technology that allows carriers to process more than one conversation per channel. The way that this technology separates transmissions is by using codes. A unique code is assigned to each conversation that separates it from others. CDMA systems are the latest technology on the market and are already eclipsing TDMA in terms of cost and call quality. Since CDMA offers far greater capacity and variable data rates depending on the audio activity, many more users can be fit into a given frequency spectrum and higher audio quality can be provided. The current CDMA systems boast at least three times the capacity of TDMA and GSM systems. As a result, phones with CDMA technology are much expensive than TDMA phones.

### **2.2.4 Global System for Mobile Communication (GSM)**

Global Systems for Mobile communications (GSM) is a digital technology that uses a combination of TDMA and frequency hopping to allow the carrier to service more customers than with analog technology. GSM is interesting in which it uses a modified and far more efficient version of TDMA.

### **2.2.5 General Packet Radio Services (GPRS)**

GPRS is a GSM packet data service developed by the European Telecommunication Standards Institutes (ETSI) as part of GSM phase 2+ developments (Helal et al 1999). Seurre (2003) explains the purpose of GPRS is to facilitate the interconnection between a mobile and other packet-switched network, which open the doors to the world of the Internet. Using this

technology in mobile phones allows users to have access to new value-added services to complement m-commerce activities. Additional capability of GPRS is, it enables users to make telephone calls and transmit data simultaneously. It allows faster data communication speeds compared to the traditional mobile technologies.

#### **2.2.6 Enhanced Data Rates for Global Evolution (EDGE)**

EDGE is a higher-bandwidth version of GPRS and has transmission speeds up to 384kbps (Sharma, 2001). This is an extension to GSM that leverages TDMA and GPRS infrastructures.

#### **2.2.7 Third Generation (3G)**

Third-generation wireless technology can provide unprecedented transmission speeds and performance. 3G is the integration of satellite services and fixed wireless access services with the cellular network which increased efficiency and capacity in data transmission. This technology will support rich media such as video clips. Figure 2.1 indicates the evolutionary paths of wireless networks from 2G through to 3G.