CHAPTER 1 - INTRODUCTION

1.1 OVERVIEW

Malaysia is the first country in Southeast Asia to have a cellular phone network (Framework for Industry Development, 2001). A decade ago, mobile phones were considered luxurious items, but now they have made their way into our daily lives that they are often considered a common article. Astoundingly, the growth of mobile phone usage and mobile networks has been so strong that they even weathered the financial crisis in 1997. In South East Asia, cellular mobile subscribers grew at an average of sixty-three per cent a year between the years 1991 to 1997. During the 1997 financial crisis, the number of subscribers continued to grow, though at a lower rate of forty-five per cent a year. The growth rate increased sharply in the year 2000 to seventy-five per cent, the highest increase since 1995 (Datafile of Asia Pacific Telecommunication, 2002).

Mobile phones in Malaysia began to proliferate from 1980 to 1989 with the introduction of cellular phones. Multiple base stations were located relatively close to each other, and there were protocols for the automated hand-off between two cells when a phone moved from one cell to the other. During this period, mobile phones were somewhat larger than current ones, and many were designed for permanent installation in cars or as transportable phones. As technology improved, the larger phones evolved into smaller hand-held phones. Two main technologies are used in mobile phones - cellular and satellite. Earlier mobile phones were analogue-based whereas newer ones are digital-based (Bellis, 2001). There are several different cellular technologies, which include Global System for Mobile (GSM), Code Division Multiple Access (CDMA), and Digital Enhanced Cordless Telecommunication

(DECT). The mobile phone technology is often divided into several generations, the 1-generation (1G), 2-generation (2G), 2.5-generation (2.5G) and the 3-generation (3G). The evolution of the mobile phone can be depicted as in Figure 1.1.

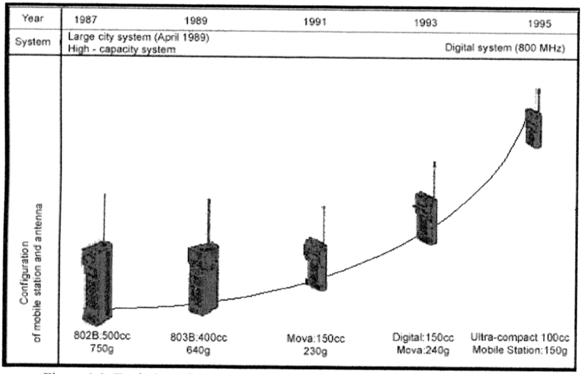

Figure 1.1: Evolution of the Mobile Phones (NTT DoCoMo Corporation, 2000)

To understand the trend of the growth of mobile phones in Malaysia, a study based on science and technology (S&T) development in the mobile phones industry was carried out. The growth rate of mobile phone usage growth rate is defined as the increase, in percentage, in the number of mobile phone subscribers in Malaysia over a year. This research investigates the growth rate from 1990 to 2001.

To aid in the research, a system called the Mobile Phone Usage Growth Rate Indicator (MPID) was developed to forecast the growth rate. This system would benefit the mobile phone sector especially in business decision-making.

The growth rate of the mobile phone usage is dependent on several factors, such as advancement in science and technology (S&T) pertaining to the product, government policies and cost. The scope of this study focuses only on the advancement in S&T. Information on the advancement in S&T in the mobile telecommunication industry for the past twelve years was used to develop the system to forecast the growth rate of mobile phone usage. In this study, the advancement in S&T represents the technological advancement in the features of the mobile phone, such as the physical attributes, durability, security, entertainment, accessibility and the wireless technology (Figure 1.2).

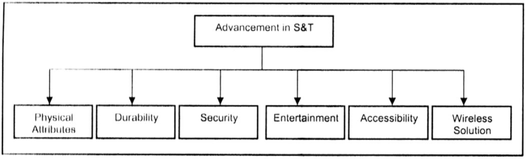

Figure 1.2: Advancement in S&T Features Pertinent to Mobile Phones

1.2 STATEMENT OF RESEARCH PROBLEM

In this research, it is essential to define the research problem domain. In this section, the problems that have been identified will determine the focus of the research and how the research will be conducted.

Currently, there is no system that can be used to analyse the growth rate of mobile phone usage in this country. Thus, managers and decision makers in the telecommunication industry do not have a suitable tool to help them to identify the factors that could impact the growth rate of mobile phone usage in Malaysia.

In this research, the advancement in S&T features pertaining to mobile phones indicated in Figure 1.2, were separately studied to investigate their relationship with the growth rate of mobile phone usage. Examples for each of the features for each category are shown in Table 1.1.

An econometric model was developed for the purpose of this research. A relationship was defined between the advancement in S&T (the independent factor) and the growth rate of mobile phone usage (the dependent factor). In this model, the percentage of growth each year is used as an indicator of the impact that the advancement in S&T has on mobile phone usage.

Table 1.1: List of the Related Technologies for Each Feature

Feature	Related Technology
Physical Attributes	Compact design Light weight Large, high quality screen display
Durability	Shock resistance Water resistance Dirt and dust resistance
Security	Call management Call Control Phone lock and key lock Restrict assess to phone directories
Entertainment	Games Animated icon messaging Animated icon and ring tone profiling Downloadable animated screen savers Downloadable ring tone
Accessibility	Predictive text entry system Quick access key Voice recognition Visual alert indicator Voice note function Smart button
Wireless Solution	Bluetooth General Packets Radio Services (GPRS) Mobile Internet Service High Speed Circuit Switched Data (HSCSD) Infrared connectivity Short Messaging Services (SMS) Dual band functionality

1.3 RESEARCH OBJECTIVES

The objectives of this research are:

i. To study the impact of S&T on the growth rate of mobile phone usage.

ii. To develop a system, MPID, to forecast the growth rate of mobile phone usage.

1.4 SCOPE OF RESEARCH

A survey was conducted to evaluate the relationship between the advancement in S&T and the growth rate of mobile phone usage. It sought to identify the features in the S&T factor that produces the greatest impact on the growth rate.

The survey was restricted to the Klang Valley, Malaysia. The groups included in this survey were university students and the working public. The university students comprised undergraduate and postgraduate students from two public universities, namely, University of Malaya and National University of Malaysia. The participants in the working group include those from the information technology (IT) and financial sectors, who are between the ages of twenty to forty years old. Table 1.2 summarises the scope of the research.

Table 1.2: Summary of Research Scope

Area of Research	Mobile Phone Usage In Malaysia	
Region	Klang Valley	
Objective	• To determine the relationship between the advancement in S&T and the growth rate of mobile phone usage. • To develop a mobile phone usage growth indicator, namely, MPID.	
Period Covered	12 years (1990-2001)	
Participants	Working Group	Information Technology (IT) Sector Workers
		Financial Sector Workers
	University Students	Undergraduate
		Postgraduate

1.5 PROJECT SCHEDULE

The research project commenced in October 2001 and was completed in May 2003. Altogether, the development of MPID starting from the requirement analysis phase until the completion of the testing and evaluation phase took fourteen months. Figure 1.3 shows the development schedule of MPID.

ID	Task Name	Start	End	Duration
1	Identifying problems, opportunities and objectives	10/1/2001	10/18/2001	18d
2	Determining information requirements	10/19/2001	1/11/2002	85d
3	Analysing system needs	1/12/2002	3/6/2002	54d
4	Designing the recommended system	3/6/2002	4/11/2002	37d
5	Developing and documenting software	4/1/2002	8/2/2002	124d
6	Testing and maintaining the system	12/12/2002	12/30/2002	19d
7	Implementing and evaluating the system	1/1/2003	1/25/2003	25d
8	Documentation	10/1/2001	5/30/2003	607d

Figure 1.3: Schedule of MPID Research and Development Phases

1.6 DISSERTATION ORGANIZATION

This dissertation consists of seven chapters. The outline of each chapter is described below.

Chapter 1: Introduction

This chapter introduces the research study. It gives an overview of the research, statement of research problem, scope of research, research objectives and project schedule. It also covers the content description.

Chapter 2: Literature Review

This chapter presents the literature review on forecasting methods. This chapter also presents a summary on the history of telecommunication in Malaysia, and also analyses mobile phone usage in Malaysia for the past twelve years, from 1990 to 2001.

Chapter 3: Survey Analysis and Research Methodology

This chapter focuses on the survey method, results and analysis carried out for this research. It also describes the system development strategies, which include the methodologies used in the research and development of the system, MPID. The Waterfall Model was followed to develop this system.

Chapter 4: System Requirements and Design

This chapter describes the system requirements for this research. This chapter also describes the design issues involved in building the MPID, which include database design, program design and user interface design.

Chapter 5: System Coding and Testing

This chapter describes the coding aspect of the system and the implementation environments, which include the software specifications. It also describes the various tests conducted to ensure that MPID is error-free.

Chapter 6: System Evaluation

This chapter explains the evaluation process performed by potential users to assess the usefulness, effectiveness and suitability of MPID.

Chapter 7: Discussion and Conclusion

This chapter describes the strengths and limitations of MPID, the problems encountered, suggestions for future enhancements and ends with a conclusion.