CHAPTER 7 - DISCUSSION AND CONCLUSION

7.1   OVERVIEW

This chapter discusses the problems encountered during the research and development of MPID, its strengths and limitations, applications, usefulness, and future enhancements.

7.2   PROBLEMS ENCOUNTERED

Throughout this research, three major problems were encountered:

i.   Questionnaire Survey

It was difficult to get full cooperation from those people who were invited to participate in the survey. They were reluctant to fill in the questionnaire form, citing their busy schedule as the reason. Besides, the answers given in some of the returned questionnaire forms are ambiguous, incomplete or unclear. Thus, these questionnaire forms were not used for analysis.

ii.   Cooperation from the telecommunication companies

It was difficult to collect data from the telecommunication companies. They were reluctant to provide information on their mobile phone subscribers. Furthermore, some of the information given are irrelevant to this research and in the development of MPID.

iii.   Evaluation of MPID

The evaluation phase took longer than expected, as it was difficult to get feedback from the target participants who include business executives and managers from the telecommunication industry. They were not very cooperative.

7.3   STRENGTHS OF MPID

The strengths of MPID include:

i.   No existing tool of a similar nature

        Currently, MPID is the first tool developed to forecast the growth and growth rate of mobile phone usage based on the advancement in S&T of the mobile phone features. There is no tool of a similar nature in the software market in Malaysia.

ii.   Flexibility of MPID forecasting component

        MPID allows users to add, modify and delete mobile phone features, and to generate forecasting results. It allows users to enter additional features and data. The features can then be used to generate the forecasting results. MPID also allows users to delete unwanted features and data from the database.

iii.   Report generation

        MPID generates two types of reports - in tabular and graphical formats (bar charts, 3D bar charts, 3D Area charts and line graphs). It also allows users to print the reports for future references.

iv.   Comparison and accuracy of the different forecasting results

        MPID allows users to compare and view the different forecasted results. It also measures the accuracy of forecasted results based on different mobile phone features.

7.4 LIMITATIONS OF MPID

The limitations of MPID include:

i. Validity of the forecasting results

The questionnaires were distributed within Klang Valley. Thus, the forecasted results on the growth of mobile phones are only valid within this region. The results could vary in the different regions such as Kelantan, Pahang, Sabah and Sarawak states. This could be due to differences in the standard of living and the area of mobile phone coverage in the regions. Thus, data need to be collected from the various states in order to obtain more accurate forecast results on the growth of mobile phone usage in the respective regions.

ii. Forecasted results are based on the advancement in S&T

The econometric model incorporated in MPID is formulated based on the trend line in the advancement in S&T. Thus, forecasting based on other factors such as the country's economic status, change of government policies and the price of mobile phones cannot be applied in the present forecasting models.

iii. Accuracy of the forecasted results

As discussed in Chapter 6, the levels of accuracy of the forecasting models based on the past four, five and six years' data indicate more than 90 per cent of accuracy (page 97). Indeed, these percentages are rather high and they do not imply the true percentages of accuracy. This is due to the fact that the Malaysian Communication and Multimedia Commission did not collect data based on the region and age group. The forecasted results are thus, generated based on the extraction of approximately 62.9 per cent of the age group between 20 – 65 years old, from the approximately

46 per cent of the mobile phone users in Malaysia for the years 1990-2001 (page 45). Thus, to measure the level of accuracy of the forecasting models, the actual number of mobile phone users from the Klang Valley for the age group between 20-65 years old should be used in the measurement. Hence, further study needs to be conducted based on the actual number of mobile phone users collected from the various regions in Malaysia to investigate the levels of accuracy of the forecasting models more accurately.

7.5   APPLICATIONS AND USEFULNESS OF MPID

MPID would benefit the mobile phone industry especially in business decision-making, and to forecast the telecommunication needs of the Malaysians, in general. MPID allows users to select one or two mobile phone features to generate the forecasting of mobile phone usage. Users are able to view the forecasted results in tables and graphs. MPID also allows users to compare the trend lines of the forecasted results based on different features. Although MPID is not able to generate the exact forecast value, it does provide information on how a user's mobile phone purchasing preference would impact on the growth of mobile phone usage. The impact of the different mobile phone features on the growth can be compared. Hence, telecommunication companies would be able to focus on the mobile phone features that contribute most significantly to mobile phone usage growth rate. Indirectly, this would help the industry to save cost, effort and time in having to do their own research to determine the features that would have the greatest impact of the growth of mobile phone usage. Producing mobile phones with the preferred features would increase the marketability of their mobile phones. Indeed, MPID can be used for forecasting mobile phone usage not only within Malaysia but also worldwide. This would require data to be collected from the countries concerned.

7.6   FUTURE ENHANCEMENTS

At present, the forecasted results of MPID are based on the advancement in S&T features. The forecasted results do show a high degree of accuracy when using selected features of the mobile phone to generate the results. It must, however, be borne in mind that other factors also have significant impact on the growth of mobile phone usage. Hence, future research could be carried out to incorporate other factors into the forecasting model, which was established based on the econometric model.

This would mean that the tool can be used in the telecommunication industry to forecast the impact of different purchasing preferences of the mobile phone on the growth of mobile phone usage. As the telecommunication sector is booming in the Asia Pacific region, future research can also be extended to other Asia Pacific countries such as India and China where mobile telecommunication is still developing.

7.7   CONCLUSION

The growth of mobile phone usage in Malaysia has significant impact on the telecommunication industry. To understand the trend of this growth, a study based on the advancement in science and technology (S&T) in the mobile phone industry was carried out. The advancement in S&T represents the technological advancement in the features of the mobile phone such as the physical attribute, durability, security, entertainment, accessibility and wireless technology. Data on the purchasing preference of mobile phone subscribers for the past twelve years (1990 to 2001) were collected and analysed, and used to develop a mobile phone growth rate forecasting system, MPID.

The impact of the advancement in S&T on the growth of mobile phone usage was also analysed. From the analysis, each mobile phone feature shows exponential growth trends. The forecasting models comprising linear regression (one feature) and multiple regression (two features) models were then developed and incorporated in the development of MPID.

The development of MPID has fulfilled the system requirements. MPID was tested thoroughly to ensure that it is error-free. Its accuracy was also analysed. The forecasting results generated by MPID do show a good degree of accuracy with regard to the trend in the growth of mobile phone usage based on the advancement in S&T. The forecasted results based on the past four, five and six years' data show more than 90 per cent accuracy for both one and two mobile phone features. Data from the past six years are found to produce the most accurate forecasting results.

MPID evaluation was carried out after system testing. Based on the feedback, MPID received high ratings for ease of use, usefulness, user satisfaction, display of information and design. This indicates that MPID has achieved the functional and non-functional requirements defined earlier. The response time for report generation is four seconds. Compared to the optimal Web site response time of eight seconds, this is acceptable (King, 2003).

In conclusion, MPID has successfully fulfilled all the research objectives. It has fulfilled the system requirements, functional and non-functional requirements.