CHAPTER 4

RESEARCH METHODOLOGY

4.1 INTRODUCTION

There are three basic types of research designs. They include exploratory, descriptive, and causal designs used to collect primary data and create data structures and information (Hair, Bush, & Ortinau, 2003). The research methodology and methods for this research were chosen in order to successfully achieve the research objectives. The justification of choices and uses will be presented in this chapter. The rationale will be discussed and explained in terms of research process, design, development of the instrument, pilot study, sample and data collection, and data analysis. The developments of the relevant research instrument along with outline of problems encountered in the survey have also been discussed.

4.2 RESEARCH PROCESS

This research was conducted as follows:

1) Obtaining information through literature survey so that we could identify how mobile advertising and services adoption have been tackled by other researchers in different situations.

2) Developing a model incorporating the relevant factors contributing to the behaviour intention to adopt mobile advertising and services. It included reviewing of prominent theories and models of technology adoption.

3) Generating various hypotheses to examine whether the models formulated were valid or not.

4) Developing a questionnaire as a survey tool to collect data.
5) Analyzing data obtained through the questionnaire to see what factors influence behavioural intention.

6) Interpreting the meaning of the results of the data analyzed and arriving at conclusions

**Figure 4.1: Schematic Diagram for Research Process**

1. Literature Survey
2. Developing Models
3. Generating Hypotheses
4. Developing QUESTIONNAIRE
5. Collecting Data
6. Analyzing Data
7. Interpreting the Results

### 4.3 RESEARCH DESIGN

The research design is the step aimed at designing the research study in such a way that the essential data can be gathered and analysed to arrive at a solution. The following are the design considerations for this research in accordance with the guidelines suggested by Sekaran (2003).

1. **The Purpose of the Study:** The purpose was hypothesis testing in nature because usually studies relating to hypothesis testing explain the nature of certain relationships; establish the differences among groups or the independence of two
or more factors in a situation. In other words, hypothesis testing is undertaken to explain the variance in the dependent variable. Hypothesis testing offers an enhanced understanding of the relationships that exist among variables, and could also establish cause and effect relationships.

2. The Type of Study: It is a correlational study since it is interested in delineating the important variables that are associated with the adoption of mobile advertising and services. It is also a causal study since it attempts to establish cause-and-effect relationships through certain types of correlational or regression analyses such as path analysis.

3. The Study Setting: As this research is a correlational study it was conducted in non-contrived settings, whereas rigorous causal studies are done in contrived lab settings.

4. Unit of Analysis: Since student samples can be useful when trying to understand relationships between constructs (Mackenzie, Scott, & Richard, 1989), the unit of analysis was an individual student. Also, this particular age group seems to be more involved with mobile phone (Barwise & Strong, 2002). Using university students as matched samples from the two countries also helped control the exogenous variables that might confound results of cross-cultural research (Straub, 1994).

5. Time Horizon of the Study: This research study is a cross-sectional study because it aimed to collect data just once, perhaps over a period of months in order to answer the research objectives.

6. Data Collection: It refers to the process of collecting data associated with variables in the hypotheses being considered for the study. In the present study, a structured closed-ended questionnaire designed specifically for the study was personally administered by the researcher on the student respondents in the two countries i.e. India and Syria.

7. Data Analysis: The step where data is analysed statistically to see if the hypotheses can be substantiated (For details please see Chapter 5).
4.4 SURVEY RESEARCH METHODOLOGY

Methodology is the strategy, plan of action, process, or design lying behind the choice and use of particular methods and linking the choice and use of methods to the desired outcomes (Crotty, 1998). Hussey and Hussey (1997) also define methodology as the overall approach to the research process, from the theoretical underpinning to the collection and analysis of data, and also suggest that methodology is concerned with the following main issues: why you collected certain data, what data you collected, from where you collected it, when you collected it, how you collected it, and how you will analyse it.

4.4.1 Methodology Strategy

Among several methodologies viz. experimental research, survey research, ethnography, etc., the survey research methodology was considered to be the most appropriate for this research. It is concerned with drawing a sample of subjects from a population and studying this in order to make inferences about the population. In the case of a large population, only a sample of the whole population is used (Hussey & Hussey, 1997). This was the case for this study. In particular, this study was classified as an analytical survey where the main intention was to determine whether there exists any relationship between different variables. Because methodology is the process or design lying behind the choice and use of particular methods and linking to the desired outcomes (Crotty, 1998), it was therefore necessary to identify which methods should be used in the research. Methods are the various means or techniques or procedures used to gather and analyse data related to some research question or hypothesis (Crotty, 1998; Hussey & Hussey, 1997). Methods used in this research were categorised into two groups (1) questionnaire method which is the most important method used to collect primary data in the survey, and (3) many statistical methods were used to analyse data such as descriptive statistics, T-tests, ANOVA and Structural Equation Modelling (For details please see Chapter 5).

Administering questionnaire is one of the main data collection methods in survey research (Gay & Diehl, 1992; Sekaran 2003; Veal, 2005). On the other hand, even though the primary data source for this research was questionnaire, it was often
necessary to make use of other existing information viz. secondary data such as government statistics and previous research (Ticehurst & Veal, 2000), obtained through the literature survey (Please see Chapter 2). Secondary data are data that already exist and do not have to be collected by the researcher (Sekaran, 2003).

4.4.2 Questionnaire Method

A questionnaire is a pre-formulated written set of questions to which respondents record their answers, usually within rather closely defined alternatives (Sekaran, 2003). The rationales behind the use of questionnaire method as a major survey tool in this research are:

1) It was used because it is an efficient data collection mechanism when the researcher knows exactly what is required and how to measure the variables of interest. Field studies, comparative surveys and experimental designs often use questionnaires to measure the variables of interest (Sekaran, 2003).

2) It was used because quantified information is required concerning a specific population and students' behaviour and attitudes are acceptable as a source of information (Ticehurst & Veal, 2000).

Sekaran (2003) suggests that the advantage of the questionnaire method is that administering questionnaires to large numbers of individuals simultaneously is less expensive and less time consuming than other methods. It also does not require as much skill to administer a questionnaire.

The questionnaires were personally administered, because it is one of the best ways to collect data when the survey is confined to a local area (Sekaran, 2003) as was the case with students in the present study.

As already mentioned, questionnaire technique was used as the main technique to collect data for this study. It is to be noted that survey research methodology has been employed by previous researchers also in studies focusing on mobile marketing and services. For example, Teo and Pok (2003), Harris et al. (2005), Hung and Chang (2005), Lu, Yao, and Yu (2005), Bauer et al. (2005), Carlsson et al. (2006), Hsu et al. (2007), Lin (2007), Turel et al. (2007), Okazaki (2007a), Okazaki and Taylor (2008), etc.
4.5 DEVELOPMENT OF THE QUESTIONNAIRE

Before going into the stage of questionnaire design, an extensive review of literature was carried out to develop a questionnaire for the present study. Prior to developing measurement instrument for conceptual constructs proposed in this study, an exhaustive search for existing developed scales in the literature was made.

4.5.1 Questionnaire Design

This study employed a structured closed ended questionnaire designed to collect primary data designed to measure university students’ adoption of mobile advertising and services in India and Syria. We used a paper and pencil questionnaire instead of an online questionnaire to reduce the problems and limitations placed by an Internet-based questionnaire survey (Thompson, Surface, Martin, & Sanders, 2003).

Measurement items used in this research have been adapted from theories and related research including Agarwal and Prasad (1998), Bauer, Barnes, Reichardt and Neumann (2005), Carlsson, Carlsson, Hyvönen, Puhakainen, and Walden (2006), Hsu, Lu, and Hsu (2007), Leavitt and Walton (1975), Merisavo et al. (2007), Moore and Benbasat (1991), Okazaki (2007a), Sweeney and Soutar, (2001), Sheehan and Hoy (1999, 2000), Davis (1989), Taylor and Todd (1995b), and Venkatesh, Morris, Davis, and Davis (2003). However, as already discussed, some additional items were developed by the researcher.

With necessary inputs from the researches referred above, the researcher attempted to design a questionnaire in accordance with the suggestions of Tull and Hawkin (1990), in that the overall questionnaire should reflect the research objectives by logically moving from one topic to another. It was essential to attach a covering letter to introduce respondents to the study and explain the survey objectives. To establish credentials and legitimacy, the covering letter explained that the study was a doctoral research project of Aligarh Muslim University, Aligarh, India, and that all information obtained would be subject to anonymity and confidentiality and used only for the purposes of the present study. The questions were structured and separated into two sections (Please see Appendix A & B). The researcher used a 5-
point Likert scale in the questionnaire because it is extremely popular for measuring attitudes and is simple to administer (Malhotra, 2005). With the Likert scale, respondents indicate their attitudes by checking how strongly they agree or disagree with the statement. The scale ranges from strongly agree = 1, agree = 2, neutral = 3, disagree = 4, strongly disagree = 5.

The English version of the questionnaire (Please see Appendix A) was used on respondents in India only. It should be remembered that English is the medium of instruction in universities and business schools included for survey in India. Thus, no difficulty was faced in using the English version in India. However, Syrian students normally use Arabic language for everyday life, and don’t possess sufficient proficiency in English. Thus, it was thought appropriate to translate the questionnaire from English to Arabic. To ascertain that the translation was equivalent, the survey instrument originally constructed in English was translated into Arabic language. Berry (1980) suggested that the goal of translation is conceptual equivalence to obtain instruments that elicit responses which convey similar meanings to members of various groups. Double translation method (discussed in subsequent sections) was considered to be the most appropriate for this study because this process has been described as one of the most suitable (Marin & Marin, 1991). Thus, Prior to using the Arabic version of the questionnaire in the main survey, pre-tests and a pilot study were exercised by using the double translation process to ensure proper translation of the survey, in order to avoid confusion or misinterpretation (Brislin, Lonner, & Thorndike, 1973).

4.5.2 Pre-testing of the Questionnaire

Pre-testing is a trial run with a group of respondents for the purpose of detecting problems in the questionnaire instructions or design, whether the respondents have any difficulty understanding the questionnaire or whether there are any ambiguous or biased questions (Sekaran 2003).

The aim of pre-testing the questionnaire was to ensure that the content as well as the mechanics of compiling the questionnaire had been satisfactory. It establishes a content validity of the scales. Hair et al. (2003) pointed out that to establish a scale’s
content validity is to ensure its ability to measure what it is designed to measure. This was fulfilled by asking respondents first to complete the questionnaire and then to comment on its length, scale, formats, wording, and instructions. Based on respondents’ feedback, slight modifications were made to a few items to correct some ambiguity in wording.

The objective of pre-testing is to evaluate the items used in the design questionnaire (Hair, Black, Babin, Anderson, & Tatham 2006). Sekaran (2003) suggests that it is important to pre-test the questionnaire used in the survey to ensure that the respondents understood the questions posed and that there is no ambiguity and no problems associated with wording or measurement. The size of the pre-testing group may be 25 or 50 subjects (Zikmund, 2003). In this study, the first pre-testing was conducted on students in India. Around 25 English-language questionnaires were distributed to university students who were mobile users to ensure accuracy and consistency of the responses.

The suggestions highlighted some potential problems with wording and other ambiguities. It is important to give careful consideration to wordings because question wording substantially influences accuracy (Zikmund, 2003). So, some of the items were refined, re-worded or changed to be more representative of the intended constructs thus enhancing the scale’s content validity. After the first pretest, the questionnaire was significantly revised because the respondents had also suggested some changes with wordings and the inappropriate sequencing of the questionnaire. Then a second pre-testing was conducted on another 25 students. After the second pre-testing, it was found that there were still some ambiguities and inadequacies. The questionnaire was again revised to incorporate suggestions regarding wording and inappropriate sequencing.

After pretesting, the questionnaire was back translated into Arabic for administrating it on the Syrian students. The Arabic version was subject to the same pretest procedure followed in India. Twenty-five Syrian students were recruited to participate in the pretesting. The Arabic questionnaire was refined according to the received feedback and then translated back into English taking help of a Professor from
University of Damascus, Syria. The back translated version of the original questionnaire did not have any meaningful differences which validated the translational equivalence (Brislin, 1986).

4.6 PILOT SURVEY

A pilot survey is a small-scale version of the larger survey; it relates particularly to questionnaire survey but can relate to any type of research procedure. It is always advisable to carry out one or more pilot surveys before starting the main data collection exercise (Malhotra, 2005; Sekaran, 2003). It should draw subjects from the target population and simulate the procedures and protocols that have been designed for data collection. It helps detect weaknesses in design and instrumentation. In fact, pilot survey can be used to test out all aspects of the survey and not just question wording (Ticehurst & Veal, 2000).

The size of the pilot group may range from 25 to 100 subjects (Cooper & Schindler, 1998). In the present study, the pilot survey was initially conducted on 35 students from Department of Business Administration, Aligarh Muslim University in Aligarh, India, and 40 students in case of Damascus University, Syria. From the results of reliability tests, validity tests and some basic data analysis, a minor change related to format was made to the questionnaire design to further improve understanding. After the data was collected, reverse scoring was performed for the negatively worded items, data was analysed by using preliminary statistical tools using SPSS, and the respondents' feedback was summarised.

4.7 SAMPLE AND DATA COLLECTION

The sample comprised students from public and private institutions located in India and Syria. The institutions covered included four from India viz. Aligarh Muslim University (AMU), Jamia Hamdard University (JH), Asia Pacific Institute of Management (APIM), and Jamia Millia Islamia (JMI) and five from Syria viz. Damascus University (DU), Damascus Open-learning University (DOU), Al-Kalamoon University (KU), Technological Institute of Business Administration and Marketing (TIBAM) and Higher Institute of Business Administration (HIBA).
Keeping in mind the difficulties and costs of sampling, absence of sample frame and peculiar nature of research spanning two cultures, it was thought proper to adopt convenience sampling for generating data. Although such samples are not strictly representative, they are less likely to create any systematic bias (Douglas & Craig, 1983).

In cross-cultural research, sample equivalence is an important issue, because non-equivalent samples would lead to alternative explanation for any differences in results between two cultures (Douglas & Craig, 1983). Keillor, D'Amico, and Horton (2001) argue that in collecting international data, especially measuring cross-culture differences, random sampling techniques used in a researcher's home market are often either impossible to implement or inappropriate to apply in other cultural settings. Thus, as already explained, this peculiar aspect of present research further necessitated adoption of convenience sampling.

The sample of this study comprised voluntary participants consisting of roughly 600 Indian and 600 Syrian university students. Questionnaire with missing responses were excluded from final analysis. Final sample size was reduced to 399 and 500 for Indian respondents and Syrian respondents, respectively. It is to be noted that according to Wimmer & Dominick (2000), for multivariate studies, a sample size of 300 is considered to be good.

4.8 DATA EDITING AND CODING

Using SPSS software version 15.0, data was edited by checking and adjusting for errors, omissions, legibility and consistency in order to ensure completeness, consistency, and reliability of the data. This was achieved by using “frequency distribution” feature in SPSS. Data was coded by assigning character symbols, and edited before it was entered into SPSS. Each item in the questionnaire had a unique variable name. A coding sheet was used to maintain information about how each variable was coded. It comprised a list of all variables in the questionnaire, the abbreviated variable names that were used in SPSS and the way in which the responses were coded. In relation to data input into SPSS, screening and cleaning of
data before furthering the data analysis stage was necessary to make sure that there were no errors at the stage of keying data. By using descriptive statistics in SPSS such as frequency analysis, the data was screened by checking each variable to see if the score was out of range for this category (checking frequencies), or for continuous variables (checking minimum, maximum, mean and standard deviation). After finding errors, it was necessary to go back to the questionnaires to confirm the data before correcting the error in the data file. Thus, after taking due care, researcher proceeded to the data analysis stage.

4.9 MISSING DATA AND OUTLIERS

Data cleaning procedure was performed before proceeding with the analysis. Outliers were detected by the help of box plots (also called box-whisker diagrams) in SPSS. Moreover, the missing values were replaced with the mean values in the database (Field, 2006).

4.10 DATA ANALYSIS

During initial stages, descriptive statistics such as minimum, maximum, frequency, percent, mean, standard deviation, skewness, kurtosis, Pearson correlation, T-tests and ANOVA was obtained by using SPSS. Data analysis involved testing the reliability (inter-item consistency) and validity of the scales (convergent validity). The second stage comprised testing the proposed research models through Structural Equation Modelling using LISREL 8.5.

Statistical techniques used in this research were categorised into two groups. The first set of techniques was used to explore differences between groups by using T-tests and ANOVA (Pallant, 2005; Sekaran, 2003) and second, Structural Equation Modelling (SEM) was used to estimate interrelated dependence relationships (Hair et al. 2006). This technique is helpful in generating a model of relationships among variables (Hayduk, 1987). Before analysing data by using these statistical techniques, it was considered important to test the reliability and validity of the research instrument.
1) Reliability

Reliability is defined as the degree to which measures are free from random error and therefore yield consistent results. However, it is to be noted that unidimensionality is a necessary condition for reliability analysis and construct validation (Anderson & Gerbing, 1991). Hence, in the present study, reliability was assessed only after scale unidimensionality was established.

2) Validity Analysis

Pearson correlation statistic was applied to determine the strength of association between two metric variables (Malhotra, 2005).

3) Principal Component Analysis

Principal Component Analysis (PCA) was performed to check whether the items of each construct load on a single construct. Kaiser-Meyer-Olkin (KMO) and Bartlett’s Tests were performed to determine if the data are likely to factor well (Malhotra, 2005). KMO measure quantifies the degree of inter correlations among the variables and hence the appropriateness of factor analysis. Another measure is Bartlett’s test of sphericity which measures the presence of correlations among the variables. It provides the statistical probability that the correlation matrix has significant correlations among at least some of variables. Thus, a significant Bartlett’s test of sphericity is required.

4) T-test

Independent sample t-tests (Sekaran, 2003) were used to explore the differences between two groups. We deployed t-tests to compare the mean scores of Indian male, Indian female, Syrian male, and Syrian female and find out whether significant differences existed between them.

5) ANOVA

The one-way ANOVA provides us with linearity tests and association measures to help us understand the structure and strength of the relationship between the groups and their means.
6) Structural Equation Model (SEM)

Structural Equation Modelling (SEM) is an advanced multivariate statistical process with which a researcher can hypothesize and test a theoretical model and the associated relationships. It also takes into account measurement errors, and considers both direct and indirect effects of variables on one another. Latent variables are theoretical constructs that unite phenomena under a single term (Bollen, 1989).

SEM analysis has been used to investigate which and how much some of the factors affect the intention for adoption of mobile marketing. By using SEM, the hypothesized model can be tested statistically in a simultaneous analysis of the entire system of variables to determine the extent to which it is consistent with the data. If the goodness of fit is adequate, the model argues for the plausibility of the postulated relations among variables; if it is inadequate, the tenability of such relations is rejected. However, despite the fact that a model is tested in each round, the whole approach is model generation rather than model testing (Byrne, 2001, 2006).

SPSS was used to conduct preliminary analyses of data together with SEM software package LISREL 8.50 which was used to test the proposed models related to mobile advertising and mobile service adoption.

4.11 SUMMARY

This chapter presents the methodology used in this research including information gathering, the instrument development, pre-tests, pilot study, data collection and data analysis process. The research instrument was pre-tested twice, and the pilot study was conducted in India and Syria. In the data analysis section, the statistical techniques used in data analysis were examined for their purpose and benefits of uses in this study. The results of the data analysis via these statistical techniques will be discussed in the next chapter.