Chapter 3
Research Methodology
A research is searching from information to gain fruitful knowledge. Research is a searching of precise data to gain specific information. Research gives the answer of practical problems by using scientific methods and expected world. It is the movement of getting some facts from indefinite to definite status. According to Clifford Woody, research comprises “defining and redefining problems, formulating hypothesis or suggested solutions, collecting, organizing and evaluating data; making deduction and reaching conclusions and at last carefully testing the conclusions to determine whether they fit the formulating hypothesis.”

In this research, researcher has studied various steps associated with the problem the researcher has work on various fact finding technique such as mean, mode, median, frequency distribution, standard deviation or CHI-Square and need to analyze that which of these techniques are relevant to his or her research.

Research is really a method of significant thinking. Research is, thus, an original input to the existing store of knowledge making for its innovation.

This research study is of “Financial Transaction through Cell Phone a Critical Analysis of Security Risk and Preventive Mechanism”. It utilizes both primary as well as secondary data.

**Research Methodology**

**Introduction**

The study is related to techno-management aspects of cell phone basically use of smart phone for doing financial transaction. The researcher has used survey based research methodology to carry out this research. In this research random sampling method for the mobile users who do financial transaction over cell phone has been used for the purpose of data collection.
Statement of the Problem:

Due to rapid growth in wireless technology the cell phone become the very popular device to people to access all the data from pocket. Now a days there are many features available with cell phone who attracts the attention of customer in respect with the same many E-commerce website enters into the market of mobile phones. Even many of the banks provide mobile application to perform basic needs of customer because of the convenience of cell phone and availability of enough options user get attracted and even perform his financial transaction through cell phone.

The major concern while performing financial transaction through cell phone is security. The security not only turns to damage or theft the cell phone but also turns to Data Security.

While performing financial transaction through cell phone customer always scares. May be because of myths he/she follows or may be actually insecurity of data. If it's actually because of insecurity in data transfer then it has to be prevented if not then should work on some awareness programs to take out these myths from customers mind

To know the detail about the Security in financial transaction and its preventive mechanism, the researcher has selected the topic titled “Financial Transaction through Cell Phone a Critical Analysis of Security Risk and Preventive Mechanism“

Objective

1. To study the frequency of financial transaction through cell phone

2. To study the need of using mobile banking services for financial transaction

3. To understand security concern of mobile users for financial transaction through cell phones

4. To study factors affecting for adoption of mobile banking services

5. To study the impact of mobile users location on adoption of financial transaction through cell phone
6. To study the impact of gender, age on adoption of financial transaction through cell phone

7. To study the challenges faced by developers to provide security in financial transaction through cell phone

8. To study the factors used by developers for increasing security of financial transaction carried through cell phones

9. To study the phase in development where security is concern

**Hypothesis**

1. Frequency of performing Financial Transaction through cell phone is not preferable by mobile users.

2. Users of Mobile banking not recognize need of using mobile banking services

3. Connivance and user friendliness are major parameters which increase uses of financial transaction through cell phone

4. Mobile users are more concern about hackers gaining access to their cell phone

5. From developers’ and users’ perspective security is key factor responsible for non adoption of mobile banking

6. Location of mobile users has impact on adoption of financial transaction through cell phone

7. Gender and age group have impact on perceived security concern about of financial transaction through cell phone

8. Securing Development and deployment with strong authentication increases the security of financial transaction carried out through cell phone
**Introduction to research methodology:**

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**Research Design:**

Research design is an outline of research study which indicates that what researcher will do from writing the hypothesis and its operational implications to the final analysis of data. A research design is the arrangement of conditions for data collection and analysis of data in a manner that aim to combine relevance to research purpose with economy in research procedure research design constitutes decision regarding what, why, where, when and how concerning an inquiry or a research study. Overall research design may be divided into the following parts.
A Primary Data

Primary data are obtained through a survey. There are several methods used for collecting primary data. Particularly in survey, the important one are – observation, interview, questionnaire, schedules, e-mail survey, telephone survey etc. Each method has its advantages and disadvantages.

The primary data collected by the researcher can be explained in the following manner.

1) Selection of the city –

The researcher has used sampling method to select city. The researcher has selected some part of Mumbai, Marathwada and West Maharashtra Rejoin of Maharashtra State as this area is center of zone of Maharashtra State and has IT hub also has most of the cell phone user.

2) Selection of Sample –

The study is concerned with techno-economical aspect of financial transaction which includes the survey related to the user and developer of Mobile application developer who has use cell phone for performing financial transaction. To know more the researcher use web pages of Banks, play store for finding banking and M-commerce APPS. Also used the analysis given by TRY and Reserve Bank of India on security of mobile financial transaction. As well the researcher study the different aspects of security transaction over cell phone through meeting with bank employees, study different research paper dealing with security issues in financial transaction.

The sample has been selected among rural and urban area as well as among students and employees, the sample also been selected from mobile application developers.

The primary data are collected from

i) Users of Cell / Smart Phone

ii) Mobile Application Developers
i) **Users of cell phone / Smart phone**

The researcher selected 750 users of smart phone who uses Internet on their phones; the users include Student, Professionals, Business Man, lay Man, etc from different area of Maharashtra State

ii) **Mobile Application Developers**

The researches selected sample of 250 persons who works in mobile application platform to develop mobile apps. The sample does not include only developers but also different work areas of application development such as testing, deployment etc.

Following steps were used for collecting the primary data.

i. Getting Response through well structured questioner, as well as response over internet by using Google Docs Form.

ii. by visiting personally to web developer as well as users of cell phone.

iii. Telephonic and/or personal interview conducted with the company /organization

The Table shows the sample size used for the study.

**Sample Size**

<table>
<thead>
<tr>
<th>S No.</th>
<th>Area</th>
<th>Sample Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Users of cell phone / Smart phone</td>
<td>750</td>
</tr>
<tr>
<td>2</td>
<td>Mobile Application Developers</td>
<td>250</td>
</tr>
</tbody>
</table>

**Table 3.1 Distribution of user of cell phone and developer of cell phone**
B) Secondary Data:

The secondary data were collected from Reputed Journals and Magazines, Newspapers, Articles, Internet Websites and Archives. To collect this data the researcher has visited various Libraries. Few of these libraries are Dr. B. A. M U. library, British library, MIT School of Management, etc.

C) Questioner

Two separate questionnaires are prepared each for the following groups –

i) Users of cell phone / Smart phone

ii) Mobile Application Developers

The first questioner is for user who does the financial transaction over cell phone deals with personal data such as name, qualification, Emai-id, residence type along with structured questioner dealing with financial transaction and security related with financial transaction over cell phone

The second questioner dealing with views of developer and sort of questioner deals with secure transaction of financial data over cell phone

All the questioner also updated over internet by using google docs to get responses from remote users and developers. Also personal interview were conducted the questioner are given in appendix 1 and 2

D) Statistical Techniques:

The researcher has collected primary data through structured questioner. The said data is properly analyzed with the use of SPSS (Statistical Package for the Social Sciences) version 16.0. The research has used statistical techniques such as averages, percentages comparison, cross-tabulation. In addition to this, the techniques of hypothesis testing are also used. Necessary graphs, charts are also prepared to support the analysis of the data whenever necessary.
The following tests are used for analysis

1. Chi-Square Test
2. T-Test
3. Anova Test
4. Non-Parametric Test

**CHI-SQUARE TEST:** Chi-square as a non-parametric test is used for testing of hypothesis. This Chi-square test is selected on the basis of following important characteristics.

- This test as a non-parametric test is based frequencies and not on the parameters like mean and standard deviation.
- This test is useful for testing the hypothesis and is not useful for estimation.
- This is very useful test in research as it can be applied to complex contingency table.
- As no assumptions are necessary in regard to the type of population and no need of parameter values, this is considered to be an important non-parametric test.

In this data analysis chi-square test for comparison between expected value and observed value. In this comparison the observed as well as theoretical or expected frequencies must be grouped in the same way and the theoretical distribution must be adjusted to give the same total frequency as we find in case of observed distribution.

Usually in case of a 2×2 or any contingency table the expected frequency of any given cell is worked out as shown below

\[
\text{Expected Frequency of any cell} = \frac{\text{(Row total for row of that cell} \times \text{Column Total for the column of that cell})}{\text{Grand Total}}
\]

**Chi-Square Formula**
\[ \chi^2 = \sum \frac{(O_{ij} - E_{ij})^2}{E_{ij}} \]

\( \chi^2 \) (chi-square) is calculated with following formula [9]. Where \( O_{ij} \) = Observed frequency of the cell in the ith row and jth column. \( E_{ij} \) = Expected frequency of the cell in the ith row and jth column. If the calculated value of \( \chi^2 \) is equal to or exceeds the table value, the difference between the observed and expected frequencies is taken as significant, but if table value is more that the calculated value of \( \chi^2 \), then difference is considered as insignificant.

**T - TEST**

**DEFINITION OF 'T-TEST'**

A statistical examination of two population means. A two-sample t-test examines whether two samples are different and is commonly used when the variances of two normal distributions are unknown and when an experiment uses a small sample size.

**T Test Formula**

\[ t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}} \]

Where,

\( x_1 \) = Mean of first set of values
\( x_2 \) = Mean of second set of values
\( s_1 \) = Standard deviation of first set of values
\( s_2 \) = Standard deviation of second set of values
\( n_1 \) = Total number of values in first set
\( n_2 \) = Total number of values in second set.
**Anova Test**

Analysis of variance (ANOVA) is a collection of statistical models used to analyze the differences among group means and their associated procedures (such as "variation" among and between groups), developed by statistician and evolutionary biologist Ronald Fisher. In the ANOVA setting, the observed variance in a particular variable is partitioned into components attributable to different sources of variation. In its simplest form, ANOVA provides a statistical test of whether or not the means of several groups are equal, and therefore generalizes the t-test to more than two groups. As doing multiple two-sample t-tests would result in an increased chance of committing a statistical type I error, ANOVAs are useful for comparing (testing) three or more means (groups or variables) for statistical significance.

\[
F = \frac{MST}{MSE}
\]

Where,

- F = Anova Coefficient
- MST = Mean sum of squares due to treatment
- MSE = Mean sum of squares due to error.

**Non-Parametric Test**

The first meaning of non-parametric covers techniques that do not rely on data belonging to any particular distribution. These include, among others distribution free methods, which do not rely on assumptions that the data are drawn from a given probability distribution. As such it is the opposite of parametric statistics. It includes non-parametric descriptive statistics, statistical models, inference and statistical tests. non-parametric statistics (in the sense of a statistic over data, which is defined to be a function on a sample that has no dependency on a parameter), whose interpretation does not depend on the population fitting any parameterised distributions. Order statistics, which are based on the ranks of
observations, are one example of such statistics and these play a central role in many non-parametric approaches.

**Limitation of the study**

It is purely a study of users of cell phones who use cell phones for financial transactions and developers of smart phone applications.

The population in respect of users is any user who uses cell phone for financial transaction. The sample of users is collected from urban and rural areas by region.

The developers are the developers who create smart phone applications used for banking purposes.

**Chapter Scheme:**

The chapter scheme for this thesis is as follows:

1. Introduction
2. Review of Literature
3. Research Design and Methodology
4. Data Presentation, Analysis and Interpretation
5. Findings, Suggestions and Preventive Mechanism

List of table
List of Graph
bibliography
Appendix

The following chapters have been designed for this research work.
1. Introduction

This chapter examines the background of the research, problem statement and research objectives of the research. It also highlights the limitations and delimitations of the research. The details study of the report given by Telecom Regulatory Authority of India and study of parameters given by reserve bank of India related with mobile as well as internet banking.

In today’s era cell phone’s not only used for calling purpose but also for verity of application like internet, mobile application, and financial transaction. As use of financial transaction over cell phone increases the security is issues also increases. The researches attempts to address the users concern about security as well as its preventive mechanism.

2. Literature Review

An extensive literature review is done on the concepts and theories related to Banking, M-Banking, E-banking and Security in Financial Transaction. A review of Research papers, articles is undertaken. The Researcher has collected secondary data from Journals and Magazines, Newspapers, articles, Internet websites, Mobile APPS. The Researcher has visited to find happenings in M- Market.

The researcher has identified seven research papers along with thirteen articles published in renowned journals on various topics such as Mobile Financial Application, M-commerce Play Stores even data collected from personal interviews with Mobile Application Developers.

The review of available Literature on each topic is taken into account in this chapter.

3. Research Methodology

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practical problems by using scientific methods and expected world. It is the movement of getting some facts from indefinite to definite status. According to Clifford Woody, research comprises “defining and redefining problems, formulating hypothesis or suggested solutions, collecting, organizing and evaluating data; making deduction and reaching conclusions and at last carefully testing the conclusions to determine whether they fit the formulating hypothesis.”

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4. Data Presentation, Analysis and Interpretation

Data Analysis is the next step after data collection in entire research process. The collected data must be analyzed in more systematic and scientific way so that hypothesis should be tested and objective should be achieved. Data processing includes coding, editing, tabulations for analysis.

The researchers collect data from cell phone user as well as Application developer. The data accepted from user and developer has been entered into statistical tool that is SPSS version 16.0. The data analysis done through Non Parametric test, Chi Square Test, Anova Test after checking normality of data.
5. Findings, Suggestions and Preventive Mechanism

In this chapter at one side chapter summary has been presented and major findings have been drawn
REFERENCES:


6. Ajai Gaur, sanjaya Gaur, Stastictial Methods for Practice and Research, Pg. 31


