CHAPTER 3 : RESEARCH DESIGN AND METHODOLOGY

3.1 INTRODUCTION

This chapter comprises of the research design which encompasses the need for the study, the research objectives, research approach, design of the study, population & sample selection, selection of variables respondents of the study and other aspects of the questionnaires. The chapter also covers the research methods that have been used in the study and the construction of hypotheses based on the statistical tests used in the study.

3.2 NEED FOR THE STUDY

There is a huge credit gap in the MSME sector in India. At the beginning of the 12th plan it was estimated to be 67% in the formal sector alone. The gap in the informal sector was estimated to be around 90% (Micro Small and Medium Enterprise Finance Market in India, 2012). The existing practice of credit scoring used by banks and other formal lenders is complicated and rigid, which makes it difficult for the lenders to precisely assess their customers based on relevant aspects. Some of the aspects that form part of these scores may be irrelevant and could create an impression of unworthiness despite being genuine borrowers. Industry based models do not allow for customisation and do not take into account the local conditions that affect the borrower. Heuristic models like the one built in this study tries to address this issue by incorporating local factors, and be flexible to the changing conditions. The developed model is also easy to understand by both the lenders and the borrowers. The model was customised taking into consideration both the opinions given by bankers and the empirical data collected from borrowers. The model may be better suited for the population under consideration rather than a standard model. The model should be considered not a substitute but as a compliment to the existing practice of evaluating borrowers.
3.3 RESEARCH OBJECTIVES

With the background of the identified research gaps, specific research objectives were formulated as below:

- To get an insight into the views of the experts regarding the level of importance of determinants and predictors of repayment performance of small business customers of banks from the select population.
- To understand the level of significance of each of the selected variables in predicting defaults.
- To develop a credit scoring methodology that could assist the lenders in assessing small businesses as part of the credit approval process.
- To reify the level of efficiency of the credit scoring model in correctly classifying defaulters and non-defaulters.
- To arrive at a critical score that can distinguish between defaulters and non-defaulters.

3.4 RESEARCH APPROACH

The approach towards the research activity undertaken in the study was bottom-up or inductive approach. The data collected from the selected sample was analysed and the results of the analysis paved the way to spawn a theory that could understand a larger population. The consensus that was created from the theory was solidified into a credit scoring methodology that could be used to determine the creditworthiness of a group of borrowers with the same set of features.

3.5 RESEARCH DESIGN

The goal of the study was to develop a credit scoring methodology that would discern the repayment behaviour of small business customers. For this purpose, descriptive design was used. The study focused on gathering information from samples of both lenders and borrowers. The information was critically analysed and the conclusions drawn were extended to describe the features of a larger population.
3.6 POPULATION SELECTION

A heuristic credit scoring model is limited in scope and cannot be generalised for large populations. Therefore, the population of study was restricted to the district of Anantapur, Andhra Pradesh, India. The district of Anantapur is one of the largest districts in India and also the driest district with agriculture being a risky source of income. According to the AP website, Anantapur district has the least cropping intensity (1.06) of all the districts in the state (AP State Portal). Bankers too do not prefer giving agricultural credit as opposed to other districts in the state of Andhra Pradesh. SME loan products play a crucial role in reaching out to the unserviced credit needs. Farmers in the district also look out for other sources of income especially small businesses during unseasonal periods of agriculture. Bankers in the district that focus on lending to non-agricultural credit sectors have an edge over other bankers that focus on agricultural lending.

The choice of the district of Anantapur was primarily based on the rational that bankers wish to focus more on non-agricultural credit products, at the same time try to increase the reach of the bank through small business credit. A credit scoring model with a localised flavour would be best suited for small business customers. Therefore, the district of Anantapur was selected as the population of the study.

3.7 RESPONDENTS

The study involved two sets of questionnaires with two sets of respondents. The purpose of the first questionnaire was to comprehend the views of the experts regarding the importance of the selected variables in determining the creditworthiness of borrowers. For this purpose, bankers who represent the bank were considered as experts. A banker is a contact person with whom the borrower interacts in his/her course of borrowing and repaying. A banker in his/her experience in dealing with lending, studies the borrower and gets to know what prompts a borrower to behave the way he/she does. Bankers’ experience plays an important role in deciphering the creditworthiness of borrowers. Hence, bankers were considered as experts and therefore the respondents of the study. The three terms ‘bankers’, ‘experts’ and ‘respondents’ are interchangeably used throughout the report.
The respondents of the second questionnaire were small business customers of the banks. The information derived from borrowers was useful in grouping customers under different heads based on different aspects and then study how those aspects influenced their repayment behaviour. For the purpose of the study, only registered micro and small enterprises were considered. Medium enterprises were few in number and are structurally very different from MSEs (Micro & Small Enterprises). While medium enterprises behave like any other corporate firm, MSEs behave more like individuals. Hence, medium sized enterprises were not considered for the study.

3.8 SAMPLING

The sample size of the expert opinion poll was almost the entire size of the population of banks in the district. The size of the population was around 300 bank branches at the time of survey (August - October 2016). Bankers who were either unwilling to respond, absent or incomplete in their responses were excluded in the process. Only one expert’s responses from each bank branch were taken. In case the head of the bank was absent, the next level decision makers in the bank were requested for a response. When even that failed as in a few cases, the responses from that bank branch could not be collected. The final count stood at 263.

The number of MSMEs in the district of Anantapur was estimated to be 6,967 in number (Socio Economic Survey of AP, 2014-15). However the proportion of MSEs in the total MSMEs was unknown. Going by the national trend, it can be said that medium enterprises are insignificant in the overall number of MSMEs. Therefore, the entire population of MSMEs was considered as population for the study. With a confidence level of 99% and a margin error of 5%, using the Cochran’s formula, the minimum sample size was calculated as 608. To get a minimum of at least four borrowers from each of the bank branches, the sample was revised to 1089.

The sampling technique used in the borrowers’ survey was convenient sampling. Since, it was impossible to identify each and every business and then choose a sample, based on the availability of the borrowers and their willingness to respond the sample was selected. Roughly, half the respondents were defaulters and the other half were non-defaulters.
3.9 SELECTION OF VARIABLES

The variables considered in the study were selected based on the literature available pertaining to the aspects of repayment behaviour. A review of literature put forth many variables that go into determining the repayment behaviour of a borrower. Since the study focused on understanding the creditworthiness of the borrower, aspects related only to the borrower have been considered in this study. Other aspects like incentives given by banks, flexible repayment options, etc were not taken into consideration. According to Basel II norms lending to small businesses must be treated as retail lending and therefore equal importance has been given to both personal and business variables. Studies also show that aspects of the borrower and the business are of equal importance for the appraisal of a small business borrower (Derban, Binner, & Mullineux, 2005). Since, a majority of small businesses do not maintain financial records; the appraisal process becomes very difficult for the lenders if financial aspects were part of the delinquency process. Therefore the credit scoring model in the current study attempts to apprehend the creditworthiness of the borrower without the support of financial data. There is no definite number of variables that must be considered for the study. Some researchers have taken as less as three variables (Fletcher & Goss, 1993), (Pendarkar, 2005), ten variables (Purohit, Magadevan, & Kulkarni, 2012). On an average, researchers have taken 20 determinants in their study (Tam & Kiyang, 1992), (Desai, Crook, & Overstreet, 1996), (Jo, Han, & Lee, 1997), etc. Therefore, a total of twenty variables were considered in our study.

3.10 DATA COLLECTION THROUGH QUESTIONNAIRE

The data collected in the study was primary data. An expert opinion poll was designed to gather the opinion of the bankers regarding the importance of each of the selected variables. The identified variables were divided under two factors namely personal and business. The aim of the questionnaire was to understand the impact of both these factors on the creditworthiness of borrowers. The questionnaire was put to a pilot study with 25 respondents. The questionnaire was finalised after taking into consideration the changes suggested by the pilot study.

The borrowers’ survey on the other hand was formulated and structured based on the variables that were considered in the expert opinion poll after the pilot study. The
questionnaire was designed as a dichotomous response based survey i.e., the responses can be given only in two ways (Eg. Yes-No; 0-1, etc). Both the questionnaires were also instrumental in the elimination of unnecessary variables without compromising on the predictability of the credit scoring model. Data from the questionnaire was also helpful in arriving at a critical score that could distinguish potential defaulters from genuine borrowers.

3.11 STATISTICAL TOOLS AND OTHER TECHNIQUES

Responses from both the questionnaires were put to statistical scrutiny through assorted statistical tests. The reliability of the expert opinion poll was tested through the Cronbach’s alpha test. One way ANOVA test was instrumental in assessing whether there were significant differences among and within the groups of bankers regarding their responses in the expert opinion poll. Factor analysis was deployed to study the affiliation of variables towards different factors in the expert opinion poll. Pearson chi square test was incorporated to determine the level of relationship of each variable with the repayment behaviour in the borrowers’ survey. These tests were also instrumental in reducing insignificant variables. Logistic regression was used to verify the effectiveness of the variables in distinguishing defaulters from non-defaulters. The credit scoring model was formulated using multivariate linear regression. A critical score was arrived at in the final stage with the application of multiple discriminant analysis. All the statistical tests were selected were based on the review of literature.

3.12 HYPOTHESES CONSTRUCTION

For each of the two surveys, two sets of hypotheses were posited and tested using two statistical tools. The first set of hypotheses were formulated to test whether there were significant levels of differences among and within groups of experts regarding their opinion on the level of importance of determinants of creditworthiness of small business borrowers. For this purpose one way ANOVA test was incorporated.

The purpose of the second set of hypotheses was to study the significance of relationship between each of the variables with the repayment behaviour of borrowers. For this purpose Pearson chi-square test was used. The hypothesis testing was instrumental in eliminating variables that had no significant relationship with the repayment behaviour of the borrowers.
The following are the formulated hypotheses:

**One way ANOVA test**

H0: There is no significant difference in the opinion regarding the level of importance for each of the identified variables among and within the groups of bankers at 1% level of significance.

H1: There is a significant difference in the opinion regarding the level of importance for each of the identified variables among and within the groups of bankers at 1% level of significance.

**Pearson chi-square test**

H0: There is no significant relationship between each of the identified variables with the repayment behaviour of the borrowers at 1% level of significance.

H0: There is a significant relationship between each of the identified variables with the repayment behaviour of the borrowers at 1% level of significance.