CHAPTER 5
RESEARCH DESIGN- METHODOLOGY

5.1 Introduction

Research design constitutes the blue-print for the collection, measurement and analysis of data; hence it is the conceptual frame by which the research is to be carried out. The present chapter describes the methodology of this research with objectives and hypothesis. It explains about pilot study, sampling process, survey methods, data collection instruments, procedures and tests for data analysis as well. The limitations of the study while collecting the research data have also been mentioned.

5.2 Research Methodology

Initially, a literature survey has been conducted in the area of human resource management and organizational development for obtaining a comprehensive view of earlier studies in the particular subject, also for determining important variables related to it. Moreover, it helps to develop the theoretical framework. The literature from the published reports, books, articles, full text from national and inter-national journals were the major secondary sources of data. Bibliographical data bases, abstracts, documents from various websites were also utilized. Thus the literature survey helped to develop a framework for designing the research questions for the study.

5.3 Objectives of the study

Based on the information gathered from the secondary data, it was decided to carry out the study about job satisfaction among employees and its impact on dairy co-operative industry in Kerala, with special reference to Kerala Co-operative Milk Marketing Federation and its three regional
The study aims to discover the underlying motives, desires, and experiences of people working in the organization by in-depth interviews. Those experiences can also be expressed in terms of quantity by an extensive survey. At this point the research methodology contains a combination of qualitative and quantitative forms of inquiry, also called as ‘triangulation’ (Catherine, 2002). The main objectives of the study are:

1. To study and ascertain the levels of job satisfaction, job performance, job loyalty among the employees of dairy co-operatives in Kerala.
2. To examine the degree of variation in the levels of job satisfaction of the respondent in terms of their demographic variables and departmental (functional) affiliation.
3. To examine the contribution of intrinsic and extrinsic factors in deciding the job satisfaction and assess whether these factors were associated with employees background characteristics.
4. To assess the impact of job satisfaction in terms of job performance and job loyalty.
5. To study the constraint factors if any, pertaining to the job satisfaction among the employees of dairy co-operatives in Kerala.

5.4 Questionnaire

A questionnaire has been used as an instrument for collecting the research data. It is the best method in a survey, when the researcher is familiar with the variables needed to be measured in a big and dispersed sample size (Mischkind, 1986). In the beginning, a clear-cut goal is the most essential step in designing a questionnaire and it involves planning before undertaking the project. We have to look into important issues to be covered and ensure that continuity is maintained. In a newly designed questionnaire it is very important to test the developed instruments for the consistency and viability.
Thus, a questionnaire has to satisfy the scale refinement and validation.

**Reliability**

An assessment of the statistical reliability is necessary before any further validation analysis. Reliability refers to degree of dependability or consistency of a scale. Unreliable scale will lack consistency of measuring the same item to the extent. Four high-quality methods for measuring reliability are Test-retest technique, multiple forms, inter-rater, Split half reliability. Now a day, particularly for field survey, internal consistency is estimated by using Cronbach’s alpha. An alpha value of 0.70 or above is considered to be criterion for demonstrating strong internal consistency, alpha value of 0.60 or above is considered to be significant (Cronbach and Meehl, 1955).

### 5.4.1 Scale refinement and validation

Validity is the most critical evaluation and indicates the degree to which instrument measures, what it is believed to measure. It can also be considered as utility, or the extent to which, differences found with a measuring instrument reflects the true differences among those to be tested (Koeske, 1994). Empirically validated scales can be used directly in the field for different programmes. A scale for a construct is useful for application by different researchers in different studies only if it is statistically reliable and valid. Content validity, construct validity and face validity are the major types of validity (Berelson, 1952).

### 5.4.2 Different approaches to scale refinement and validation

**Content validity**

Content validity is a non-statistical type of validity that involves “systematic examination of the test content to determine whether it covers a
representative sample of the behavior domain to be measured” or the extent to which a measuring instrument provides adequate coverage of the topic understudy. If the instrument contains a representative sample of the universe, the content validity is good; its determination is mainly judgmental and intuitive (Shadish et.al., 2002). It can also be determined by using a panel of persons who shall judge how well the measuring instruments meet the standard, but there is no numerical way to express it. Accordingly, the researcher consulted various experts and academic professionals in particular field for this purpose and hence ensured that the questionnaire so prepared for the evaluation of the job satisfaction is measured with sufficient content validity.

**Face validity**

Face validity is an estimate, whether the test appears to measure a certain criterion, but it does not guarantee that the test actually measures phenomena in that domain and is very close to content validity. The content validity depends upon a theoretical basis for assuming a test that it is assessing all domains of a certain criterion, meanwhile face validity relates to whether the test appears to be a good measure (Haynes et.al., 1995). This judgment is made on the face of the test, thus it can also be judged by the experts in the field.

**Convergent validity**

Convergent validity refers to the degree to which a measure is correlated with other measures that is theoretically predicted with one of the approaches to the construct validity. Otherwise, it is estimated by comparing it to the measure of the same concept developed through other methods to assess how well the items are together. This involves empirical and theoretical support for the interpretation of the construct (Bagozzi et.al., 1991).
Constructs are theoretical or unobserved (e.g. latent variables or factors). Each item in the scale is treated as different approach to measure the construct. Accordingly, by using CFA each item in the scale is checked with the help of coefficient called Bentler-Bonett fit index (NNFI or TLI). A scale with TLI value of 0.9 or above is an indication of strong convergent validity. It has been observed that TLI values of each construct as well as overall TLI values are more than 0.90 and this indicates strong convergent validity of the instrument. (Siebert and Siebert, 2005).

**Confirmatory factor analysis**

In social research works, researchers should apply measures with good reliability and validity that are appropriate in diverse populations (Abbott, 2003). Development of psychometrically sound measures is an expensive and time consuming process, and CFA is one step in the development of process, because researchers often do not have the time or resources to develop a new measure and they have to use existing measures (Greeno et.al., 2007). However, while using existing measures, it is important to examine whether a measure is appropriate for the population included in the study. In these circumstances, CFA can be used to examine whether the original structure of the measure works fit in the population thus tests the specific aspect of validity (Harington, 2009). A fundamental feature of CFA is its hypothesis-driven nature.

In CFA, the researcher specifies the number of factors and the pattern of indicator factors in advance, thus the researcher must have a firm and prior sense, based on past evidence and theory of the factors that exists in the data. It is applied for four major purposes namely, psychometric evaluation of measures (questionnaires), construct validation, testing method effects and, testing measurement in variance (across groups or population) (Brown, 2006). CFA focuses on the relationship between observed measures or indicators (eg.
Test items, Test scores etc), and latent (unobserved) variables or factors, deals specifically with measurement models. Structural Equation Model (SEM) includes the structural model or casual path among the latent variables. Thus it provides a quantitative method for testing substantive theories (Raykov and Marcoulidus, 2006).

5.5 Pilot study

A pilot study was conducted for testing the appropriateness of the research questions and methods adopted. The pilot study not only helps in selecting the appropriate data collection strategy but also helps to check whether random sampling was appropriate for the sampling technique. In addition, the significance about the questionnaire is also tested through the pilot study.

The pilot study was conducted with a pre designed questionnaire to 20 selected members from each of the three regions, altogether consisting of 60 respondents.

On the basis of findings from the pilot study, the questionnaire was further refined and this refined questionnaire was used for the final data collection. The design of the questionnaire was carefully done keeping in mind the variables under study. The key areas to be measured were identified and grouped under each headings. The below table shows the variables under the study and the items used to measure the variables with Cronbach’s alpha.
Table 5.1
Variables and Measures

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Statements</th>
<th>Cronbach’s Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Intrinsic factors</strong></td>
<td>Professional achievement</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Current job</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Recognition by the employer</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Willingness to assume responsibility</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Impact of environment of the individual</td>
<td>0.849</td>
</tr>
<tr>
<td><strong>Extrinsic factors</strong></td>
<td>Salary</td>
<td>0.69</td>
</tr>
<tr>
<td></td>
<td>Job security</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Promotion</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Interpersonal relations</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Working conditions</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Supervision</td>
<td></td>
</tr>
<tr>
<td><strong>Job performance</strong></td>
<td>Arrives for work on time</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Identifies problem</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Proposes solution to problems</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Uses time effectively</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Consult with supervisors and co-workers as necessary</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Demonstrates initiative as appropriate</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Effectively collaborates with other department members as necessary</td>
<td></td>
</tr>
<tr>
<td></td>
<td>My performance is better than that of my colleagues with similar qualifications</td>
<td>0.784</td>
</tr>
<tr>
<td></td>
<td>I am satisfied with my performance because it is mostly good</td>
<td></td>
</tr>
<tr>
<td></td>
<td>My performance is better than that of employees with similar qualifications in other organizations</td>
<td></td>
</tr>
<tr>
<td>Dimension</td>
<td>Statements</td>
<td>Cronbach’s Alpha</td>
</tr>
<tr>
<td>---------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>------------------</td>
</tr>
<tr>
<td>Job Loyalty</td>
<td>I want to continue my work in the same organization</td>
<td>0.732</td>
</tr>
<tr>
<td></td>
<td>I would like to advise my friends to do work in this organization</td>
<td></td>
</tr>
<tr>
<td></td>
<td>When somebody speak ill of my organization, I will defend it immediately</td>
<td></td>
</tr>
<tr>
<td></td>
<td>I would support my organization in almost any</td>
<td></td>
</tr>
<tr>
<td></td>
<td>No matter whether it will benefit me or not, I will be willing to continue working under my organization</td>
<td></td>
</tr>
<tr>
<td></td>
<td>When someone praises my organization, I feel like personal compliment</td>
<td></td>
</tr>
</tbody>
</table>

The questionnaire was self-developed in consultation with the supervisor; it was closed in form, made on the basis of 5 point Likert scale ranging from (excellent, good, satisfactory, sometime unsatisfactory, unsatisfactory), as the model of rating. Summated Scales or Likert type scales takes less time to construct and can be easily used in respondent-centered and stimulus-centered opinion research studies like this (Edwards and Kenney, 1946). Demographic questions were included in the beginning of the questionnaire, which is followed by wide-ranging points to the above mentioned variables. As a final point, a question to measure the satisfaction of the employees was given at the end of the questionnaire. (The questionnaire information sheet is presented in Appendix). These scales were easy to understand for all the employees.

5.6 Survey

The sample of the study consists of a large sample of employees from three sectors of Kerala co-operative Milk Marketing Federation and its three
regional Unions and is essentially cross-sectional. Moreover, the variables that existed were selected, observed, recorded, and analysed. So, survey method using a structured questionnaire is the best approach for a quantitative research. It helps to understand the possible relationships between the data and the unknowns in the universe (Miller, 1978).

The validity and accuracy of final judgment is most crucial and depends heavily on the extent to which data is collected in the first place. The quality of data will greatly affect the results and hence importance must be given to this process. Every possible precaution should be taken to ensure accuracy while collecting the data. One of the major problems in this path is sample size justification. Sample size calculation is concerned with how much data we require to make a correct decision in a particular research. If more the data, then the decision will be more accurate and there will be less error of the parameter estimate. This doesn’t necessarily mean that more is always the best in sample size calculation. Hence in the present study the researcher calculated the sample size using power analysis on the basis of information obtained from the pilot study. The power analysis gives that a sample of 350 of employees is adequate for the study (Mac Callum et.al., 1996).

5.7 Sample Profile

The dairy Co-operative in Kerala is based on Anand Pattern Co-operative societies. There have 3206 number of primary Co-operative societies in the state. These are the part of a three tier system with the primary co-operative society at the village level. There are three regional unions at the middle level which is fedearated to the apex body in the state level KCMMF Ltd. In the primary society the secretary is the chief executive officer of the organization. The other employees lab assistant, procurement assistant etc. The primary society employees pay scale is fixed on the basis of their milk procurement, trade profit and turn over. So they not in a common pattern. The
study is conducted among the employees of three regional unions (Thiruvananthapuram Regional Co-operative Milk Producers Union Ltd, Ernakulam Regional Co-operative Milk Producers Union Ltd And Malabar Regional Co-operative Milk Producers Union Ltd) and the state federation who have the same pay scale and service conditions.

The population for the study consists of employees of different departments of Kerala Co-operative Milk Marketing Federation Ltd and its three regional unions. In Dairy Co-operative industry there are five departments (Production, Marketing, Finance, P&I and HR).

The respondents for the study consists of the employees of the sample dairy co-operatives. There were 2552 employees as on 31-3-2012. From them 20 per cent were selected at stratified random sampling. Thus the total sample employees selected for the intensive study come to 510.

The collection of data was based on two stage simple random sampling and stratified proportional sampling among the five categories of employees. In the first phase, the researcher has chosen one unit from each of the district by simple random sampling. The respondents were selected using stratified proportionate sampling from among the five departments namely production, HR, P&I, Finance and marketing. The sample size is presented in the following Table 5.2.
Table 5.2
Sample profile

<table>
<thead>
<tr>
<th>DAIRY CO-OPERATIVES</th>
<th>TOTAL NO OF EMPLOYEES</th>
<th>NO OF EMPLOYEES SELECTED AS SAMPLE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Production</td>
<td>Marketing</td>
</tr>
<tr>
<td>KCMMF</td>
<td>371</td>
<td>50</td>
</tr>
<tr>
<td>TRCMFU</td>
<td>494</td>
<td>66</td>
</tr>
<tr>
<td>ERCMPU</td>
<td>352</td>
<td>47</td>
</tr>
<tr>
<td>MRCMPU</td>
<td>574</td>
<td>77</td>
</tr>
<tr>
<td>TOTAL</td>
<td>1792</td>
<td>240</td>
</tr>
</tbody>
</table>

*Source: Survey*
The survey was conducted by interaction and personal discussions with the employees in a period of four consecutive months. This has helped the researcher to monitor the work life of employees and also to obtain data free from errors while collecting and recording the information.

5.8 Data preparation for analysis

The data collected has been processed and analysed by various methods. “As data are collected, they should be examined for completeness, comprehensibility, consistency and reliability.” (Claire, 1962).

5.8.1 Data Editing

The collected questionnaire were checked for its completeness and edited as required. Since most of the questionnaire were collected personally by the researcher, it was possible to check and edit the questionnaire in front of the respondent, if required. However, in the case of indirect questionnaire collection approach, the editing of data was done in a limited way as re-contact with all the respondents were not possible in all the cases.

5.8.2 Coding

Editing of data was followed by the coding of the responses. Each item in the questionnaire was given a unique code using number. For example, the responses in the questionnaire 1 are coded as 1 for ‘Not satisfying,’ 2 for ‘Poorly satisfying’, 3 for ‘Moderately satisfying’, 4 for ‘Very satisfying’ and 5 for ‘Extremely satisfying’. The demographic responses were also coded with numbers. For example, the variable male was coded with 01 and 02 indicates a female respondent. In the same manner, the variables like company, experience, category, age and place of residence were coded using numbers. The responses were then keyed to a SPSS program.
Blank questionnaire

If 25% of items or more were left unanswered, that questionnaire was excluded from the analysis. If it was less than 25%, the computer program at the time of analysis was allowed to ignore the blank responses.

5.9 Data analysis method

The method used in the study was exploratory as it utilized scoring of the variables. The collected data contained both qualitative and quantitative data. Accordingly, the study used both qualitative and quantitative techniques for the analysis of data. The statistical analysis comprised of two stages. The first stage examined the descriptive statistics of the measurement items and assessed the reliability and validity of the measure applied in this study. The second stage tested the proposed research model and this involved assessing the contributions and significance of the manifest variables path coefficients (Grimm, 2000).

The computer program, Statistical Package for the Social Sciences (SPSS version 20) was used to analyze the data. In the case of ranking questions, the researcher had adopted the weighted average techniques with values starting from the highest possible rank to the lowest and weight as the number of respondents. The weighted mean is calculated for each category and ranks are assigned on the basis of the values of the weighted mean. The mean, standard deviation, percentage and frequencies were first calculated to get the initial reaction of the respondents to each item in the questionnaire. Thus all the items were analyzed using descriptive statistics.

A one sample Z test was used to investigate the level of quality of work life. To explore the significant difference in response between two companies, an independent Z-test was utilized. ANOVA test was applied to find out any difference in responses caused by demographic variables. Later,
the Chi square tests were adopted to realize the dependency of the personal satisfaction level and the demographic factors (Yuan and Bentler, 2004). The acceptable level of significance was P<.05.

Confirmatory factor analysis was used to explore the relationships between independent and moderating variables and to describe the construct of the theoretical framework. This was done using the software AMOS 7 (Arbuckle, 2006a). In the confirmatory factor analysis, first a theoretically supported model was developed for each factor, a path diagram of casual relationships was constructed and, the parameter estimated in the model were examined based on the goodness of fit measures available in AMOS output (Byrnes, 2006).

By using SEM, it is a common practice to use a variety of indices to measure the model fit. In addition to the ratio of the χ² statistic to its degree of freedom, with a value less than 5 indicating acceptable fit, researchers recommended a handful of fit indices to assess model fit (Kline, 2005). These are the Goodness of Fit Index (GFI), Adjusted goodness of fit (AGFI), Normed Fit Index (NFI), Standardized Root Mean Residual (SRMR), and the Comparative Fit Index (CFI). According to the usual procedures, the goodness of fit is assessed by checking the statistical and substantive validity of estimates (i.e. no estimates lie out of the admissible range, as the case for negative variances or correlations larger than one and, no estimates lack a theoretical interpretation, as the case for estimates of unexpected sign), the convergence of the estimation procedure, the empirical identification of the model, the statistical significance of the parameters, and the goodness of fit to the covariance matrix. Since complex models are inevitably unspecified to a certain extent, the standard χ² test of the hypothesis is a perfect fit to the population covariance matrix and is given less importance than measures of the degree of approximation between the model and the population covariance.
matrix. The root mean squared error of approximation (RMSEA) is selected as such a measure (Gignac, 2006).

The measures of “goodness of fit” followed in this research are;

**Absolute fit measures**

- Likelihood ratio Chi-square statistic (p): usually greater than 0.05 or 0.01 is the level of acceptable fit.
- Goodness of fit index (GFI): higher values closure to 1.0, indicates better fit.
- Root mean square error of approximation (RMSEA): values ranging from .05 to 0.08 are acceptable.
- Root mean square residual: smaller values are better.

**Incremental fit measures**

- Tuker-Lewis Index (TLI): A recommended value of TLI is 0.09 or greater. The value closure to 1.0 indicates perfect fit.
- Normal fit Index (NFI): A recommended value of NFI is 0.09 or greater. The value closure to 1.0 indicates perfect fit.
- Adjusted goodness –of –fit index (AGFI): A recommended value of AGFI is 0.09 or greater. The value closure to 1.0 indicates perfect fit.

**Parsimonious fit measures**

- Normal Chi-square (CMIN/DF): Lower limit 1.0 and upper limit 2.0/3.0
- Parsimonious goodness-of-fit index (PGFI): the value closure to 1.0 indicates perfect fit (Thompson, 2004)
Considering the above values, a conclusion was reached about the final model of each factor and their relationships. Correlation was then exercised to explore the relationships among the factors of independent and moderating variables. Moreover, multiple regressions were applied to investigate the association between independent and moderating factors (Cohen et.al, 2003)

**Coefficient of variation**

The coefficient of variation (CV) is the most commonly used technique, particularly in studies like this to compare the variability of two or more than two series of their relative variation. The series, for which the coefficient of variation is greater, is said to be more variable or conversely less consistent, less uniform, less stable or less homogeneous. The formula for calculating correlation coefficient is;

\[
C.V = \frac{\text{Standard deviation} \times 100}{\text{Mean}}
\]

**Mean percentage Score**

To identify the level of satisfaction of the variables we use the Mean percentage score, which is calculated using the formula;

\[
MPS = \frac{\text{Mean score of the variable} \times 100}{\text{Maximum possible score}}
\]

**Pearson r correlation:** Pearson r correlation is widely used in statistics to measure the degree of the relationship between linear related variables. For the Pearson r correlation, both variables should be normally distributed. For example, in the stock market, if we want to measure how two commodities are related to each other, Pearson r correlation is used to measure the degree of relationship between the two commodities. The following formula is used to calculate the Pearson r correlation:
Where:

\[ r = \text{Pearson } r \text{ correlation coefficient} \]

\[ N = \text{number of value in each data set} \]

\[ \sum xy = \text{sum of the products of paired scores} \]

\[ \sum x = \text{sum of } x \text{ scores} \]

\[ \sum y = \text{sum of } y \text{ scores} \]

\[ \sum x^2 = \text{sum of squared } x \text{ scores} \]

\[ \sum y^2 = \text{sum of squared } y \text{ scores} \]

**Tests**

**Chi square- test of Independence, T-test, Z test and One way ANOVA**

To test the hypothesis, that two attributes are associated or not, the Chi-square test for independence has been applied. Chi-square is measured as

\[ \chi^2 = \sum \frac{(O - E)^2}{E} \]

where \( O \) refers to the observed frequencies and \( E \) for the expected frequencies (the ratio of the product of the row total and column total to the grand total).

**One Sample Z-Test**

One sample Z- Test is a statistical procedure used to examine the mean difference between the sample and the known value of the population mean. In one sample t-test, the population mean is known.
Two Sample $Z$- test

The Independent-Samples $Z$ Test procedure compares means for two
groups of cases. Ideally, for this test, the subjects should be randomly
assigned to two groups, so that any difference in response is due to the
treatment (or lack of treatment) and not to other factors.

The test Statistics is

$$Z = \frac{(\bar{x}_1 - \bar{x}_2)}{\sqrt{s_1^2/n_1 + s_2^2/n_2}}$$

One-Way ANOVA

The One-Way ANOVA procedure produces a one-way analysis of
variance for a quantitative dependent variable by a single factor (independent)
variable. Analysis of variance is used to test the hypothesis that several means
are equal. This technique is an extension of the two-sample $t$ test. Besides, for
determining that differences exist among the means, researcher wants to know
which means differ. For this purpose, a post hoc test (multiple regression) was
adopted. Contrasts are tests set up before running the experiment and post hoc
tests are run after the experiment (Mac Callum, 2003)

5.10 Limitations of the survey

The limitations of the present study are as under.

1. The study is limited to cooperative dairies working in Kerala State. Its
   conditions cannot be applied to the whole cooperative dairy industry at
   national level.
2. The tools and techniques used in the present study are not out of the verge of certain limitations of their own which also applies to the study.

3. The primary data have been collected through questionnaire from the respondents of selected dairy units in Kerala State. So there is the possibility of errors in the opinions of the respondents which apply to the present study.

4. Dairy industry either at national level or at state level may be working in private and cooperative sectors but the present study is based on the functions of the dairy industry in cooperative sector. Hence, the findings of the study will not be applicable to private sector dairy unit.

5. The survey is subjected to the bias and prejudices of the respondents. Hence 100% accuracy can’t be assured.

5.11 Conclusion

The chapter gives an overall picture of the methodology employed by the researcher for the study. Moreover, representation of the universe, sampling method, sample size, data collection method, instrument, and the techniques for data analysis were cleared along with limitations of the research method of the study.
REFERENCES


