

# Chapter - III

## Research Methodology

### 3.1: Introduction

Research Methodology deals with the plan of action in research that determines the pathways of how the data is to be collected, analyzed, and construed. The reliability and validity of the study significantly based upon the systematic collection and scientific analyzing of data. This study examined the impact of E-HRM on transactional functions of HRM by assessing the managers conducted at different FMCG organizations. The research question and two hypotheses, as stated in chapter 1 and 2, served as the foundation and purpose of this study and are further addressed in this section. This chapter also discusses the methodological rationale and the population and sample, sampling design, hypothesis, the data collection, and the analysis of the data.

### 3.2: Research Design

Research design is primarily a framework of methods and procedures preferred by the researcher to mingle different components of the research in a significant manner so that the problem of the study is efficiently touched. It provides a clear insight into the outline of the study using a systematic methodology. In this part, every researcher has a series of investigating questions that need to concentrate. Research design helps the researchers for future planning of the methods to be espoused for data collection, and the techniques utilized in the data analysis, observance in viewpoint of objectives of the study, the accessibility, and availability of time, staff, and money (Kothari, 2004).

The outline of the research can be addressed by research design with a proper approach. Hence, our study will be conceding at the center of the research design. The research design significantly explains the type of research (survey, experimental, semi-experimental, review, and co

relational) and also defines the sub-type of the study (research problem, innovative design, and detailed case-study).

Research design is a significant method and measures that help in determining the type of data collection, the sources of data collection, and also discovering the scientific approach. If the research design is right, then it will make sure that the objective and economical procedure of collected information is relevant to the research problem. A systematic research design might be considered as a set of progressive decisions that, in use mutually, form a defined model for the demeanor of the study (Shajahan, 2004). However, with the help of research design a systematic and logical plan is to conduct for directing a study. The research designs hold the blueprint of the study, from data collection to interpretation of the result. In this study, descriptive research design has been adopted to explain the study accurately.

Descriptive research is a study designed to portray the contributors in a precise method. Descriptive research is primarily a study that describes the characteristics of the respondents who participated in the study. There are three habits of descriptive research that a researcher can conduct, are observational, case study, and survey. In this study survey method has been utilized to conduct the research. Survey research deals with the procedure of conducting research using surveys that are collected from the survey participants. Then, the collected data is used to analyze and depict a meaningful conclusion. The survey research method can be classified based on two factors: the medium of survey and time involved for conducting study. The medium of survey includes three main survey methods. Those are online or email, Phone, and face-to-face. In this face-to-face survey method has been utilized. Based on the time involved in conducting study, survey research divided into two parts. Those are longitudinal survey research and cross-sectional survey research. In the case of longitudinal survey research, survey is conducted over a

continuum of time. However, cross-sectional survey method is conducted to accumulate information from a target audience. In this study cross-sectional survey method has been adopted. The main of this study to target the HR managers and their opinions about the effectiveness of E-HRM practices.

### **3.2.1: Data Collection**

In this study, the data were collected from suitable sources. Primary data is used to analyze and depict the conclusions. Primary data is collected with the help of a questionnaire-based survey method, which was faced by face-to-face interaction. Primary data were collected from the participants with a structured questionnaire. The field survey method was utilized to collect primary data (first hand) from the participants. In this study, questionnaire was the primary tool utilized for collection of data, most endeavors were taken, and much concentration was given to construct the questionnaire logically by formulating pertinent and adequate questions to accomplish the objectives properly. The research supervisor fully helps during the questionnaire development, which crucially is an expert in the research field. The set of questionnaires was prepared for HR executives or managers associated with HR functions in and around West Bengal. The specific period to be studied was one year from June 2015 to June 2016. For all the variables examined in this study, normal HRM and E-HRM data were collected to compare the variables. Most of the questions are constructed related to the comparison study. The detailed data used in this research were data analyzed to test the hypothesis conducting this research. To satisfy the hypothesis, the examination of different factors that are associated with E-HRM system on the overall efficiency of the organizations, the data analyzed were two-factor analysis and MLR.

To satisfy the first objective, twenty questions are prepared for collecting the data to find out the variables of E-HRM practices that are used by the FMCG organizations on their daily day to day function. The score was calculated on a 5-point Likert scale, where five is strongly agreed, and one strongly disagrees.

To satisfy the second objective, twelve questions are selected for collecting the data to find out the significant factors of this web-based e-HRM over normal HRM functions that have the capability to increase efficiency of the entire organization. The score was calculated on a 5-point Likert scale, where five strongly agree, and one strongly disagrees.

To satisfy the third objective, MLR has been used to find out the degree of efficiency and two questions are prepared to construct a model. The score was calculated on a 100-point scale.

To measure the overall E-HRM efficiency index one question was asked that is do you think that e-HRM helps to improve overall HR efficiency. This question is scoring based on a 100-point scale. However, 100-point scale is classified into seven categories: Excellent (90-100), Very good (80-89), Good (70-79), Adequate (60-69), Acceptable (50-59), not sufficient (40-49), nothing any change (< 40). To measure the transactional time index one question was prepared that is do you think that e-HRM helps to effectively reduce the transactional time. This question is scoring based on a 100-point scale. However, this 100-point scale is classified into seven categories: Excellent (< 40), Very good (40-49), Good (50-59), Adequate (60-69), Acceptable (70-79), not sufficient (80-89), nothing any change (90-100).

### 3.2.2: Sampling Design

#### 3.2.2.1: Population

The researcher has identified the specific location for this study is West Bengal where several FMCG organizations situated. This research area is the most suitable for the study of E-HRM practice in the FMCG sector. The population is defined as the aggregate or totality of those conforming to a set of specifications (D. F. Polit & Beck, 1998, 2004). The target population for this study is the thirty different FMCG companies or Organizations (i.e. Dabur, Parle, Britannia, etc.) along with the different parts of West Bengal.

#### 3.2.2.2: Sampling Plan

Sampling refers to the process of selecting a portion of the population to represent the entire population (D. Polit & Hungler, 1989). It is a subset of a population selected to participate in the study. In this study, stratified random sampling technique has been adopted. The prime uniqueness of stratified random sampling involves strata (the division of the population into small groups based on some characteristics), and each member of the population under strata has an equal chance of being assortment. Reputed thirty organizations were chosen which includes small to large FMCG organizations. The researcher has selected thirty FMCG companies because these companies have to utilize the e-HRM system for the Human Resource Management function.

The first data collection has been done through the questionnaire filled by the managers of the FMCG organization. To measure the different levels of e-HRM attributes and their impact on

different factors, questionnaire was prepared for requisite data collection for the analysis. The questionnaire was prepared based on analysis requirement.

### 3.2.2.3: Sample size

According to [Gay, Mills, & Airasian \(1996\)](#), the number of subjects significantly affects the power of a study. Power means the analytical ability to reject a false null hypothesis. Besides, “if the sample is too small, the results of the study may not be generalizable to the population.” However, sometimes researchers are addressing barriers in large number of potential participants. Depending on the type of research involved, some experts consider the minimum sample size of 30 as a guideline for correlation, causal-comparative, and accurate experimental research ([Gay et al., 1996](#)). For regression types of analytic work, a good rule of thumb is 15 participants per variable ([Tabachnick & Fidell, 2000](#)).

In this research work, we have taken 150 respondents (n=150) as sample size who are specially working with the e-HRM system. The researcher mainly concentrates on the respondent’s willingness, which is crucial for data collection. Data was collected with the help of questionnaire as a tool with several variables based on which impact of E-HRM on HR transactions was determined. The survey was conducted among the managers of thirty organizations (5\*30)=150 located in West Bengal.

### 3.3: Hypothesis

The study crucially considered two major hypotheses based on the research objectives, and it includes:

**H<sub>0</sub>:** Different Factors associated with the e-HRM system has no significant impact on the overall efficiency of the organization.

**H<sub>1</sub>:** Different Factors associated with the e-HRM system has significant impact on the overall efficiency of the organization.

### 3.4: Data Analysis

The principle of analysis is to construct an empirical analysis where the relations are cautiously carried out to draw meaningful conclusions. Collected data has to be systematically and scientifically analyzed accordingly to accomplish the research objectives of the study. The study also prepared concerning the research hypothesis. The data analyses have been done through the computer system with the help of SPSS and MS Excel software.

Data analysis is an essential part based on which conclusions and recommendations of any research work are made. Collected data will be analyzed with the help of different statistical tools like Factor Analysis Method, Regression Analysis test, paired sample t-test. With the help of the SPSS software package to interpret the data. Apart from that, different statistical tools used depending upon the requirement with the progression of the research work.

All the data were analyzed by SPSS software and computed statistical significance. The analysis of the data has been done through some descriptive and inferential statistics tools that are discussed later. The descriptive statistics primarily introduced in this study are the mean, median, and standard deviation. For inferential statistics, the paired sample t-tests were used to establish the difference between normal HRM and E-HRM efficiency. Multiple Linear Regression



Analysis (MLR) has been done to establish the relationship between different factors associated with E-HRM. One model is developed using scatter diagram to establish the relations between E-HRM efficiency and transactional time.

### **3.5: Statistical tools**

The collected data from the survey are to be analyzed with proper statistical tools and methods. Both graphical and tabulated forms are utilized to symbolize the data suitably where essential. The graphs are mainly drawn from the MS excel and table, and statistical analysis is done from the SPSS software due to expertise in the software handling of the researcher.

#### **3.5.1: Weighted average**

The study is mainly considered as a descriptive study. The maximum questions in the questionnaire were in the form of a Likert scale. The responses of various factors values are determined using a Likert scale that is awarded as:

5= strongly Agree/strong positive

4=Agree/positive

3=Neutral or neither agree/ neither disagree

2=Disagree/negative

1=strongly disagree/ strong negative.

The higher value in the Likert scale used in the study indicates higher the conformity on the factor under deliberation and vice versa. In the study, the researcher utilized the weighted average to reduce dimensions of factors after factor analysis in SPSS.

#### **3.5.2: Cronbach's alpha**

Cronbach's alpha ( $\alpha$ ) is applied to measure the reliability of the data. Cronbach's alpha test examines the internal consistency from which the reliability of the questions was checked. It is a function of the no of items in a test, the mean covariance between item-airs, and the total score

variance. Mostly acceptable  $\alpha$  values are as follows: Excellent ( $0.9 \leq \alpha$ ), Good ( $0.8 \leq \alpha < 0.9$ ), Acceptable ( $0.7 \leq \alpha < 0.8$ ), Questionable ( $0.6 \leq \alpha < 0.7$ ), Poor ( $0.5 \leq \alpha < 0.6$ ), Unacceptable ( $\alpha < 0.5$ ). Cronbach's alpha is most suitable for Likert type scale and it also suitable for the measurement of internal consistency of multi-items (Gliem & Gliem, 2003; Panayides, 2013). However, Cronbach's alpha reports are not always sound. Sometimes large sizes do not suggest sufficient reliability. The small size of the alpha value not always depict the problems; it depends on the sample size, nature of data, the normality of distribution, scale length and width, etc. (Panayides, 2013).

### 3.5.3: Factor Analysis

Factor analysis is a statistical technique used to minimize the number of variables into a lesser no of factors(Child, 1990). This technique is one of the best and popular techniques used in social and behavioural science to deal with numerous variables. This technique found the most normal variance from all the variables and put them into an average score. Based on the average scores, the researcher can go further study. However, Factor Analysis (FA) is a part of GLM (General Linear Model). This technique has several assumptions and different types of extraction methods. The types of factoring are as follows:

- a) Principal Component Analysis (PCA): This extraction method is widely using and the primary standard method utilized by the researchers. PCA method mainly extracts the maximum variance and makes them the first factor. Then, it removes the first factor and starts extracting another maximum variance for making the second factor. This same technique goes until the achievement of the last factor (Panayides, 2013).
- b) Common Factor Analysis (CFA): This method is mainly using the Structural Equation Model (SEM). CFA is the second most preferable method used by the researchers for

their study. CFA extracts the common variance and making the factors. CFA does not comprise all the variance of all variables (Panayides, 2013).

- c) Image Factoring (IF): IF method calculated factors based on the correlation matrix. OLS Regression method is utilized to forecast the factors.
- d) Maximum Likelihood Method (MLM): MLM method calculated factors are using correlation metrics, but for making the factors, it utilizes the maximum likelihood method.

There are other methods also available, like Alfa factoring outweighs the least squares. In this study, the researcher uses the most popular PCA method for factor extraction.

Factor loading in factor analysis primarily depicts the correlation coefficient of the variable and factor. Factor loading showcases the variance enlightened by the variable on that meticulous factor. In this study, the researcher uses 0.5 or higher factor loading, which represents the factor extorts adequate variance from that variable.

Eigenvalues are calling as characteristic roots of the factor analysis. Eigenvalues showcase variance extorts by that meticulous factor out of the entirety variance.

The factor score is entitled to the component score. The factor score can be used as an index of all variables because it includes all rows and columns. The factor score can be used for advanced analysis.

According to Kaiser Criterion, for determining a factor uses Eigenvalues are proper criteria. In this study, Kaiser with a rotation matrix is used for factor analysis. According to the variance extraction rule, more than 0.7 variances are considering as a factor for this study.

The rotation method is used to make the output more steadfast to appreciate the output. In this study, the Varimax rotation method is used to make the output more reliable.

The factor analysis assumes some assumptions. Those are as follows: a) presume that there are no outliers in the data set. B) The sample size is adequate means the case must be higher than the factor. C) There is no perfect multicollinearity. D) There does not require homoscedasticity. E) Linearity in the dataset.

Some test is required to find out the suitability of the data to precede the factor analysis. Those are as follows:

First, correlation matrices are calculated and scrutinized. The result depicts that there are some extent correlations present to go ahead for factor analysis.

Second, the Kaiser-Meyer-Olkin (KMO) test has been done to measure the sampling adequacy and it produces the value range between 0 to 1 (Crane, Busby, & Larson, 1991). The KMO test result can be interpreted as: marvellous (0.9 & above), meritorious (0.8 & above), middling (0.7 & above), mediocre (0.6 & above), miserable (0.5 & above), unacceptable (below 0.5) (Hair et al. 1995). According to Crane et al. (1991), More than 0.6 is acceptable.

Third, the Bartlett Test of sphericity compares the correlation matrix to the identity matrix. The test primarily ensures if there is a redundancy between variables that may be abridged with various factors. The p-value of fewer than 0.05 vouches that the data set is suitable for factor analysis.

Fourth, Factor analysis primarily includes two-stage. The first stage is called Factor Extraction Process. This stage includes how many numbers of factors will be extorted from the dataset. For many factor extractions, the PCA method is most popular, and it is used for factor extraction in this study. The second stage includes a rotated component matrix. This stage is called the Rotation of Principal Components. After first stage (factor extraction), the next stage is to construe and naming the factors. The unrotated component matrix provides the preliminary image of the loading variables in the factors. It is cleared by using varimax rotation. After the

rotated component matrix, the researcher needs to select suitable names for factors. In the study, factor analysis has been done to find out the factors which are influences in day-to-day E-HRM practice.

#### **3.5.4: ANOVA**

ANOVA is a widespread technique mainly applied by researchers in the field of biology, economics, education, psychology, business, sociology, and other disciplines. ANOVA primarily applied when multiple cases are concerned (Kothari, 2004). ANOVA is used to analyze the differences among and between groups. ANOVA depicts a statistical test of whether two or more sample/population means are equal or not and it simplifies using t-test ahead of two means. ANOVA is applied when the independent variable is on nominal scale, and the dependent variable is on the metric scale (Nargundkar, 2003).

#### **3.5.5: Multiple Linear Regression Analysis (MLR)**

Regression is a tool used to showcase the reason and result relationship between two or more variables (Uyanik & Güler, 2013). MLR is the most popular predictive analysis form of linear regression (LR) analysis. MLR explains the relationship between two or more independent variables and one continuous dependent variable. The independent variable may be continuous or categorical scale. The previous variable is called independent and next variables are called dependent variables. When regression analysis has been done with two or more independent variables to showcase the relationship between independent and dependent variables are called MLR. The prime objective of applying this technique is to forecast the unpredictability of the dependent variable support from covariant with all the dependent variables. MLR is functional to forecast the level of dependent phenomenon.

### **3.5.6: Paired sample t-test**

The paired sample t-test primarily called as dependent sample t-test. It is a statistical technique that uses to examine whether the mean difference between two sets of variables is zero or not. In this test, each subject is calculated twice, ensuring in pairs of observations. A paired sample t-test mainly proceeds in the repeated measures or case-control studies to find out the significant difference. In this study, the researcher is interested in evaluating the effectiveness of E-HRM on transactional time in FMCG organizations. A paired sample t-test might consider the best technique because it measures the performance of a sample before and after completing the particular task and analyze the differences in the task.

### **3.5.7: Scatter Plot**

Scatter plot is use to find out the relations between E-HRM efficiency and Transactional time. In this study, the model is established through scatter plot. The model is named as E-T graph.

#### **Drawing Steps of the E-T graph:**

An E-T (E-HRM efficiency with Transactional time) graph is a graphical representation of a basic condition concerning to E-HRM efficiency and transactional time. E-T graph displays data for two variables: E-HRM efficiency index and transactional time Index. These two variables are widely useful tools to assess the E-HRM performance quickly. This graph can be used by the managers to show two important things: How the relations changes between E-HRM efficiency and transactional time throughout the time scale. The graph shows you that does your E-HRM practice give you competitive advantage or not.

This graph is made up of a scatter diagram and the steps are:

1. Give the E-T graph a title, which includes the name of the organization where the graph is drawn.
2. Draw a frame. The frame should look like the below model:
3. Use the hundred-point scale up the left-hand side to point the E-HRM efficiency index.
4. Use the hundred-point scale up the right-hand side to point the transactional time index.
5. Use a scatter plot.

### **Measurement Technique:**

An E-T graph is one type of scatter diagram required for plotting the E-HRM efficiency index and transactional time index of a particular sample against one another. The points or position of the resultant graph on the framework provides an idea about the competitive advantage and disadvantage.

In this, the E-HRM efficiency index values (%) are plotted against those of transactional time values (%) on a fixed frame. Where, E-HRM efficiency index is plotted along the X axis which is graduated from 0 to 100 while the transactional time is plotted along the Y axis, graduated from 0 to 100. This graph is mainly prepared to show the competitive advantage and disadvantage of the E-HRM practice. A flow line is also attached to find out the trend of the relations. The four corners are marked as:

#### **Type A: Competitive disadvantage**

Position in the graph: North West (NW).

Extension: In X-axis 0 to 50 and Y-axis 50 to 100.

Characteristics: Transactional time is high, and HR efficiency is low.

Probable reasons for this class: Unskilled HR, HR performance low; Traditional HR practice

**Type B: Pre- advantage**

Position in the graph: South West (SW).

Extension: In X-axis 0 to 50 and Y-axis 0 to 50.

Characteristics: Transactional time is low, and HR efficiency is low.

Probable reasons for this class: HR may be highly skilled; HR performance is good; HR practice is traditional.

**Type C: Advantage**

Position in the graph: North East (NE).

Extension: In X-axis 50 to 100 and Y-axis 50 to 100.

Characteristics: Transactional time is high but highly efficient HR practice.

Probable reasons for this class: Efficient HR practice; Unskilled HR; or HR performance is low.

**Type D: Competitive Advantage**

Position in the graph: South East (SE).

Extension: In X-axis 50 to 100 and Y-axis 0 to 50.

Characteristics: Transactional time is low and highly efficient HR practice.



Probable reasons for this class: Efficient HR practice, skilled HR, HR performance is high; and innovative HR practice.

The Hypothetical graph is shown below:

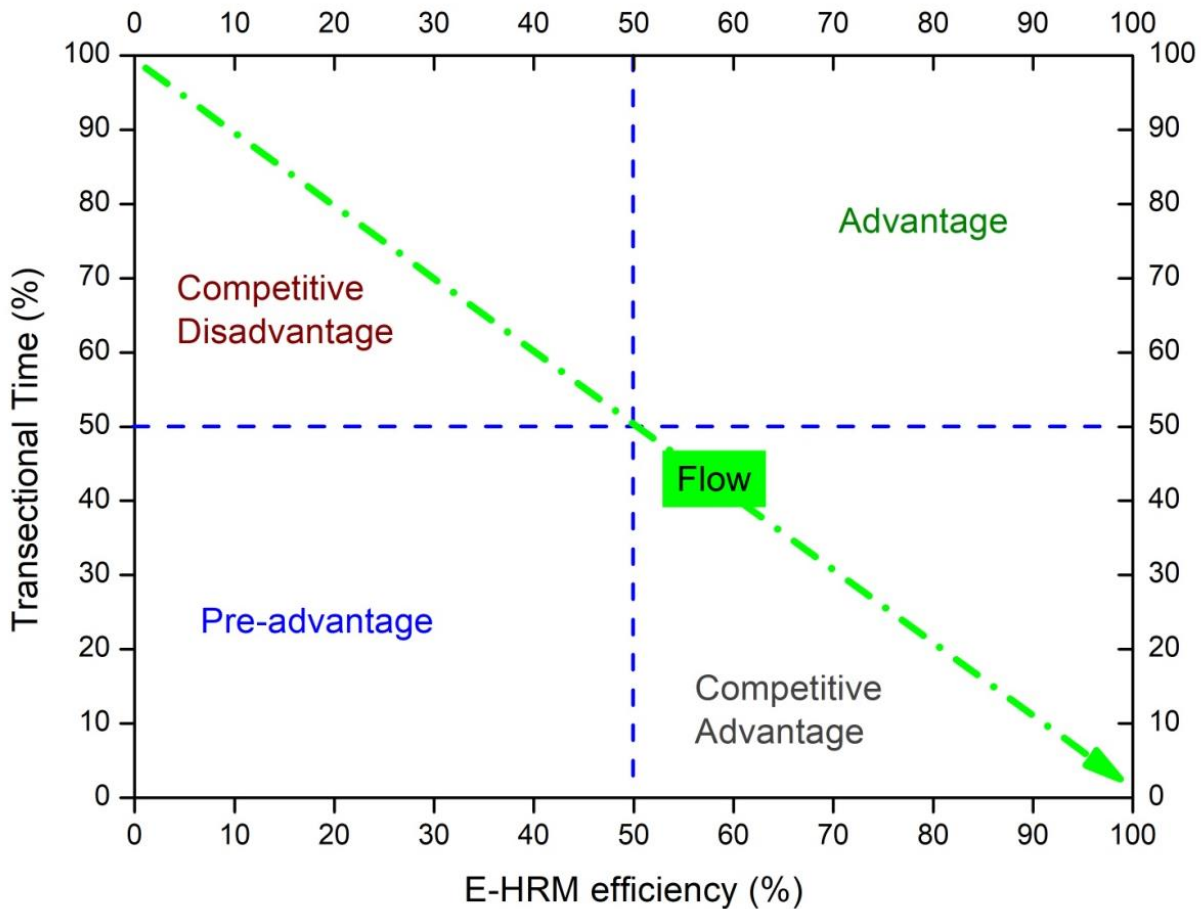


Figure 3. 1: E-T Graph

### 3.6: Limitations of the study

The study was conducted in the West Bengal of India where the endowment is copious. The growth of FMCG sector and application of technology in HRM are escalating gradually. However, some limitations of this study are as follows:

- i) The study was restricted within the FMCG sector of West Bengal in India.

- ii) The primary focus of the study was the impact of E-HRM on transactional functions of HRM.
- iii) The target respondents were mainly HR executives and the managers associated with HR functions.
- iv) The study only includes popular 30 leading organizations.

### **3.7: Conclusion**

This methodology chapter discussed the methodological rationale and the population and sample, sample design, the data collection, and analysis of the data. Next, the detailed results of data analysis are presented in chapter 4.

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