CHAPTER III

RESEARCH METHODOLOGY
III.1 Approach of the Research

In order to understand the variables impacting collaborative learning using online social media in information technology industry, it is first required that the concept of information technology and social software tools be understood. It is then necessary to compile the market scenario and then establish the measurement instrument.

The approach of this study is:

(a) Gain a preliminary understanding about information technology industry scenario.

(b) Conduct a review of literature to ascertain various variables impacting system quality, information quality, collaborative learning, individual learning, team learning, organisational learning and benefits. It is also important to assess research gaps.

(c) Conduct a pilot study to verify the applicability of the survey instrument and to make necessary modifications in the instrument for final survey.

(d) To also ascertain standard deviation value and estimate sample size and reliability coefficient.

(e) Conduct a survey to gather primary data and test hypotheses and research model using statistical packages.

III.2 Research Design

*Exploratory research:* This design (Malhotra, 2010) is defined as “research that focuses on collecting either secondary or primary data and using unstructured formats or informal procedures to interpret them”. Exploratory studies are often used to classify problems or to understand a phenomenon and are not intended to provide conclusive information to determine a course of action. It regularly involves focus-group interviews, in-depth interviews and/or pilot studies. Exploratory studies are most suited when the existing
knowledge and experiences of the researcher are limited and that the scope of the study is to find out as much of the subject as possible, which involves several ways to collect data.

**Descriptive research:** This design is defined as research that uses a set of scientific methods to collect raw data and create data structures that describe the existing characteristics of a defined target population or market structure. Descriptive studies aim to portray, depict or describe certain fields of interest in order to select a course of action. Descriptive studies are most suited when the researcher already possesses knowledge about and experience from the subject, and that the scope of the study is to describe a certain field thoroughly, often only involving one way of collecting data. Descriptive research, also known as statistical research, describes data and characteristics about the population or phenomenon being studied. Descriptive research answers the questions *who, what, where, when and how.*

**Causal research:** This design is defined as “research designed to collect raw data and create data structures and information that will allow the researcher to model cause-and-effect relationships between two or more market (or decision) variables”. Causal studies aim to explain causality between market factors to create a framework for decision makers to understand that “if ... happens, then ... will occur”. Adopting causal studies presumes that the researcher possesses a great deal of knowledge of and experience from the subject studied. It often involves a technique of collecting data that gives precise and accurate information, since only factors linked to the hypothesis want to be studied.

*Causal research design was employed for data collection, analysis and testing of guest loyalty research model used in this research.*
III.3 Sampling Design

Population: The population comprised employees of Information Technology industry at Bengaluru.

Frame: The frame comprised millennial employees of Information Technology industry at Bengaluru. Millennial employees are those employees in the age group of 21 to 32 years.

Sampling Method and Size: Proportionate Stratified Sampling was employed. In statistical surveys, when sub-populations within an overall population vary, it is advantageous to sample each subpopulation (stratum) independently. Stratification (web 3.1) is the process of dividing members of the population into homogeneous subgroups before sampling. The strata should be mutually exclusive: every element in the population must be assigned to only one stratum. The strata should also be collectively exhaustive: no population element can be excluded. Then random or systematic sampling is applied within each stratum. This often improves the representativeness of the sample by reducing sampling error. It can produce a weighted mean that has less variability than the arithmetic mean of a simple random sample of the population.

In the current study, the population (I.T. industry millennial employees) at Bengaluru is not known. In such a case, the standard deviation value needs to be ascertained from the pilot study. The ascertained standard deviation value will then be used for computing the estimated sample size using the formula $n = \sigma^2 \cdot \frac{z^2}{D^2}$ where $n = \text{estimated sample size}; \sigma = \text{standard deviation}; D = \text{level of acceptable error (Level of significance)};$ and $z = \text{standard variate}.$

In order to compute the standard deviation value, the average standard deviation values of the question relating to satisfaction with collaborative learning was calculated and it
was found to be 0.813. The level of significance was taken as 5% level and corresponding z value was 1.96.

The estimated sample size was calculated (Malhotra, 2010) thus:

\[ n = \left( \sigma^2 \cdot Z^2 \right) / D^2 \]

\[ \sigma = 0.813 \text{ (value obtained from Pilot study)} \]
\[ D = 5\% \text{ level of significance} = 0.05 \]
\[ z = \text{Standard variate corresponding with D value} = 1.96 \]

\[ n = (0.813)^2 \cdot (1.96)^2 / (0.05)^2 = 1015.671 = 1016 \text{ employees} \]

The list of I.T. companies in Bengaluru (NASSCOM, 2012) was compiled. It was found that there were three broad categories: (a) I.T. services, (b) BPO, and (c) Internet and eCommerce. Proportionate stratified sampling was employed as presented in Table 3.1.

Table 3.1

<table>
<thead>
<tr>
<th>Stratum</th>
<th>No. of companies</th>
<th>Number of Millennial employees</th>
</tr>
</thead>
<tbody>
<tr>
<td>I.T. Services</td>
<td>169</td>
<td>631</td>
</tr>
<tr>
<td>BPO</td>
<td>79</td>
<td>295</td>
</tr>
<tr>
<td>Internet and eCommerce</td>
<td>24</td>
<td>90</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>272</strong></td>
<td><strong>1016</strong></td>
</tr>
</tbody>
</table>

Source: Compiled by researcher

III.4 Data Collection Design

*Primary Data Collection Method:* Survey method was employed for millennial employees. Unstructured interviews were conducted with HR /managers and system administrators.
**Primary Data Collection Instrument:** Undisguised structured questionnaire was used for survey.

**Secondary Data:** Secondary data was sourced from books, periodicals, reports, and World Wide Web.

### III.5 Pilot Study

A pilot study was undertaken wherein 60 millennial employees were administered a survey instrument (structured undisguised questionnaire). The survey instruments was suitable modified based on their response to the survey besides feedback. Similarly, feedback was also taken from a few academicians as well as I.T. employees. The standard deviation was also computed (0.813) from pilot study data.

### III.6 Reliability

It can be seen from Table 3.2 that the cronbach alpha values for the instrument comprising 60 items is greater than 0.7 thereby indicating good reliability. Values above 0.7 are acceptable as espoused by Nunnally (1978).

It can also be seen that the Cronbach alpha has increased from pilot study to survey thereby indicating very god reliability.

**Table 3.2**

<table>
<thead>
<tr>
<th>Period</th>
<th>Number of Respondents</th>
<th>Number of Items in Research Instrument</th>
<th>Cronbach Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pilot Study</td>
<td>55</td>
<td>66</td>
<td>0.687</td>
</tr>
<tr>
<td>Survey</td>
<td>1016</td>
<td>60</td>
<td>0.719</td>
</tr>
</tbody>
</table>

Source: Primary Data
III.7 **Statistical Tools and Techniques**

Univariate, Bivariate, and Structural Equation Modelling (SEM) analysis was employed using statistical packages (SPSS and AMOS).

III.8 **Conceptual Framework**

The updated D&M IS Success Model appears to be an appropriate framework for application in the social software context, since it is a comprehensive evaluation framework; the proposed associations have been validated by a large number of empirical studies; there are many validated measures for the proposed success dimensions that can be reused; it has been applied to several types of IS; and it is the dominant evaluation framework in IS research (Urbach et al. 2008). Consequently, an adapted version was constructed based on the literature of related domains such as web-based systems and knowledge management, as well as utilising the experiences of the researcher.

The variables used in framework are:

i. System Quality

ii. Information Quality

iii. Satisfaction with Collaborative Learning

iv. Strategic Benefits

v. Informational Benefits

vi. Transactional Benefits

vii. Individual Learning

viii. Team Learning

ix. Organisational Learning
The Collaborative Learning Model is presented in Figure 3.1.

**Figure 3.1**

Collaborative Learning Model

Source: Adapted from (i) Information Systems Success Model proposed by W. DeLone and E. McLean (ii) Wiki and Weblog Success Model proposed by Philip Raeth et al. (iii) Framework linking virtual worlds capabilities and learning in organisation proposed by Jessica Li et al. (iv) Measurement tools of Torkzadeh, G., and Doll, W.J. (v) Measurement tools of Mirani, R., and Lederer, A.L.
III.9 Research Questions and Hypotheses

Research Question 1: Do quality factors have an effect on satisfaction with Collaborative Learning?

H1a: System quality has no effect on satisfaction with collaborative learning.
H1b: Information quality has no effect on satisfaction with collaborative learning.

Research Question 2 (RQ2): Does organisational learning have an effect on benefit variables?

H2a: Organisational learning has no effect on Strategic benefits.
H2b: Organisational learning has no effect on Informational benefits.
H2c: Organisational learning has no effect on Transactional benefits.

Research Question 3 (RQ3): Does satisfaction with collaborative learning have an effect on individuals and groups?

H3a: Satisfaction with collaborative learning has no effect on impact on individual learning.
H3b: Satisfaction with collaborative learning has no effect on impact on team learning.
H3c: Satisfaction with collaborative learning has no effect on impact on organisational learning.

Research Question 4 (RQ4): Does demographic factors have an effect on perception about impact of collaborative learning on individuals, teams and organisations?

H4a1: There is no significant difference between male and female with respect to perception about impact of collaborative learning on individuals.
H4a2: There is no significant difference between male and female with respect to perception
about impact of collaborative learning on teams.

H4a3: There is no significant difference between male and female with respect to perception about impact of collaborative learning on organisation.

H4b1: There is no significant difference between Bachelors and Masters degree holders with respect to perception about impact of collaborative learning on individuals.

H4b2: There is no significant difference between Bachelors and Masters degree holders with respect to perception about impact of collaborative learning on teams.

H4b3: There is no significant difference between Bachelors and Masters degree holders with respect to perception about impact of collaborative learning on organisation.

H4c1: There is no significant difference between business focus with respect to perception about impact of collaborative learning on individuals.

H4c2: There is no significant difference between business focus with respect to perception about impact of collaborative learning on teams.

H4c3: There is no significant difference between business focus with respect to perception about impact of collaborative learning on organisation.

H4d1: There is no significant difference between age with respect to perception about impact of collaborative learning on individuals.

H4d2: There is no significant difference between age with respect to perception about impact of collaborative learning on teams.
H4d3: There is no significant difference between age with respect to perception about impact of collaborative learning on organisation.

*Research Question 5 (RQ5): Does demographic factors have an effect on satisfaction with Collaborative Learning?*

H5a: There is no association between age and satisfaction with Collaborative Learning.

H5b: There is no association between gender and satisfaction with Collaborative Learning.

H5c: There is no association between educational qualification and satisfaction with Collaborative Learning.

### III.10 Limitations of Research

The limitations of the research were:

(a) the study is focused on collaborative learning using online social media in I.T. industry only and other dynamics of human resource management and Knowledge / System management are not under its purview;

(b) There may be changes in the online (virtual) environments, social software tools and social networking in the future which in turn may influence changes in social media platforms, technologies, and learning practices.