Chapter 3
Methodology

3.1. INTRODUCTION

Existing literatures (Larsen and Lewis 2007; Lin et al 2010 and Boxer and Rekettye 2011) revealed that the factors acting as barriers/facilitators for innovation are classified into internal and external factors; the identified factors were specific to manufacturing firms and ignored service based firms. Further, the factors identified were only from firm perspective and there is dearth of literatures noting the factors affecting/facilitating customers in purchasing service innovation and thus this study explores the factors of service innovation from both organization and customer perspective. The scale development process of this study is to develop and validate scaled items for typologies of service innovation such as product and peripheral product, process and peripheral process, organization, strategic and marketing with respect to different service industries. A comparative analysis is done to understand if there is any significant difference between the typologies predicting the customer performance of the firm among industries. The path analysis is performed to estimate the nomological validity and mediation role of corporate reputation between service innovation and WOM. This section deals with the methodology adopted in exploring the internal and external factors of the firm and the customer in adopting and accepting service innovation. Further, the section extends in specifying the methodology used for scale development, validation and estimation of the path coefficients from service innovation to WOM through corporate reputation.

3.2. RESEARCH DESIGN

This study adopted exploratory research design to explore the factors that either act as a barrier or facilitator for service innovation and two research designs such as: (a) Exploratory Research Design and (b) Descriptive Research Design to develop and validate industry specific items to measure typologies of service innovation.
3.2.1. EXPLORATORY RESEARCH DESIGN

Existing literatures to identify the underlying factors or to develop large pool of item to measure a concept used qualitative techniques like literature review, focus group discussion, in-depth interviews and experts’ opinion survey. Thus in this study, qualitative techniques such as: (a) Literature review, (b) Focus group discussions and (c) In-depth interview was used to identify the factors of service innovation and techniques such as: (a) Literature review, (b) Focus group interviews, (c) In-depth interviews, and (d) Experts’ opinion survey were adopted to identify typologies and generate items to measure the typologies of service innovation.

3.2.2. DESCRIPTIVE RESEARCH DESIGN

After generating and purification of codes (scaled items related to typologies of service innovation) through exploratory research design, these codes needed to be tested by collecting data, organizing, tabulating and depicting, where depicting understands the characteristics of the population/inferential statistics. Existing scale development articles (Gerbing and Anderson 1988; Hinkin 1995 and Parasuraman et al 2005) mostly used the survey method to understand the characteristics of the population. Thus, in this study survey method is used to test how customers determine the codes in measuring each typology of service innovation. Two surveys for three different industries were used to perform (a) study-1 for PCA and (b) study-2 for CFA. Once the scale’s unidimensionality is determined, the next step in scale development is examining the nomological validity. This study used variance based PLS–SEM to test the descriptive approach. Two new constructs were included in the study-2 (corporate reputation and WOM) for nomological test.

3.3. INDUSTRY SELECTION AND SAMPLING DESIGN

3.3.1. SERVICE INDUSTRY SELECTION

The service innovation measurement scale was developed individually for three major service industries viz., (a) Higher education (b) Banking and (c) Retailing. These three industries were chosen based on Lovelock et al (2004) classification of service industry.
From the classification, one industry from each cell was taken and items that can measure service innovation specifically to that industry was generated and validated.

The selected industries are:

(a) Intangible action – Things = Banking
(b) Intangible action – Person = Higher education
(c) Tangible action – Things = Retailing
(d) Tangible action – Person = Health care

With respect to healthcare industry, in-depth interviews with patients, care takers and two levels of management ((a) Dean/CEO (b) Doctors/Engineering heads within Multispecialty Hospitals) were conducted. Since approaching individual patients and getting their opinion regarding innovation was difficult and further, patients who were approached were not in a position to give proper level of agreement, this industry was dropped based on experts’ suggestion and the study continued with comparing innovation dimensions with remaining three industries.

3.3.2. SAMPLING DESIGN

In this section, a detailed discussion is given on the sampling design adopted in this study. Since this study used two different research methods such as: (a) qualitative and (b) quantitative, two separate discussions on sampling frame, sampling method, sample unit, sample size are given. At the end, a brief note is given on overcoming sampling error in this study.

3.3.2.1. QUALITATIVE STUDY

The qualitative methods of data collection adopted in this study are (a) Focus group discussion (b) In-depth interview and (c) experts’ opinion survey. The qualitative study was conducted for a period of 5 months from August 2014-April 2015.
3.3.2.1.1. SAMPLING FRAME

The sample for the focus group discussion were the customers of the selected three service industries like students for higher education and those customers who frequently do transactions for banking (visit banks at least once a month) and customers who frequently visit the retail store for their purchase (customers who go for shopping at least twice a week). The sampling frame for In-depth interview was the top level management (founder/resident/vice president/general manager) and middle level manager (dean/head of the department/ chief manager/area manager). The experts for two opinion surveys were chosen based on either subject knowledge or experience in their industry. One academician and two practitioners were selected based on their availability.

3.3.2.1.2. SAMPLING METHOD

Non-Probability purposive sampling technique was used in selecting the sample. The reason for choosing purposive sampling is that the customers who frequently visit the place of service delivery only were selected for focus group discussions. Generally, purposive sampling is needed to be used for qualitative research because there is a need for discussion about the construct from various dimensions and he/she needs a good experience on the service offered by the firm. Similarly, for In-depth interview the same purposive sampling design was adopted because they were selected based on their designation and the position in the hierarchical level of management (3 samples for each industry, one from top management and two from middle management). For experts’ opinion survey, a list of subject experts and industry specific practitioners were approached with a formal invitation and those who came under the criteria and interested to fill the questionnaire was requested to take the survey. The criteria followed in this survey method are that: (a) Academician who is expert in the service industry and (b) Practitioner who has experience for more than 10 years in the service industry.

Existing scale development literatures (Basch 1987; O'Loughlin et al 2004; DeJong and Hertog 2007 and Tong et al 2007) used judgmental/purposive sampling method specifically criterion sampling to select sample for qualitative studies based on certain
criteria and noted that purposive sampling help in getting rich information (Palinkas et al 2015). Thus, this study followed the same method to maximize the quality of outcome.

3.3.2.1.3. STUDY AREA AND SAMPLE UNIT

The study area for two focus group discussions and three in-depth were from the cities like Bangalore, Chennai and Vellore. A panel of 9-12 members for each discussion was included that included both male and female customers who were interested to participate in the discussions. For in-depth interview, a request was made by directly approaching and through mail to 5 colleges, 15 banks (includes both private and public) and 18 retail stores (chain of stores) among which one top level decision maker from each industry and two executives in middle level management were finalized based on their interest and researcher’s convenience. Earlier literatures like Chan (2001), Cook et al (2002), Peterson et al (2003) and Rochlen et al (2009) organized focus group discussions within a single city or two whereas in this study participant unit were from three different locations (two different states) to give their opinion on various service innovation related activities from three different service industries.

For both the experts’ opinion survey, the experts (Table 3.1) were from five different continents (America, Europe, Africa, Asia and Australia). The questionnaire was sent through e-mail where the experts marked their level of agreement and returned the questionnaire through e-mail. Remainder e-mails or telephonic calls were made to each expert twice during the month of March and April 2015. The designation of each expert is given below:
### Table 3.1: Name List of experts approached for two levels of opinion survey

<table>
<thead>
<tr>
<th>Industry</th>
<th>Experts’ opinion-1</th>
<th>Experts’ opinion-2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Higher education</td>
<td>1. Sr. Professor (Private university in USA) 2. President (Private Business School in Bangalore, India) 3. Executive Director, (Private University- Chennai, India) 4. Professor (only suggestions received) (Business School in Belgium)</td>
<td>1. Sr. Professor (Private university in USA) 2. Professor (Medical college in Vellore, India) 3. Sr. Professor (Indian Institute of Technology, India)</td>
</tr>
<tr>
<td>Banking</td>
<td>1. Professor (Private Institute, Rwanda) 2. General Manager (Nationalized Bank - India) 3. Zonal Manager, South (Nationalized bank- India)</td>
<td>1. Vice President, (Private Bank - India) 2. Divisional Manager, (Nationalized Bank - India) 3. Branch Manager (Private bank- South Australia)</td>
</tr>
<tr>
<td>Retail</td>
<td>1. Sr. Professor Management Institute - India) 2. Store Manager (chain of garments store - India) 3. Store Manager (chain of Mobile stores - India)</td>
<td>1. Area Head (XXX Hypermarkets Australia) 2. Head – Office Depot, (Private Retail Ltd- India) 3 Store manager, (Chain of super market –India)</td>
</tr>
</tbody>
</table>

#### 3.3.2.1.4. SAMPLE SIZE

There are many literatures (Creswell 1998; Ritchie et al 2003; Charmaz 2006) suggesting that determining sample size for qualitative study is difficult and it varied from one study to another and further stated that when the researcher observed the saturation limit has reached he/she can conclude the process. For the total of six focus group discussions in this study for three different industries 73 customers participated and discussed on the semi-structured questionnaire. Most of the existing literature (Babin et al 1994; King et al 2000; Parasuraman et al 2005) used two focus group discussions to identify the grounded information about construct. Under each focus group the number of participant varied from 9-12 in this study and this difference in sample size for each group is based on the availability of the customer, further it satisfies the minimum threshold limit for a focus group discussions stated in earlier literatures like Fern (1982), Chan (2001), Carlsen and Glenton (2011).
According to Ritchie et al (2013), it is better to concentrate on how in-depth a researcher conducts an interview rather than the breadth in terms of sample size. Boyce and Neale (2006) stated that if same points are repeated then the saturation point has attained and better to end the interview. Since this study only validated the codes generated through focus group, a minimal sample size of 9 participants (3 internal employees for each industry) was considered and is in line with other existing literature for minimum sample size (Stremersch et al 2001; Alam 2002; Macdonald and Sharp 2003; Shaw et al 2005; Chesbrough and Crowther 2006). The reason for conducting in-depth interview is to know whether there is any difference between customer and the internal employee about the innovative activities and further to add if any codes which was not captured during focus group discussions. For experts’ opinion survey, in total 18 experts opinion was used for dimension reduction (3 for each industry) and relevancy checking (3 for each industry).

Table 3.2: Focus group area and sample size

<table>
<thead>
<tr>
<th>Industry</th>
<th>Sample Area</th>
<th>Procedure</th>
<th>discussions</th>
<th>Sample size</th>
<th>Sample frame</th>
<th>mode</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Higher education</td>
<td>Vellore/ Bangalore/ Chennai</td>
<td>Focus Group</td>
<td>2</td>
<td>9-12</td>
<td>Customer / Decision Maker</td>
<td>Video Record</td>
<td>60-90 minutes</td>
</tr>
<tr>
<td>Banking</td>
<td>Vellore/ Chennai</td>
<td></td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Retail</td>
<td>Chennai/ Bangalore</td>
<td></td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 industries</td>
<td>3 geographical Area</td>
<td>Surveys are good for collecting information about people’s attributes and attitudes but if you need to understand things at a deeper level then it is needed to conduct a focus group</td>
<td>Totall y 6 focus group interviews</td>
<td>Sample size of 73 participants</td>
<td>Innovatio n by firms is based on customer’ s demand and their response to innovatio n actually measures the innovatio n effectiven ess</td>
<td>Helps in capturin g the informat ion of each responde nt (both by voice and by expressi on that help for future analysis</td>
<td>Minim um of 360 to maxim um of 540 minutes of discussion</td>
</tr>
</tbody>
</table>
The Table 3.2 details on the area (location) of the focus group discussions that were conducted, number of discussions for each industry, sample size, sample frame, mode of data collection and duration of the discussions.

The details on sample selection procedure adopted to select the sample unit are presented in Table 3.3. According to Kitzinger (1995), Powell et al (1996) and Greenbaum (1998), a focus group must overcome three major criteria such as major differences in age of the participants in a single discussions both male and female participants must feel comfortable to participate and the discussion group must be free from power discrimination (all sample must be selected with equal cadre). In this study all the three criteria were considered in selecting the participants. Further, Table 3.3 exhibits about the targeted sample unit for each industry and what are the inclusion and execution criteria adopted in selecting the candidate as a participant in the discussions.

### Table 3.3: Sample selection procedure for focus group discussion

<table>
<thead>
<tr>
<th>Industry</th>
<th>Demographic Details</th>
<th>Industry specification</th>
<th>Sample Unit</th>
<th>method</th>
<th>inclusion/exclusion criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Higher education</td>
<td>Classified as Younger age (20-27), middle age (27-35) and elders (35 and above)</td>
<td>Based on convenience and availability, no discrimination on gender entertained</td>
<td>Patient/s care takers were individually approached</td>
<td>college/university</td>
<td>Post graduate students of private university or staff members who are parents of the students studying in that university.</td>
</tr>
<tr>
<td>Banking</td>
<td>Nationalized banks that includes both government and private banks</td>
<td>Customers using service of multiple banks must have used internet banking or mobile banking or ATM service</td>
<td></td>
<td></td>
<td>Exclude those who have only used technology but not visited the bank and vis-à-vis</td>
</tr>
<tr>
<td>Retail</td>
<td>Both food and non-food retailers</td>
<td>Customers/consu mers who visit and do purchasing in supermarket at least once in a week</td>
<td></td>
<td>Advantage on include customers who have done online purchase frequently along with regular purchase</td>
<td></td>
</tr>
</tbody>
</table>
The detail on the area (location) where the in-depth interview was conducted, number of participants under each industry and how the interview was recorded and the duration of the interviews is portrayed in Table 3.4.

**Table 3.4: In-depth interview sampling design**

<table>
<thead>
<tr>
<th>Industry</th>
<th>Sample Area</th>
<th>Procedure</th>
<th>No of participants</th>
<th>Sample size</th>
<th>Sample frame</th>
<th>mode</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Higher education</td>
<td>Vellore/Bangalore/Chennai</td>
<td>In-depth Interview</td>
<td>3</td>
<td>3*3 industries</td>
<td>2 different levels</td>
<td>Video Record</td>
<td>30-45 minutes</td>
</tr>
<tr>
<td>Banking</td>
<td>Vellore/Chennai</td>
<td></td>
<td>3</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Retail</td>
<td>Chennai/Bangalore</td>
<td></td>
<td>3</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 industries</td>
<td>Based on lovelock’s service industry classification</td>
<td>3 geographical Area</td>
<td>3 from each industry</td>
<td>9 members</td>
<td>Zonal Manager (High level) branch Manager (Middle level)</td>
<td>Helps in capturin the information of each responde nt (both by voice and by expression that help for future analysis</td>
<td>Minimum of 1680 to maximu m of 2520 minutes of discussion</td>
</tr>
<tr>
<td></td>
<td>Chennai – Possibility of high Innovation activity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bangalore – comparativ ely Possibility of Mediator innovation activity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Vellore – Town where comparativ ely Possibility of low innovation activity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The method can produce very precise and specific answers as well as an exhaustive and varied knowledge about individual determined experiences, opinions and motives, which the group interview and the quantitative methods cannot encompass.
Each interviewee was selected based on purposive sampling techniques and based on their interest and availability. Table 3.5 gives on the demographic details of the interviewee where prior appointment was fixed with the interviewee the name and their organization name were not given in this study in respect of their request.

**Table 3.5: Demographic details and sampling design – in-depth interview**

<table>
<thead>
<tr>
<th>Industry</th>
<th>Demographic Details</th>
<th>Industry specific</th>
<th>Sample Unit</th>
<th>method</th>
<th>Sample size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Higher education</td>
<td>Classified as Younger age (30-40) , middle age (41-50) and elders (50 and above)</td>
<td>Based on convenience and availability, no discrimination on gender entertained</td>
<td>Interviewed separately and promised that information provided will be used only for research purpose</td>
<td>T.M: President/vice president of an institution who has the power to take decisions. M.M: Dean/ Directors has the power to direct the employees based on T.M decisions</td>
<td>T.M: 1-President/ Vice president M.M: 2– Dean/directors</td>
</tr>
<tr>
<td>Banking</td>
<td>Nationalized banks that includes both government and private banks</td>
<td></td>
<td></td>
<td>Volunteers based on request, interest and availability</td>
<td></td>
</tr>
<tr>
<td>Retail</td>
<td>Supermarket which contains both food and non-food products</td>
<td></td>
<td>T.M: Owner/store head of a supermarket who has the power to take decisions. M.M: Store manager/ supervisor who has the power to direct employees under his control</td>
<td>T.M: 1- Owner/ general manager M.M: 2– store manager/ supervisor</td>
<td></td>
</tr>
</tbody>
</table>

*Note: T.M = Top level management, M.M = Middle level management*
Two different semi-structured questionnaires were framed to conducting the interview with top management and middle management. Similar to focus group, soft laddering technique was followed in in-depth interview. The interview was completely voice recorded since the video recording was not encouraged by the participants.

3.3.2.2. QUANTITATIVE STUDY

The quantitative research design is adopted in this study to validate the codes generated through qualitative study. The need to convert qualitative data to quantitative data is to understand how well these codes represent typologies of service innovation. For example, Auer-Srnka and Koeszegi (2007) in their study described that qualitative data is converted into quantitative for deriving theoretical and generalized results. The approach is termed as “Integrated Design” approach. Most of the scale development articles (Kapferer and Laurent 1985; Abdullah 2006 and Gable et al 2008) followed the integrated design approach to validate the qualitative data.

Two surveys were conducted in this study to examine the reliability and factor loadings (study-1) and unidimensionality and model testing (study-2). In existing literatures two different set of sample respondents were taken to perform PCA and CFA (Clarck and Watson 1995; Noar 2003; Wang et al 2007 and Turker 2009) and further Cadogan et al (1999), Noar (2003), Sin et al (2005) and Turker (2009) suggested that different sample set needed to be used for these two steps and thus in this study two set of customers were approached in different time period. The quantitative study was conducted for a period of 6 months from May 2014 to October 2015.

3.3.2.2.1. SAMPLING FRAME

For the two surveys (for PCA analysis and unidimensionality checking) the samples were the students of higher education industry (engineering, arts and science, management and medical), customers of various banks (private, public and foreign) and finally for retailing customers who purchase/visits various retail stores (departmental stores, specialty stores, factory outlets, super market and hyper market). Customers who do not access the service industry place directly were asked not to participate in this study (online/distance higher education, only online banking/ accessing only ATMs and Online retailing).
3.3.2.2.2. SAMPLING METHOD

For the study-1 (Reliability and Principle Component Analysis) and study-2, (Unidimensionality/CFA analysis and model testing) non-probability convenience sampling method was applied. The major reason is that the study is on developing scale for the whole industry and not specific to any type (like university/college type or public/private bank or departmental/specialty store) where identifying the exact population was not possible. Convenience sampling techniques is the most widely used method in the scale development literatures (Burgoon 1976; Clarck and Watson 1995; Bahia and Nantel 2000; Li et al 2002; Walsh and Beatty 2007) and thus this study adopted the non-probability convenience sampling method to determine the participants of the survey.

3.3.2.2.3. STUDY AREA AND SAMPLE UNIT

For study-1 and study-2, customers from different cities from South Indian States like Karnataka (Bangalore, Mysore), Andhra Pradesh (Chittoor, Kadapa and Tirupati), Tamil Nadu (Chennai, Vellore and Coimbatore) and Pondicherry (Union Territory) participated. These sample units were not only the residence of the respective cities but were from nearby town or visitors from other states who were in these cities for rendering their service (for example in higher education industry-students from various parts of the country stay in these cities for their higher education purpose). The samples for each industry were widely distributed.

*Higher education* - students from engineering, management, medical and arts & science participated. *Banking* – customers of public, private and foreign banks. *Retail* – customers who purchase in departmental store, specialty store, super market, and factory outlets were approached.

Earlier scale development articles conducted the survey in a single place like shopping mall (SERVQUAL scale) and in a College/University (Measuring Transactive Memory Systems in the Field) (Perceived value of service) where as this study’s experts were from around the world and the customers were from different cities in southern part of India.
3.3.2.2.4. SAMPLE SIZE

Study-1: Existing studies (Churchill et al 1974; Burgoon 1976; Saxe and Weitz 1982; Richins and Dawson 1992 and Cadogan et al 1999) in item reduction stage used sample size greater than 150 and noted 200 is adequate to perform reliability and PCA. According to Clarck and Watson (1995), anything between 150 and 200 is reasonable to perform item purification process. The sample size for three different industries is greater than 200 (209 for higher education, 208 for banking and 211 for retail) and thus satisfying the threshold size to perform reliability and PCA.

Study-2: Existing literatures (Clarck and Watson 1995; Liden and Maslyn 1998; Lewis 2003; Turker 2009) suggested the sample size head to be greater than 250 ($n > 250$) to perform CFA in their study. Similarly, Noar (2003) stated that larger sample size is needed for CFA compared to PCA and thus in this study measures were taken to collect sample above the threshold limit of $n > 250$ where the sample size for higher education was 263 students, for banking it was 252 customers and retailing it was 258 customers.

For model testing, the sample size mentioned above for each industry satisfies both item-to-subject ratio (Churchill and Peter 1984), as well as the rule of thumb for SEM analysis, that is the minimum sample size must not be lower than 200 samples (Kline 2005).

3.3.2.3. SAMPLING ERROR

Authors like (Burgoon 1976; Clarck and Watson 1995; Li et al 2002; Lewis 2003) used students sample in their study and noted that the sample is adequate for performing the analysis. In this study both student and non-student sample is used to overcome sampling errors.

Since the study adopted convenience sampling method, the chance for non-response error can be eliminated (the questionnaire is given only to customer who accepted to fill his/her level of agreement). A proper instruction was given to the customer in the questionnaire and special care was taken to remove the unfilled and pattern followed questionnaire to overcome response error.
3.4. SOURCE OF DATA COLLECTION

In order to identify, analyze and find answer for research questions of this research study there need to be source of data. The data source can be a primary data or secondary data or the combination of two that is termed as “dual methodology”. In this study dual methodology is followed since the research gap was identified from the secondary sources and scale development process and model testing was performed based on the primary data collection.

3.4.1. SECONDARY SOURCE

The methodology followed on screening and selection of articles for identification of research problem is discussed in this section. Initially various libraries in India (libraries of various universities like VIT University, IIM-Ahmadabad, IIM-Bangalore, T.A. Pai Management Institute, IIT-Delhi, Pondicherry University and Christ University) were accessed for the collection of articles related to innovation and service innovation. A list of key words was prepared that would relate the researchable concept “Service Innovation” (like Innovation, services, facilitators, barriers, service innovation, factors, product, process, typologies, organization, innovation and performance, dimensions, New Service Development, etc.).

The search was grounded on all possible combinations of the listed keywords. All the available articles related to the keywords were downloaded and segregated based on the relation between them, the grouped articles were given a common title as “barriers and facilitators of innovation”, “service innovation conceptual”, “empirical evaluation of service innovation”, “dimensions of service innovation”, “typologies of service innovation”, “service innovation and performance”, “drivers/antecedents of service innovation”. The articles were collected from various Journal publishers like Sage publications, Scopus Elsevier, Emerald, Business Communication Quarterly, Rout ledge, Taylor & Francis, Oxford University Press, Wiley online library, Inderscience Publications, World Scientific publishers, David Publications, Scientific Research etc. The period of search was the articles published from 1986 to 2013 that can be grouped together for further segregation.
In this search, articles which contained the word “Innovation” that is related to management was considered. A total of 480 articles were downloaded (from 7th October 2012) and on deleting the duplication a final list got reduced to 241. Out of the 241 articles, those articles related factors affecting innovation were 53 articles and article related to typologies, dimensions, service innovation measurement, empirical studies related to service innovation and outcome variables, conceptual studies related to measurement of service innovation were 84 articles. Tranfield et al (2003) stated that a systematic review is needed to be done by more than one reviewer, which was followed in this study where the articles were reviewed thoroughly by the authors to find the gap in the literatures. The procedure is pictorially explained in Fig 3.1.

Fig 3.1: Literature Review Process flow

Note: “The number of articles given above includes only those articles that was reviewed for problem identification and does not include the articles referred for scale development and model testing”.

The retrieved 137 articles after elimination are further classified under two topics:

1. Articles related to antecedents/factors/barriers/facilitators of innovation in service industries
2. Measurement and outcomes of service innovation

Finally full paper review was done with 84 articles related to measurement and outcome of service innovation and 53 articles were related to antecedents or factors as barriers/facilitators of innovation.

3.4.2. PRIMARY SOURCE

The primary sources of data collection in this study were the customers, firms’ decision makers and experts in the service industries. For scale development process, there need to be a qualitative study where items (codes in this case) can be generated. Thus focus group discussion and in-depth interview was conducted with customers and firms’ management decision makers thereby list of codes were generated and verified with the help of experts. These sources of collection are recorded using an audio/video recorder.

Two questionnaires have used in getting experts’ opinion and the questionnaire was e-mailed to the experts and after couple of remainders the expert replied back either through e-mail or through courier services. The next process is checking reliability and validity of the scale and thus the codes were written as items and a questionnaire was designed to get the level of agreement of the customers on innovative activities performed by the service industry. To check the unidimensionality and model testing a second set of questionnaire was designed for all the three industries where the reply was given by the customers who frequently use the services offered by the service industry.

The questionnaire was administered in colleges/universities, customer visiting banks for their transactions, Malls, near specialty stores and with private firms’ employees since they are the customer of either a bank/retail store.
3.5. METHOD OF DATA COLLECTION

This section discussed on the method and mode of collecting both qualitative and quantitative data. Primarily codes were generated through: (a) Focus group and (b) In-depth interview and cleaned through (c) Experts’ opinion and validated though (d) Reliability and PCA and (e) Unidimensionality. Finally, model was tested by including two new endogenous variables.

3.5.1. QUALITATIVE STUDY

3.5.1.1. FOCUS GROUP DISCUSSIONS

The researcher acted as a moderator and the full discussion was recorded through a video recorder. Specific seating arrangement was practiced to have a clear view of the participants and to have voice clarity. Initially, the participants were given information on, for what and why this discussion is conducted along with instructions on how to contribute in discussions. They were clearly told that the session would be recorded and used only for research purpose. The moderator initiated the discussion later followed “soft laddering” technique to get maximum information on each topics given in a semi-structured questionnaire. The discussion ended when the moderator felt that the points discussed are repeated and no new codes are emerging.

3.5.1.2. IN-DEPTH INTERVIEW

Three in-depth interviews were conducted for each industry (such as higher education, banking and retailing). The researcher of this study acted as an interviewer and the interview followed laddering technique and similar to focus group when the points were repeated the interview was ended. Based on the request of the interviewee the name of the service firm is not mentioned and the interview was only audio recorded.

3.5.1.3. EXPERTS’ OPINION

The experts were given the definition for each typology and were asked to place each item under its specific typology two of the three experts’ suggestion were considered. Addition, removal and reframing of items were done based on experts’ opinion. In the
second opinion survey, the codes were written as an item and placed under each typology and given to three new experts along with the definition of the typology to check the relevancy of the items.

3.5.2. QUANTITATIVE STUDY

Study 1 - PCA: The quantitative approach used survey method where the questionnaire for higher education was given to 264 students where 232 replied their level of agreement and after removing the unfilled or questionnaire with pattern following finally 209 questionnaires were taken for PCA analysis. Similarly, for banking 246 questionnaires were distributed to customers who frequently perform transaction by visiting the banks/use innovative methods for transaction adopted by bank. 230 questionnaires were retuned among which 208 forms were taken to perform the analysis. Finally for retail industry 266 questionnaires were distributed in which 236 retuned and finally 211 forms were fit to perform analysis. The retail industry questionnaires were given to those customers who frequently visit any retail store either for purchase/window shopping (bricks and mortar) where online retailing was not considered in this study.

Study 2 - CFA: Based on the threshold specified 300 questionnaire were distributed for each industry in which 268 for higher education, 262 for banking and 270 for retailing was received and finally 263 for higher education, 252 for banking and 258 for retailing was considered to perform CFA analysis. Student sample was taken for higher education industry since they are the customers to whom the service is rendered, related to banking and retailing industry a proper care was taken to make majority of the sample are actual customers who visit and purchase the service frequently.

3.6. INSTRUMENT DESIGN

This study followed the standard scale development procedure that involves: (a) Item generation (b) Item purification (c) Item validation through reliability and PCA (d) Unidimensionality test and (e) Nomological validity (Loevinger 1957; Churchill 1979; Gerbing and Anderson 1988; Comrey 1988; Anastasi 1988; Bagozzi et al 1991; Clark and Watson 1995; Smith and McCarthy 1995; Netemeyer et al 1995; DeVellis 2012). It was noted that most of the existing scale development articles (Parasuraman et al 1988;
Green et al 1993; Liden and Maslyn 1998; Eastman et al 1999; Petrick 2002) used Likert 5 point/7 point rating type scale. With the Indian context this study developed the measurement scales with 5 point Likert rating method.

3.6.1. ITEM GENERATION

With the help of a semi-structured questionnaire, for both focus group and in-depth interview, the moderator (researcher acted as a moderator) in this study laddered to get 161 codes for higher education, 205 for banking and 174 for retailing in focus group. Further through in-depth interview 124 codes were obtained for higher education, 119 for banking and 155 for retailing. On deleting the duplication and unrelated codes the final set of codes generated were 92 for higher education 120 for banking and 134 for retailing.

3.6.2. ITEM PURIFICATION THROUGH EXPERTS’ OPINION SURVEY

The first step adopted in this study for item purification is experts’ opinion survey method (Hudak et al 1996; Hardesty and Bearden 2004 and Worthington and Whittaker 2006). Two level of experts’ opinion was conducted in this study and they are: (1) Moving codes to specific typology and (2) Relevancy checking.

A questionnaire was prepared and the experts were given the definition for 12 typologies of service innovation and were asked to move each code to its specific typology based on the definition. Once the codes are moved to specific typology a new questionnaire was developed for relevancy checking where each typology contained its respective codes. The questionnaire contained the introduction, need for the study, instructions and operational definitions. Finally, similar to opinion-1 in opinion-2 also a separate table was given to add any new codes if it was not captures in the questionnaire. Based on the experts’ suggestions codes were removed/added/moved to different typology. The codes were then written into items based on item writing rules specified by various authors (Churchill 1979; Gerbing and Anderson 1988; Haladya and Downing 1989; Clark and Watson 1995) and finally these items were proofread and taken for PCA analysis.
In this stage, the questionnaire containing items to measure service innovation typologies were given to the customer of three industries viz., Higher education, Banking and Retailing.

The questionnaire contained three parts,

(a) Introduction Part

The introduction part contained the title of the study, purpose of this study, instruction to the respondents and guarantee of confidentiality.

(b) Classification Questions

Socio–demographic details of the respondents (to make the customer focus more on target questions the classification questions were placed at the end of the questionnaire)

(c) Target Questions

Contained seven typologies and its respective items to measure service innovation

To make a count on number of questionnaires distributed and returned back, each questionnaire was given a serial number along with a code at the top to specify the industry to which the questionnaire belongs (E – for Higher education, B for Banking and R for Retailing). At the end a note of gratitude was written to thank them for their contribution.

The questionnaire was given to the customers of that service industry who frequently purchase and/or use the service.
3.6.4. STUDY-2 INSTRUMENT DEVELOPMENT FOR UNIDIMENTIONALITY (CFA) AND MODEL TESTING

A new set of items was received after the deletion of items which loaded low in the PCA analysis. Based on the set of items, a new questionnaire was developed to perform unidimensionality test.

Similar to study-1 questionnaire, this questionnaire contained three parts:

(a) Introduction Part
   The introduction part contained the title of the study, purpose of this study, instruction to the respondents and guarantee of confidentiality.

(b) Classification Questions
   Socio-demographic details of the respondents (to make the customer focus more on target questions the classification questions were placed at the end of the questionnaire). Additional socio-demographic questions were added compared to study-1 questionnaire to capture more information about the respondents to understand the difference among the customers based on certain criteria.

(c) Target Questions
   Seven typologies to measure service innovation and its respective items. In addition, two new constructs were added for model testing. The two new construct were (a) corporate reputation and (b) WOM (a detailed explanation is given in chapter 2 for the reason on choosing these construct as a mediator and as an outcome variable).

The mediator construct corporate reputation was a unidimensional construct that contained 7 items to measure and was adopted from the study done by Walsh et al (2006). Similarly the construct WOM was also a unidimensional construct that contained 7 items to measure was adopted from a study by Walker (2001).
To make a count on number of questionnaires distributed and returned back, once again the study followed the same method of given a serial number along with a code at the top to specify the industry to which the questionnaire belongs (E for higher education, B for banking and R for retailing). At the end, a note of gratitude was written to thank them for their contribution. According to Burgoon (1976) in order to retain a typology/dimension it must at least have two items loaded on them. Thus, in the final set of items all the typology for each industry had more than two items loaded thereby satisfying the condition.

3.7. DATA ANALYSIS TOOLS

There are two approached adopted in this study (a) qualitative approach and (b) quantitative approach. In qualitative approach, text analysis was performed using R-studio and NVIVO software tools to identify the research gap from the literature. Mendeley software tool (Meta search engine) was used for literatures review process for managing and sharing of research articles.

For quantitative approach, the obtained data through questionnaire was coded and cleaned with SPSS tool package for further analysis. Multiple cleaning process such as (a) replacing missing values by calculating nearby means (b) removing out layers (verifying through box plot in software tool) (3) removing the sample if there are multiple unfilled level of agreements/followed any pattern.

In order to check the reliability of the developed instrument, to validate the instrument through factor loadings (PCA) and one way ANOVA is used to compare means of each typology among three different service industries with SPSS package V16.0. Gerbing and Anderson (1988) stated that traditionally the development and evaluation of measurement scales relied on coefficient alpha and/or item-total correlations and/or PCA.

The set of measurement items for each typology to measure service innovation for three industries was developed by performing two major analyses namely, (a) CFA analysis for the measurement model and (b) path analysis for structural model to determine nomological validity, mediation and comparative study. SEM was adopted to perform CFA analysis and path analysis. The reason for adopting SEM was to perform multiple
regression analysis at a same time that is it can consider several equations simultaneously (predictor can be a criterion in the same equation). The major advantage of SEM is that it can deal with latent variables, which are connected with observed variable and termed as measurement model.

Thus, this study adopted software tool by name LISREL 8.2 to test the unidimensionality of the measurement model. The tool helps to confirm the measurement model in this study that is items developed to measure service innovation typology do measure the typology. The output is verified based on factor loadings and model fit indices. The major model fit indices used by majority of literatures are:

(a) Absolute fit measures (Chi-square, RMSEA and GFI)
(b) Incremental fit measures (TLI and CFI)
(c) Parsimonious fit measures (AGFI and Chi-square/degrees of freedom).

These fit indices in this study helped in items reduction and attaining unidimensionality. Those items that fail to meet the threshold limit were removed to satisfy the fitness of the measurement model.

On the other hand, PLS-SEM was used to test the structural model. The PLS-SEM helps to maximize the variance explained by independent variables on one or more dependant variable. This approach helps to attain context validity by giving composite reliability values, Cronbach alpha values, convergent validity by giving AVE values and factor loadings, discriminant validity by performing cross-loadings and nomological validity by calculating path coefficients and R² value. To determine the entire validity tests, Visual PLS 2 software tool was used to perform PLS-SEM. Further, the path coefficient values obtained through PLS SEM helped to calculate mediation effect of corporate reputation between service innovation and WOM through “Preacher and Hayes Bootstrapping Method”, “Sobel’s Aroian test for mediation”, and “Calculation of Effect Size”.
3.8. SERVICE INNOVATION TYPOLOGIES AND ITS SUB TYPOLOGIES

This study initially identified 12 typologies measuring service innovation and based on experts’ suggestion. Finally, seven major typologies emerged to measure service innovation (product innovation, peripheral product innovation, process innovation, peripheral process innovation, organization innovation, strategic innovation and marketing innovation). The definitions for all the 12 typologies are given in Table 3.6.

Table 3.6: Definition for typologies and sub-typologies of service innovation

<table>
<thead>
<tr>
<th>Typology</th>
<th>Sub-Typology</th>
<th>Defined as</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product Innovation</td>
<td>Major New Service Product</td>
<td>New core service for markets that have not been previously defined. These services usually include both new service characteristics and radial new concepts.</td>
</tr>
<tr>
<td></td>
<td>Service Product Line Extension</td>
<td>Additions by the firms to their current service lines. Line extensions occur when a company introduces additional items in the same service category under the same brand name.</td>
</tr>
<tr>
<td></td>
<td>Service Product Improvement</td>
<td>Service Improvements are the most common type of innovation. They involve changes in the performance of the current core service or line extended services.</td>
</tr>
<tr>
<td></td>
<td>Supplementary Service-Product</td>
<td>Adding new facilities or enhancing service elements to an existing core services or by significantly improving an existing supplementary services.</td>
</tr>
<tr>
<td>Process Innovation</td>
<td>Major New Service Process</td>
<td>Using new processes to deliver existing core services in new ways with additional benefits.</td>
</tr>
<tr>
<td></td>
<td>Service Process Line Extension</td>
<td>Less innovative than process innovation but often represent distinctive new ways of delivering existing services so as to either offer more convenience and different experience for existing customers or attract new customers.</td>
</tr>
<tr>
<td></td>
<td>Service Process Improvement</td>
<td>Changes in the performance of the current processes or line extended processes.</td>
</tr>
<tr>
<td></td>
<td>Supplementary Service-Process</td>
<td>Adding new facilities or enhancing service elements to an existing service processes or by significantly improving an existing service process.</td>
</tr>
<tr>
<td>Organizational Innovation</td>
<td>Organization</td>
<td>Organizational innovation involves introducing a new organizational method in the firms’ business practices, workplace organization or external relations.</td>
</tr>
<tr>
<td></td>
<td>Style change</td>
<td>Typically there is no change in either processes or performance. However style changes are often visible, creating excitement which may motivate employees.</td>
</tr>
</tbody>
</table>

Contd.,
Strategic Innovation

Strategic Innovation is a multi-functional approach that brings together all the creative assets, capabilities and disciplines of the organization to work together on producing breakthrough ideas and driving new business growth. Strategic innovation occurs when a company identifies gaps in the industry positioning map, decides to fill them, and the gaps grow to become the new mass market.

Marketing Innovation

Marketing innovation involves a new marketing method involving significant changes in service promotion or pricing.

*Source: Christopher Lovelock et al (2004) and OEDC innovation definitions*

### 3.9. ETHICAL CONSIDERATION

Thus in this study, all the process was carefully undertaken to fulfill ethical values. A request letters was sent to authors whose study was not available on free access where the authors replied with their full paper and permitted to use their findings to support this study. During focus group discussions, it was noted that there was no discrimination in age, gender and power among the participants. Further, during in-depth interviews a formal request was sent to the purposively selected experts in the field and based on their convenience the interview was conducted. The questions were designed in such a way that it would not create restlessness among the respondents to reply. Further an assurance was given to participants in both the qualitative study that their name would not be printed in any forms without their approval and secondly, assurance was given on the video/audio recording that it would be used only for this research study. With respect to experts’ opinion survey 1 and 2, similar kind of assurance was given specially to the practitioners so that they would give unbiased responses. With respect to quantitative study, all the questionnaire were with a covering letter explaining the need of this survey and instructions were given both in experts’ opinion survey and study survey (given to customers to note their level of agreement) on how to fill the questionnaire (see Appendix VI for questionnaires). Special care was taken to overcome gender, age, occupation and income level bias. Since it was a convenience sampling method adopted for this study only those customers who were ready to fill the form were approached to get their level of agreement.