Chapter 3

Research Methodology

This chapter describes the methods and procedures used to identify existing, common business model design elements and their relationships with reference to the external environment, identify and evaluate Critical Success Factors (CSF's), conceptualize and create an empirical generic / reference business model reflecting their relationship and effect on industry performance.

It describes how this generic / reference business model forms the basis to further compare the effect of business model designs on business performance of firms. It also describes the methods used to collect data for use in answering the research questions and testing the research hypotheses. Finally, the chapter ends with an overview of the data analysis methodologies used to test the research hypotheses.

3.1. Research Gap

On completion of literature review, it became evident that there was a dearth of studies which look into the effect of business models on business performance in the Life Sciences Business Process Outsourcing (BPO) Industry domain. There was also no evidence of research which have studied the effect of business models on business performance in the Indian Life Sciences Business Process Outsourcing (BPO) Industry context.

India being a destination for BPO Services specifically in the Life Sciences Domain (based on contribution of services to the GDP) there exists a huge gap in our understanding of the effects of business models on business performance. There is also a dire need on the availability of a industry specific generic business model framework which can predict business performance.

To fill the existing knowledge gap and satisfy this unmet need, this research study focuses on understanding the effects of business models on business performance in the Life Sciences Business Process Outsourcing (BPO) Industry domain and construct a industry specific generic business model framework which can predict business performance in this specific business domain.
Based on the reviewed literature, it becomes evident that to understand and study the effect of business model on business performance in any industry we need to accomplish the following:

- Identify existing business models
- Identify elements constituting these business models
- Categorise these elements into themes
- Determine the relationship between these elements and hence the themes
- Create a generic business model or theme which is specific to the industry under study
- Evaluate this model using real life examples/samples

At the end of this process we would have generated a robust industry specific generic business model framework which can be utilised to study the effect of business models on business performance/success.

### 3.2. Research objectives

As previously indicated, very few rigorous empirical studies have been conducted to investigate how business models affect business performance and success, and how business model related elemental variables (Critical Success Factors - CSF) influence this effect. Hence, the primary purpose of this study is:

- To increase understanding of how business models can be constructed through the examination of its underlying processes
- To increase understanding of the relationship between business models and business performance/success by taking into account elemental variables (Critical Success Factors - CSF) associated with the business model

By developing and empirically testing a working theory, this research seeks to provide insight for Life Sciences BPO industry business models, thus, improving overall effectiveness of business models and their impact on business performance/success.

To achieve this purpose, the following major research objectives are addressed:
• Identify, constituent elemental critical success factors of business models in the Life Sciences BPO industry using survey questionnaire instrument through multiple pilot studies.

• Identify a set of themes to classify the above identified constituent elemental critical success factors of business models and operationalize them.

• Propose or construct a generic business model framework based on the identified constituent elemental critical success factors and their relationships affecting business performance.

• Identify a business performance and success outcome measure that relates to organizational performance.

• Using the constructed generic business model framework identify and compare business model relationship to business performance of identified Indian Life Sciences BPO organizations.

• Test association of the relationship between proposed business performance values and factual business performance and success values obtained from the above objective.

Accomplishing these research objectives is expected to contribute both to practitioners, by providing guidelines for creating business models which will enhance business performance/success; and to academic research by providing insight, and direction for future research.

Since, research has the ultimate of developing an organized body of scientific knowledge, this research study is being undertaken in order to gain new knowledge and add to existing knowledge through a documented, data-driven approach to the development of scientific knowledge.

3.3. Research Questions

Given the pervasive reference to business models in the industry and the dearth of rigorous study on the subject, the researcher believes that research on business models and how these affect and enable organizations to achieve improved performance results under different conditions can contribute greatly to the current body of knowledge. Although this research seeks to represent the proof of causal relationships
between business models and business performance/success, it does not attempt to answer deeper questions about why the performance implications exist.

Based on the above, one primary research question to be addressed in this research is:

- How does business model design affect business performance in the Life Sciences BPO domain?

This primary research question in turn gets translated into four sub-questions as follows:

- What are the existing business model design elements in the Indian BPO context?
- How can business models be described and represented in order to conceptualize, define and build reference or generic business model framework?
- Can this generic business model framework be used to identify and compare existing business models OR Can an efficient business model design be determined by comparing models of different Indian BPO firms?
- How can a specific business model with value constellations be built for the BPO domain?

### 3.4. Research Hypotheses

To achieve the objectives of this research, the following initial hypotheses were investigated. These hypotheses were developed based on the requirement of the study in answering the research question/s.

- Null hypothesis (H₀) : An organization’s business performance is independent of its business model.
- Alternate hypothesis (Hₐ) : An organization’s business performance depends on its business model.

Due to dearth of research studies, the research was designed in such a way that on identifying elemental CSF’s, themes and exposing the respondent data set to exploratory factorial analysis, working hypothesis could be formulated depending on the factor solution obtained after EFA. Based on the obtained four factor solution (post EFA), we arrived at the following set of working hypothesis (Null(H₀ₙ) and Alternate (Hₐₙ) where n = 1, 2, …, x):

44
• $H_{01}$ : An organizations’ business performance is independent of “Customer Factor”.
• $H_{A1}$ : An organizations’ business performance depends on its “Customer Factor”.
• $H_{02}$ : An organizations’ business performance is independent of “Organization Factor”.
• $H_{A2}$ : An organizations’ business performance depends on its “Organization Factor”.
• $H_{03}$ : An organizations’ business performance is independent of “Industry/Sectoral Factor”.
• $H_{A3}$ : An organizations’ business performance depends on its “Industry/Sectoral Factor”.
• $H_{04}$ : An organizations’ business performance is independent of “Environmental Factor”.
• $H_{A4}$ : An organizations’ business performance depends on its “Environmental Factor”.

Since the study was designed to compare two rank variables to measure the strength of association between business models and business performance, or lack of it, the following working hypothesis was also tested.

• $H_{05}$ : There is no association between model based ranks and RTS based ranks of an Indian Life Sciences BPO organization.
• $H_{A5}$ : There is association between model based ranks and RTS based ranks of an Indian Life Sciences BPO organization.

3.5. Research Design

There is limited research that have studied the relationship between business models and business performance and success, especially in the Life Sciences BPO industry domain. Based on this, the study was designed to start with an initial limited exploratory design (LED) phase and then move into the conclusive research design (CRD) phase. The empirical investigation through survey research was intended to improve generalizability of the analysis of the interrelationship between business models and its impact on business performance.

The initial, limited exploratory research design (LED) phase was adopted due to the need for rich data that could facilitate the generation of theoretical categories that could not be derived satisfactorily from existing data (Locke, 2001). In the LED phase secondary data was utilized initially to identify at least some of the elemental CSF’s. Since this identified very few elemental CSF’s, it was followed with collection of primary data through five pilot studies.
Data from this stage was used to identify elemental critical success factors (CSF) of business models in this domain and categorize them into themes. This formed the basis for creating the survey instrument which was used in the next stage of the study (large scale research survey). The final survey instrument with 46 elemental CSF’s and 8 themes was arrived at after content validity and reliability analysis.

In the CRD phase, the causal research design was utilized to collect primary data through a large-scale research survey. Data was collected using a web-based survey questionnaire response system through organizational informants who participate in their organization’s outsourcing initiative in various roles. Based on data obtained through this large scale survey, the 8 themes with their constituent elemental CSF’s were reduced using exploratory factor analysis (EFA) to yield a more manageable four factor solution based on the relationships between these elemental CSF’s.

The study was also designed to collect business performance metric data in the form of returns to shareholders (RTS) which was calculated from organization specific financial data collected using secondary sources. This business performance data and the four factor solution were used to construct a generic business model framework for Life Sciences BPO organizations.

The last and final Comparative study phase of this study was designed so that, primary data was collected through a limited survey using a set of respondents (working in Indian BPO/CRO Organizations) who were different from those who took part in the large scale research survey study.

Based on total respondent scores, arrived at after applying the individual four factor loading scores to individual survey instrument response, different business models were identified. In summary, 33 business models were identified and organizations were ranked on the total respondent score. Applying the generic business model framework on these 33 identified business models individually, yielded an organization specific business performance metric (predicted RTS). This organization specific predicted RTS value was used to compare the participating Indian Life Sciences BPO organizations. On completion of this phase a total of 21 unique business models were identified.

In the final step, organization specific financial data from secondary sources which quantifies the identified business performance measure RTS were collected for the
above specified Indian companies. The predicted RTS and the actual RTS were also analyzed for any association to determine the robustness of the proposed generic business model framework.

The study also used the quantitative method of analysis based on numerical scoring and grading. To arrive at an appropriate survey instrument and create the generic business model framework with its individual elements a mix of both qualitative and quantitative methodologies were used. To test research hypotheses, related statistical tests for hypothesis testing were applied to appropriate data.

In addition, this research was based on the following assumptions:

- Business models can be developed as a set of related constructs (elemental critical success factors) based on them being identified from the literature or through small pilot studies.
- Field-based survey research is preferable, for studying use of Business models compared to an artificial environment (e.g., lab experiments) in terms of generalizability.
- The sample of companies that participated in the research was a good representation of those adopting and using Life Sciences BPO and the organizational informants had adequate knowledge in the sense that they were practitioners of the process.

3.6. Study Approach

The following Table gives an overview of the approach followed in this study to attain the indicated objective.

Table 3.1 - Overview of study approach

<table>
<thead>
<tr>
<th>Sl.</th>
<th>Approaches</th>
<th>Objective / Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Literature review</td>
<td>• Identify area of research</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Understand existing business models and elemental critical success factors affecting business performance</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Identify knowledge gaps and existing needs in the Life Sciences BPO Industry domain – Study purpose</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Determine research design and study approach</td>
</tr>
<tr>
<td>2.</td>
<td>Pilot Studies (Five)</td>
<td>• Identify existing business models</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Identify elemental critical success factors constituting these business models</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Categorizing existing elemental critical success factors into themes</td>
</tr>
<tr>
<td>Sl.</td>
<td>Approaches</td>
<td>Objective / Outcome</td>
</tr>
<tr>
<td>-----</td>
<td>----------------------------</td>
<td>--------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Understand relationships between elemental critical success factors and business performance</td>
</tr>
</tbody>
</table>
| 3.  | Survey Instrument development | • Development of Critical Success Factors  
|     |                            | • Content Validity Assessment and Reliability Study  
|     |                            | • Creation of a “Reliable” Survey Instrument                                          |
| 4.  | Field survey (sample survey) | • Identification of population (theoretical and accessible populations), sampling frame (listing of accessible population from which the sample is drawn), sample (group of people selected for the study)  
|     |                            | • Purposeful, systematic and rigorous collection of data for data analysis and interpretation |
| 5.  | Exploratory data analysis   | • Confirm existence of identified elemental critical success factors  
|     |                            | • Confirm existence of business models  
|     |                            | • Identify themes for categorizing existing elemental critical success factors  
|     |                            | • Identify relationships between elemental critical success factors and business performance |
| 6.  | Confirmatory data analysis  | • Confirm themes for categorizing existing elemental critical success factors  
|     |                            | • Confirm relationships between elemental critical success factors and business performance  
|     |                            | • Construct a industry specific generic business model framework                     |
| 7.  | Comparative Study           | • Create a comparative list of organizations based on the industry specific generic business model framework  
|     |                            | • Create a comparative list of organizations based on the business performance metric (RTS)  
|     |                            | • Evaluate both the lists for association  
|     |                            | • Confirm industry specific generic business model framework  
|     |                            | • Compare different business models of Indian Life Sciences BPO organizations based on their business performance |

3.7. Population and Sample

The primary objective of this research is to evaluate the impact of Life Sciences BPO industry Business Models on business performance; therefore, outsourcing professionals from Business Outsourcing functions (Customers as well as service providers) at the organizational level are appropriate subjects. These participants are assumed to have direct experience with business process outsourcing and possess knowledge about their organization and service provider/customer performance.

It was determined that the target respondents included in this research must satisfy any one of the following criteria:

a) should be employed in either an independent organization or a strategic business unit within a multiple business organization that outsources business processes
b) should be employed in either an independent organization or a strategic business unit within a multiple business organization that provides outsourced business process services to outsourcing customers

c) should be employed in either an independent organization or a strategic business unit within a multiple business organization in the Life Sciences industry – Pharmaceuticals, Biotechnology, Generics manufacturing, Clinical Research organization, IT services provider to the life sciences industry or BPO service provider to the life sciences industry that outsources business processes.

The criteria were defined to ensure that respondents have the best knowledge about the Life Science outsourcing industry and have direct experience with the outsourcing function and hence were capable of providing useful inputs. Further, as this research aimed to develop a measurement instrument that could be applied in to either private or public organizations, no restriction in types of organizations were applied.

Since there is no readily available database for this population, the purposive sampling frame was originally set to Life Sciences outsourcing organizations across all geographies. Considering the sample size required, costs and disadvantages of postal survey, it was decided that an electronic survey would be more appropriate, given that the target respondents would all have internet access.

The e-mail addresses of the respondents who satisfied the indicated criteria were identified online primarily on the LinkedIn Professional Group “Life Sciences Outsourcing” through the researcher’s networks and several outsourcing online networks in LinkedIn to provide the required sampling frames for this study. All the professional groups selected in this study to complete the sample frame had specific entry gate criteria. For example, the LinkedIn group Life Sciences Outsourcing is a regulated group which has an entry gate criterion in the sense that this is an exclusive group for professionals in the outsourcing industry and has around 1495 members.

In summary, the final samples comprised of organizations worldwide and included members of online forums and members of researcher’s networks who have the best available knowledge of the life science outsourcing industry and have direct experience with the outsourcing function in the life sciences industry.
3.7.1. Mechanics of Questionnaire Administration

Data was collected by a web-based survey administered to the target participants, similar to the pilot study using the paid version of the online survey tool - SurveyMonkey® (http://www.surveymonkey.com). Web-based surveys are becoming increasingly prevalent in survey research. They are less costly, more convenient, and provide more control than postal surveys (Couper, 2000).

A questionnaire identical in terms of content was adapted and created on the SurveyMonkey® website from the CSF’s and Source of CSF developed and exhibited under Table 3-9. The survey was organized into nine sections with the first section, serving as a screening section. This section asked for general information and demographic information of the respondents. The next eight sections focused on the study variables. The participants were required to answer all survey questions. The copy of the questionnaire is provided in Annexure III. Considering the time required to complete the questionnaire (30–45 minutes) and to facilitate survey completion, the respondents were allowed to save their survey responses by specifying the e-mail address to which a continue link could be sent.

The survey was administered in six steps by following the slightly modified methodology defined by Dillman (2000): pre-notification, initial mailing, first follow-up, second follow-up, third follow-up and a fourth and final follow-up through e-mails. In the first, pre-notification/solicitation step, a personalized e-mail request for participation in the survey was sent to target respondents, which informed them about the nature and purpose of the research and requested their participation in the survey. The pre-notification included communication about survey purpose, description, source of respondents’ contact information, researcher’s contact information, a statement about confidentiality of the respondent’s response, and as an incentive an option to receive the research summary was also communicated (Dillman, 2000; Simsek, Veiga, and Lubatkin, 2005).

Next, an e-mail message with hyperlink to the online questionnaire was sent to the identified respondents. Respondents were also asked to forward the invitation to the most suitable person within their organization in case they were not familiar with outsourcing. The first e-mail reminder was sent out three weeks after the invitation. The next two follow-up emails were sent two and three weeks apart respectively, after
the first e-mail. The final remainder e-mail was sent to respondents three weeks after the third e-mail. Details of the e-mails sent are enclosed under Annexure IV.

3.8. Data Collection Procedure

3.8.1. Elemental CSF Study Data Collection

Using the described screening process (Section 3.7 Population and Sample), around 2857 potential respondents were identified and online solicitation to participate in the survey were sent. The online survey preparation and conduct was initiated on November 08, 2010 and completed on the 21st of March 2011.

In total, 2857 invitations were sent out to a much focused sample frame and at the end of the survey window, 347 responses were submitted/received. The response rate was 12.15% considering that some of the respondents preferred not to participate or would not have received the e-mail itself due to an active/enabled spam filter in their e-mail program. This response rate for this survey is low due to the fact that the criteria for selecting the sample frame was rigid.

The low response rate was anticipated primarily due to the “survey completion estimated time” which was longer than the recommended threshold of 20 minutes found in the literature and since each study theme (Source of CSF’s) was constituted by multiple CSF’s (elements). This was a risk which was taken to ensure increased validity of the survey instrument over the potential risk of incurring a lower response rate.

Roughly around 80% of the non-usable submitted surveys were incomplete in responses which sheds light to the fact that the scarce time available for these types of tasks among the respondents compared to the estimated survey completion time might have driven away many potential respondents. Also a number of people may not have participated due to lack of sufficient experience or involvement with the Life Sciences outsourcing process itself.

In summary 243 (71.67%) out of 347 received survey responses were considered for the analysis. This data was then analyzed using exploratory data analysis (qualitative) techniques and exploratory factor analysis to arrive at a four factor solution. This four factor solution identifies elemental critical success factors (CSF’s), corresponding
themes of these CSF's and their relationships which influence or affect business performance of Life Sciences BPO organizations.

3.8.2. Data Preparation

On closure of the survey window and completion of the data collection process, survey data was downloaded from the survey website in Microsoft Excel format and combined into a single spreadsheet. The data set was then screened for partial responses, duplicates, eligibility criteria and examined for systematic bias and patterns of missing data. The missing value codes for blank responses were given a value of “000” and added to the data analysis file. Then, each individual response was examined to assess whether the level of missing data in a primary study variable was high. On observing a blank value in this part of the questionnaire, the response was disqualified and hence was excluded from the final analysis data set. Only responses having all their fields completed were considered for the final analysis data set.

As a result of this process, 104 responses were dropped from the final analysis. On inspection of these non-useable responses, a majority of 83 responses showed that they were partial responses to the actual survey questions. 12 of the submitted responses were disqualified since the respondents did not belong to the Life Sciences industry. Each individual response was also examined for survey fatigue, (Farris, 2006) i.e., where respondents become tired and responded to the survey with the same value. The standard deviation of responses across all 46 scale-items in the survey was calculated for each respondent. Nine of the respondents who demonstrated zero variation in all responses – i.e., answered all 46 questions with the same value – were removed from the data set (Table 3.2).

Table 3.2 - Summary of Response Disqualification

<table>
<thead>
<tr>
<th>Sl.</th>
<th>Particulars</th>
<th>Responses</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Total number of responses dropped from those received</td>
<td>104</td>
<td>100.00</td>
</tr>
<tr>
<td>2.</td>
<td>Total number of partial Responses dropped</td>
<td>83</td>
<td>79.82</td>
</tr>
<tr>
<td>3.</td>
<td>Total number of Responses dropped due to respondents not belonging to the Life Sciences industry</td>
<td>12</td>
<td>11.53</td>
</tr>
<tr>
<td>4.</td>
<td>Total number of respondents dropped due to survey fatigue in their responses</td>
<td>09</td>
<td>8.65</td>
</tr>
</tbody>
</table>
In total, 243 usable responses, out of the 2857 invitations sent remained in the main study data set for final analysis, yielding a usable response rate of 8.50% when compared to the number of invitations sent. Table 3.3 summaries the response rate of each sampling frame and provides a summary for the overall sample size of the study.

Table 3.3 - Sampling frames and Response rates

<table>
<thead>
<tr>
<th>Sl.</th>
<th>Particulars</th>
<th>No. of Members</th>
<th>No. of Invites Sent</th>
<th>No. of Responses</th>
<th>No. of usable Responses</th>
<th>Percent Response</th>
<th>Percent Usable Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>LinkedIn online groups - Life Sciences Outsourcing</td>
<td>986</td>
<td>986</td>
<td>108</td>
<td>78</td>
<td>10.95</td>
<td>72.22</td>
</tr>
<tr>
<td>2</td>
<td>LinkedIn online groups - BPO Executives</td>
<td>12,026</td>
<td>212</td>
<td>54</td>
<td>29</td>
<td>25.47</td>
<td>53.70</td>
</tr>
<tr>
<td>3</td>
<td>LinkedIn online groups - CRO, CMO and CRAMS</td>
<td>14,832</td>
<td>837</td>
<td>83</td>
<td>57</td>
<td>9.92</td>
<td>68.67</td>
</tr>
<tr>
<td>4</td>
<td>LinkedIn online groups - Global Outsourcing</td>
<td>821</td>
<td>374</td>
<td>31</td>
<td>27</td>
<td>8.29</td>
<td>87.10</td>
</tr>
<tr>
<td>5</td>
<td>LinkedIn online groups - India Outsourcing</td>
<td>17,119</td>
<td>261</td>
<td>28</td>
<td>22</td>
<td>10.73</td>
<td>78.57</td>
</tr>
<tr>
<td>6</td>
<td>Researcher's networks</td>
<td>592</td>
<td>187</td>
<td>43</td>
<td>30</td>
<td>22.99</td>
<td>69.77</td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td>46,376</td>
<td>2857</td>
<td>347</td>
<td>243</td>
<td>88.35</td>
<td>430.04</td>
</tr>
<tr>
<td></td>
<td>Percent</td>
<td>6.16</td>
<td>12.15</td>
<td>70.03</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Average Percent</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>14.73</td>
<td>71.67</td>
</tr>
</tbody>
</table>

3.8.3. Business Performance Parameter Data Collection

Based on literature research the market based measure Returns To Shareholders (RTS) was selected in this study to represent business performance. Another reason why this measure was chosen is that ultimately one of the most critical business performance and success factors, is what the shareholder gets for his investment.

Out of the 243 useful responses received, a total of 117 respondents had indicated either the division in which they were working and or the organization to which they were affiliated. A total of 28 Customer organizations and 18 service provider organizations were selected from the above based on the following criteria, for this stage of data collection:

a) The respondents should have provided the name of their organization
b) The organization is either an independent organization or a strategic business unit within a multiple business organization in the Life Sciences industry – Pharmaceuticals, Biotechnology, Generics manufacturing, Clinical Research organization, IT services provider to the Life Sciences industry or BPO service provider to the Life Sciences industry that outsources business processes.

c) Required financial information of the organization is readily available in public domain.

After selection of the organizations, factual secondary financial data were collected from standard financial resources, financial websites and the specific organizations’ website to arrive (calculate) at the business performance metric – Returns to shareholders (RTS) value for the specific organization.

This data was then analyzed using quantitative data analysis techniques (multiple regression analysis, Analysis of variance (ANOVA)), to construct a generic business model framework. This constructed framework depicts the identified essential elemental critical success factors (CSF’s), their internal relationships and the effect or influence or relationship of these identified CSF’s on the business performance metric returns to shareholders (RTS).

Hypothesis testing techniques were also applied to test and confirm the appropriate hypothesis of this study.

3.8.4. Comparative Study Data Collection

Based on the four factor solution arrived at, after exploratory factor analysis (EFA), a second questionnaire (enclosed under Annexure V) was created by utilizing elemental critical success factors identified. These identified factors were placed in the same sequence as dictated by the four factor solution based on the individual factor loading value of the individual elemental critical success factors.

Essential verbal modification of these elemental critical success factors to ensure a better understanding of each of these elemental factors were only applied for creating this questionnaire for comparative analysis. The verbal modification was strictly enforced to introduce a more sentence based description of individual critical success factors. This was essential since this questionnaire was exposed to a new set of respondents as is, without further categorization under specific themes.
This questionnaire was sent to preselected organizations and respondents working in those specific organizations which were selected based on the following criteria:

**Organization selection criteria:**

1. should be an independent organization or a strategic business unit within a multiple business organization that provides Life Sciences outsourcing business services (Business Process Outsourcing Organizations, Clinical Research Organizations)
2. registered, listed BPO, CRO companies in India who were willing to provide required financial information
3. availability of annual reports either through the organizations website or through reliable financial information gatherers (e.g.: Yahoo finance, Bloomberg, Google finance etc.)

**Respondent selection criteria:**

1. should be employed in INDIA in any one of the organizations identified using the above criteria
2. should be employed in INDIA either in an independent organization or a strategic business unit within a multiple business organization that provides outsourced business process services to outsourcing customers
3. should be employed in INDIA in either an independent organization or a strategic business unit within a multiple business organization in the Life Sciences industry – Pharmaceuticals, Biotechnology, Generics manufacturing, Clinical Research organization, IT services provider to the Life Sciences industry or BPO service provider to the Life Sciences industry that outsources business processes.

The organization selection criteria were defined to ensure that the researcher would have direct access to unbiased, statutory information to help evaluate business performance based on selected financial parameters. The respondents’ criteria were defined to ensure that they have the best knowledge about the Life Science outsourcing industry and have direct experience with the outsourcing function and hence were capable of providing useful inputs.

Considering the sample size required, costs and disadvantages of postal survey, it was decided that an electronic survey would be more appropriate, given that the target respondents would all have internet access.
The e-mail addresses of the respondents who satisfied the indicated criteria were identified online primarily through India specific LinkedIn Professional Groups related to Life Sciences Outsourcing and through the researcher's networks. Mechanics of questionnaire administration followed the procedure defined under the same heading in the section above.

Using the above described screening process, around 45 potential respondents based out of India and working for India based organizations were identified and online solicitations to participate in the survey were sent. The online survey preparation and conduct was initiated on July 4th, 2011 and completed on the 27th of August 2011.

In total, 45 invitations were sent out to a much focused sample frame and at the end of the survey window, 36 responses were submitted/received. The response rate was 73.35% as only 33 of the received responses were considered usable since 3 incomplete responses were lost to follow-up. The response rate for this survey is high due to the fact that the sample size was small and there was a vigorous follow-up through personal calls to ensure the survey was completed and returned.

Based on total respondent scores, arrived at after applying the individual four factor loading scores to individual survey instrument response, 33 different business models were identified. Applying the generic business model framework on these 33 identified business models individually, yielded an organization specific business performance metric (predicted RTS). This organization specific predicted RTS value was used to compare and create a ranked list of participating Indian Life Sciences BPO organizations.

Of the 33 business models identified, 21 were unique business models in the sense that they had unique respondent scoring values. From the above data the 21 unique business models were analyzed to determine an association between generic business model framework predicted business performance (RTS) and actual business performance based on factual RTS (organization specific financial data from secondary sources).

3.9. Overview of Data Analysis Methods

There are no prior studies or research which established the elements of a business model, significant themes and their relationship to business performance, specifically
in the Life Sciences BPO industry domain. This study is an attempt to understand, the above.

The first step in this research was to identify, through pilot studies the existence of business models and the elements which make up these business models with reference to the Life Sciences BPO Industry. Next an initial model to understand the effect of these identified elements and specified themes on business performance was inferred from responses obtained by administering a structured, validated survey instrument to a focused group of respondents. Next, the validity of the constructs was tested and finally, the overall model was statistically evaluated. This inferred model included the primary constructs of business models and measures of those constructs. This inferred model was then used/applied as a generic framework on 21 different organizations to understand the relationship between business models and business performance.

The results from this research attempts to answer the following five research questions posed under Section 3.3:

1. What are the existing business model design elements in the Indian BPO context?
2. How does business model design affect business performance in the BPO domain?
3. Can an efficient business model design be determined by comparing models of different Indian BPO firms?
4. How can business models be described and represented in order to conceptualize, define and build reference models or frameworks?
5. How can a specific business model with value constellations be built for the BPO domain?

Standard techniques for descriptive statistics, reliability testing, exploratory factor analysis, regression analysis and hypothesis testing were used to achieve the above objectives and are dealt in detail in Chapter 4 – Data Analysis and Discussion.

3.10. Survey Instrument Development

Generally accepted principles of instrument design was used in this research to develop measures of Business Model Elements so that the survey instrument so
generated could identify the critical success factors for India based Life Sciences BPO industry and their relationship to business success or performance. The general six steps procedure laid out by Hinkin (1998) was followed for development of the instrument. The general six steps procedure along with the detailed process followed are represented in (Figure 4.1).

**Figure 3.1 - Measurement Development Process**

**Hinkin’s (1998) Proposed Process**

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**Actual Process followed for Instrument Development**

1. Literature Review
2. Identification and development of Initial Items
3. Identification of Significant Themes
4. Initial Item Reduction
5. Content Validity Study
6. Reliability Analysis
7. Pilot study of the Questionnaire
8. Replication

The part of the study/process was initiated with a literature review of business model elements and related literature to identify how Business Models use has been previously operationalized. The reviewed literature on business models for the Life sciences BPO industry provides only a limited scope to identify significant themes
and derive satisfactorily theoretical items/categories/components from existing data. Due to this limitation, five pilot studies were undertaken to attain the objective of identifying significant themes and existing items/categories/components of existing business models and their relationships (Step 1). Table 3.2 provides a brief overview of the studies.

Table 3.4 - Studies to identify existing Business Model Elements

<table>
<thead>
<tr>
<th>Sl.</th>
<th>Study Title</th>
<th>Objective</th>
<th>Identified / Assessed Business Elements</th>
<th>Identified / Assessed Significant Themes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Strategic Analysis of Life Sciences Business Process Outsourcing (BPO) Industry</td>
<td>The objective of this study was to strategically analyse Industry Structure, Business ecosystems and their relationship structures in the Life Science BPO industry in a globalized economy by applying Porter’s modified Six Forces analysis, Value chain and Value grid frameworks.</td>
<td>33</td>
<td>06</td>
</tr>
<tr>
<td>2.</td>
<td>Global Competitiveness of Indian Life Sciences BPO Industry – An Empirical Study</td>
<td>The objective of this study was to understand the phenomenon of “global competitiveness” from the Life Sciences BPO Industry context, and also evaluate India’s global competitiveness in the offshore Life Sciences BPO industry ecosystem by applying an adapted, competitive index measurement framework.</td>
<td>31</td>
<td>10</td>
</tr>
<tr>
<td>3.</td>
<td>BPO supply chain strategies for the Life Sciences industry</td>
<td>The objective of this paper was to understand various challenges faced in human resources management in BPO organizations in terms of recruitment, training &amp; development, retention and propose solutions to overcome these critical challenges.</td>
<td>25</td>
<td>6</td>
</tr>
<tr>
<td>4.</td>
<td>Strategic framework for creating a Life Sciences centric BPO Business Model</td>
<td>The objective of this study was to understand the life sciences industry and the phenomenon of “global competitiveness” from the Life Sciences BPO Industry context, identify and evaluate “Critical Success Factors” which are strategically essential to create and sustain a offshore centric Life Sciences BPO business model.</td>
<td>32</td>
<td>4</td>
</tr>
<tr>
<td>5.</td>
<td>HR Challenges in Business Transformation Outsourcing</td>
<td>The objective of this paper was to gain a deeper understanding about HR challenges being faced in Business Transformation Outsourcing and offer appropriate solutions to overcome them.</td>
<td>8</td>
<td>4</td>
</tr>
</tbody>
</table>
Overall, the above indicated studies assessed and identified one hundred and twenty one (121) items/categories/components (Step 2) and twenty six (26) significant themes (Step 3). To provide further support to these assessed significant themes and items/categories/components, some of them were duplicated in multiple studies to understand and validate their grouping, individual effects and relationship on business performance or success. Details of the above indicated studies which helped assess, and identify twenty six (26) significant themes and one hundred and twenty one (121) items/categories/components are provided under Annexure I.

By grouping similar items/categories/components and applying the method of "Critical Success Factors (CSF)" (Rockhart, 1979; Rockhart, 1981; Richard, 2004) on data obtained from the above studies, fifty two (52) items / categories / components / "Critical Success factors (CSF)" (initial survey items) were identified. The CSF's so identified were content analyzed to identify and categorize them under eight (8) significant themes/"Sources of CSF" to guide the development of individual survey items (Step 4). These items served as input to construct the measurement instrument (questionnaire) for a pilot study (Step 5).

In Step 6 the content and reliability of scales were evaluated through reliability analysis and the final Sources of CSF (Eight (8) – significant themes) and CSF's (Forty six (46) – items/categories/components) so obtained were used for data collection in the full study (Step 7).

From data obtained in Step 7 exploratory factor analysis were used to detect possible reduction and further refinement of the measurement items. These identified Factors would ultimately form the generic framework of Critical Success Factors required for business success (performance) of Indian Life Sciences BPO industry.

Finally, confirmatory factor analysis of revised scales should be tested and validated with an independent sample to enhance the generalizability of the new scales; however, this step was not within the scope of this research and is identified as an area for future research. The remainder of this section discusses Steps 1 through 6, which will cover the all four steps of Hinkin (1998), i.e., item generation through content validity study.
3.10.1. Critical Success Factors Generation

Spector (1992) recommends that researchers should first clearly define the construct/phenomenon based on theory, and then develop items that support the definition, and take a confirmatory approach to validate the theoretical ideas guiding the creation of items. In addition, when working with a complex construct, Spector (1992) also recommends that researchers should partition the construct into several key dimensions to ensure the adequacy of the content domain and develop a scale with multiple subscales by creating items for each separate dimension of the construct.

Hinkin (1998) proposes that creation of items to assess a phenomenon under examination can be conducted inductively whereby; the items are generated based on content analysis of the literature or experts or subjects' descriptions of the phenomenon. Scales (sets of survey items) can also be derived, or deductively elucidated whereby, a theoretical definition of a construct is developed based on an understanding of the relevant literature and of the phenomenon to be investigated.

The inductive approach is typically used when the researcher explores an unfamiliar phenomenon where little theory may exist, whereas the deductive approach is appropriate in situations where some theory exists (Hinkin, 1998).

This research adopted the inductive approach to develop construct definitions. Following the inductive approach, the initial review of Business Model Elements and their effect on Business Success/Performance and relevant literature was conducted to identify a conceptual framework and existing scales that defined or operationalized business models and their effect on Business Performance in order to guide the development of a theoretical definition of the Business Model construct.

To ensure that this process could produce an instrument strongly grounded in literature, a systematic literature review was conducted as detailed under Section 2.5, Chapter 2. To overcome this literature limitation, an initial pilot study with a focused sample of professionals from the life sciences BPO industry was undertaken (Study Sl. No. 1 – under Table 3.2: Studies to identify existing Business Model Elements). A questionnaire consisting of theoretical business model elements essential for competitive advantage (and hence business performance) were identified by applying Porter's Five Forces Industry Analysis Framework (Porter, 2004), Six forces Analysis
(McAfee, Preston, 2005), Value Chain Analysis (Shank and Govindarajan, 1993) and Value Grid Analysis (Frits and Matthias, 2006). This questionnaire was administered to the identified sample population and based on their inputs an initial set of Business Model Elements were created. The business elements identified and their significant themes are presented in Annexure I under details of pilot studies.

Based on the results of this study, an adapted, high level, value grid for the Life Sciences BPO industry was created. This value grid depicts the various themes of the Life Sciences BPO industry and their relationships with each other. The vertical dimension of the value grid comprises the value adding components of the linear value chain and hence depicts the upstream and downstream processes. The horizontal dimension in the figure is represented by the variations or inherent factors under a specific value adding component to the value chain. End users of these services are depicted in the extreme right hand corner of the value grid.

After identifying the industry competitive forces and their influence on business performance, another pilot study was undertaken to determine business model elements essential and specific to make the Indian Life Sciences Business Process Outsourcing industry competitive (Study Sl. No. 2 – under Table 3.2 : Studies to identify existing Business Model Elements). In this study, an attempt was made to survey Life Sciences BPO professionals using a structured questionnaire methodology to arrive at the competitive nature of the Life Sciences BPO Industry and measure the global competitive nature of Indian Life Sciences BPO Industry. The questionnaire was created based on The World Economic Forum’s 12 Pillars (themes) of Competitiveness (Xavier, 2008) based on : Institutions, Infrastructure, Macroeconomic stability, Health and primary education, Higher education and training, Goods market efficiency, Labor market efficiency, Financial market sophistication, Technological readiness, Market size, Business sophistication, Innovation to evaluate national competitiveness.

The business elements identified by this study are presented in Annexure I under details of pilot studies.

During these studies, and informal discussion of these results with experienced professionals in this industry, various elements which we could group under the theme Human Resources were found to be directly associated with business
performance. To identify these specific thematic elements and understand their relationships, another pilot study with a specific focus on the Human Relations theme was undertaken (Study Sl. No. 3 - under Table 3.2: Studies to identify existing Business Model Elements).

A 25 item, structured questionnaire was developed based on information collected after extensive desk study followed by review of publications, from various industry reports and through informal interviews with HR professionals. Although this list was not very exhaustive, these were the most commonly referred to challenges in the BPO context. An option was provided in the questionnaire for the respondent/s to indicate additional elements not covered under those provided. Respondents were randomly selected from top and middle level HRM professionals from the organizational hierarchy of BPO’s located in various Indian cities. On analysis of the data collected, elements and significant themes presented in Annexure I under details of pilot study were identified along with an understanding of their relationship/s.

To identify more business model elements and hence make the final survey instrument stronger, a final pilot study (Study Sl. No. 4 - under Table 3.2: Studies to identify existing Business Model Elements) was undertaken with a different and much more intense thematic focus. This study used the methodology of Critical Success Factor Analysis to identify business model elements and their relationships. The concept of identifying and applying CSFs to business problems dates back to the original concept of “success factors” put forth in management literature by D. Ronald Daniel in the 1960s. However, the CSF concepts and approach are still very powerful today and are applicable to many of the business challenges being presented. The CSF method has found its way into many formalized information or business systems and technology planning methodologies that are still being used today (Richard, 2004).

An effort was made to survey Life Sciences BPO professionals using the structured questionnaire methodology to arrive at a strategic framework for creating a life sciences specific BPO business model and also measure the essentiality of these identified critical success factors from the Life Sciences BPO Industry and Business context. This would ultimately identify business model elements, relationship between these elements and the initial response on how essential the respondents consider these elements to business performance.
On analysis of the data collected, elements and significant themes presented in Annexure I under details of pilot study were identified along with an understanding of their relationship/s.

Taken together, findings of all the above indicated pilot studies yielded support for creation and the validity of the proposed framework for identifying, assessing and evaluating business model elements and their essentiality on business performance in the Life Sciences BPO industry domain.

3.10.2. Identification of Most Important “Critical Success Factors” (Elements) and “Source of Critical Success Factors” (Themes)

Based on the results of the above study and iterative process of identifying and grouping similar items which utilized judgment by the researcher a total of eight (8) Source of CSF’s (significant themes) and fifty two (52) CSF’s (business model elements) were identified. These identified CSF’s were used to guide the generation of the final survey items representing the concept of business models in the Indian Life Sciences BPO industry.

During the identification and grouping process, all 121 items were reclassified into 8 themes based on operational definitions for the themes. For example, identified items like Physical Infrastructure were categorized under under Strategy. Within each Source of CSF, the categorized elements were further grouped into a subtheme of similar ideas. The process was an iterative one. While grouping the similar items into subthemes, the count of the number of items assigned to each theme was recorded. In order to ensure that the themes and their embedded elements were distinct constructs, any elements or themes that related to other variables were screened out. Similar elements using different wordings in different questionnaire were merged into one element. For the purpose of parsimony, any themes with only one item assigned to it were marked as candidate for deletion and some were deleted based on judgment of the researcher.

In the end, 52 CSF’s (elements) under 8 Source of CSF’s (themes) were identified. At least five CSF’s were identified for each of the 8 Source of CSF’s. These themes served as the major source of input for developing the final survey items.
3.10.3. Critical Success Factors Development

According to Hinkin (1998), several basic guidelines should be followed in developing scales (i.e., a set of items to measure a construct). First, all items should focus on the same perspective, i.e., items representing behaviors should not be included in the same scale as items represented outcomes of behaviors. Second, "double-barreled" items should be avoided and an item should focus on only a single idea. Third, statements should be concise and simple using language that target respondents are familiar with and understand. Fourth, items with negatively-worded or reverse-scored items should be used with caution. Hinkin et al. (1997) add that items that may introduce biased responses, i.e., leading to questions, should also be avoided. Spector (1992) recommends that items should be written in plain English and avoid using jargon, colloquialisms and expression, and the reading level of respondents should be taken into consideration. Ideally, several statements that have slightly different shades of meaning should be generated for each item and the best statement representing the item should then be selected (Lewis et al., 2005).

Following these guidelines, scale items (elements/CSF's) were written to reflect each of the 8 themes (Source of CSF's). Because of the large number of items, a single statement, however, was written for each item. Still, the wording of each statement was reviewed multiple times by the researcher and the researcher's advisor. Through this process, alternative statements were created for items that were unclear and the best statement was selected for those items.

Table 3.3 under Annexure I below provides the item statements together with the respective themes. Next, these items were subject to a content validity study.

3.11. Content Validity Assessment and Reliability Analysis

A pilot study was undertaken to assess content validity and reliability of the CSF's (elements) and Source of CSF's identified and developed as exhibited under "Exhibit 1: Developed Critical Success Factors and Source of CSF's" enclosed under Annexure I. Rungtusanatham (1998), defines content validity as "the degree to which the measurement instrument spans the domain of the construct's theoretical definition; it is the extent to which a measurement instrument captures the different facets of a
construct”. The content validity assessment should be conducted once items are generated (Hinkin, 1998).

According to Hinkin (1998) there is no one best technique for assessing content validity and no technique can ensure that content validity is obtained. The available approaches can only provide “content adequacy” for the new instrument. Polit and Beck (2006), also write that assessment of content validity is a posteriori exercise of judgment used by a researcher to evaluate the content relevance of a measurement instrument after careful conceptualization and domain analysis during item generation. Tojib and Sugianto (2006) observe that there are both qualitative methods (Delphi or Q-sort) and quantitative methods (Content Validity Ratio, Content Validity Index, etc.).

This research assessed content validity of the instrument using a modified version of Tojib and Sugianto’s (2006) Content Validity Index (CVI) because this assessment can be performed relatively quickly and easily while offering criteria to retain or delete items from an instrument. Reliability analysis (Nunnally, 1978) of the responses was also performed. The reliability of the survey scales was evaluated by computing Cronbach’s alpha for each element (CSF) (Cronbach, 1951). Thus, a content validity and reliability study, was conducted using a survey questionnaire consisting CSF’s and Source of CSF’s presented under “Exhibit 1: Developed Critical Success Factors and Source of CSF’s” enclosed under Annexure I.

3.11.1. Content Validity Assessment Reliability Analysis Procedure

Content validity in the current study was assessed through one round of content validation and also by applying the technique of reliability analysis using a panel of content experts (Nunnally, 1978). The criteria for selecting the content experts were derived from the guidelines proposed by Grant et al, (1992) that is, 1) they must hold a PhD qualification or be PhD candidates and 2) they should actively conduct research in the domain of interest or have professional experience in the indicated domain.

Fifteen industry experts, four academics and six doctorate students from Indian universities were initially identified as prospective content experts, on the basis of their publications as well as their professional LinkedIn profiles. Personalized email
invitations were sent to the identified samples, outlining the reasons why they were selected, the purpose of the study, and a request for their participation in the study. Positive responses were received from seven industry experts, two academics, three PhD candidates. Specific, structured instructions for these reviewers were then emailed to each of them, outlining in detail the tasks that have to be completed. They were asked to complete the tasks attached with the instruction document using Microsoft Word. The completed document was emailed back to the researcher. Within one month, twelve responses were received from the content experts. Two responses were excluded because of incomplete response and loss to follow-up. Finally, only ten responses could be included for further analysis.

The experts were asked to complete the questionnaire with two components. The first component of the questionnaire contained an option for the expert to indicate the essentiality of individual element under a specific theme. In the second option they were asked to rate the importance of each dimension using a 5-point rating scale (1 represents ‘Least Important’, 5 represents ‘Most Important’). These were important to identify the agreement of experts on the correctness of the identified elements and its expected dimension. Finally, the content experts were also asked to provide comments on the completeness of dimensions and the appropriateness of the items.

### 3.11.2. Discussion of Results and Findings from Content Validity Study and Reliability Analysis

94% of the experts confirmed the essentiality of the elements and their placement under a specific theme. The mean responses given by experts to the measure of essentiality were calculated for each dimension. All mean values of the importance rating given for each dimension were greater than 3, ranging from 3.92 to 4.76. This finding suggested that all dimensions were confirmed to be essential.

The above collected data was also used to analyze the elements and its theme for reliability (reliability analysis) using the method suggested by Nunnaly (1978). Hatcher (1994) indicates that since Cronbach’s alpha is a coefficient of reliability (or consistency) and determines the internal consistency or average correlation of items in a survey instrument to gauge its reliability, coefficient ranges in value from 0 to 1 may be used to describe the reliability of factors extracted from dichotomous (that is, questions with two possible answers) and/or multi-point formatted questionnaires or
scales (i.e., rating scale: 1 = poor, 5 = excellent). Nunnaly (1978) indicates that a Cronbach's alpha of 0.7 to be an acceptable reliability coefficient but lower thresholds are sometimes used in the literature.

Using this method of reliability analysis, removal of element numbers 13, 17, 19, 46, 47, 52 would help the survey instrument attain reliability of more than 0.7 (0.729). Due to this, the specified elements were excluded from the Questionnaire exposed to Content Validity and Reliability analysis to arrive at the final survey instrument presented in “Exhibit 2 : Final Instrument – Critical Success Factors and Source of CSF’s” enclosed under Annexure I.

The final survey instrument consists of eight (8) Source of CSF’s (significant themes) namely : Strategy, Human Resources, Operations, Marketing, Finance, Environment, Industry and Innovation. Under these Source of CSF’s, a total of forty six (46) Critical Success Factors (business model elements) are included. Source of CSF – Strategy includes 8 CSF’s, Human Resources includes 5 CSF’s, Operations 3 CSF’s, Marketing 7 CSF’s, Finance 7 CSF’s, Environment 6 CSF’s, Industry 6 CSF’s and Innovation 4 CSF’s. Details of the analysis are provided under Annexure II.