CHAPTER 4

THE RESEARCH APPROACH
4.1. Overview

This chapter gives an overview of the research approach employed. The research methods employed are discussed progressively in detail in the subsequent chapters, but this chapter gives a synopsis for the sake of context and clarity.

4.2. Sampling Methodology

The aim of the research is to assess empirically, how Open Innovation plays a role in the ICT industry. More specifically, the linkage between performance of the Telco firms and the intensity of adoption of Open Innovation practices by them needs to be established.

It is difficult to generalize findings from any study that is done only in specific countries or specific geographic regions, because there could be country/region specific effects, such as development index, regulations, technological environment, etc. Hence studies done purely in Latin America or in Europe can yield interesting insights but cannot directly be generalized globally.

Similarly it is hard to generalize findings from studies done on Telcos with specific type of ownership, such as only state-owned Telcos, or only Telcos belonging to large conglomerates, or only those which have evolved from established Telcos. The main idea of this research is to conduct a global study of how Open Innovation practices are influencing Telco firms’ performance. The results drawn should be applicable globally, i.e. free of biases owing to region, size, ownership, etc. The regional effects should be specifically factored into the model itself, in the form of a variable.

To avoid sampling bias, the following approach was adopted for this study:

A random sampling of ~60 Telco firms, globally, was taken. The sample included a mix of the following varieties of companies:

1. Large, medium and small Telcos
2. Telcos with presence in many countries, few countries and only one country
3. Telcos with base (headquarters) in different countries around the world – in different geographies – Asia Pacific, Far East, Australia,
North Americas, Latin America, Europe, Africa, Middle-East

4. Telcos with different ownerships – pure government owned, quasi-government, publicly listed, and privately held.

5. Telcos which had grown organically, growth through acquisitions, are spin-offs from larger companies, etc.

6. Telcos which are pure Telco companies, whose parent-companies are non-Telcos, or government backed, etc.

7. Telcos which are pure Mobile Services companies, who run both Landline and Mobile Telecom services

8. Telcos in countries with different levels of economic and technological development

It should be noted that there are only about 700 Telco firms world-wide. Hence the sampling is about 9% of the total global universe of Telco firms, and hence this is considered a good representation of the Telco industry.

The data pertaining to the Telco Firm’s performance variables was collected from public sources, such as Company Reports and reliable Industry Resources and Forums. These were collated into a table. The financial figures were multiplied by PPP (Purchasing Power Parity) to bring about parity for the purpose of statistical analysis.

For the Telco Firm’s Open Innovation variables, the data for the variable "Revenue-split with VAS Providers", the country-wise data from 2011 was used. The GII figures were taken from World Economic Forum website. For the variables "Ambidextrous Thinking" and "Intrapreneurship", mobile services were sampled for each Telco firm from publicly available sources, and each of these Services in the sample was used rated to rate the variables "Ambidextrous Thinking" and "Intrapreneurship" on a Likert-like Scale using the dimensions mentioned in the subsequent chapters.
4.3. The Construct

This is explained in detail in the forthcoming chapters. But here is a summary:

The unit of analysis for the study is the ICT (Telco) firm. The Telco firm's performance is the dependent variable, and is defined as a composite variable constructed from the following variables:

i. VAS (Value Added Services) Revenues per Subscriber.

ii. The Telco's total revenue per subscriber — Indicates overall revenues per subscriber, wherein the revenues include voice and non-voice/data revenues. Indicator of overall beneficial effect on the Firm. Also indicates the overall percolation of benefits of OI to all the Telco subscribers and the value-capture.

iii. EBITDA – Indicates absolute Profitability figure for the Telco

iv. EBITDA Per mobile Subscriber – Indicates Profitability per Subscriber

v. Total Revenue per Employee – The financial efficiency measure, in terms of Profitable Revenue measured at the employee level

vi. EBITDA per Employee: Taking these dependent variables (v and vi), verifies whether Open Innovation contributes to improvement in financial efficiency of the firm, both in terms of overall efficiency and specifically in terms of profitability. These variables depict a Telco firm's operational efficiency at both levels.

VAS (Value Added Services) is representative of the MDS (Mobile Data Services), the fastest growing and significant segment of Telco revenues. EBITDA is the firm’s Earnings before Interest, Taxes, Depreciation and Amortization. It is representative of the profitability of the Telco firm. The details of how the composite variable is constructed, is given in the subsequent chapters.
The rationale for choosing these variables is as follows:

As highlighted in Chapter 1, Section 1.1.2, the primary challenges for Telcos in the ICT industry are to generate revenue and to remain profitable. Hence the total revenue and the EBITDA of the Telco have been taken as performance indicators.

*EBITDA is a key performance measure for almost all telecom companies (Barkus 2010).*

It is necessary to take into account existing revenue streams in totality, but also take out and measure separately, the revenues in the high growth areas, i.e. revenues from Mobile Data Services, as they represent the future growth potential of the Telco. As a Telco keeps launching services and adding subscribers, it is essential to check whether the Telco is generating revenues and profits from each subscriber. Hence both EBITDA per subscriber and Total Revenues per subscriber have been considered for measuring the Telco’s performance. A Telco may improve its operational and financial efficiency through use of superior processes, management, and automation. To measure the sum total effect of efficiency at every level, the revenue per employee and profitability per employee are taken.

An effective innovation strategy should improve a Telco firm’s performance for the variables mentioned. These variables have been selected after due diligence, discussion and validation with experts from the industry through Delphi technique. Due to the dynamic nature of the ICT industry and the sweeping changes in the past few years, as discussed in the previous chapters, analysis of longitudinal data (time series data) has been ruled out. Similarly, due to the turbulence, competition, decline of older business models, and mergers and acquisitions, the parameters of growth and market share for a Telco were also left out.

The Open Innovation parameters constitute the independent variables. There are essentially two Open Innovation parameters that are constructed from four variables.

The two Open Innovation parameters are:

a) Open Innovation Strategy of a Telco firm, depicting the strategy of the firm in terms of revenue sharing arrangements, and within the context of
the innovation capability of the country in which the Telco operates
b) Open Innovation Social Capital of the Telco firm, which denotes the Open Innovation culture fostered within the organization, as reflected in the kind of services that the Telco has been offering.

Open Innovation Strategy is constructed from:
- Revenue Sharing arrangement with MDS partners
- Global Innovation Index from the World Economic Forum

Open Innovation Social Capital of a Telco firm is constructed from:
- Ambidextrous Thinking
- Intrapreneurship\(^\text{10}\)

Both of the above are derived through expert opinion by examining the characteristics of the actual services launched by the firm.

This is depicted in the following Figure 4-1.

**Figure 4-1: The Open Innovation Construct**

![Diagram of Open Innovation Construct](image)

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\(^{10}\) Intrapreneurship: Embodying the spirit of an Intrapreneur - a person within a large corporation who takes direct responsibility for turning an idea into a profitable finished product through assertive risk-taking and innovation.
4.4. Open Innovation Strategy

The intensity of Open Innovation in an organization is a function of the Open Innovation strategies being put into practice by the top management, and the Open Innovation social capital built in the organization over the years, both of which give the organization the Open Innovation capability in the market.

A Telco’s strategy is shaped by the environment it operates in. The country’s basic innovation capability is determined by a number of factors, such as the infrastructure, the level of education of the population, the governance, etc. A strategy that has succeeded in Germany may not work in Uganda, and vice-versa. Hence, for a global study, it’s important to factor in the country’s effect on the strategy. To do this, we take the Global Innovation Index from the World Economic Forum, which takes into account a set of 40 variables, and computes the innovation index per country.

The most important component of a Telco firm’s Open Innovation Strategy is indicated by the revenue-sharing arrangements with its partners that it is willing to participate in, for launching services together. Comprehensively, this indicates the importance the Telco firm attaches to the joint partnership, in terms of monetary value it is willing to share out of the revenues generated by the services launched by the partnership. Not surprisingly, the revenue-sharing arrangements of Telcos within a country are similar, i.e. they fall within a narrow band. This is because strategy is the easiest part to copy from each other over time, and the VAS/MDS vendors also have bargaining power within a country – all of which has an equalizing effect on the revenue-sharing arrangements of the different Telcos in the country. Hence, all other things being equal — the real differentiator between two Telcos within a country is the Open Innovation Social Capital, which has to be nurtured and built over the years within an organization.

4.5. Open Innovation Social Capital

The Open Innovation Social Capital can only be measured indirectly, for it to carry any objectivity or a uniform yardstick across Telcos globally. For this
research, it was felt best to sample the actual services launched by Telcos in a given period, and have the Telco firm rated by experts on two parameters – Ambidextrous Thinking and Intrapreneurship of the Firm, on the basis of examining the services. These two critical Open Innovation parameters were obtained from Open Innovation literature (Fasnacht, 2009). The two variables Ambidextrous Thinking and Intrapreneurship are derived from examining the actual Mobile Data Services launched by the ICT companies during the period 2011-2012. These variables are firm-specific.

4.5.1. Ambidextrous Thinking

Firm Specific Social Capital for Innovation, Ambidextrous Thinking capability (Fasnacht, 2009) is taken as an Independent Variable—marked on a Likert scale of 1 – 7. The services launched by the Telco firms were sampled and analyzed and rated on the scale.

Essentially, ambidextrous thinking involves striking a balance (and even synergy) between the following:

- Exploitative Innovation and Exploratory Innovation
- Closed Innovation and Open Innovation
- Product Focus and Client Focus
- Efficiency and Flexibility
- Proprietary and Central Systems, and Flexible Service Oriented Architectures
- Production and Consumption of Services and Content (e.g. in Social Networks the end-users are Prosumers)
- Depth and Width (i.e. Niche Vs. Mass market)

Ambidextrous thinking is reflected in the variety, uniqueness and the way that the services are launched, reconciling the trade-offs between opposing forces, and are rated along the dimensions mentioned above.
4.5.2. Intrapreneural Attitude

Firm Specific Social Capital for Innovation, Intrapreneural Attitude (Fasnacht, 2009) in the Firm is taken as Independent Variable marked on a Likert scale of 1 – 7. Intrapreneural Attitude is reflected ultimately in the kind of services launched by the Telco firms. The services were sampled, analyzed and rated on the scale. The considerations for rating Intrapreneural Attitude are as follows:

- The launched services’ market harmonization and diffusion in the target subscriber market
- Whether the launched service expands the existing services into existing or new markets
- Whether the launched service re-uses and builds upon existing services
- Width (Subscriber Base targeted – this could be existing or new subscribers)

To conduct a world-wide study of Telco firms, the actual services launched by the firms (in the sample) were examined, instead of relying on opinions. To evaluate Ambidextrous Thinking, the actual services launched in the market were examined for characteristics of Ambidextrous Thinking listed above. A set of services were sampled in the given duration (2011-12) for each Telco firm.

4.5.3. Rating Method

Each of the sampled Mobile Data Services for a Telco was taken, and the rating was done along each of the dimensions given above for Ambidextrous Thinking, and the statistical median was taken as the rating for Ambidextrous Thinking for that particular launched service. The dimensions are listed in Section 4 and 4.5.1. This yields the rating for one service launched by the Telco.

Thereupon, for the (sampled) set of services launched by the firm, the statistical mean of Ambidextrous thinking ratings was taken. The rating was done using expert opinions from three experts using Delphi method, wherein the
The author acted as the facilitator. Two rounds of rating were done by the experts. In the first round, each expert was consulted individually by giving them the sample list of Services against each Telco firm taken from the Telcos sample list. The expert was asked to go through the list of services and give rating for each of the Telco on the two variables of Ambidextrous Thinking and Intrapreneurship. In the second iteration, the experts were shown the ratings of the other experts too, and asked to re-rate the Telcos on the two variables. The expert was encouraged to revise his earlier ratings in light of the ratings by the other experts. Finally, the consensus of the ratings was taken for each Telco Firm, to represent the scores for each of the variables, "Ambidextrous Thinking" and "Intrapreneurship". A good consensus was observed in two rounds, hence it was not necessary to hold a third round. The Figure 4-2 below gives the process in the form of a flowchart, for rating the parameter Ambidextrous Thinking for a Telco. The dimensions referred to as X, Y, Z, etc. in the Figure 4-2 are listed in section 4.5.1. The same procedure is used for rating the parameter, Intrapreneurship.
The three experts chosen are people well versed with the ICT industry and its services, with a minimum industry experience of at least 15 years each, and have held senior technical and management positions in their career, in reputed organizations pertaining to the ICT industry.
4.6. The Effect of Competitive Intensity

Competition is an important parameter (Porter, 1985) which influences both the strategy and the performance of a Telco Firm. For a Telco firm, the competition is largely restricted to the country in which it operates. For example an operator in UK faces no competition from an operator in Indonesia. A Telco operating in a country typically does not compete for subscribers’ business in another country. The only way it can do so is by establishing a subsidiary in the other country and begin operations there either on its own or in collaboration with the local operators in that country. This is because the Telco market is bound by government regulations of a country and by the infrastructure. The infrastructure, both physical and spectrum bandwidth (“airwaves”), are more or less restricted to a area (barring some border areas). Hence the Telco operators in different regions, even within a country or a city, leave alone across different countries, can operate independently on the same spectrum, say 2G/3G/4G without interference. Thus there is practically no competition across countries. Hence the study of the effect of competition on a Telco is essentially country-specific.

Competition is measured in terms of Competitive Intensity, which is the inverse of Herfindahl-Hirschmann Index (DoJ, USA). It is essential to study the effect of Competitive Intensity on the model being proposed in this research. It was found that there is no direct effect of Telco market’s competitive intensity on a Telco firm’s performance but rather there is a moderating effect and this was studied.

The relationship of — Open Innovation Strategy's impact on Telco firm's performance, has been taken and the moderating effect of Competitive Intensity in the ICT industry examined. This is depicted in the figure below.
4.7. Validating the Data

Data records with some fields incomplete were summarily removed. The final data set used for analysis was again verified for coverage across different dimensions, so that there was no statistical sampling bias. The data was validated against all the pre-requisites for regression. The data was checked for the normal-distribution assumptions, homogeneity of variance assumptions, and multicollinearity. Histogram graphs were also plotted to visually verify the normality assumptions.

4.8. Establishing Relationships

The data analysis for establishing relationship between the dependent and independent variables was conducted using:

a) K-Means Cluster Analysis of the dependent and independent variables  
b) Chi-Square Tests  
c) Factor Analysis to yield factors pertaining to Telco firm's performance score (dependent variable) and Open Innovation factors (Open Innovation Strategy and Social Capital)  
d) Linear Regression was conducted to analyze the relationship between
Open Innovation parameters (independent variables) and the Telco firm’s performance (dependent variable, which is a composite index, constructed from different variables).

Moderation Analysis was used for evaluating the effect of Competitive Intensity on the relationship between ICT firm's performance (dependent variable) and Open Innovation Strategy (independent variable). Linear Regression was carried out with and without the moderation variable and the effect was studied.

All of these are described in detail in the subsequent chapters.