Chapter V
RESEARCH METHODOLOGY AND DESIGN

5.1 Introduction

In the previous chapter, a literature review was done to explore impact of e-Governance on higher educational institutions and their stakeholders. Following factors have been identified for investigation:

a. e-Governance and its objectives
b. Higher education
c. Role of e-Governance in Higher education
d. Awareness of ICT of various stakeholders of higher education
e. Implementation of e-Governance in Higher education
f. Perceptions on e-Governance use in Higher education

Now this chapter can deal with research methodology that was used for this study.

Research is the systematic investigation into existing or new knowledge. It is used to establish or confirm facts, reaffirm the results of previous work, solve new or existing problems, support theorems, or develop new theories. The research design is the conceptual structure within which research is conducted; it constitutes the blueprint for the collection, measurement and analysis of data. Therefore, the “Research design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure.”

Research involves formulating the problem to be investigated, selecting a suitable research designed, choosing and applying appropriate procedures for data collection, and analyzing and communicating the process and findings through a written report. “The research methodology refers to the research decisions’ taken within the framework of specific determinants unique to the research study”.

The primary purposes of this research are documentation, discovery, interpretation, or the research and development of methods and systems for the advancement of human knowledge. The design includes an outline of what researcher will do after
formulated the hypothesis and its suggestion to the final analysis of data. To politely, the answers with respects to:

a) What data is required?

b) How the data is collected?

c) What technique of data collection was used?

d) How the data was analysed?

This study is descriptive because it will describe the social, political, economical, technical factors at the working conditions at higher educational institutions that influence stakeholders’ administrative working nature state that the emphasis is on an in-depth description of an individual, group, situation or organization.

5.2 The Nature of the Study

The present study is an exploratory in nature. The study is designed on the survey method. This research study addresses the use of e-Governance in Higher educational sector in Maharashtra state. The national as well as state government has put in maximum efforts to implement e-Governance in every sector especially in higher educational institutions in the state to increase transparency, efficiency and reliability in the functioning of government. E-Governance is mostly concerned to reorganizing public administration in a way that the relationship between the government and the citizen will be more direct and participial, the potential of using e-Governance to improve the quality of life of the vast population of the country.

The government of India has recently approved the National e-Governance Action Plan for implementation during the year 2003-2007. The plan seeks to lay the foundation and provide the impetus for long-term growth of e-Governance within the country. The plan seeks to create the good governance and institutional mechanisms, setup the core infrastructure and polices and implements a number of mission mode projects at the center and state. The NeGP of India has taken a holistic view of e-Governance initiatives across the country. A massive countrywide infrastructure reaching down to the remotest of villages is evolving and large-scale digitization of records is taking place to enable easy, reliable access over the internet. The ultimate objective is to bring public services closer home to citizens.
e-Governance allows truly and direct participation of citizens to communicate with government in policy and decision making and citizens to communicate to each other which helps to reflect their veridical needs and welfare. There are direct or indirect and internal or external benefits:

**Internal Benefits** –
- a) Better staff motivation,
- b) Greater political control,
- c) Improve public image of institution or Government.

**External Benefits** –
- a) Delivering cheaper and better services,
- b) Reaches to the wider population and;
- c) Encourage foreign investments and so on.

As a result, the study is exploratory in nature. It was assumed that e-Governance is a vital importance for the effective and efficient management of the administrative policies of the government and the higher educational institutions in Maharashtra. But so far Indian higher educational institutions are lying to implement the effective e-Governance policies. This cause also shows that the higher educational institutions are not utmost utilizing their resources to compete to the world class Universities and Institutions around the globe.

Some major impediments lay in the attempt to measure e-Governance activities. First is the limited ability to quantify public services such as health and education. These services must, basically, be evaluated qualitatively. Secondly, it is very complicated to assess or evaluate the quality of these services. And thirdly it is very difficult to measure citizens’ demand and their satisfaction from these services. But, since there are not too many other options the market place analogy could be used.

The present study on e-Governance in higher educational institutions is an attempt to bring to light the issues related to implementation of e-Governance. It has put forward some suggestions about the promotional measures which are best suited for better implementation of e-governance in higher educational institutions and find out some loop hole of it.
5.2.1 Present scenario of Higher Education in Maharashtra

Maharashtra has been created a good platform to implement the e-governance projects to demand and aspirations of the people of this economically developed state. Today only awareness of IT and ICT is not sufficient to achieve something, but at the same time what are the different benefits of these technologies are also important for the wellbeing to the individual and to the society as a whole.

**Maharashtra is the leader in e-Governance**

One of the pioneers in promotion of ICT and e-Governance in India, the government of Maharashtra has been at the forefront in implementing e-Governance initiatives that focus on citizens’ need and ensure superior service delivery. A report from NASSCOM states that 90 percent of the IT-BPO industry in India is concentrated in and around 7 cities in India, including Mumbai and Pune in Maharashtra. Cities like Nashik, Nagpur and Aurangabad also emerge as major hubs of the software industries.

In all e-Governance initiatives Martahi (Regional language of the state) has been accepted as the first and mandatory language. Marathi co-exists with English. The 64 percentage of the population speaks Marathi, so large sections of the state population to take advantages of the e-Governance initiative. In order to provide faster and more efficient governance and easier access to information, the state has got its Maharashtra State Wide Area Network (MSWAN) implemented. In this network, state government created incorporated 35 Districts, 324 Thashil, 6 Divisional Headquarters and several 100 horizontal offices connected with the state headquarters. It provides a secured network for data, voice and video interaction. The system will also help to provide various services to the people of the state.

The Director of Department of IT told “the state government will have separate e-Governance policy for continuity in objectives and directions on e-Governance. Under this policy we allow 3% of the total budget on e-Governance project for each department. Now it’s only 0.5%.” State has been taken gigantic efforts to facilitate the reach of high speed broadband to all parts of the state, including rural areas. In
many cases cloud computing solutions based on new generation networks has been deployed for e-Governance.

The state e-Governance policy aims to encourage the use of ICT in government not only as a tool for management and administration but also valuable tool for decision making. It re-engineers the administrative processes to provide Simple, Moral, Accountable, Responsive and Transparent e.g. SMART governance to its citizens.

The state governments plan for the implementation of e-Governance is multidimensional –

a) To setup ICT to enable infrastructure,
b) To increase the bandwidth,
c) To increase IT literacy rate in the state,
d) To provide high bandwidth not only urban but rural area, and
e) The government has to increase direct participations of citizen in government decision making.

When we talk about the higher educational institutions in India, there is tremendous increase in the number of Universities and affiliated colleges to Universities as well as the enrollment of the students. Management of Indian education needs to be built accountability, transparency, decentralization, and professionalism in their functioning, so that it is able to deliver good quality education to all, and ensure optimal utilization of available resources. Proper planning, coordination, staffing and budgeting are essential condition for effective management and development. A good management delivers better results with the resources available. Coordination of different bodies or stakeholders of higher education, timely completion of specific targets and due autonomy in various areas are needed to ensure effective performance of every educational institute in Maharashtra state.

In keeping view with its billion-plus population and high proportion of the young, India has a large formal Education System. Its target group (18 to 27 years). Size of the Maharashtra Higher education system² is given in the following Table No 5.1.
Table No 5.1

Size of the Maharashtra Higher Education System

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Particulars of Higher Education</th>
<th>Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Target Population (6-24 years age group)</td>
<td>19.35 Million</td>
</tr>
<tr>
<td>2.</td>
<td>Total Enrollment in all Educational Institutions</td>
<td>17.61 Million</td>
</tr>
<tr>
<td>3.</td>
<td>Total Universities</td>
<td>44</td>
</tr>
<tr>
<td>4.</td>
<td>Total Colleges / Institutions</td>
<td>3258</td>
</tr>
<tr>
<td>5.</td>
<td>Number of Teachers</td>
<td>76602</td>
</tr>
<tr>
<td>6.</td>
<td>Pupil Teacher Ratio in Higher Education</td>
<td>23</td>
</tr>
<tr>
<td>7.</td>
<td>Number of educational Institutions in India</td>
<td>31324</td>
</tr>
</tbody>
</table>

From the above table higher education system in state is the largest one. But at the same time quality of higher education is the biggest challenge of the hour as our state. At the same time country is progressing towards global economical power in the world. Much credit for this goes to the ancient moral values coupled with every-young spirit of the nation to acquire higher education in terms of determining great aims and objective under very difficult conditions and challenging circumstances. But recent ranking of the Indian universities are not aspiring to people of the country and the Honorable, President of India, Shree. Pranab Mukharji also concerns the development of higher education in India.

5.2.2 Need and Importance of the Study:

A study of e-Governance in Higher education Institutions was under taken by the researcher, because previously this type of research was not taken by anybody. Therefore, higher education is the area where we find all stakeholders are 100% literate. And to implement e-Governance specifically in higher education is not impossible. Why, not? Because, all stakeholders of higher education are highly educate. Most of them are aware of IT. Such type of work is not yet carried out by anybody in the state. The Pune University is one of the best universities in the state. The state of Maharashtra has been selected for research by the researcher because it is highly literate; most industrialised, and sound economical background state in India.
Impact of e-Governance in Higher education for student and citizens is important parameters to improve government services in University parameter. Now-a-days all Universities and Colleges across the state are trying hard to implement e-Governance in their area but all these efforts are not sufficient and correlated because they all are isolated. They are not still able to conduct the students’ online examination and not collect Universities fees online. Reports should be generated regarding with course wise students who appear for examination, result analysis of examination and college or teacher wise students’ performance and many more.

Different online and up-to-date reports are possible such as total students enroll for particular course; Course wise students appeared for examination, result analysis of examination, college and teacher wise student’s performance and many more.

To get latest online information without watching newspapers or visiting to Universities and Colleges for finding their notice boards. By using e-Governance all circulars, latest events like conferences, guest lecturers happening in and around universities and colleges known to students and citizens online, so they are able to participate to enrich their knowledge.

Good governance in the nation like India has much importance which can be achieved with the effective citizens’ participation in decision making process to assure transparency, accountability which reduces corruption. This kind of ambiance is possible only when if there is an effective implementation of e-Governance application.

Transparency and citizen centric governance is expected as broad outcome of e-Governance, which is rare in developing country like India. It is said in certain research that the culture of governance in India has been characterized by secrecy, seniority based on caste rather than merit and corruption. These factors are hurdles in good governance and e-Governance. Hence, we hope e-governance implementation in higher educational institutions can help to achieve good governance.

Quit often e-Governance initiative leads to mandatory for government departments, universities and higher educational institutions. These institutional changes affect both students/citizens and a method at all interfaces. Hence re-engineering is a major task required because large Universities and Colleges / Institutions are using different
e-Governance applications and they all are not interrelated to each other; result in inconsistency across the e-Governance applications. Therefore, there should be unique digital portal available throughout Universities and higher educational institutions in the state of Maharashtra.

This type of research will require cooperation and coordination from Government of Maharashtra, University Grant Commission, higher educational institutions and Software development firms, hence they are rarely pursued.

### 5.3 Research Design

Research is the systematic investigation into existing or new knowledge. It is used to establish or confirm facts, reaffirm the results of previous work, solve new or existing problems, support theorems, or develop new theories. The research design is the conceptual structure within which research is conducted; it constitutes the blueprint for the collection, measurement and analysis of data. So, the “Research design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure.”

**Essentials of research design are:**

i) An activity and time based plan.

ii) It is based on research question.

iii) It guides the selection of source and type of information.

iv) Discuss the various frameworks and find out suggestion for it.

v) Find out the relation between various studying variables.

vi) Design outline for every activity related to research.

**Two stage Design:**

Exploration is the first stage with limited objectives which clearly defines the research question and second stage is developing research design. Two stage designs help in budgeting the cost and efforts for research study.

1) **First Stage exploration achieves**-

i. Establishing the major dimensions of the research task.

ii. Define a set of subsidiary investigation questions that can be used as guideline to a detailed design.

iii. Develop several hypotheses about possible causes of a management dilemma.
2) **Second stage it is to prepare** -

i. Design of detailed study,
ii. Planning for conduct of data, and;
iii. Prepare analysis tables and interpretation of data.

### 5.4 Research Methodology

It is a way to systematically solve the research problem. It may be understood as a science of studying how research is done scientifically. The various steps that are generally adopted by a researcher in study his research problem along with the logic behind them. Researcher also needs to know which methods or techniques are relevant. He/she also needs to understand the assumption underlying various techniques, but they also need to know the criteria by which they can decide that certain techniques and procedures will be applicable to certain problems. It means the researcher has to design his own strategy and methodology, for his/her problem. The methodology may vary from problem to problem.

It has many dimensions and research methods do constitute a part of the research methodology. “When we talk of research methodology we not only talk of the research methods but also consider the logic behind the methods we use in the context of our research study and explain why we are using a particular method or technique and not using others so that research results are capable of being evaluated either by the researcher himself or by others.”

### 5.4.1 Descriptive Study:

Most of the social research comes under descriptive study. Descriptive research studies are those studies which are concerned with describing the characteristics of a particular individual or of a group. Examples which include studies concerned with specific prediction, with narration of facts and characteristics concerning individual, group or situation, whereas diagnostics research studies determine the frequency with which variables are associated. It is example of descriptive research studies.
In descriptive as well as diagnostics studies, the researcher must be able to define clearly, what he wants to measure and must find adequate methods for measuring it along with a clear cut definition of ‘population’ we want to study. Its aim is to obtain complete and accurate information of the problem, the procedure to be used must be carefully planned with the due concern for the economical completion of the research study. The design must be rigid and not flexible. Following steps are using descriptive research studies:

5.4.2 Steps are used in descriptive research:

1. Defining the objectives of the study.
2. Designing the method of data collection.
3. Finalising the samples.
4. Collection of data.
5. Processing and analyzing the data.
6. Findings and Conclusions.

Following Steps are used in descriptive survey research:

1. **Defining the objectives of the study** -
   In descriptive study the first step is to specify the objectives with sufficient precision to ensure that the data is relevant. In the following point 5.5.1 we specified the objectives of the research.

2. **Designing the method of data collection** -
   The data is to be obtained from different way. It means the techniques for collecting the information must be planned. There are several methods of data collection with their merits and limitations that are available for the purpose and researcher may use one or more of these methods. Whichever method is selected, questions must be well examined and be made unambiguous.

3. **Finalizing the sample** -
   In most of the descriptive studies the researcher takes out samples; before that if possible make the groups within the study. Then only wishes to make statements about the population on the basis of the sample analysis or analyses. In this study we are using purposive random sampling techniques.
4. **Collection of data** -

At the time of collecting data from various sources it should be examined for completeness, comprehensibility, consistency and reliability.

5. **Processing and analyzing the data** -

Then data collected must be processed and analysed. This includes the coding the questionnaire, sections and questions, observation etc., then tabulating data; performing several statistical computations such as percentage, valid percentage, cumulative percentage and Chi-Square, Z-test tests are used.

6. **Findings and Conclusions** -

The task of communicating the findings to others and the researcher must do it in an efficient manner. The layout of the findings needs to be well planned so that all things related to the research study may be well presented in simple and effective manner.

### 5.5 Research Topic

As researcher is familiar with “*Trends in Information Technology*” since last 10 years he has realized the importance of e-Governance. Then, he decided to do the research on “*A study of e-Governance in Higher education institutions in Maharashtra.*” The motto behind the topic e-Governance in going to be buzzword in next few decades and so researcher realized that higher education field is appropriate for implementing e-Governance and most of its stakeholders are highly literate, most of them are IT literate as well.

### 5.5.1 Objectives of the study

The Indian higher education system is on the threshold of change with the government introducing a slew of reforms to chalk out the roadmap for the 21st century. India’s continued economical success will depend on it providing educated and skilled labour with this. The government has announced an ambitious plan to bring about modernization in higher educational system.
Thus government has decided to use ICT and e-Governance in higher education system. The most important aim of implementation of e-Governance in India and specifically in Maharashtra is to improve the public service delivery to the common man at affordable cost.

e-Governance is mostly concerned to reorganise public administration in a way that the relationship between the government and the citizen will be more direct and participial. Provision of government and government allied services to the citizens and different organizations is considered as the important criteria for measuring development of the country. Use of ICT in public sector for automation of services to citizens has assigned priority in NeGP.

E-Governance projects are undertaken by a number of center and state level departments with the objective of enhancing their capacity to deliver services and minimize public grievances with improved living conditions.

Good governance delivers better result even if limited resources are available. It provides coordination with different bodies of higher education, timely completion of specific targets and due autonomy in various areas are needed to ensure effective performance of every educational institute. There are various aspects which related to the quality of higher educational institutions are as follows:

a) Visionary Leadership  
b) Good Administration  
c) Empowerment of Stakeholders  
d) Teaching Standards  
e) Adoption of latest Technologies  
f) Focus on Future Trends  
g) Attitude and working culture of working force  
h) Student Teacher Ratio  
i) Curricular Revisions with respect to the industry and market demand  
j) Social Responsibilities  
k) Eco-friendly Environment  
l) Adoption of PPP Model

These are the standards of global universities. The universities can be judged on the basis of each of the above cited criteria. Many universities/ Institutions in India still rely on the old and out dated governance system.
To achieve the above cited standards by using e-governance we have been studying the following are objectives of the study:

1. To study the extent of present application of e-Governance in Higher education Institutions in Maharashtra with special reference to professional colleges.
2. To study the effectiveness of e-Governance in Higher education for improving Transparency, Accountability and Quality.
3. To check whether Governing Bodies develop system for seamless transfer of information between offices dealing with public administration and the stakeholders of higher education system.
4. To take feedback from the stakeholders for better performance of e-Governance.
5. To identify the deficiencies in the use of e-Governance in Higher Education Institutions in Maharashtra.
6. To suggest the effective model of e-Governance for the development and effective management for educational facilities in Maharashtra.

5.5.2 Study of the hypotheses

A proposition is defined as a statement about concept that may be judged as true or false if it refers to observable phenomena. When proposition is formulated for empirical testing it is called hypothesis.

Hypothesis has also been described as statement in which we assign variables to cases. A case is defined in this sense as the entity or thing the hypothesis talks about. The variable is the characteristic or attribute that in the hypothesis is imputed to the case.

Normally, when one talks about hypothesis, one simply means a mere assumption or some supposition to be proved or disproved. Or it can be a single proposition or be made up of several propositions which will trigger a set of scientific experiment to prove right or wrong.

But for a researcher hypothesis is a formal question that he intended to resolve. Thus a hypothesis may be defined as a proposition or a set of proposition set forth as an explanation for the occurrence of some specific group of phenomena either asserted merely as a provisional conjecture to guide some investigation or accepted as highly probable in the light of established facts.
5.5.3 Hypotheses are set by the researcher for the research study

1. There is positive relationship between e-Governance & effective Management of higher education Institutions in Maharashtra.

2. E-Governance is playing a dominant role for balanced regional development of educational facilities in Maharashtra.

3. The development and empowerment of the stakeholder and use of e-Governance are directly related to each other.

5.6 Sample Design

It is process of obtaining information about the entire population by examining part of it. Sample studies are undertaken in practical life, consideration of time and cost almost invariably lead to a selection of respondents. When there is selection of only a few items, it saves time and money. The respondent selected should be as representative of the total population as possible in order to produce a miniature cross-section. So that, sample study is usually less expensive than a census study and produces results at relatively faster speed.

The selected respondent constitute what is technically called a ‘sample’ and the selection process is called ‘sampling technique’. The survey so conducted is known as ‘sample survey’. Algebraically, let the population size be $N$ and if a part of size $n$ (Which is $< N$) of this population is selected according to some rule for studying some characteristic of the population, the group consisting of these $n$ units is known as ‘sample’.

5.6.1 Steps in sample design

While doing the research, the researcher must pay attention to the following points:

1. Types of Universe:

If we consider world as a whole, world is divided into 7 (Seven) Continent. Continent is again divided into finite number of countries. Countries again divided into finite states. So, this study is concern. The researcher had selected the state of Maharashtra with in India which is the third largest country in the world. It comes under the Asia continent.
2. Sampling Unit

Now-a-Days Higher education in India is one of the hot topics for the discussions. Out of 29 states in India, we have selected Maharashtra is one of the economical and educationally developed state in India. The study will consider only the field of Higher Education Institutions in Maharashtra. The state is divided into six different geographical regions. There are 44 Universities geographically spread in these regions. By using purposive sampling, the researcher has selected 09 Universities with 10 sampling and 09 Institutions in different regions of the state. 20 students from each institute but reported 171 and 10 industries have been selected for the study but sample increased to 11.

3. Source List

It is ‘sampling frame’ from which sample is to be drawn. Source list should be comprehensive, correct, reliable, and appropriate. There are 44 universities with in all regions (i.e. Mumbai and Kankan, Pune, North Maharashtra, Marthwada and Vidharbha) of the state covered and different category of it. Number of Institutions runs under these Universities. There are many stakeholders of the higher educational Institutions. They are as follows:

   a) Governments department of education.
   b) Types of Universities.
   c) Few educational institutions.
   d) Large numbers of Colleges/Institutes’.
   e) Huge number of Faculties and Students.

4. Sampling Size

There are very few differences between the Universities in so far as governance is concerned, the study intends to consider a sample of 09 Universities and 09 Sansthas’ of Maharashtra and 180 students from these Universities will be considered for the study and 10 different kinds of Industries were selected. The period of the study is 2001 to 2012.
Following 9 Universities from different regions of the state were taken for the study:

1. Mumbai University, Mumbai. (Est. 1857)  
2. University of Pune, Pune. (Est. 1948)  
3. Maharashtra University of Health Sciences, Nashik. (Est. 1998)  
5. Sant Gadge Maharaj Amravati University, Amravati. (Est. 1983)  
6. Dr. B.R. Ambedkar Marathwada University, Aurangabad. (Est. 1958)  
7. North Maharashtra University, Jalgaon. (Est. 1990)  
8. Swami Ramanand Teerth Marathwada University, Nanded. (Est. 1994)  

Apart from these Universities, Sansthas / educational institutions were considered for the study.

Following 10 Established and old educational Sansthas’ (Institutions) were taken for the study:

1. Vivekanand Education Society, Mumabi. (Est. 1962)  
2. Navkakan Education Society, Chiplun. (Est. 1964)  
4. Maratha Vidya Prasharak Samaj, Nashik. (Est. 1914)  
5. Ghokale Education Society, Nashik. (Est. 1918)  
8. Shri Sharda Bhavan Education Society, Nanded. (Est. 1952)  
9. Khandesh Education Society, Jalgaon. (Est. 1944)  

20 Students from each institutions/sansthas have been selected for the study. Their selection will be made through purposive random sampling. Therefore their number is (20 X 9) 180.

5. Parameters of Interest

At the time of designing questionnaire we consider following most important pillars of the higher educational institutions. As we think they help lot for doing this study, they are as follows:

180 - Staff, Students and Principles of various Universities and Colleges.  
010 - Registrars and IT Nodal officers of Universities.  
009 - Chairman and Secretaries of reputed and well known Santhas /Institutions.  
010 - Industries / Businesses.  
020 - Randomly selected Colleges.
Various sampling units are based on the stakeholders’ categories. Their categories and number of samples are given in the following Table No 5.2.

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Category of Stakeholders</th>
<th>Proposed Sample</th>
<th>Actual Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Registrar or IT Nodal officers of Universities</td>
<td>09</td>
<td>11</td>
</tr>
<tr>
<td>02</td>
<td>Chairman or Secretary of educational Sansthas</td>
<td>09</td>
<td>09</td>
</tr>
<tr>
<td>03</td>
<td>Students, Faculties and Principals from 20 Institutions (120+47+03)</td>
<td>180</td>
<td>170</td>
</tr>
<tr>
<td>04</td>
<td>CEO or HR Manager of the industries</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>Total Samples</td>
<td>208</td>
<td>201</td>
</tr>
</tbody>
</table>

Pilot study has been conducted with the trail sample of 30 stakeholders for the research study.

6. **Budgetary constraints**

This topic is vast as geographical area is concerned. We have covered at most all regions of the state. All these strata (stakeholders) are spread in the radius of approximately 700km away from research center. So collecting data is very costly. We also tried by emails but response is pure.

7. **Sampling Procedure**

A sample design is a definite plan for obtaining a sample from a given population. Researcher must select/prepare a sample design which should be reliable and appropriate for his research study. Mainly two costs are involved in sampling analysis i.e. the cost of collecting the data and the cost of an incorrect inference resulting from data. But at the end we planned in better way for collection of data so cost will be controlled as well we never got any sampling error in our analysis.
5.7 Data Collection

The type of data-collection methods relevant to the quantitative approach are questionnaires, checklist, indexes and scales. A questionnaire has been defined by De Vos and Fouche (1998:89) as an instrument with open or closed questions or statements, to which a respondent must react. The method used by the researcher was a self-designed questionnaire consisting of seven sections and an existing scale consisting of around 66 subscales (See Appendix A to D). The questionnaires and the scales were handed out to the respondents to complete on their own but the researcher was available in case problems are experienced and encouraged the respondents to continue with the contribution. The objectives are given at the top of questionnaire so respondent should know the purpose of it.

Rubin and Babbies (1992:335) state that the mail survey is the typical method used in self-administered studies, but there are several other common method. Rubin and Babbie further state that in some cases it may be appropriate to administer the questionnaire to a group of respondents gather at the same place at the same time.

5.7.1 Source of Data:

The study is based on the survey of the stakeholders of the higher education Institutions. The data required for the research it was collected by two sources, primary and secondary sources.

A) Primary sources:

The primary sources are those which are useful to collect a fresh and the first time data from the stakeholders like Students, Faculties, and Registrar or IT Nodal officers of Universities, Chairman or Secretary of Sansthas and CEO or HR Managers of the Industries. There are several methods of collecting primary data, particularly in surveys and descriptive research. Some of these:

i) Questionnaire
ii) Observations
iii) Personal Interview
iv) Other Methods –
    a. Content Analysis
    b. Website Analysis
B) Secondary Sources:

e-Governance application is the International agenda for developing and developing countries now-a-days. Various International and National reports belong to e-governance and Higher education is used to get secondary data. Other resources of information’s are-

i) Newspapers and Magazines.
ii) University News.
iii) International Journals.
iv) Indian National e-Governance Plan.
v) Books on e-Governance and Higher Education in India.
vi) UGC Reports.

5.7.2 Development of a self-designed questionnaire:

This questionnaire, which is used as a quantitative data-collection instrument, firstly has the objective of collecting personal information and, secondly institution/ organizations information where they studying or working, thirdly awareness of ICT, fourthly the awareness of e-Governance, fifthly higher educational information and so on.

The main themes in the chapter on the literature review were captured and used in designing the questionnaire. The themes are as follows: Interpersonal relationship of stakeholders of higher education, Awareness of ICT and the functioning of e-Governance, Their perception on utilization of e-Governance and whether it is helpful for the effective management and development of educational facilities in higher educational institutions or not.

The data will be interpreted together with the SPSS results to draw up that the e-Governance is playing dominant role for balanced regional development of educational facilities in Maharashtra. And the development and empowerment of the stakeholder and use of e-Governance are directly related to each other or not.

The self-designed questionnaire comprises the following:
The questionnaire is prepared for different stakeholders into four groups:

a) University Registrar / BCUD Directors / Head of the IT Department.
b) Chairman / Secretary of the Institutions/ Sansthas.
c) Principal /Directors, Staff and Students of the Colleges.
d) CEO or HR Manager of Industry / Business.

For a copy of these questionnaires, (see Appendixes A).

Each of the above questionnaires is again divided into seven sections. The sections are as follows:

Section A: Personal Information
Section B: Information of Sanstha / Organization
Section C: ICT Awareness
Section D: Awareness of e-Governance
Section E: Higher Education Institution (HEI) information
Section F: e-Governance and HE in Maharashtra
Section G: User perceptions on e-Governance in HE
Section H: e-Governance Models

Each of the above section has been divided into number of questions:

Section A: 11 Questions A1 to A11
Section B: 12 Questions B1 to B12
Section C: 08 Questions C1 to C08
Section D: 06 Questions D1 to D06
Section E: 10 Questions E1 to E10
Section F: 09 Questions F1 to F09
Section G: 09 Questions G1 to G09
Section H: 02 Questions H1 to H02

There are 66 different questions are set for the above sections but all there are not included in each questionnaire as per the need and respondent position within the organization.
The self-designed questionnaire shown and approval has been taken from the guide. These measuring instruments aim to gather data to address the above mentioned objectives of the research.

In a structured questionnaire all responders have the same possible choices, all questions are presented to the respondents in the same order, instructions and expiations are fixed and there is no opportunity for the respondents to seek further clarification and this format can be used in both questions and interviews.

The researcher handed out questionnaires to the stakeholders being studied. Permission to conduct research at the various Universities, Sansthas, Institutions and Colleges was sought from various Management or administrators and they granted the permission to do so. (See Appendix E)

### 5.7.3 Study of University, Colleges and Sansthas Websites:

In order to know the features provided by Universities websites related to the e-Governance, what applications or services they provide to the students, citizens and employer. How do these entities communicate or utilize the information provided by these websites? And how are they beneficial with these services? etc. are study.

### 5.7.4 Study of presentation:

Ample presentations are available in the field of education. They may be prepared by International and National experts, Vice chancellors of the Universities, service provider agencies like MKCL, CISCO, TCS etc., Students, Department Heads, Professors and so on. But, very few presentations are available on e-Governance. All these presentation have very good information about e-Governance related to the higher education.
5.7.5 In-depth interviewing:

An interview method of collecting data involves presentation of oral-verbal motivation and reply in terms of oral-verbal responses. Such interviews are held to explore needs, desires and feeling of respondents. Interviews at various levels were planned to get information in their views on topic. As such, depth interviews require great skill on the part of the interviewer and at the same time involve considerable time. There are basically formal and informal interview, in our case we talk to the registrar or head of the IT Department, Secretary or Chairman of Institutions, and students of various faculties’ informal ways to get real information. It helps to give complete idea and picture of the topic. Meeting with officer level or department level helped to get operational issues of the e-Governance in higher education and problems faced by them.

5.7.6 Discussion with software development team:

Discussion with software development team provides insight of the e-Governance and m-Governance applications. To know Software development life cycle, success and failure of software and new application can be discussed.

5.7.7 Accessing relevant e-Governance web-sites:

e-Governance websites are developed by various entities’ like Government, Universities, Sansthas and colleges studied in details. Websites are used for similar applications for different Universities, Colleges, and Institutions; within and outside states. What services they provide to their stakeholders can be studied.

5.7.8 Field visits to e-Governance implementation sites:

Visiting few citizen centers where electronic services are offered real view of the e-Governance system. Now-a-days it’s also available in every higher educational institutions or cyber cafes from where students and citizens can avail all types of information.
Exploratory study was conducted by visiting at University website hosted places or Sansthas’ head offices. The purpose of exploratory study was to get a reasonable understanding of the system and to identify stakeholders’ with their roles in the system. Study topics objectives were short-listed separately as per needs of stakeholder of the higher educational system. Observations from visit and interviews were carefully studied and recorded.

**Outcome of exploratory study –**

i. Higher education systems entities / stakeholders were identified and documented which were used to define questions in the questionnaire for the fulfillment of objectives of the study.

ii. Stakeholders were identified for the higher education system for e-Governance application.

iii. Separate questionnaire for each stakeholder was prepared. Each questionnaire consists of with qualitative and quantitative questions.

iv. Sample size for data collection was decided.

v. Basis of above information actual survey was planned.

### 5.8 Data Analysis

After data collection, data was entered and analysed by simple descriptive analysis using Statistical Package for Social Scientists (SPSS) 11.00 Version software. The software was chosen because it is the most widely used package for analyzing survey data. The software has various advantages; it is user friendly, can easily be used to analyse multi-response questions, cross section and time series analysis and cross tabulation; and it can also be used alongside Microsoft Excel and Word. SPSS and MS-Excel packages were used to prepare analysis reports. For interpretation of the data on statistical platform, Chi-Square test and Percentage, Cumulative percentage techniques were applied. On these basis following types of tables were prepared.

**Tabulations and Interpretations:**

a) Frequency tables for all stakeholders with rank
b) Correlation tables
c) Cross tabulations across stakeholders to compare the response
d) Chi-square test report to know significant difference between two items
e) Frequency graphs generated
f) Comparison between attributes across stakeholders
On the basis of the study conclusions were derived and recommendations are made.

a) Existing facts as observations were derived.
b) Success factors were identified.
c) Replication issues were defined.
d) Recommendations were made.
e) e-Governance model for higher education was conceptualized.

5.9 Scope of the Study

The scope of the topic was restricted within the geographical area of Maharashtra. The period of the study was 2001 to 2012. In this study the researcher has studied 9 Universities, 9 Institutions, 180 Students and 10 Industries. But actual respondents were 201. Therefore, the scope of the study was restricted to Maharashtra for 2001 – 2012 and 201 respondents.

5.10 Limitation of the Study

The topic indicates wide geographic spread and internationally important therefore it is bound to have some limitation on research by an individual. Therefore the scope of the subject is restricted to selected sample size of respondents and their categories. If there is any change in location and sample size, result may or may not vary.

The state of Maharashtra, due to its wide geographically area, distribute in six different regions. Researcher had collected the primary data less or more from all these regions, all categories of universities and colleges including metropolitan, urban, semi-urban and rural area. Most of the higher educational institutions are in metropolitan and urban area less in rural area. e-Governance is the new concepts which are not much aware the rural and semi-urban students. They lack the knowledge of it. But they tried their level best to give the answers. Some of the respondents are working at very high rank; therefore time is the most important issue for them. Because of the secrecy full and detailed information was not given by the respondents though the researcher has tried his level best to collect detailed and real information.

5.11 Scaling Techniques

Measurement is relatively complex and demanding task, especially when it concerns qualitative or abstract phenomena. It is the process of assigning numbers to objects or
observations. The scales of measurement can be considered in terms of mathematical properties. For designing the different question for the present study the researcher uses various scales when strata are defined.

5.11.1 Scales used for data analysis

A topic generally creates a great deal of confusion in social and educational research in the case of type’s scale that we use in measuring behavior. In conclusive research, where we rely on quantitative techniques, the objective is to express in numeric terms the difference in responses. Therefore, a scale is used to represent the item being measured in the range of possibilities. The values assigned in the measuring process can then be manipulated according to certain mathematical rules. There are different scaling techniques that are used and these are shown in following Diagram No 5.1

**Diagram No 5.1**

Different Scaling Techniques

With comparative scaling, the items are directly compared with each other, while in No comparative scaling each item is scaled independently of the other.
a) Comparative scaling techniques –

i. **Paired comparison** - A respondent’s is presented with two items at a time and asked to select one. This is an ordinal level technique when a measurement model is not applied.

ii. **Rank ordering** – A respondent is presented with several items simultaneously and asked to rank them. (Ex – Rate from 1 to 4 the obstacles do you face in the implementation of e-Goveranance?) This is an ordinal level technique.

iii. **Constant sum** – A respondent’s is given a constant sum of money, script, credit, or points and asked to allocate these to various items. This is an ordinal scale.

b) Non-comparative scaling techniques –

i. **Continuous Rating Scales** *(Graphic rating scale)* – A respondent’s rate items is placing a mark on a line. The line is usually labeled at each end. There is sometimes a numbers of series, called scale points (Ex – From 0 to 50) under the line. Scoring and codification is difficult.

ii. **Itemized Rating Scales** - The respondents are provided with a scale that has a number or brief description associated with each category. The categories are ordered in terms of scale position; and the respondents are required to select the specified category that best describes the object being rated. The itemized rating scales are classified into *Likert, Semantic differential, and Stapel scales.*

   a. **Likert scale** – Respondents are asked to indicate the amount of agreement or disagreement (from *strongly agree to strongly disagree*) on a **five- to nine-point scale.** The same format is used for multiple questions. This categorical scaling procedure can easily be extended to a magnitude estimation procedure that uses the full scale of numbers rather than verbal categories.

   b. **Semantic differential scale** – Respondents are asked to rate on a 7 point scale an item on various attributes. Each attribute requires a scale with bipolar terminal labels.

   c. **Stapel scale** – This is a unipolar ten-point rating scale. It ranges from +5 to −5 and has no neutral zero point.
5.11.2 Scaling data type

The type of information collected can influence scale construction. Different types of information are measured in different ways. The most widely used classification of measurement scales are as follows:

- **a) Nominal Scale**
- **b) Ordinal Scale**
- **c) Interval Scale**
- **d) Ratio Scale**

**a) Nominal Scale** – A nominal scale as the name implies, is simply some placing of data into categories, without any order or structure. In research activities a YES/NO scale is nominal. It has no order and there is no distance between YES and NO. It could simply be called “labels”.

**Ex** – Basically refers categorically discrete data such as name of your school, type of car you drive or name of a book. Terms we are used for colors name.

![Example ofnominal scale](image)

The statistics which can be used with nominal scales are in the non-parametric group. The most likely one would be:

- a) Mode
- b) Cross tabulation – with chi-square

**b) Ordinal Scale** – An ordinal scale is next up the list in terms of power of measurement. The simplest ordinal scale is ranking. There is no objective distance between any two points on your subjective scale. An ordinal scale only lets you interpret gross order and not the relative positional distances. A likert scale is a type of ordinal scale.
**Ex** – Military rank, they have an order but no well defined numerical difference between ranks. The result of horse race, which says only which horses arrived first, second, or third but includes no information about race time.

The statistics which can be used with ordinal data would be use non-parametric statistics. These would include:

a) Median and Mode  
b) Rank order correlation  
c) Non-parametric analysis of variance

c) **Interval Scale** – The standard survey rating scale is an interval scale. It is assumed to have equidistant point between each of the scale elements. This means that we can interpret differences in the distance along the scale. We differentiate this to an ordinal scale where we can only talk about differences in order, not differences in the degree of order.

*Ex*-When we asked to rate your satisfaction with a piece of software on a 7 point scale, from Dissatisfied to Satisfied, you are using an interval scale.

Interval scales are also scales which can be defined by metrics such as logarithms. In these cases, distances are not equal but they are strictly definable based on the metric used.

The parametric statistics techniques which can be used with interval scale data are as follows:

a) Mean and standard deviation  
b) Correlation – r  
c) Regression  
d) Analysis of variance  
e) Factor Analysis
Apart from above we can use a whole range of advanced multivariate and modeling techniques.

Remember that you can use non-parametric techniques with interval and ratio data. But non-parametric techniques are less powerful than the parametric ones.

**d) Ratio scale** – It is the top level measurement and is not often available in social research. The factor which clearly defines a ratio scale is that it has a true/absolute zero point. The ratio scale possesses all the properties of the nominal, ordinal and interval scales.

*Ex- A ratio scale is the measurement of length.*

The parametric statistics techniques which can be used with ratio scale data are as follows:

a) Mean and standard deviation  
b) Correlation – r  
c) Regression  
d) Analysis of variance  
e) Factor Analysis  
f) Coefficient of variation or ratio

Apart from above we can use a whole range of advanced multivariate and modeling techniques.

**References:**

4. University news, September 2008, Indian Universities : Miles to Go Yet, pp9  